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THE IRON TRADE REVIEW

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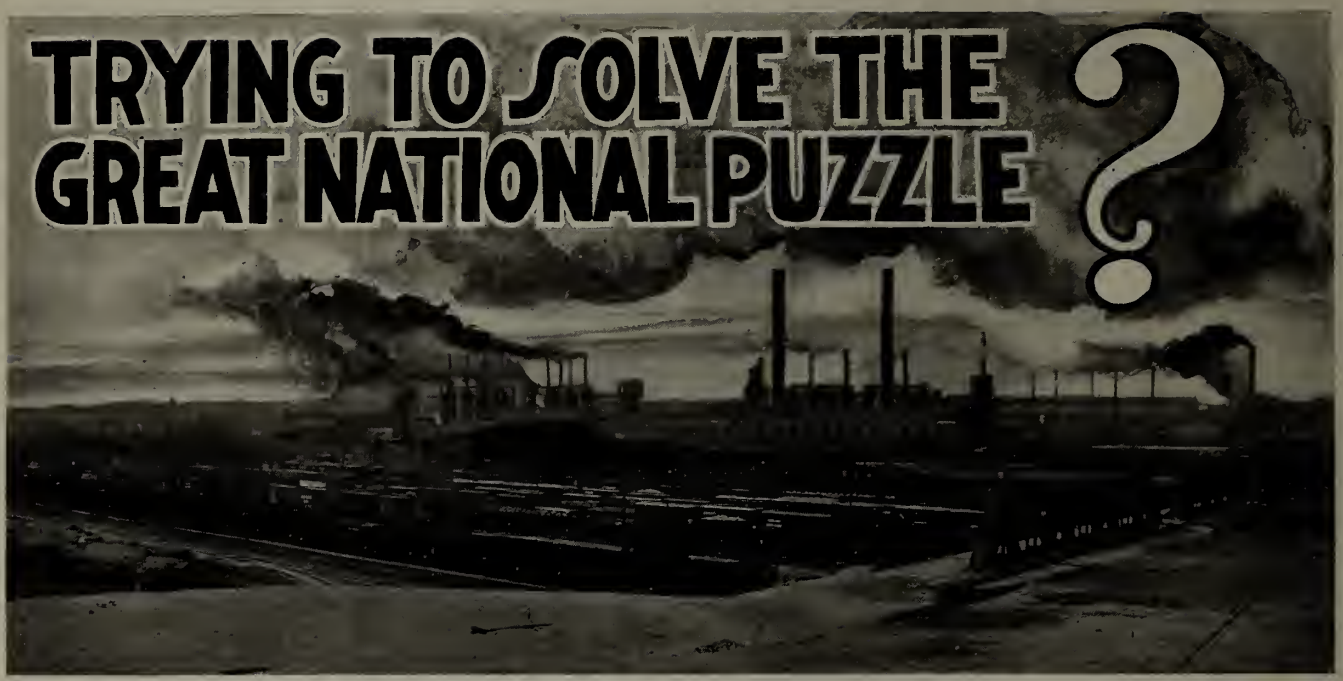
Iron and Steel Industry Meets Supreme Test

WASHINGTON has taken unto itself the scepter of the iron and steel industry. All the major movements affecting prices or distribution, management or production now have their root in the capital city. Tonnage and capacity count for little at this time in the determination of rank among the great producing centers of the industry. Each is doing its part loyally. The industry is acting as a unit, producing as a unit and is under control as a unit. National necessity has superseded all considerations of trade advantage. Competition has become that of patriotic service. In the cause of humanity and justice, the leading iron and steel industry of the world is pitting itself ingot for ingot and ton for ton against its greatest rival which has perverted its power.

Great responsibility and demands already have been placed upon the American iron and steel industry and its leaders. The response has been as creditable as the industry is great. What ultimate form this duty will attain in the coming year is not defined. That it will be tremendous in importance and magnitude there is little doubt. It is with high praise for the performances of the past as well as confidence for the future that Secretary of Navy Josephus Daniels says:

> "The response of the iron and steel industry as a whole to the call of the nation for increased production of steel, which is absolutely necessary to the successful prosecution of the war, has been gratifying to the navy department, whose requirements are and will continue to be a large factor in the growing demand. On the threshold of this New Year I desire to express my appreciation of the past efforts of the steel industry generally and my confidence that it can and will meet all the tonnage requirements which will be asked of it in 1918. Every mill must keep rolling and every man must do his part to bring about this result. Ships and munitions and more munitions and more ships will win the war. To supply this essential we must have steel and more steel and still more steel."

Modern war in all its complex phases when finally reduced, is a matter of industry, and iron and steel lie at its foundation. The United States is blessed in the possession not only of the capacity to produce the basic materials of peace or war, far exceeding any other nation, but also mechanically the means equally powerful to fashion it to the needs of battle. In the present struggle of giant forces, a nation of 43,000,000 tons is at grips with one of 18,000,000 tons. The relative potentialities are manifest. The weight of advantage is clear. The problem for this nation becomes one not of tonnage or man power but of organization and application. In the manner that the great executive and creative minds of America are able to measure up to their supreme test will the answer of peace and victory be framed.



Excess Profits Tax Bewilders Industry

BY GUY F. CREVELING

PRICE fixing has limited the profits possible to the iron and steel and allied industries. War taxes enacted are of equal interest to these industries, for they will determine the amount of these profits which will be retained by the various companies for distribution or investment in their businesses. As time passes and the steel trade has become fully accustomed to the fixed prices, the war taxation will loom more and more in importance. Not long ago business houses looked upon their taxes as a small amount of their expenses, but that time has passed, for years, if not forever. When this war is over the United States will have a national debt that by comparison will make the pre-war debt unworthy of the name. We have assumed a new place among the nations and the obligations of this position will not end with the war, but may call for continued large expenditures. It behooves all business men to consider seriously this new factor in their affairs, not merely with a view to making their returns by next March and their payments by next June, but with the broader thought of future years. Henceforth taxes must be reckoned as one of the most important elements in the cost of doing business. Of course, the imposition of heavy taxes will be accepted without complaint by business men as a necessary part of the immense price we are paying for world liberty, just as other emergency steps taken by the government have met with little opposition on the part of those affected.

A Muddled Situation

WHAT is invested capital? This is the burning question of business just now. Upon it depends the taxes that every manufacturer and business man will pay into the war chest, under the new national revenue law. No two minds agree as to the answer. Great confusion exists. The situation is a fine example of how legislation by compromise muddles. In this article Mr. Creveling tells why legislative revision is imperative and throws all available light upon the obscure points.

Act Anything But Scientific

But though the heavy taxes will be borne cheerfully, there is plenty of room for criticism of the unscientific composition of the so-called "scientific" war revenue act of Oct. 3, 1917. For ambiguities, inconsistencies and inequalities, the excess profits section of this act has seldom been equaled in all the checkered history of American legislation. It took congress six months to frame the law, but the act as it stands was devised in two weeks. Immediately after war was declared in April, the house ways and means committee began work on a war revenue bill. It first considered the excess profits tax plan of Great Britain, which levies 80 per cent on all profits above a normal pre-war average. But the house committee immediately dropped this plan, proposing to tax all earnings above 8 per cent on the capital invested at the rate of 16 per cent, regardless of whether the war had affected favorably or unfavorably earnings of the various businesses. This scheme met with much disapproval from business interests, because it accepted 8 per cent as a fair measure of what any company should earn. The house passed the bill in this form, however, whence it went to the finance committee, which rejected it as unsound. The senate committee held that the tax should be on war profits and proposed that war profits be determined by a comparison with the average earnings of the pre-war years 1911, 1912 and 1913. Under this plan the senate committee proposed to tax the war profits at rates running from 12 up to 50 per cent, according to the respective increases. After debating the bill in this form in the senate, about Sept. 1, the committee suddenly changed its intention and went back to the house plan of taxing all profits above a certain fixed rate on the capital actually invested, fixing the base rate at 10 per cent. About the middle of September the bill went into secret conference where important changes

were hastily made, then was passed by both houses and was signed Oct. 3. As a result, we have a tax law which is a composite of the house idea of taxing all profits, whether they are due to war or not, and the senate theory of a graduated scale of taxes. This act is a compromise between the conflicting house and senate theories, having none of the virtues of either and most of the faults of both.

The framers of the act apparently had in mind the United States Steel Corp., the Standard Oil Co., the Ford Motor Co., and a few other outstanding examples of big business in their calculations, for the law is drawn with little regard for its effects upon the great rank and file of tax payers, some of whom will suffer severely from a literal interpretation of the excess profits section. It is expected to raise $1,200,000,000 by excess profits taxing, out of the total of $2,866,020,000 which is estimated for all the new taxes.

The perplexing features of this section have set a-churning the gray matter of the country's wisest business heads. Corporation managements and lawyers, tax experts, public accountants, bankers and ordinary everyday business men have striven in vain to interpret this legislative puzzle whose elusiveness would have put the sphinx to shame. Most of them have seen flaws in the act but few have been able to tell just what would be their taxes for the year 1917, which, after all, was the real object of their study. The final interpretation of the act as it now stands rests with Daniel C. Roper, the commissioner of internal revenue, who has nicknamed the war revenue act "the Liberty tax", Mr. Roper has been organizing a vast administrative machine to bring into the United States treasury every penny that the law calls for as the old outgrown internal revenue bureau never would have sufficed for the job now on hand. Mr. Roper's decisions are subject to the approval of the treasury department.

The entire theory of the excess profits tax, as enacted, revolves about a single pivot-invested capital. But the definition of "invested capital" in the act is so vague and ambiguous that its meaning is impossible of certain interpretation. Possibly by the time this article is published Commissioner Roper will have issued a complete set of explanations and regulations; it is to be hoped such will be the case so that business men will be able to tell at the end of the year how much they have earned in order that they may adjust their accounts and issue the regular annual statement.

The new excess profits tax is intended to be levied upon income or profits derived from a trade or business. The latter term is all inclusive and is made specifically to include "professions and occupations". The term "occupations" includes salaried positions, with an exception, of course, in favor of federal, state and municipal employes. The tax is, in effect, a graduated levy on the excess of net income over specified graduated percentages of capital. The first of these percentages is what is called in the act "the deduction" and the first tax is 20 per cent of the excess of the net income over this deduction and up to 15 per cent of the invested capital. The deduction is either 7 or 9 per cent or an intermediate percentage of the "invested capital", according to the showing made as to percentage on pre-war capital earned in the pre-war years 1911, 1912 and 1913, inclusive. There is a special addition to this deduction of $3000 in the case of a corporation or of $6000 in the case of a partnership or individual. The remaining graduated tax percentages are based on the excess over the flat named percentages of invested capital without any addition of the $3000 and $6000, respectively.

Where a corporation, partnership or individual was not engaged in the

What is Invested Capital? Here's What the Tax Law Says

AS USED in this title "invested capital" does not include stocks, bonds (other than obligations of the United States), or other assets, the income from which is not subject to the tax imposed by this title, nor money or other property borrowed, and means, subject to the above limitations:

(a) In the case of a corporation or partnership:

(1) Actual cash paid in.

(2) The actual cash value of tangible property paid in other than cash, for stock or shares in such corporation or partnership, at the time of such payment (but in case such tangible property was paid in prior to Jan. 1, 1914, the actual cash value of such property as of Jan. 1, 1914, but in no case to exceed the par value of the original stock or shares specifically issued therefor).

(3) Paid in or earned surplus and undivided profits used or employed in the business, exclusive of undivided profits earned during the taxable year: Provided, that (a) the actual cash value of patents and copyrights paid in for stock or shares in such corporation or partnership, at the time of such payment, shall be included as invested capital, but not to exceed the par value of such stock or shares at the time of such payment, and (b) the good will, trade marks, trade brands, the franchise of a corporation or partnership, or other intangible property, shall be included as invested capital if the corporation or partnership made payment bona fide therefor specifically as such in cash or tangible property, the value of such good will, trade mark, trade brand, franchise or intangible property, not to exceed the actual cash or actual cash value of the tangible property paid therefor at the time of such payment; but good will, trade marks, trade brands, franchise of a corporation or partnership, or other intangible property, bona fide purchased, prior to March 3, 1917, for and with interests or shares in a partnership or for and with shares in the capital stock of a corporation (issued prior to March 3, 1917), in an amount not to exceed, on March 3, 1917, 20 per centum of the total interests or shares in the partnership or of the total shares of the capital stock of the corporation, shall be included in invested capital at a value not to exceed the actual cash value at the time of such purchase, and in case of issue of stock therefor not to exceed the par value of such stock;

(b) In the case of an individual.

(1) Actual cash paid into the trade or business.

(2) The actual cash value of tangible property paid into the trade or business, other than cash, at the time of such payment (but in case such tangible property was paid in prior to Jan. 1, 1914, the actual cash value of such property as of Jan. 1, 1914).

(3) The actual cash value of patents, copyrights, good will, trade marks, trade brands, franchises or other intangible property, paid into the trade or business, at the time of such payment, if payment was made therefor specifically as such in cash or tangible property, not to exceed the actual cash or actual cash value of the tangible property bona fide paid therefor at the time of such payment.

In the case of a foreign corporation or partnership, or of a nonresident alien individual the term "invested capital" means that proportion of the entire invested capital, as defined and limited in this title, which the net income from sources within the United States bears to the entire net income.

trade or business during the whole or any one of the pre-war years, income up to 8 per cent on the present invested capital is not taxed. The rate of pre-war income makes but little difference in any event in the amount of the tax, as the deduction is limited between 7 and 9 per cent and is used only in computing the war profits tax up to 15 per cent. This labored requirement of a comparison of net earnings and invested capital in the pre-war period with net earnings and invested capital in the taxable year, is ridiculous. To compute a possible difference of 2 per cent, a ponderous method has been provided, which has attracted more attention than it really deserved and has confused many business men, not only as to itself, but as to the whole law. This part of the act was the sop thrown out by those who favored taxing profits generally, to those who favored taxing only profits which had been increased by the war.

The graduations of the tax vary according to the per cent earned upon the capital invested as follows: On the first 15 per cent or less earned on the capital (less the exempted income and the $3000 or $6000 deduction) the tax is 20 per cent; on the next 5 per cent or less (profits 15 to 20 per cent) the tax is 25 per cent; on the next 5 per cent or less (profits 20 to 25 per cent) the tax is 35 per cent; on the next 8 per cent or less (profits 25 to 33 per cent) the tax is 45 per cent; and on the remaining income (all over 33 per cent) the tax is 60 per cent.

Representative Fordney, of Michigan, ranking Republican of the house ways and means committee, in order to demonstrate the workings of the excess profits tax and show the differences between the taxations on corporations, partnerships. and individuals, had an example of each incorporated in the *Congressional Record.* These examples assume the same capital and net income for all:

FOR CORPORATIONS

(a) Corporation with capital of $100,000 and net income of $50,000.

Deducting from net income 9 per cent of the capital, the maximum deduction, plus $3000, or total deduction of $12,000, shows the taxable income to be $38,000.

Tax on amount in excess of deduction and not over 15 per cent of capital —$3000 at 20 per cent	$600
Tax on amount of profit in excess of 15 per cent of capital and not over 20 per cent—$5000 at 25 per cent	1,250
Tax on amount in excess of 20 per cent of capital and not over 25 per cent—$5000 at 35 per cent	1,750
Tax on amount in excess of 25 per cent and not over 33 per cent of capital—$8000 at 45 per cent	3,600
Tax on amount in excess of 33 per cent of capital—$17,000 at 60 per cent	10,200
Total excess profits tax	$17,400
Net income	50,000
Excess profits tax	17,400
Net income subject to income tax—$32,600 at 6 per cent	1,956
Total tax	$19,356

FOR PARTNERSHIPS

(b) A partnership of three parties with a capital of $100,000 and net income of $50,000.

Deducting from net income 9 per cent of capital invested, plus $6000, or a total deduction of $15,000, shows the taxable income to be $35,000.

Tax on amount of income in excess of deduction and not over 15 per cent of capital	.....
Tax on amount of income in excess of 15 per cent but not over 20 per cent of capital—$5000 at 25 per cent	$1,250
Tax on amount of income in excess of 20 per cent but not over 25 per cent of capital—$500 at 35 per cent	1,750
Tax on amount of income in excess of 25 per cent but not over 33 per cent of capital—$8000 at 45 per cent	3,600
Tax on amount of income over 33 per cent of capital—$17,000 at 65 per cent	10,200
Total excess profits tax	$16,800
Net income	$50,000.00
Less excess profits tax	16,800.00
Income for distribution	33,200.00
Share for each partner	11,067.00

Income tax for each partner:

$9067 at 2 per cent	181.34
7067 at 2 per cent	141.34
2500 at 1 per cent	25.00
2500 at 2 per cent	50.00
1067 at 2 per cent	32.01
Total for each	429.69
Total for all three	1,289.07
Total tax	$18,089.07

FOR INDIVIDUALS

(c) Individual engaged in business with capital of $100,000 and net income of $50,000.

The excess profits tax would be the same as on a partnership, which is shown above to be $16,800.

Net income	$50,000
Deduct excess profits tax	16,800
Income subject to income tax	33,200

Income tax of individual on $33,200:

$31,200 at 2 per cent	$624
29,200 at 2 per cent	584
2,500 at 1 per cent	25
2,500 at 2 per cent	50
2,500 at 3 per cent	75
2,500 at 4 per cent	100
5,000 at 5 per cent	250
13,200 at 8 per cent	1,056
Total income tax	$2,764
Excess profits tax shown above	$16,800
Add total income tax	2,764
Total tax	$19,564

Apparently the deductions of 7 to 9 per cent plus $6000 or $3000, as the case may be, are to be made only in computing the taxable income up to 15 per cent. Thus, any business earning over 15 per cent is subject to the higher rates of taxes on the excesses even though its total net income may be less than the deductions specified. For example, in the case of a corporation with a capital of $20,000 and a net income of $4400, or 22 per cent, which earned 8 per cent in the pre-war period, the total deduction would be $4600 (8 per cent plus $3000), or $200 more than the total income. Yet the corporation would be taxed $390, as follows:

On $3000 (15 per cent) less $4600 At 20 per cent rate	$...
On $1000 (15-20 per cent) Taxed at 25 per cent	250
On $400 (20-22 per cent) Taxed at 35 per cent	140
	$390

There are many who believe that congress really intended to apply the scale of taxes to the income remaining after the deductions had been subtracted. Thus in the case of the $100,000 corporation instanced by Mr. Fordney, the taxation would have applied only to $38,000 of income, which would have made the total excess profits tax $12,600, instead of $17,400.

Invested Capital the Crux

The basis of the excess profits tax being the relation of net income to invested capital, the key to the tax thus is seen to rest in the definition of the term "invested capital". The definition of invested capital in the act is only the skeleton upon which will be built a complex structure of decisions, rulings and practice. As one authority says, "It supports and gives general form to that structure when completed but is just as impossible to forecast from examination of a new tax schedule, the exact things that will happen in ruling and practice as it is to determine from examination of a human skeleton whether the deceased had red hair, or blue eyes, or wore whiskers, or had corns, or liked ginger ale with his Scotch."

In just the same way, it depends upon the views of the commissioner of internal revenue and the treasury department what will be regarded as invested capital in the computing of excess profits taxes. An advisory commission of business men has been selected to aid the commissioner in arriving at a decision on this point. It is not clear just why congress should frame a measure which must immediately entail the formation of a commission to interpret.

Although we are not told what invested capital is, we are explicitly told some things which it is not. We know, for example, that it does not mean the whole amount of money or property employed in a business. A company which began with a paid-in

capital of $100,000 and which has a surplus of $25,000 and undivided profits carried into the taxable year of $5000, has an invested capital of $130,000. It may also have an outstanding bond issue of $50,000, and so has $180,000 actually employed in the business. But the law plainly states that borrowed money is not capital and cannot be used as such in computing the rate of net earning. Neither can such excess. This ruling is based on the definition of the terms "trade" or "business" previously mentioned. According to the report, the treasury department holds that the term "occupation" fits every salaried person except those specifically exempted, notably the members of congress who passed the law. The weakness of such a clause is evident.

In case a trade or business has no the act, it is subject, in addition to lower graduated taxes, to a tax of 60 per cent on everything in excess of $3300. If the treasury department rules the capital nominal the tax drops from 60 per cent to 8 per cent.

If the commissioner of internal revenue is unable in any case to determine satisfactorily the invested capital, the law provides that "the amount of the deduction shall be an

Government Taxes Levied Against a Sole Trader (Married)

Capital invested $150,000
Net profits for taxable year..... 100,000

				Tax law of Sept. 8, 1916, amended Oct. 3, '17	Excess-profit tax, Oct. 3, '17	Total tax
Net profits	$100,000					
Less exemptions	4,000					
Taxable profits	$96,000	Normal tax, Law 1916.....	2 per cent	$1,920		
Subject to additional tax....	$20,000	Additional tax, Law 1916.....	1 per cent	200		
	20,000	Additional tax, Law 1916.....	2 per cent	400		
	20,000	Additional tax, Law 1916.....	3 per cent	600		
	20,000	Additional tax, Law 1916.....	4 per cent	800		
					——	$3,920
Total	$80,000					
War income tax, 1917:						
Net profits	$100,000					
Exemption	2,000					
Taxable profits	$98,000	Normal tax, Law 1917.....	2 per cent	$1,960		
Subject to additional tax....	$2,500	Additional tax, Law 1917.....	1 per cent	25		
	2,500	Additional tax, Law 1917.....	2 per cent	50		
	2,500	Additional tax, Law 1917.....	3 per cent	75		
	2,500	Additional tax, Law 1917.....	4 per cent	100		
	5,000	Additional tax, Law 1917.....	5 per cent	250		
	20,000	Additional tax, Law 1917.....	7 per cent	1,400		
	20,000	Additional tax, Law 1917.....	10 per cent	2,000		
	20,000	Additional tax, Law 1917.....	14 per cent	2,800		
	20,000	Additional tax, Law 1917.....	18 per cent	3,600		
					——	12,260
Total	$95,000					
War excess-profit tax:						
Taxable profits	$3,000	Additional tax, Law 1917.....	20 per cent		$600	
Subject to additional tax....	7,500	Additional tax, Law 1917.....	25 per cent		1,875	
	7,500	Additional tax, Law 1917.....	35 per cent		2,625	
	12,000	Additional tax, Law 1917.....	45 per cent		5,400	
	50,500	Additional tax, Law 1917.....	60 per cent		30,300	
					——	40,800
Total	$80,500					
						$56,980

profits accumulated during the year and actually employed in the business be treated as invested capital. If new capital is invested during the year, the company will get the benefit of it, in determination of the rate of net earnings only for that part of the year elapsing after its investment. The invested capital is to be averaged monthly and the average for the year is used in computing the earnings rate.

According to reports of unofficial rulings of the treasury department, the law will compel all persons receiving a salary in excess of $6000 per annum to pay a tax of 8 per cent on invested capital, or only a nominal capital, the act provides for a tax of 8 per cent on the income of such business in excess of a deduction of $3000 in the case of a corporation and $6000 in the case of a partnership or individual. This brings up rather a nice point. Some firms have a moderate capital in money while their real capital is their brains, experience and organization. It will be up to the commissioner of internal revenue to decide whether or not their capital is nominal. The Blank Co. may have an invested capital of $10,000 and a net income of $20,000. According to amount equal to the same proportion of the net income of the trade or business received during the taxable year as the proportion which the average deduction, without including the $3000 or $6000 deduction, for the same calendar year of representative tax payers engaged in similar business, bears to the total net income of the trade or business received by such corporations, partnerships and individuals, plus in the case of a domestic corporation $3000 and in the case of a domestic partnership or a citizen or resident of the United States, $6000."

From the language of the act's def-

inition of invested capital it seems to have been the original intention of the framers to allow the full original investment value of property. However, as this would undoubtedly mean the valuation of properties acquired many years ago and would in most cases be impossible, the provision has been inserted that if the property were acquired prior to Jan. 1, 1914, it should be valued as of that date. No provision is made for the many changes in character of the original property occurring prior to that date nor for the frequent case where the original property has disappeared. The taxation committee of the Investment Bankers' association makes this comment:

"It is plainly impossible for the government to determine the valuation of tangible property acquired many years ago, and if it is to allow substitution of new properties for old, the result will be a determination of the actual 1914 values, which is just what the act does not apparently intend to allow. The original properties would, in the average case, be intermingled with the properties purchased for cash and would represent the investment of cash or undivided profits by way of replacement and improvements. If the act is to be enforced in its present form, the department and the courts will be, in a sense, compelled to find a 'way out' of this difficulty, probably by allowing as 'paid in or earned surplus and undivided profits' everything not otherwise credited that has gone into property and is in fact capital. This, we are inclined to think, is the most practical interpretation of the act.

"There are many other complications and difficulties affecting the inclusion or exclusion of patents, good will, etc. Throughout there is a combination of the two ideas of 'invested capital' and actual capital, which makes any responsible application of the definition illusive and in some cases almost impossible. Some of the effects of the law are all but incredible. The measure as a whole and in its present form represents the hurried and secret work of the conferees laboring under serious handicaps and is very far from representing the ability of the members of the house and senate committees responsible for it. Certainly many of its actual defects were never intended by any thinking member of congress whose wish it is to further the interests of the country at this time."

The committee proceeds to point out that a mercantile partnership of three members having an invested capital of $10,000 and a net income of $15,000—not an unusual situation in

Figuring the Steel Corporation's Taxes

By Standard Statistics Co., New York

		Average for years 1911-13
(1)	Actual cash paid in:	
	Cash surplus provided at organization	$25,000,000
(2)	Actual cash value of tangible property paid in at organization for stock of shares:	
	Valuations of tangible properties acquired at organization, as indicated in the report of the commissioner of corporations of the federal government on "The Steel Industry"	$682,000,000
	Appropriated for capital expenditures	215,494,424
(3)	Earned surplus of undivided profits used or employed in the business exclusive of undivided profits earned during the taxable year:	
	Profit and loss surplus	$119,850,200
	Total	$1,042,344,624
	Deduct funded debts—outstanding	634,188,222
	Estimated capital invested	$408,156,402

Estimated Capital Invested—Taxable Year

Cash surplus provided at organization	$25,000,000
Valuation of tangible properties acquired at organization, as indicated in the report of the commissioner of corporations of the federal government on "The Steel Industry"	682,000,000
Appropriated for capital expenditures	225,494,424
Profit and loss surplus (Dec. 31, '16)	356,360,913
Total	$1,288,855,337
Deduct:	
Funded debt outstanding Dec. 31, 1916	629,298,873
Estimated capital invested	$659,556,464

For purposes of demonstrating the effect of the law, let it be assumed that the basic figures for consideration in computing the taxes are as follows:

	Capital invested	Annual net income	Per cent earn. on capital
Taxable year (1917)	*$660,000,000	†$450,000,000	68.2
Average for pre-war period 1911-12 and 1913	408,156,402	63,585,777	15.6

*Estimated capital invested as of July 1, 1917.

†Estimated net income for year to end Dec. 31, 1917.

The average pre-war profit of $63,585,777 is 15.6 per cent of the $408,156,402 indicated average capital investment for the pre-war period, so that under the terms of the law a maximum of 9 per cent of the estimated capital invested in the taxable year may be deducted from the $450,000,000 estimated net income for the taxable year to determine war profits.

Accordingly the excess war profits taxable are computed on this basis:

Estimated net income for taxable year	$450,000,000
Deduct:	
9 per cent of $660,000,000 capital invested	59,400,000
Balance	$390,600,000
Special exemption to corporations	3,000
Taxable war profits	$390,597,000

The taxable war profits of $390,597,000 are subject to a graduated scale tax as hereinafter indicated:

		Taxes
20 per cent on (15 per cent of $660,000,000 capital invested, less an exemption of $59,403,000 as above determined)	$39,597,000	$7,919,400
25 per cent on amount between 15 and 20, or 5 per cent	33,000,000	8,250,000
35 per cent on amount between 20 and 25, or 5 per cent	33,000,000	11,550,000
45 per cent on amount between 25 and 33, or 8 per cent	52,800,000	23,760,000
60 per cent on balance	232,200,000	139,320,000
Total	$390,597,000	$190,799,400

According to the above computation the excess war profits tax is computed as $190,799,400, which deducted from the estimated net income for the year, $450,000,000, leaves a balance of $259,200,600, on which sum there is to be levied the normal income tax of 2 per cent and the war income tax of 4 per cent thus making additional taxes of 6 per cent amounting to $15,552,036.

Upon this basis of computation the estimated tax obligations of the United States Steel Corp. would be approximately $206,000,000. This result is based upon a continuance of profits during the fourth quarter at about the same rate as prevailed during the nine months ended Sept. 30, 1917.

any part of the country—is taxed $7,680, more than half the earned income of the members. On the other hand, there are many cases where the government would fail to get the anticipated tax. A concern with $10,000,000 paid in, say in 1905, whose capital has been reduced by losses to only $1,000,000, the stock of which has been bought in 1915 for $900,000, is taxed on a capital basis of $10,000,000 and has apparent immunity from the tax on income up to $700,000 a year.

Some people are of the opinion that corporations' balance sheets will be used to indicate their invested capital. Others believe that the prices of stocks on Jan. 1, 1914, will be taken to indicate the property values on the date. Still others believe a physical valuation of property will be necessary. The managements of most of the leading steel companies frankly admit they don't know what their taxes will be for 1917. But they are, as a rule, laying aside amounts which they hope will cover these charges. For example, the Republic Iron & Steel Co., for the nine months ending Sept. 30, 1917, earned net profits of $21,681,000, from which the reserve deducted for the new taxes was $8,636,000, or a little less than 40 per cent. The Pittsburgh Steel Co., for the fiscal year ended June 30, 1917, reported net operating profit of $9,663,938, and its war profits taxes were put at $1,823,540, or 18 per cent, although, of course, these taxes are on earnings of only six months. The Superior Steel Co., for the eight months ended Aug. 31, 1917, had a net income of $2,099,372, while the reserve for excess profits taxes was $577,947, or 27 per cent. The Carbon Steel Co. earned $2,244,745 net, of which it set aside $1,211,423 for federal income and excess profits taxes. The Lackawanna Steel Co., in its report for the first nine months made no provision for excess profits taxes, owing to the uncertainty of computing these. The United States Steel Corp. laid aside approximately $164,000,000 during the first nine months of 1917.

There have been a good many guesses as to what the Steel corporation will be assessed as excess profits taxes this year, some of which differed as much as $75,000,000; its allowances, however, for the first three quarters of 1917 lead to the belief that the corporation expects its tax will be about $240,000,000 for the entire year.

Several other taxes imposed by the war revenue act are worthy of attention, including the tax of 10 per cent on capital not invested in the business, unless invested in government securities, which provision is intended to stimulate purchases of Liberty bonds; tax on promissory notes; tax on drafts not payable at sight; tax on new issues of capital stock or transfers; tax on power of attorney and proxy, and various others. These taxes are couched in fairly explicit language, as is also the war income tax, which is in addition to the rates levied by the income tax law of 1916. It is interesting to note that the war revenue act, in connection with the flat 6 per cent rate on profits provided by the income taxes, indicates the following exemption:

"That in assessing income tax the net income embraced in the return shall also be credited with the amount of any excess profits tax imposed by act of congress and assessed for the same calendar or fiscal year upon the taxpayer and, in the case of a member of a partnership, with his proportionate share of such excess profits tax imposed upon the partnership."

Taxes May Have Been Spent

How the new tax would work injustice in some cases is indicated by a table worked out by William H. Dennis, certified public accountant, 37 Nassau street, New York. This table is published herewith, showing that a sole trader with an invested capital of $150,000 would have to pay a tax of $56,980 on profits of $100,000.

This absurd legislation could not be better designed if drawn purposely with a view to destroying business and cutting down production. It includes a series of paragraphs and sections which do not mean what they say and say any number of things they do not mean and are capable of scores of different constructions. One able lawyer says upwards of 100 decisions will be necessary before the excess profits section can be straightened out. The board of excess profits advisors must attack the confusion centering about invested capital and pass along its conclusions to the secretary of the treasury, who in turn must issue instructions to the collectors, who will use their judgment in individual cases. It is inevitable that a great many injustices and inequalities will be the result.

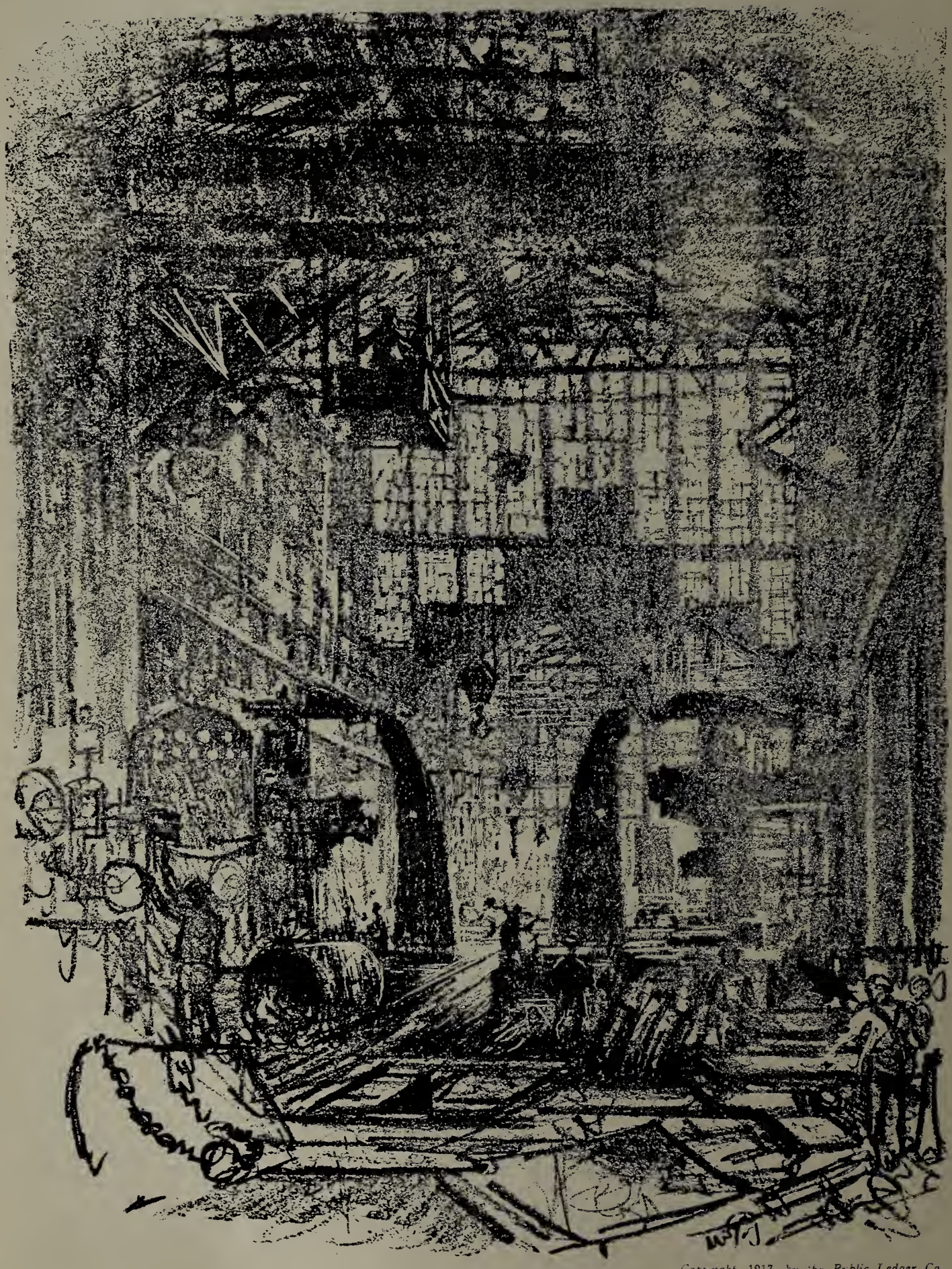
There is only one way out of such a muddle, one safe and sane solution to the puzzle. This is the repeal of the law, and the passage of a new one framed by experts on sound economic lines. Congress is now in session and perhaps by the time these lines are printed will have taken such action. If not, it is the duty of every business man to himself bring such pressure and influence as he can to bear to persuade congress to provide a new war revenue act.

None Will Be Allowed to Escape Tax

NO general tax in the history of this or any other country will be administered with more organized care and effort than the war revenue measure, according to Daniel C. Roper, United States commissioner of internal revenue, who will direct its collection. The field force of the revenue bureau is to be greatly expanded for this purpose. Schools of instruction are to be held in every collection district; and revenue officials are to be sent into every county in the United States to render advice and help taxpayers to make out their returns. Every means will be utilized to inform taxpayers as to the amount for which they are liable and how, when and where payments should be made. A board of nine leading business men has received and studied the views of general business on the excess profits clause and will render advice to the government along this line.



DANIEL C. ROPER



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"THE RIVETERS," A DRAWING BY JOSEPH PENNELL

Will There Be Enough Ship Steel?

A Study of the Fabricated Ship Problem From the Steel Manufacturer's Standpoint —What the Shipbuilding Program Means When Translated Into Rolling Mill Schedules

BY E. C. KREUTZBERG

A PROMINENT steel fabricator has stated that whereas in England modern building and structural operations were developed largely through experience gained in shipbuilding, this order has been exactly reversed in this country. Here standardized shipbuilding methods are being evolved through the instrumentality of the craftsmanship which years ago elevated bridge and structural fabricating to the level of a fine art. For years dreamed of by a few engineers whom old-line shipbuilders were inclined to look upon as visionaries, the standardized ship is the child of a dire emergency which it was impossible to meet by ordinary methods. As long as the United States remained a neutral observer of the war, stimulation of shipbuilding in this country was entirely a matter of private initiative. With our entrance into the war, the shipbuilding industry at once became one of the country's principal offensive and defensive arms, since it was clear that without an abundance of ships, we could transport neither troops nor supplies. As a result of this vital need, shipbuilding methods are being revolutionized. In fact, this industry, under the urge of war, is undergoing progress almost over night which it undoubtedly would have required many years of prewar conditions to develop.

What the Average Man Sees

Of the tremendous shipbuilding activity now vibrant throughout the country, participated in by hundreds of industries and thousands of workers, the average man sees only what is visible on the surface. Of the records which are broken daily in the construction of the vessels, and in the production of the materials entering into their construction, he has only a hazy idea. For instance, on Dec. 4, the Federal Shipbuilding Corp. laid its fifth keel at its yard near Newark, N. J., on a site which only some two months before, had been unoccupied meadow land. On Nov. 21, this company riveted into its initial hull the first plate rolled by the new Liberty mill of the Carnegie Steel Co. at the Homestead works, Pittsburgh. The Liberty mill, incidentally, is typical of the almost superhuman efforts the steel industry is making in its endeavor to sustain the shipbuilding program. When the construction of this mill was authorized on April 17, no pencil had been put to paper in making preliminary estimates or designs and no parts or supplementary machinery were available. By the employment of steam shovels for practically all excavating work; by the use of special trains for transporting parts which required attention at other plants, and through the patriotism of skilled workmen and office men who voluntarily gave up their Saturday half holidays, their Sundays and their evenings to do work which the scarcity of common labor otherwise would have greatly delayed, it was possible to rush the mill to completion in record time. In fact, it began actual production of plates for the government on Oct. 17.

The decision to carry out by far the major portion of our shipbuilding program in steel, meant not only the stimulation of every branch of the steel industry whose service is essential in this work, but the decision itself was made possible by the existing capacity and efficiency of the industry as a whole. That the steel industry's production will keep well in advance of shipbuilding requirements, appears certain.

For instance, a standard cargo carrier, 9000 tons deadweight, such as is being constructed by the Chester Shipbuilding Co., and the Merchant Shipbuilding Corp., requires 2123 net tons of plates, 771 tons of shapes and 93 tons of bars and miscellaneous steel, making a total of 2987 tons; in addition, some 145 tons of rivets are required. A 9400-ton deadweight vessel, of the type which is being built by the Federal Shipbuilding Corp., requires 2060 tons of plates, 900 tons of shapes and 22 tons of bars and miscellaneous steel, making a total of 2982 tons; in addition 143 tons of rivets are required. For a 5000-ton vessel, some 1700 tons of steel, not including the rivets, are required, with plates, shapes and bars in approximately the same ratio as for the larger vessels. As shown by these figures, the net tonnage of steel required per vessel, depending on the type, varies from 31 to 34 per cent of the figure representing the deadweight tonnage, the percentage increasing inversely as the size of the boat. For each deadweight ton of standardized steel shipping, therefore, approximately 687 pounds, or 0.3435 ton of steel are required, of which 65 to 68 per cent are plates, 24 to 29 per cent shapes, 3 per cent or less bars and miscellaneous steel, and 4 to 5 per cent rivets.

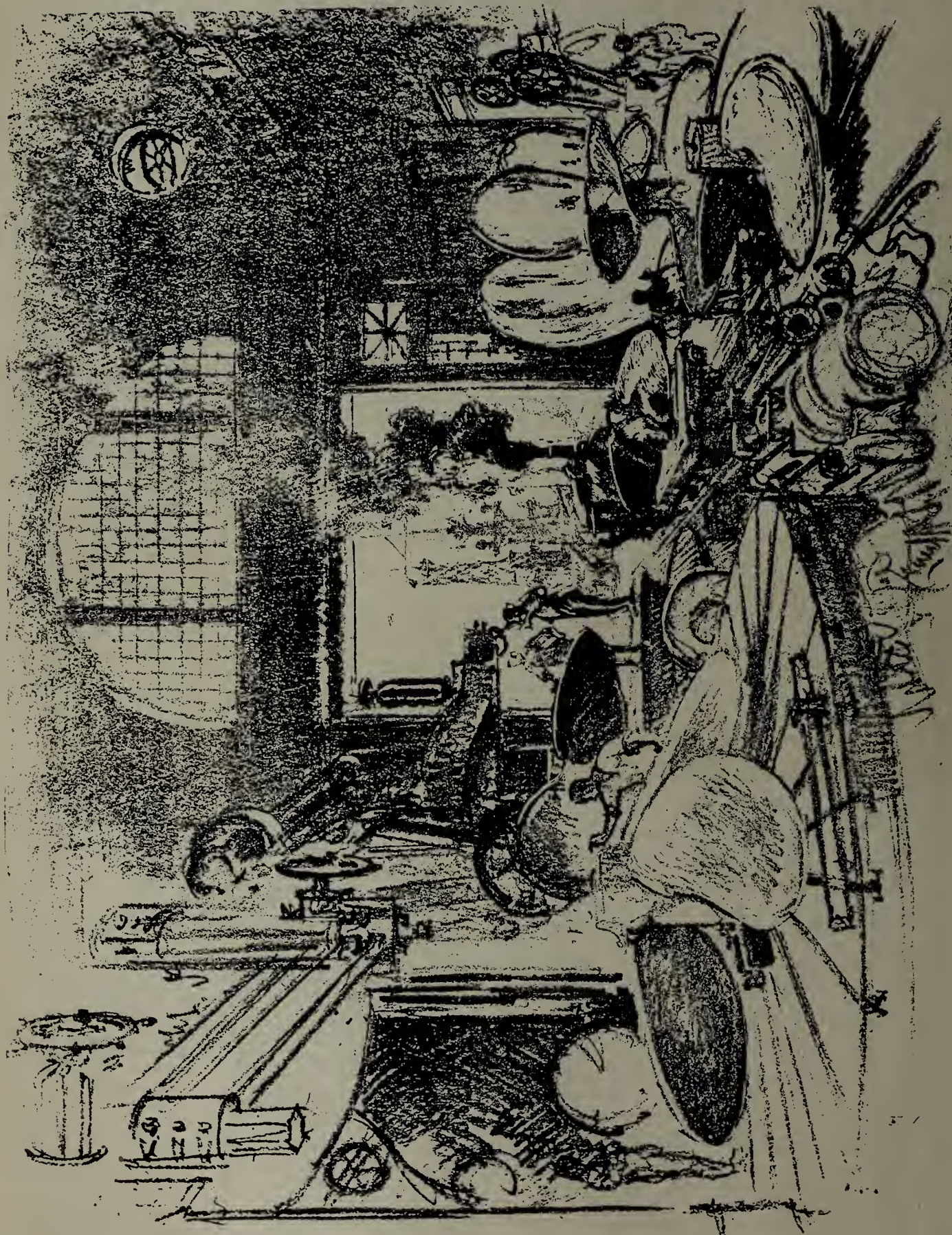
Huge Tonnage by March

Composite vessels, neglecting the rivets, bars, and miscellaneous steel, may be estimated as requiring per deadweight ton, 0.2246 tons of steel, of which 61 per cent are shapes and the remainder plates.

It is stated by authorities who have carefully analyzed the possibilities that by next March steel shipbuilding will have developed to a point which will permit of the launching of 240,000 to 250,000 deadweight tons per month. It will not be until the fourth quarter of 1918 that our capacity will have increased to the rate of 6,000,000 tons annually. Launchings of new steel vessels during 1918, it now is calculated, will not be in excess of 3,400,000 deadweight tons. In addition to the steel

Ships to Win the War

LLOYD GEORGE says, "Ships will win the war." Ships to win the war are now being turned out in almost every port all around the coast from Maine to Washington, while on the Great Lakes one concern alone has contracts for 70 canal-size steamers for 1918 delivery. This tremendous program means much to the American steel industry. Will there be steel enough to go around? In this article Mr. Kreutzberg answers, "yes" emphatically, and tells you why. The American steel industry can carry the burden of war in ships, as well as in guns, munitions and countless other directions.



"MAKING PROPELLER BLADES," A DRAWING BY JOSEPH PENNELL

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vessels, it is likely that at least 150,000 deadweight tons of composite ships will be launched during 1918. It is on these figures that calculations of the amount of steel to be required in 1918 in carrying out the shipbuilding program must be based. For the steel vessels, approximately 1,168,000 net tons of steel will be required. For the composite vessels, approximately 33,700 tons of steel will be required. The total, therefore, is 1,201,700 tons, of which about 778,000 tons are plates and 330,000 tons shapes.

In sheared and universal plates in dimensions which are suitable for shipbuilding, the country's capacity now is at the rate of 2,800,000 to 3,000,000 tons, and it conservatively may be estimated by reason of new plate mills which are under construction, that by the fourth quarter of 1918, the capacity of such plates will be between 3,500,000 and 3,600,000 tons. After deducting 778,000 tons as representing the requirements for our merchant shipbuilding program during 1918, at least 2,400,000 tons of such plates will be left out of the 1918 production to take care of other demand. Large quantities will be required for various military requirements of the United States, such as the construction of cars, locomotives, tanks, trench bombs, etc., and it is likely that our active allies will endeavor to secure at least 1,000,000 tons of ship plates here during 1918. Therefore, while the fulfillment of the shipbuilding program will require a much smaller percentage of the output than has been expected, war requirements generally, according to well informed estimates, will account for fully 75 per cent of the output of plates suitable for shipbuilding. Incidentally, the plate output which reasonably can be expected during the next twelve months, would be sufficient, were it devoted exclusively to shipbuilding, for the creation of more than 14,000,000 deadweight tons.

Three Kinds of Shipbuilders

Standardized and fabricated are entirely synonymous terms when applied to the majority of vessels now being built for the government. The essential feature of standardization is the adoption of designs which eliminate curves wherever possible, thus enabling fabricating shops to furnish the larger portion of the hull steel. The ideal condition in standardization is found where shipyards, like the American International Shipbuilding Corp. and the Submarine Boat Corp. devote themselves entirely to assembling fabricated steel into complete vessels. So far this state of advancement has not entirely passed the period of organization. Shipyards in this country now fall into three clearly defined groups. The first includes established shipbuilding plants which have their own facilities for completely fabricating the plates and shapes needed. These plants are dependent on the steel industry only for plain material as it comes from the mills. The second group includes yards such as those of the Chester Shipbuilding Co., the Federal Shipbuilding Corp., the Merchant Shipbuilding Corp. and the Newburgh Shipyards, which have their own facilities for fabricating the bow and stern sections and other parts which have to be warped or where the opening or closing of angles is necessary. These yards rely on outside fabricating plants for other fabricating work, which constitutes all the way up to 88 per cent of the steel required for the vessels they are building. The third group of shipbuilders, already alluded to, embraces purely assembling organizations depending on outside shops for all of the steel required.

At least some or all of the fabricators who furnish material to the third group must be provided with all of the equipment necessary for handling this steel. The tools that are required include single and multiple punches, plate planers, shears, beveling shears, scarfing machines, drilling, reaming and countersinking apparatus, while for curved work, bending rolls and presses, and bending slabs for bending the flanges of channels and angles. Also for bending plates for the bow and stern, presses for bending shapes, special heating furnaces, etc., are needed. Only a few of the best equipped shops so far have undertaken the curved work.

The principal tool employed in fabricating ship steel, in fact, the tool which old-line shipbuilders regarded as practically valueless for their work, but which has proved a major factor in making the present speeding-up process possible, is the multiple punch. An idea of the punching which is necessary is conveyed in a recent statement by Homer L. Ferguson that a 7500-ton fabricated ship requires about 650,000 rivets, which means at least 1,300,000 holes for rivets alone. The multiple punch



Photograph by International Film Service

LAYING THE KEEL FOR A STANDARDIZED STEEL SHIP

does in a moment what would require minutes with the single punch. By adapting the spacing of holes to the same multiple, the punch spindles can be set permanently and after that it simply is a matter of constant repetition of the same operation. When the holes are too close together to be punched at one stroke, the spacing is arranged so that an additional stroke will suffice.

The difficulties encountered in the construction of the fabricated vessels result almost entirely from the lack of familiarity with such work which is prevalent outside of shipbuilding establishments. It is contended that any shop which can fabricate bridge and structural steel can concentrate its activities on the fabrication of ship steel. This contention appears to be well founded, since fabricating shops which only a few weeks ago accepted contracts for ship work with a good deal of apprehension are finding it to be less difficult than they anticipated. The extent to which fabricators may participate in shipbuilding is shown by the fact that in some cases they have even their own mold lofts for laying out hulls completely or in parts, in order to make their own drawings and templates. The present bridge and structural shop capacity of this country is rated at 180,000 tons per month, or 2,160,000 tons per year. This figure is equivalent roughly to some 6,288,000 deadweight tons of shipping. Considering the steel which will be fabricated at the self-contained and partly self-contained shipyards, the fabricators will probably have a comparatively easy time of it.

In brief, the great iron and steel industry of the United States is already organized and equipped to meet any demands our war shipbuilding program may require.

A contract has been awarded by the government to the Wolverine Brass Works, Grand Rapids, Mich., for $400,000 worth of brass airplane parts.

Employes Have Mutual Insurance Society

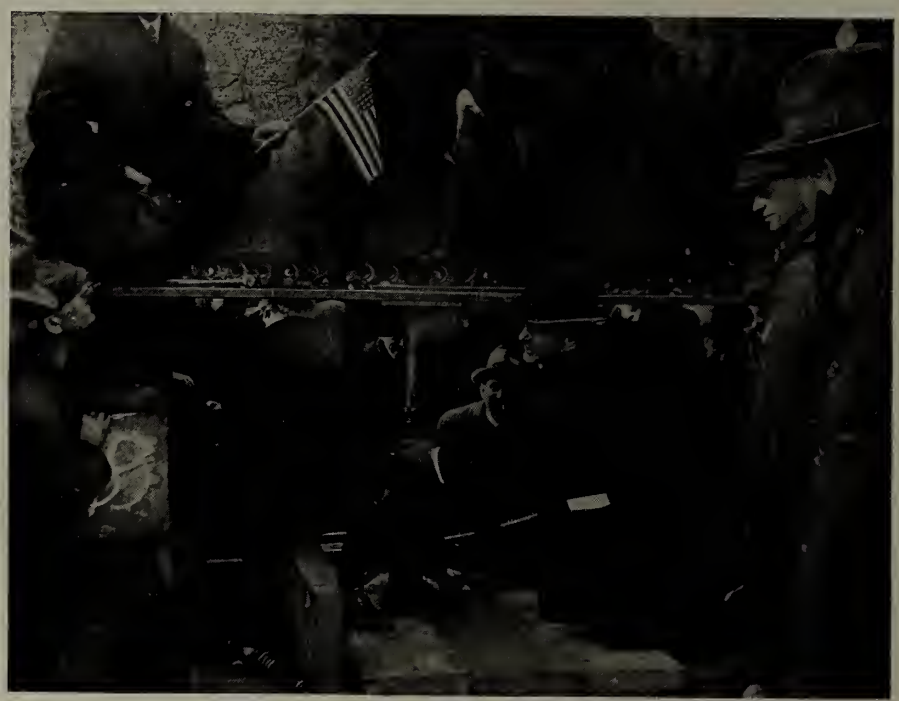
The General Electric Co. at its several plants has encouraged a system of mutual insurance at small cost to employes. Briefly stated, the protection consists of a death benefit and a weekly indemnity while sick or disabled. The death benefit paid out of the treasury of the mutual benefit association is $100, but the General Electric Co. supplements this by another payment of $100, thus making the death benefit $200. This is payable at once in cash to the beneficiary of the deceased member.

The weekly disability payment in case of sickness is $6 per week for men and $5 per week for women. Payment is continued for 14 weeks, during any 12 consecutive months. In all periods of disability members are excused from paying dues. A visiting committee is formed in each case to call upon the sick member and in many cases the company's nurse calls upon the patient.

The cost of this triple protection against death, sickness and accident varies from nothing a year in some sections, up to a maximum of $5.20 per year. The cost per member averaged $4.07 at Lynn in 1916; and the average at Schenectady was but $3.97 in 1917.

Membership begins with the payment of an initiation fee of 50 cents and the first week's dues of 10 cents. Thereafter, 10 cents is payable and collected every week in advance and no member can be obliged to make any further contribution. This payment is suspended altogether for shorter or longer periods when the section treasury shows a balance of $300 or more.

These dues or premiums are payable to collectors chosen from the membership of the association, and it is obvious that the insurance for this reason may be provided at a rate which would be without profit to an outside corporaton. In addition to the dues from members, the association has other small sources of income, principally the annual field days. The receipts from these field days are turned into the treasury of the mutual benefit association. Dances are held from time to time and other entertainments, more or less impromptu in their nature, assist in swelling the treasury fund and in reducing the dues paid by the members. These events meet with hearty response from the members. The total of death and sick benefits in the various factories of the General Electric Co. approximate $100,000 per year. The amount of life insurance carried by all these associations is over $4.500,000.



Photograph by International Film Service

DRIVING THE FIRST RIVET IN A STANDARDIZED STEEL CARGO CARRIER

Utah Ore Deposits

The United States geological survey, department of the interior, has on hand a few copies of the professional paper 80, on the geology and ore deposits of the San Francisco and adjacent districts, Utah.

The valuable minerals in the San Francisco and adjacent districts are described and illustrated, and their nature, origin, and commercial importance are fully discussed. The Rollins mine, the first mine opened in Utah, was in the San Francisco district. This mine produced a few tons of lead bullion, but the discovery of the Horn Silver mine in 1875 brought the San Francisco district into prominence and resulted in the extension of the Utah Southern railroad. Beaver county, in which the San Francisco district lies, produced from 1860 to 1916 gold, silver, copper, lead, and zinc valued at $47,211,876. About 70 per cent of this amount represented ore mined in the San Francisco district.

Washington Bossing Steel Industry

Sweeping Control of Sale and Distribution of Mill and Furnace Products Now Exercised by Government as War Measure Brings Nation-Wide Adjustment of Manufacturing Enterprise and Other Fundamental Changes

BY C. J. STARK

"NOTHING to do." This phrase could be framed and hung appropriately in hundreds of sales offices in the iron and steel industry just now. Applied literally to the full round of office routine with its hundred and one details, it is, of course, a mere figure of speech. If anything, the troubles of the sales department over delays in deliveries, errors of shipments, complaints over quality, specifications, etc., all of which are symptoms of an extraordinary condition of business, have been compounded. But it does fitly describe the state of affairs in the booking of and the competition for new orders which is grist for the sales office and without which the latter is as functionless as the mill wheel with no water to turn it.

All this means that the government is in the saddle in the iron and steel business, completely and absolutely; that the law of supply and demand for the present is nonexistant; and that the distribution of mill and furnace products is proceeding along strange lines. The seat of authority in the industry no longer resides at plant headquarters in Pittsburgh or Chicago, South Bethlehem or Birmingham, but finally in Washington. The capital city, without a pound of iron and steel being made within its corporate limits, has become the chief city of the nation in the iron and steel business.

Market in New Era

This new market era in the iron and steel industry was inaugurated Sept. 24, 1917. On that date President Wilson announced his official approval of an agreement between the war industries board and representative iron and steel manufacturers whereby the government, its allies, and the general public were to be supplied at a greatly reduced level of prices. The new schedule was made subject to revision Jan. 1. Compared with the open market that had prevailed the fixed maximum prices represented a drastic piece of economic surgery. Tank plates had been selling up to $240 per ton; they were now to be furnished at $65 a ton. Structural shapes were cut from $90 to $60 per ton; steel bars from $90 to $58; coke from $12 to $14 in the spot market to $6 and $7, ovens; and pig iron was dropped from $55 and $60 to $33 and $33.60, furnace.

The President's announcement made it manifest that the whole market structure of iron and steel was about to be rebuilt from the ground up to specifications dictated by the law of necessity, not of economics; and that every primary, intermediary and finished product of the industry was to be brought in line with the arbitrary base levels fixed on raw and leading mill materials. Overshadowed by such a program, without precedent and of far-reaching possibilities, the iron and steel market did the expected thing when the significance of the President's statement was grasped quickly by the trade. It simply stopped. Material offered for sale was withdrawn. Buyers, who a few days before had been willing to pay almost any figure to obtain tonnage, nullified their inquiries as fast as the telegraph and telephone could perform their parts. Confusion and uncertainty generally prevailed. Then, after a few days, the market began gradually to square itself with the new conditions.

Regulation More Than Price Fixing

As the market struggled to reestablish itself, the mills and furnaces found that government regulation meant much more than the mere fixing of maximum selling prices. Not only did the federal authorities aim to limit the line of price beyond which sales were to be discountenanced, but to a great extent they prescribed the channels that distribution should take.

Inseparably linked with the price fixing program of the government, has been the establishment of a general system of priority in the satisfaction of requirements. In substance this determines the order and the extent to which each buyer shall obtain manufacturing material in accordance with the importance of his product as a necessity of a war period. All demands have been divided into three chief classes, A, B and C. All A material pertains to direct war needs of the government and its allies, B material to indirect war needs, and

Fixed Price Schedule

PIG IRON

At Furnace

No. 2 foundry	$33.00
Basic	33.00
Bessemer	36.30
Malleable	33.50
Gray forge	32.00
Standard low phosphorus	53.00
Copper low phosphorus	50.00
Northern charcoal	35.50
Southern charcoal	43.00
Silveries, 8 per cent	46.00
Bessemer ferrosilicon, 9 per cent	51.70

OLD MATERIAL

Delivered to Consumer

Heavy melting steel	$30.00
No. 1 railroad wrought	35.00
Cast borings	20.00
Machine shop turnings	20.00

SEMIFINISHED PRODUCTS

Pittsburgh and Youngstown

Rerolling billets	$47.50
Forging billets	60.00
Sheet bars	51.00
Slabs	50.00
No. 5 wire rods	57.00
Grooved skelp	2.90c
Universal skelp	3.15c
Sheared skelp	3.25c

FINISHED STEEL PRODUCTS

Per pound, base, Pittsburgh

Steel plates	3.25c
Structural shapes	3.00c
Steel bars	2.90c
Iron bars, mill	3.50c
Galvanized sheets, No. 28	6.25c
Blue annealed sheets, No. 10	4.25c
Black sheets, No. 28	5.00c
Plain wire, 100 pounds	$3.25
Wire nails, 100 pounds	3.50
Painted barb wire, 100 pounds	3.65

COKE

At Ovens

Standard furnace	$6.00
Standard foundry	7.00
Beehive crushed	7.30
By-product	base plus freight from nearest beehive oven to producer's plant.
By-product crushed, base	6.50

IRON ORE

Lower Lake Ports

Mesabi nonbessemer, 51½ per cent	$5.05

WAREHOUSE PRODUCTS

Mill base plus freight to warehouse plus $20 per ton on bars, structural shapes, plates, blue annealed sheets No. 16 and heavier, and billets.

Mill base plus freight to warehouse plus $25 per ton on one pass cold-rolled sheets, No. 18 and lighter, galvanized sheets and cold-rolled shafting.

C material to all other uses. The A and B classes are subdivided in the order of their importance as essentials of war. Licenses are issued by the priorities committee of the war industries board for the A and B requirements to signify their rank and to speed their fulfillment over other orders. No licenses are issued for Class C shipments. The effect of this differentiation of requirements is that after A and B needs have been satisfied the remainder goes to the filling of C business or that of a nonwar character. Priorities of transportation have further cleared the path for the swiftest possible execution of vital business. The use of iron and steel products for certain general classes of work was specifically forbidden by the order issued by the priorities committee under date of Oct. 27. In its main features the priority system has been borrowed from Great Britain, where a similar method of distribution has been in effect for many months.

Priority is Fundamental Idea

Examination of the full plan of federal regulation shows that control of priority represents the fundamental idea upon which the whole system is founded; and that the fixing of prices stands as a necessary complement to the latter. Observation of the results of the several months of application of the system to the iron and steel industry confirms this conclusion.

Today the iron and steel industry completely is yielding to federal authority. It must be emphasized, however, that this is a really voluntary and co-operative relationship on the part of the producer. No formal legal authority for the defining of maximum prices or of regulation of the industry has been conferred by act of congress upon the war industries board which, in fact, has no official standing except as express powers have been delegated to it by the President. The board occupies merely an advisory capacity toward the duly chosen officers of the government. Furthermore in the purview of the Sherman antitrust law which still is on the statute books, price agreements are nefarious instruments of trade. But then these are war times. That makes a great difference. The first law of strategy or rather common sense is to insure a supply of the most indispensable material of battle, which is iron and steel. The representatives of the government have set about methodically to see that this is done. The exception to the situation, as to express legal power over various materials of the iron and steel industry, is in coke. Under the Lever act or the food control bill, absolute legal authority for the production, sale and distribution of both coal and coke, is vested in the President through his appointee, the federal fuel administrator.

In the end all this talk of the legal aspect of the case merely is a matter of technical hair splitting. It cannot be honestly conceived that there are any limits to the broad constitutional power of the President of the United States in time of war as the commander-in-chief of all forces, military and otherwise, of the nation. Again, it is quite sure that were specific legal authority required to effect results, the enabling legislation would not be long in forthcoming and in a drastic form, probably. The priority powers of the President, under the food control bill, also give him or those to whom this authority is delegated by him, a very effective weapon for any contingency. It is nevertheless a creditable chapter in the history of the iron and steel industry that its leaders, acting in full and patriotic appreciation of their unusual responsibilities in this great crisis, unhesitatingly have subordinated private interest to national necessity, leaving the whys and wherefores of their legal rights as subjects for academic discussion.

The present war truly is one of iron and steel. The greatest national industry of its kind in the world, far exceeding in capacity that of Germany, is applying itself vigorously to the discharge of its supreme duty. It has brought itself to a war basis in surprisingly swift fashion. Whatever may be said regarding the state of progress of other war preparations of the government, it is certain that the real foundation upon which all must be buttressed, that of ample iron and steel supply, has been fully assured no matter what superlative proportions the ultimate requirements may attain.

Federal Control in First Stage

Extension of federal authority over every branch of the industry virtually still is in its early stages. Scarcely three months have elapsed since the publication of the President's original price statement. The subsequent steps have been gradual. In fact base prices, differentials and extras on a number of mill products are yet to be brought by official promulgation in line with those previously announced. However, government regulation has been in force a sufficient time to produce some very marked effects in the industry certain of which are likely to outlive the war crisis and may have important significance in the future.

On the purely technical side of prices there have been some interesting consequences. Before government regulation intervened, quotations of individual producers covered a wide spread. This was a natural outcome of the excessive demand. In plates for example, taking prices varied as much as $60 to $80 a ton. Similar conditions, in a degree existed in tubular goods, wire products, sheets and other lines. This situation grew out of the different policies which were being pursued by sellers. Some companies were inclined to put restraint upon their quotations; others allowed the law of supply and demand to take its free course. Fixed prices eliminated this general diversity and restored market uniformity.

Extras are Re-established

Similarly in the official recommendations of extras and differentials, various schedules which in the past had not been adhered to strictly or had been enforced in an irregular fashion in the tremendous market of the past two years, again were re-established as fixtures. The effect of these announcements under government direction has been to standardize selling practice in a fashion that the industry has not shown for a long period if at all. This designation of proper extras and differentials on mill products, when finally rounded out, promises to endure long after the war. The reason for this is that producers under the sanctioned method of procedure have been able to consult together freely on price matters in a way which would not have been possible legally or for various causes they would not have cared to do in times of peace.

In pig iron, a final impetus has been given by the determination of official differentials based on chemical content, to the movement for the placing of orders and the valuation of grades strictly in accordance with analysis. While this method of buying legally has been followed in recent years, some traces of the old days of orders by fracture, still have obtained. Furthermore, in various districts there have been confusion and overlapping of grades and symbols. The pig iron industry now is possessed of a complete and correlated schedule of differentials, scientifically devised, which will go far toward modernizing and improving the conditions of buying and selling in this line. There is little doubt that the so-called government schedule of differentials largely will remain as a permanent institution in the

post-bellum period. To the extent that it has enabled the iron and steel industry to drop antiquated market practice and to substitute for it, new systems approved by concerted action government price fixing has done both producers and consumers a good turn.

It is safe to say that two-thirds of the production of the furnaces and mills of the country now are being devoted directly and indirectly to war uses. With some of the larger companies, this percentage of a military character is considerably greater. A recent official estimate showed that 80 per cent of the ingot output of the Steel corporation is going into war work. At times this percentage has been even larger with this and other producers. In some products the pressure of war demand has been much more intense than in others. Plates stand out as a conspicuous illustration of this fact, because of their relation to merchant shipbuilding and naval construction.

Blooming and billet mills due particularly to the great tonnage needed in semifinished form for the production of artillery ammunition, ordnance, etc., have been driven at top speed. The country's capacity for the production of large rounds has been extended to the limit. It was estimated in October when shell steel buying by the United States government was begun in earnest that a requirement of 2,500,000 to 3,000,000 tons then was in sight and this was to be filled as quickly as possible.

Indirect War Needs Heavy

Bar mill output also has been demanded in a considerable degree for munitions. The indirect war requirements imposed upon the mills which under the priority regulations are placed ahead of ordinary business and are second only to the direct needs of the battle line, have been voluminous and far reaching.

Through its priority machinery both of shipments and of transportation the government is enabled to obtain the swiftest delivery of these millions of tons of war business. By exercising this power, however, it not only has pushed back an equal tonnage of nonwar orders which long had been on mill books, but has placed various lines of manufacture of a so-called nonessential class in a position where tonnage is not likely to be obtained at all. The dislocation of normal productive activity which is resulting from this situation in reality has placed in jeopardy the immediate future of many manufacturing establishments and a widespread process of industrial adjustment now is going through the country in consonance with this condition. Various lines of manufacturing are being revamped or rearranged to partake of a character such as will serve in some way the general war machine. Only in this manner are these plants able at least for the present to assure themselves of governmental co-operation and the benefit of its superseding authority without which their supply of materials for manufacturing would become precariously uncertain at best. At the same time the general spirit of economy which pervades the country and the increased costs that are the normal accompaniment of war conditions, are cutting down the volume of new business in different branches of industry, not directly concerned with the supreme effort which the nation is making as a belligerent. This is effecting a natural redistribution of much-needed supplies such as iron and steel. The production of pleasure vehicles, including automobiles and their accessories, of building materials, except for construction pertaining to war requirements, of luxuries, novelties, etc., road building and innumerable other forms of normal enterprise are reflecting the influence of these conditions. Standardization of production in a given field also is resulting in a saving of effort which permits concentration in the most essential directions. Iron and steel makers both have felt the effects of this new industrial regime through the diversions of tonnage and on their own part have been helping to bring it about through directing distribution into those channels best serving the government. It has become almost necessary for a consumer to have a priority certificate to obtain shipments even against a contract long overdue. Consequently much old tonnage on mill books closed some months back and which is included in those classes barred from priority privileges, virtually has been rendered inactive and of nominal value to either buyer or seller.

Readjustment is Tremendous

The readjustment of industry is one of the most tremendous movements which the nation has undergone in years. It is very likely to leave its impress permanently on many forms of manufacturing enterprise. It is understood to be the policy of the government to effect this war transformation with as little lasting hardship to established industries as is possible. Obviously this can be the only sound policy for it is of paramount importance that the nation's fundamental commercial strength be not allowed to be sapped in the hurly-burly of war activities. The basic thought of the government underlying this reappraisal of the country's manufacturing facilities, is said to be the utilization of the capacity of every plant suitable for war production to the extent this is not actually needed for the maintenance of the national life. Probably a certain amount of pressure is thought to be necessary to bring about this metamorphosis. The arm for this purpose is the priority system.

While the country is passing through this recasting of normal business, the wrench is likely to be plainly felt. Indeed, already the ground-swells are appearing on every side. There is high authority for the opinion, such as Frank A. Vanderlip, that in the end industry will emerge stronger and better and that labor not only will be fully but more profitably employed than at the present time.

Tonnage Should be Ample

As to iron and steel, the war will continue to make heavy drafts upon capacity until enduring peace for the world finally is won. Even then, the tremendous armament which the country will have acquired will demand much tonnage if only for maintenance. At present the industry is being drawn upon to supply the sinews for the creation of this great war machine. Requirements doubtless have not yet reached the peak. This growth however is not likely to be so accelerated or the monopoly of mill and furnace output be so extensive in the future as at the present time when the rush of initial preparations is under full steam. Great Britain with 8,000,000 tons of ingots at the beginning of the war and now with 12,000,000 tons, has built up a powerful war-making unit not unlike in scope and character our own. At the same time she has carried on her own national life and has supplied her allies with a large tonnage. This latter she has made up partially by imports from this country. In 1916 she exported 3,357,829 tons of iron and steel material and imported only 872,890 tons. It would seem to be a mathematical truth that the United States making 43,000,000 tons of ingots annually will be able to create the greatest war machine the world has ever seen, take care of all deficiencies of her allies to the same extent as in the past few years and still have 20,000,000 tons or more for home consumption. The prospect for the average business being able to obtain its proper proportion of this tonnage is reasonably assured whenever the operation of the normal laws of distribution is allowed to take its natural course

Unparalleled Events Fill Busy Year

Government Regulation Terminates Most Spectacular Market Performances and Highest Price Levels in History of Iron and Steel Industry—Production Surmounts Obstacles of Speeded-Up Conditions—Future Developments Now in Doubt

MORE market history was made in 1917 than in any other like period since iron and steel became the premier industry of the country. In truth an adequate comparison with the past falls short because no previous period offers even a limited parallel to the extraordinary twelve months just ended. International political factors of an extraordinary character were joined with unusual economic conditions to produce easily the most remarkable year in the annals of the industry. For the first time ever known, federal authority was exercised over the movements of prices and of distribution. This developed from the fact that the war had made the United States government the principal patron of the blast furnaces and the mills. In fact, the broader questions of national interest and war power are superseding at present all normal considerations of a commercial character. This condition has prevailed for a number of months.

Year Falls Into Two Great Periods

The year logically falls into two distinct periods. The first was of practically seven months' duration. In that period under an overwhelming demand from an impoverished world, prices were carried so far beyond anything in the previous experience of the industry, as at present constituted, that they probably set the high water mark for this and future generations. The second period dates from the time at which full government regulation was put in force and the few weeks preceding during which the trend of events toward federal control clearly was foreshadowed. The first period recorded a true expression of the fundamental relation of supply and demand in a virtually world's market. The second represented an abnormal situation where commercial factors were subordinated to national expediency and artificial market conditions were enforced.

The line of prices in the year when left to the unrestricted forces of supply and demand ran upward in phenomenal fashion until the apex of this movement was reached in July and August. This rise was the natural extension of the tremendous volume of buying in 1916 which had expanded order books to the point of saturation. Upon this peak of tonnage there still were piled during the early months of the year further orders in liberal volume. The seemingly insatiable demand for iron and steel products from all quarters of the globe kept manufacturers under a perfect deluge of inquiries. The situation gradually reached the point with the mills where capacities were so far engaged that bookings automatically checked themselves. It then became the exception when new business could be accepted.

At first the war requirements of the government did not cause any extensive dislocation of new buying. Business went on largely in the accustomed channels, general demand continued as excessive as ever and prices mounted steadily. Then the scope of the government's war program gradually began to unfold itself. A shipbuilding effort of unrivaled magnitude was launched. New naval construction was laid out on a large scale. Supplies of ordnance and munitions were provided for, based upon the expectation of a prolonged and vigorous struggle. Every turn of the nation's new war machine brought a fresh demand for tonnage upon the overcrowded mills and furnaces. These war needs, direct and indirect, have grown steadily until they have reached a tremendous figure. In September it was estimated on high authority that government requirements of 7,000,000 tons for nearby shipment were before the industry. This crush of critical necessities now has reached the point where it is displacing rapidly all other business. It has become practically out of the question for manufacturers to fill requirements not connected with the war.

Export Demand Is Major Factor

AS IN 1916, one of the truly dominant factors in bringing about and in sustaining the year's market on its unusual plane of price and tonnage was the export demand. The movement overseas purely became a question of carrying facilities, and this as well as mill capacity fixed the tonnage that could be sold. At all times the demand was far beyond the facilities either to transport or to produce. In total, the exports of 1917 practically equaled those of 1916. For the first 10 months they aggregated 5,190,717 gross tons. In the calendar year of 1916, the total was 6,110,732. On Aug. 15 the government established an embargo on the exportation of certain classes of steel except by license. This embargo had the effect of giving the government a flexible control over domestic iron and steel supplies not only to better assure its own needs, but to make certain that the distribution of the foreign tonnage would go into the most desirable channels.

Pig iron accomplished the seemingly impossible in the year and basic, bessemer and foundry grades were sold freely at above $50, furnace. What they would have brought had the government bar not been on prices during the latter part of the year when coke shortages produced a veritable famine of metal is an open question. Belief has been expressed by close students of the market that $75 to $100 would not

have been beyond reason under the economic situation that then obtained. Bessemer in July sold at the top figure of $57, valley, and the average for that month was $57.95, Pittsburgh. This represented an advance of $22 over the average for December, 1916. Basic rose from $30, valley, in December of the previous year to $52.25 in July. Foundry iron got up to $55, valley, in July, but failed to reach the figure it commanded in 1864, which was over $73, furnace. Nor did it equal its performance of the same year when prices in the Lehigh valley between May and December ranged from $59.50 to $70.25 per ton. The high price for eastern Pennsylvania No. 2X in 1917 was $52.50, furnace. Low phosphorus iron experienced a most spectacular flight. In the first half of the year it advanced from $53.50 to $92.50, Philadelphia. These astounding values for pig iron symbolize the unexampled demand that existed for every form of blast furnace product. One of the effects of these very profitable prices for the maker was the reclaiming to production of many isolated and high-cost furnaces which long had been carried on the country's inactive list and were regarded as unlikely to resume.

Finished Steel Products Bid Up Excitedly

FINISHED steel products moved upward with swift strides from January to August, or during the period when the market was unrestrained. The advances in mill material were very erratic, however, as the pressure of buying was unequally applied. Plates stand forth as the most violent performer of the year owing to the frantic efforts that were made by every maritime nation of the globe to obtain shipbuilding material in order that they might profit from the very lucrative conditions prevailing in the ocean transportation market. Eastern Pennsylvania mills as usual were leaders in quoting up the market to its record point. Tank plates got up to 10c, Pittsburgh, in July, and Lloyds' ship steel then ranged from 11c to 12.50c, Pittsburgh. Marine boiler steel, United States standards, was marketed at the unprecedented figure of 20c, Pittsburgh. The maximum advance in tank plates in the year was from 4.75c, Pittsburgh, in December, 1916, to 10c, Pittsburgh, in July, or $105 per net ton. Most of the high prices in plates were paid for export tonnage. Structural shapes scored an advance of $60 a ton, or from 3c to 6c, Pittsburgh; steel bars, $30 a ton, or from 3c to 4.50c, Pittsburgh; blue annealed sheets, $90 a ton, or from 4c to 8.50c, Pittsburgh; blast sheets, $90 a ton, or from 4.50c to 9c, Pittsburgh; galvanized sheets, $80 a ton, or from 6.50c to 10.50c, Pittsburgh; wire nails, $25 a ton, or from $3 to $4.25, Pittsburgh, per 100 pounds; and tin plate, from $6 to $8 a ton, some export sales having been made at $15, Pittsburgh, per base box. Sheet bars were sold at $105, Pittsburgh, or an advance of $45 in the half year; and billets at $100, Pittsburgh, a rise of $40. Heavy melting steel scrap at Pittsburgh went from $25 per gross ton in January to $40.25 in July; and No. 1 cast, from $20 to $34.75, in the same period. Spot Connellsville furnace coke was bid up to $15, ovens, and Connellsville foundry coke on contract was sold at $12.50, ovens. As in pig iron, the extraordinary prices which mill steel attracted brought about the rehabilitation of numerous old plants which had been discarded in the former days of close operating margins.

Production Overcomes Obstacles

AS the accompaniment of an industrial situation kept constantly in high gear, iron and steel production in the year has been attained in the face of a series of unusually severe and numerous obstacles. Labor has been inadequate and less stable; and raw material shortages principally in coal and coke have exercised a drag upon capacity the effect of which at times was marked. Underlying this factor of manufacturing supplies has been the fundamental deficiency of traffic facilities. Handicapped by an abnormally delayed opening of navigation which imposed a loss of 3,500,000 tons at the start, the season's iron ore movement from the Superior ranges reached the very creditable total of approximately 64,500,000 gross tons of which 62,498,901 tons were moved by vessel. This compares with a late movement of 64,734,138 tons and total shipments of 66,658,466 gross tons in 1916, the record year. Pig iron production in 1917, including charcoal, was about 38,800,000 gross tons as against 39,434,797 tons the preceding year. The steel works turned out, it is estimated, 42,600,000 gross tons of ingots. The yield of the preceding year was 41,401,917 gross tons. Finished steel production probably will be 32,000,000 tons. Coke clearly reflected the erratic traffic conditions of the year. Shipments of the Connellsville region in the twelve months were not over 17,500,000 tons. In 1916 they were 21,654,524 tons.

At the beginning of 1918 radically different conditions hold sway in the iron and steel market compared with twelve months previously. One year ago buying and selling were free to pursue their own movements and prices fluctuated in the degree that material was bid for. The world was the market field. Now federal authority is all-extensive. Purchases more and more are being restricted to defined and limited purposes. Largely they are being confined to the war necessities of the government and its allies. As events have proved, virtually there was no limit to the point where prices, starting a year ago, could rise; today the maximum levels that the producer may quote are fixed. Moreover, there is no assurance they will not be further reduced arbitrarily by subsequent action. War made the great market and the tremendous prosperity of the American iron and steel industry of the past two years. War now has produced a unique and counter condition of which the significance and final results to the industry are yet to be shown. How the various aspects of this new order of affairs may develop during the next year are questions for speculation and doubt since precedent fails to offer the slightest guidance.

History is Freely Made in Pig Iron

Fifty Dollar Metal a Figure of Fancy Becomes Common Price of Market—Government Regulation Checks Upward Movement Which Probably Would Have Broken All Records—Demands Exceed Capacity of Furnaces

A DREAM came true in 1917. A vision has become history. Fifty-dollar steelmaking pig iron, regarded by optimistic producers as a remote possibility during the spectacular upward movement of the market the early part of April, became a reality about June 1. Seventy-five dollar and even $100 iron likely would have been attained the latter part of the year, had it not been for the voluntary reduction of quotations, subsequently approved by President Wilson. The successful application of the so-called war price on all grades of pig metal consumed both for war and domestic purposes was equally as notable an achievement as the establishment of quotations at historically high levels. All grades did not attain the $50 level, although the entire market went to maximums that had not been approached before in the history of the industry except foundry iron which in August, 1864, sold at an average price of $73.63. But a number of grades went well past $50, and one, low phosphorus iron, almost doubled it when it hit the high mark of $92.50, Philadelphia, in the third week of June, an advance from $53.50 from the first week of the year. Most grades registered their greatest levels in July.

Consumers during the closing month of the year scoured the country for iron, many of them in vain. The shortage which now obtains is pronounced in nearly all grades, especially basic foundry and malleable. Steel works which are operating heavily on war orders, are greatly concerned as to where they will obtain iron, while furnaces are straining themselves to meet obligations. Irregularity of coal and coke supplies and bad traffic conditions are responsible in large measure for the inadequacy of pig iron production. The total output for the first 11 months of 1917 was 35,367,853 tons, as compared with 35,834,945 tons for the corresponding period in 1916. Exports of pig iron for the 10 months ending with October totaled 562,969 tons, compared with 395,260 tons for the same period in 1916. During the early part of December 344 of the 434 blast furnaces of the country were in operation, comparing with 322 out of a total of 420 which were blowing at the corresponding time in 1916. Demand for iron was active practically the entire year. At the close of 1917 it was little short of frenzied. A leading authority estimated about the middle of November that the shortage at that time was at the rate of about 3,000,000 tons per annum.

Representatives of the iron and steel industries, including iron ore and coke, were called by the war industries board to meet with it at Washington on Sept. 24, 1917. The meeting was presided over by Judge Lovett, acting chairman of the war industries board, and the industries elected Judge E. H. Gary, president of the American Iron and Steel institute, as their spokesman. The war industries board explained what President Wilson had in mind for the best interests of the government and its allies, with respect to the prices of steel necessary for war uses and of all the materials used in the manufacture of steel. It stated the President had come to the conclusion that the situation could be clarified only and justice done to all the interests involved by establishing the same prices to the public as might be agreed upon as applicable to the needs of the government and its allies. The industrial representatives had entered the meeting with varying notions about the propriety of any prices agreed upon being made universal in their application, but it may be stated that all of them had come to the meeting reconciled to the idea that such of their products as were required by the United States government and its allies must be tendered

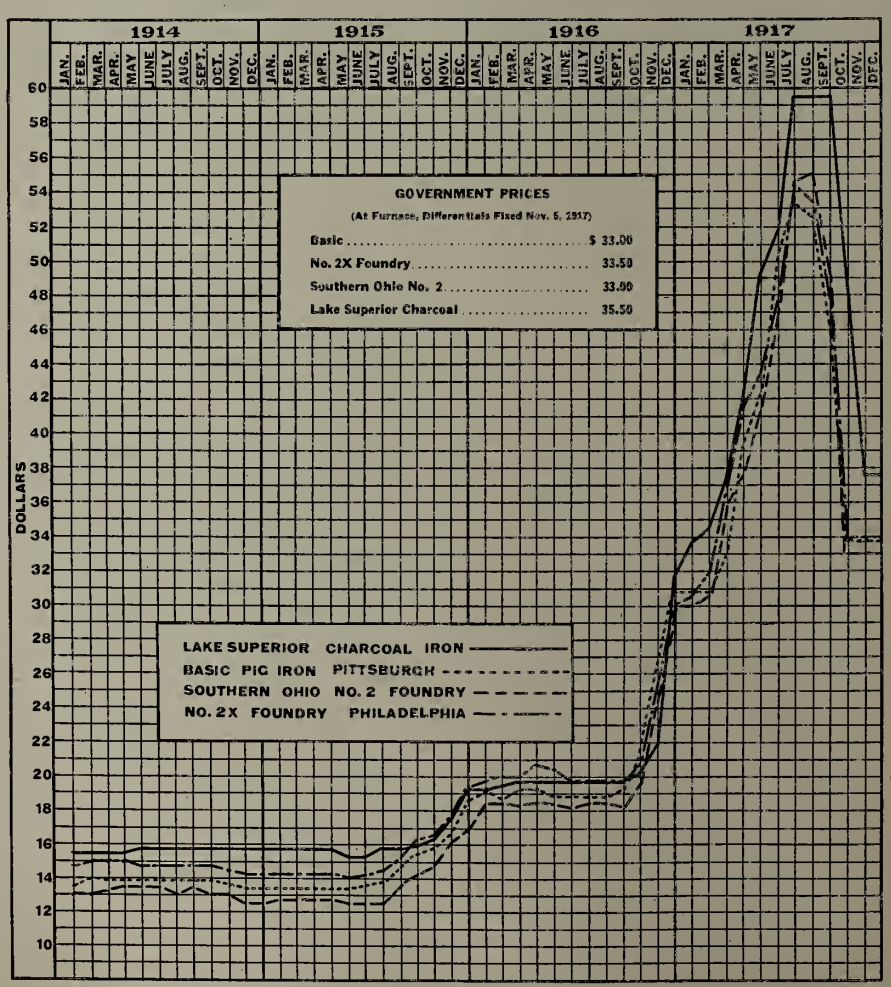


CHART OF PRICES ON FOUR LEADING GRADES 1914-1917

at prices which would be satisfactory to the representatives of the government. After hearing the expressions of the President's thoughts on the subject, the matter was left with the industrial representatives and the board retired from the meeting. It was agreed upon, however, that the entire subject was too complicated to permit of treatment by such a large body as his public announcement of his approval, the iron and steel interests in the United States, with very few exceptions, if any, adopted the prices as law, and they have been since observed as such. It was agreed upon later that the differential prices on the great variety of shapes and forms of steel proceeding from the bases treated of would be committed to the asauqua, Pa.; W. T. Shepard, Rogers, Brown & Co., Buffalo; A. H. Woodward, Woodward Iron Co., Birmingham, Ala.; Frank Billings, Tod-Stambaugh, Cleveland; H. Coulby, Pittsburgh Steamship Co., Cleveland; Frank B. Richards, M. A. Hanna & Co., Cleveland. Immediate action was taken.

The committee called together in

Prices of Representative Grades of Pig Iron, 1914-1917

BASIC, PITTSBURGH

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$30.95	$30.95	$32.85	$39.20	$42.15	$50.20	$53.20	$52.75	$43.95	$33.95	$33.95	$33.95
1916	19.20	18.77	19.20	19.20	18.95	18.95	18.95	18.95	19.08	20.83	25.95	30.95
1915	13.45	13.45	13.45	13.45	13.45	13.54	13.83	14.89	15.65	15.95	16.70	18.55
1914	13.42	14.09	13.96	13.90	13.90	13.90	13.90	13.90	13.90	13.75	13.45	13.45

BESSEMER, PITTSBURGH

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$35.95	$35.95	$37.45	$42.20	$44.95	$55.20	$57.95	$55.55	$48.27	$37.25	$37.25	$37.25
1916	21.32	21.45	21.55	21.95	21.95	21.95	21.95	21.95	22.20	24.33	30.35	35.95
1915	14.70	14.63	14.55	14.55	14.55	14.58	14.88	15.89	16.80	16.95	17.45	19.70
1914	15.00	15.09	15.15	14.90	14.90	14.90	14.90	14.90	14.90	14.85	14.70	14.70

NO. 2X FOUNDRY, PHILADELPHIA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$30.50	$31.75	$36.90	$41.75	$43.35	$47.50	$54.35	$53.40	$47.80	$34.00	$34.00	$34.00
1916	19.75	20.00	20.00	20.75	20.50	19.75	19.75	19.75	19.75	20.50	25.25	30.00
1915	14.25	14.25	14.25	14.25	14.00	14.25	14.50	15.25	16.25	16.50	17.50	19.25
1914	14.75	15.00	15.00	14.75	14.75	14.75	14.75	14.75	14.75	14.50	14.25	14.25

SOUTHERN OHIO NO. 2 FOUNDRY, IRONTON

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$30.00	$30.75	$35.80	$37.75	$41.20	$47.50	$54.50	$55.00	$49.25	$33.00	$33.00	$33.00
1916	18.30	18.50	18.30	18.50	18.50	18.15	18.44	18.40	18.13	19.38	24.00	30.00
1915	12.75	12.75	12.75	12.75	12.56	12.50	12.60	13.63	14.20	14.88	16.13	17.00
1914	13.00	13.00	13.25	13.50	13.50	13.50	13.00	13.50	13.00	13.00	12.63	12.63

LAKE SUPERIOR CHARCOAL IRON, CHICAGO

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$33.75	$34.50	$37.55	$42.25	$49.25	$51.80	$59.50	$59.50	$59.50	$48.50	$37.50	$37.50
1916	19.25	19.50	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.35	21.95	31.75
1915	15.75	15.75	15.75	15.75	15.25	15.25	15.75	15.75	15.95	16.25	17.50	19.25
1914	15.50	15.50	15.50	15.50	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75

STANDARD LOW PHOSPHORUS, PHILADELPHIA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$54.50	$57.50	$66.70	$75.50	$77.00	$85.00	$92.50	$92.50	$82.00	$55.50	$55.50	$55.50
1916	54.50	57.50	66.70	75.50	34.00	34.00	33.00	33.00	34.00	40.00	46.00	55.00
1915	19.00	19.00	20.00	20.00	20.00	20.50	21.50	23.50	24.50	28.00	30.00	32.00
1914	21.00	21.00	21.00	21.00	21.00	20.50	20.50	21.00	21.00	21.00	19.00	19.00

BASIC EASTERN PENNSYLVANIA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$30.15	$30.50	$33.80	$38.25	$40.80	$46.40	$50.75	$51.00	$46.50	$33.50	$33.50	$33.50
1916	19.50	19.50	20.00	20.50	20.00	19.25	19.00	19.25	20.00	21.00	25.50	30.50
1915	13.50	13.75	14.00	13.25	13.50	13.50	13.75	15.25	17.25	17.50	17.75	18.00
1914	14.00	14.25	14.25	14.25	14.00	14.00	14.00	14.00	14.00	14.00	13.50	13.50

VIRGINIA NO. 2X FURNACE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$26.50	$28.25	$34.25	$38.40	$41.00	$46.50	$52.25	$51.90	$46.50	$33.50	$33.50	$33.50
1916	17.25	18.00	18.25	18.50	18.50	18.50	18.50	18.50	17.50	18.50	23.75	27.00
1915	12.50	12.50	12.50	12.50	12.50	12.50	12.50	13.00	13.50	14.00	15.50	17.00
1914	12.75	12.75	12.75	12.75	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50

SOUTHERN NO. 2, BIRMINGHAM

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917	$23.00	$24.50	$28.00	$35.80	$35.75	$35.75	$46.00	$48.00	$43.50	$33.50	$33.50	$33.50
1916	14.50	14.65	15.00	15.00	15.00	14.45	14.00	13.60	14.40	15.15	19.60	23.00
1915	9.50	9.50	9.40	9.35	9.75	9.55	9.60	11.00	11.30	11.75	13.15	14.20
1914	10.50	10.50	10.60	10.50	10.50	10.45	10.05	10.00	10.00	10.00	9.90	9.50

was present, and that, therefore, the work of the conference would be confined to base products only; that is, iron ore, coke, pig iron, plates, shapes and bars.

Following many hours of discussion and calculation, a scale of prices was submitted to the war industries board. Upon a further conference with that body, a few modifications were made and the work of the conference was submitted to the President, who approved of it, and upon committees of the American Iron and Steel institute for consideration and recommendation to the war industries board. The matter of differentials on the many varieties of pig iron was submitted to the subcommittee on pig iron, iron ore and lake transportation, composed of the following: Chairman, H. G. Dalton, Pickands, Mather & Co., Cleveland, C. D. Dyer, the Shenango Furnace Co., Pittsburgh; Leonard Peckitt, the Empire Steel & Iron Co., Cat-

New York representatives of the blast furnace interests in all sections in the United States and Mr. Dalton was chosen as chairman of the conference. The conclusions were submitted through the committee on steel and steel products to the war industries board and were promptly approved. The foundation of the work of the conference was the base price of $33 for basic and No. 2 foundry iron, which was adopted as the authorized price for these grades of iron at all

blast furnace points. In arriving at prices differing from the base which would be fair to the manufacturers of low phosphorus, charcoal, bessemer, malleable, the higher silicon grades and the various grades of foundry iron, a study was made of the practices of the trade in the different localities and comparisons were made as to the estimation the public had placed upon the values of the different grades, not only during normal times but since the war conditions had obtained. These differentials were approved by the committee on steel products of the American Iron and Steel institute and were announced Nov. 5.

At the opening of the year, furnaces in the central west and the south had ample stocks on hand and while there was no shortage in the valleys, western Pennsylvania and the east, stocks were rather low. The increasing demand made itself felt from the outset. Foreign requirements at that time were extremely heavy. The scarcity of vessels and the prohibitive freight rates, however, prevented the major portion of these demands from being placed. On shipments to Italy, $50 to $60 was asked in January, while the rates to France ranged from $55 to $60. Early in January, the French government put out an inquiry for 100,000 tons of bessemer, and closed for 20,000 tons at $35, valley, or $37.14, New York. Japan bought large quantities of iron, principally foundry and basic. The Scandinavian countries and Italy also purchased heavy tonnages. Furnaces in the east and the valleys took especially large foreign tonnages. Early in February Italy placed 75,000 tons of bessemer with valley furnaces and apparently had a standing order for 100,000 tons of this grade.

As the result of the tremendous commitments of furnaces, both from domestic and foreign sources, deliveries were falling behind in some districts, such as in the east and western Pennsylvania and eastern Ohio, and many consumers were on the verge of having to shut down. Steel companies in all sections bought heavily. The Jones & Laughlin Steel Co., Pittsburgh, was a conspicuous buyer during the entire year. Toward the close of the year various subsidiaries of the United States Steel Corp. came into the market for both basic and bessemer iron for the first time in many years. The American Bridge Co. bought 7500 tons of basic in one lot for its Pencoyd, Pa., plant. The National Tube Co. and the American Steel & Wire Co. also took tonnages, buying over wide territory. The greatest buying movements in the Pittsburgh district took place in March, June and October.

The close of the year found valley furnaces practically committed entirely for the first quarter and first half. Some producers limited their commitments for these positions to 65 to 75 per cent of their theoretical output, thus protecting themselves against any contingencies that might arise, such as the shortage of raw materials. Long and hard drives showed their effect and forced numerous valley furnaces to blow out for repairs.

Inquiry for pig iron in the Chicago district was extremely heavy at the close of the year and extended into the third quarter and last half of 1918. Some sales were made for third quarter, but no business was closed for the entire last half, although sellers were willing to book tonnage for that delivery at the present fixed rate. Melters were working hand to mouth and delay in delivery in some cases caused some foundries to shut down until iron was received. Lake Superior charcoal makers are sold fairly full for first half and have been taking interest in last half tonnage, some of which has been placed. Much off-iron was produced in the Chicago district, as in other centers, as a result of poor coke.

Eastern Makers Are Buyers

In the eastern pig iron market practically all steel companies which ordinarily produce enough iron to meet their own requirements were forced to come into the market for large tonnages. The Lukens Steel Co., as usual, was the largest single buyer of basic in the east during 1917. In March and April this interest closed for 60,500 tons from eastern furnaces, at $34 to $35, delivered, for second half. In May it placed an additional 45,000 tons at $42, delivered. Of the latter, about 25,000 to 30,000 tons were for 1918. In January standard low phosphorus was so scarce in the east that one consumer there had to go to Milwaukee to obtain spot iron. At about the same time a sale of eastern spot was made at $57, Philadelphia. At that time copper-bearing low phosphorus was selling at $55, eastern Pennsylvania. At the end of January 1000 tons of eastern bessemer were sold to Canada at $36, furnace. Fair tonnages of Buffalo malleable were selling in the east at that time at $35, Buffalo, and about the middle of February the Central Iron & Steel Co. sold 25,000 tons of 0.70 per cent phosphorus basic to Italian buyers at higher than $32.50, tidewater. At this period also the Bethlehem Steel Co. bought 5000 to 10,000 tons of standard low phosphorus for future shipment at $57.62, delivered. Late in March, and early in April, sizable sales began to be made for delivery in the first half of 1918. About the middle of April the Bethlehem Steel Co. purchased about 11,700 tons of bessemer at close to $40, eastern furnace. In May numerous sales of southern iron were made to Japan at $41.50 to $42, Birmingham. Bessemer was selling to Japan at as high as $44, New York. Early in May the Baldwin Locomotive Works bought approximately 8000 tons of foundry for last half at prices equivalent to $42.50 to $43.50, Philadelphia. Sales were made then also of Buffalo iron at $45 for 1917 and $40 for 1918, while the eastern Pennsylvania minimum was $42, furnace. The Bethlehem Steel Co. in May bought 10,000 tons of standard low phosphorus. By the end of May southern iron and Buffalo iron were beginning to be bought with difficulty beyond 1917. In June the Baldwin Locomotive Works closed for 14,000 tons of foundry at prices ranging from $42, furnace. The asking price under $50, eastern furnace, for No. 2X immediately disappeared and by June 25 eastern Pennsylvania makers asked from $50 to $54, furnace, for No. 2X, the lower prices in most cases being quoted only for immediate acceptance. Toward the end of June a large tonnage was sold to an eastern maker at $60, furnace. During the middle of July sales of Lebanon low phosphorus were made at $33.

The export embargo declared by President Wilson became effective Aug. 15 and one result of it was the offering at resale of a great deal of iron which had been sold for export. These resale offers and the greatly reduced demand led to a well defined reaction, declines of $2 to $3 a ton taking place on several grades.

At the opening of 1917, southern iron was selling at an average of $24.27 per ton, that is, all grades considered. Prices rose and prior to Sept. 24 a special analysis iron had sold as high as $57, Birmingham, while $48 and $50 for foundry No. 2 and basic were common prices. As the prices of iron went up and the demand became more urgent, there came a spread of rehabilitation of furnaces throughout the south, Georgia, Tennessee and Alabama participating in this movement. New companies were organized and old properties taken over, improved and placed in operation. The makers of iron took on the same ideas of progression as did the prices.

Car Supply Dominates Coke Market

Traffic Conditions Supplemented by Labor Shortages Cut 1917 Production by Large Margin and Precipitate Famine in Supplies Which is Reflected by Remarkable Rise in Prices, Both Spot and Contract

WITH a runaway market prevailing for some time before levels were fixed on Sept. 24 by the fuel administration, blast furnace and foundry coke commanded enormous and unprecedented prices in 1917. Production in the Connellsville region up to the week ending Dec. 8 totaled 17,019,222 tons according to the Connellsville *Courier* and for the year approximated 17,619,000 tons. This compares with 21,761,605 tons produced in 1916, the record year. The decrease for 1917 was, therefore, about 4,142,604 tons. The new year comes in with an extreme scarcity of fuel at blast furnaces and banking has been frequent as a result. Coke production for the year exceeded the car supply. So the outstanding feature of the market was a shortage of cars, a condition that was and is extremely serious. Because of the lack of a regular supply of rolling stock considerable tonnage of coke was drawn from the ovens and dumped on the ground awaiting shipment. It was not uncommon in the year for the car supply to dwindle down to 30 per cent of allotments. During the last quarter the average was a little more than 50 per cent. Operations of the Connellsville regions sufficient to meet all demands of furnaces would have required about 70 per cent.

Situation Causing Anxiety

The new year comes in with the coke situation one of much anxiety despite the numerous steps taken to solve the attendant problems. The remedial efforts made include priority orders, proposed use of any kind of equipment in which fuel could be shipped and attempts to eliminate cross shipping in the Connellsville region. While the bad traffic situation was easily the greatest hindrance to the coke industry in 1917, labor conditions were extremely unsatisfactory on the whole.

While production in 1917 in the Connellsville regions fell below that of the preceding year, relief is promised by the building of additional by-product plants. The greatest undertaking of this kind is that of the Carnegie Steel Co., which is putting in a battery of 1280 by-product ovens at its Clairton, Pa., works. When all of these ovens are in operation they will insure capacity blast furnace output of the company. The ovens will serve nearby furnaces as well as some on the Ohio river. Coal will be brought to the ovens by water, thus making more cars available in the Connellsville regions. It is hoped to have 640 of the ovens in operation in March. The output of this number of ovens, one-half of the total to be built, will be approximately 2,000,000 tons annually. In 1917, more than 500 retort ovens were put into operation by owners of merchant and steel works blast furnaces, who in the past had depended either wholly or in part upon the Connellsville district for fuel.

The remarkable advances in prices of coke is shown by a glance at the monthly averages for a series of years. In 1913 Connellsville furnace

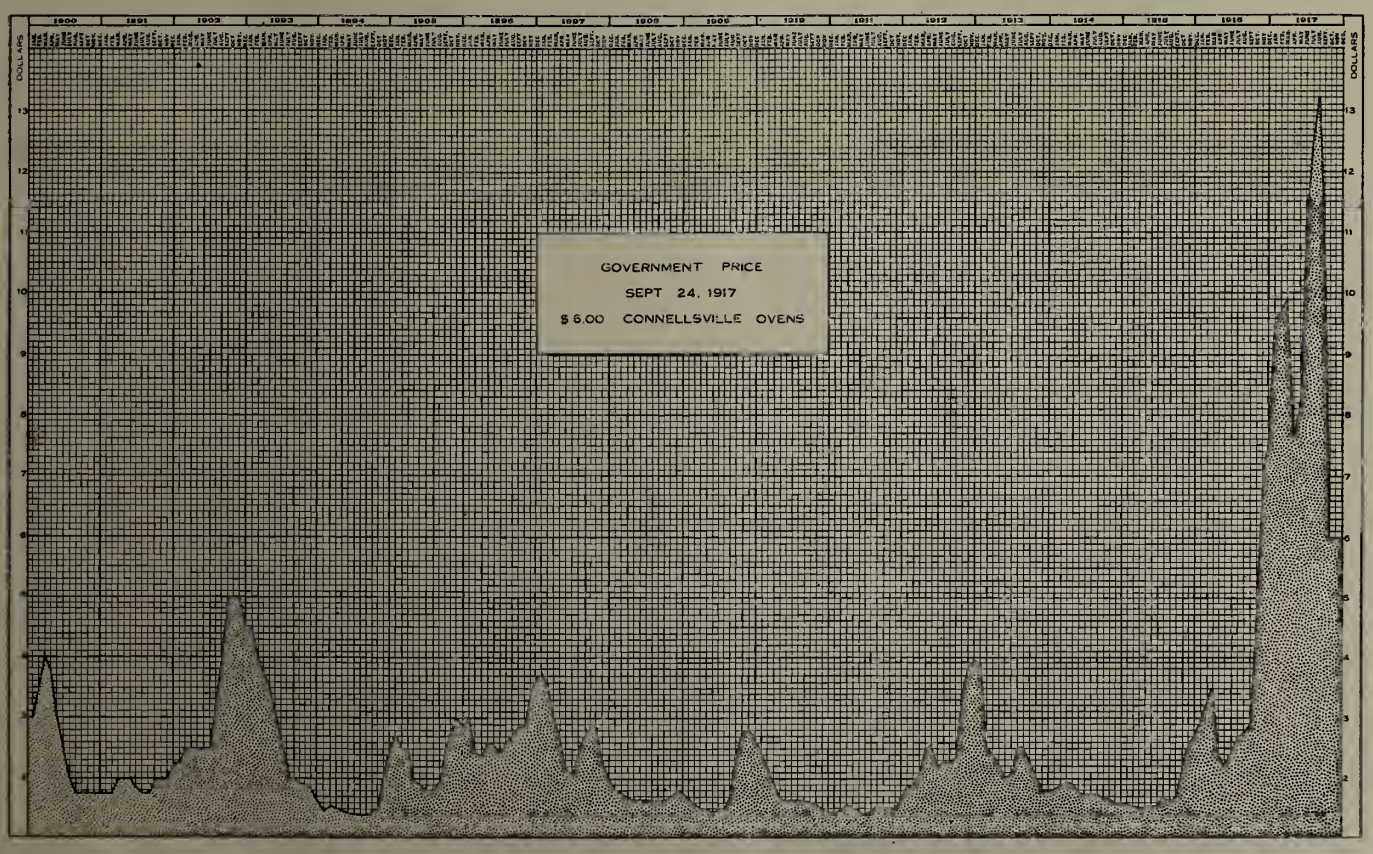


CHART OF AVERAGE MONTHLY PRICES AT OVENS OF CONNELLSVILLE FURNACE COKE 1900-1917

coke for prompt delivery averaged $2.34; in 1914, $1.75; in 1915, $1.78; in 1916, $4.25, and in 1917, $8.90. Connellsville foundry coke for spot shipment in 1913 averaged $3.06; in 1914, $2.29; in 1915, $2.24; in 1916, $4.42, and in 1917, $10.51. Even these comparisons do not adequately emphasize the price situation in 1917 for the averages are brought down sharply by reason of the fact that the government prices, fixed greatly below those that prevailed in the open market, are necessarily taken into calculation. The wide ranges of prices can be appreciated by pointing out that spot furnace coke reached its lowest level the first week of May, when it was selling at $7 and its highest point during the week of July 5, when it commanded $15.50. Contract furnace coke was at its lowest level the first week in January, when it sold at $5, ovens. The highest price it commanded, $10, ovens, was during the week of July 12. Spot foundry coke reached its lowest point during the week of April 12, when it sold at $9.50, ovens, and its highest price, $15, ovens, during the week of July 12. Contract foundry coke sold at $6 at the opening of the year, which was its lowest price, and it reached its maximum level of $12.50 during the week of July 12, although it is understood that some tonnages for this delivery were closed in the greater Pittsburgh district at as high as $15. While there were fluctuations in prices, the general tendency was decidedly upward. Blast furnace interests as a matter of fact shortly after the first half of the year gave only secondary consideration to prices. Their great trouble was in obtaining supplies, although the movement was fairly free at this time.

On Oct. 25 the fuel administration fixed a price of $6, ovens, on furnace coke. There was an extreme reluctance on the part of most operators to sell at this figure and a general refusal to accept spot business. It was a common thing for the great portion of the operators to evade taking this business, by claiming they were engaged in filling contracts, which, of course, had been made at much more attractive prices than that fixed by the government. This was rather remarkable in view of the fact that only a short time previously it had been the practice to defer shipments on contracts in order to accept spot tonnages which in turn were sold at higher prices than those provided in contracts. In other words the operators who indulged in this practice had reversed their positions. There is still a marked hesitancy to close business at government prices and reports have been persistent that the food control act, regulating these prices, has been repeatedly violated through sales at levels above those established. This, of course, does not apply to all operators for a number of them, including the larger ones, have adhered strictly to the law. Blast furnace interests from time to time have complained to the fuel administration that coke operators were trying to obtain higher prices than those set.

On Nov. 5, the fuel administration reaffirmed the blast furnace coke price of $6 and established prices of $7 on 72-hour foundry coke, and of $7.30 on crushed coke over 1-inch size. These prices applied f.o.b. ovens, in car lots, net ton, and were effective on all coke made in ovens without by-product recovery east of the Mississippi river. The extra $1 on foundry coke and the extra $1.30 on crushed coke were fixed to clear up certain points and to enable producers to do business, it was announced by Director Blauvelt. On the following week, prices for by-product coke, except that produced in New England, were established as follows: Run of oven, $6; select foundry, $7; crushed 1-inch size, $6.50; these are base prices and to each is added the freight rate from the beehive district, which takes the lowest freight rate to the point where the by-product coke is produced. The sum of these two figures makes the quotations on the by-product coke f.o.b. cars at the by-product ovens to the consumer base, switching or freight charges to recover its transportation to his plant.

As a rule, coke prices in the east in 1917 were in conformity with those prevailing in the Pittsburgh district, excepting when car shortage on one road, as compared with others, resulted in a disparity. The highest price reached on eastern business was $16, at which large tonnages of furnace fuel were sold on the approach of the July 4 holiday. The continued difficulty in getting coke led to the placing of contracts for tonnages over long periods. In the early part of June a large melter closed for his foundry requirements up to July 1, 1919. This buisness went at $10, Connellsville ovens, for the last half of 1917; $9.75 for the first half of 1918; $9.50 for the last half of 1918, and $9.25 for the first half of 1919. Few contracts covering the entire year 1917 were made in the Pittsburgh and valley districts. In the latter districts, however, contracts on a sliding scale for the first half of 1918 were made. As a general thing these were on a ratio of five and five and one-half to one,

1917 Coke Prices

MONTHLY MINIMUM PRICES PER NET TON CONNELLSVILLE OVENS

Months	Furnace Prompt	Furnace Contract	Foundry Prompt	Foundry Contract
Jan.	$9.56	$7.25	$10.38	$6.38
Feb.	9.75	8.00	10.88	6.50
Mar.	9.90	7.60	11.30	6.90
Apr.	7.62	7.25	9.62	7.88
May	8.20	8.00	9.65	8.50
June	11.12	8.50	11.188	10.88
July	12.50	9.62	13.00	12.38
Aug.	13.20	10.00	12.70	12.50
Sep.	11.12	9.62	13.3125	12.50
Oct.	6.00	6.00	7.00	7.00
Nov.	6.00	6.00	6.60	6.60
Dec.	6.00	6.00	7.00	7.00
Av. for yr.	9.24	7.82	10.51	8.90

Virginia, West Virginia and Alabama Coke Prices

MONTHLY CONTRACT PRICES FOR THE YEAR 1917

	Wise County		Pocahontas		New River		Alabama	
	Furnace	Foundry	Furnace	Foundry	Furnace	Foundry	Furnace	Foundry
January	$5.39	$6.82	$5.36	$6.59	$5.44	$6.84	$6.35	$7.00
February	8.40	8.98	8.26	9.29	8.94	10.00	5.70	8.14
March	8.00	9.25	8.00	9.25	8.30	11.94	6.03	10.77
April	7.46	8.36	7.46	8.36	7.56	8.69	6.58	11.50
May	8.25	8.75	8.25	8.25	8.75	9.75	7.00	11.50
June	8.86	10.08	9.25	9.44	8.75	10.50	7.00	11.50
July	9.95	11.10	9.56	10.32	8.75	10.75	7.00	11.50
August	10.47	13.00	10.60	12.80	9.25	12.70	7.00	11.50
September	9.60	11.25	9.60	11.18	9.25	13.70	6.80	10.60
October	6.00	7.00	6.00	7.00	6.00	7.00	6.00	7.00
November	6.00	7.00	6.00	7.00	6.00	7.00	6.00	7.00
December	6.00	7.00	6.00	7.00	6.00	7.00	6.00	7.00

based on the price of basic iron, valley. The price of basic iron having been fixed at $33, furnace, contracts based on the former ratio call for delivery at $6.60 and on the latter ratio at $6.

Demand for both furnace and foundry coke was strong throughout the year in the south and justified the development and improvement at old and new ovens made in that section. The Gulf States Steel Corp. built 37 Koppers by-product ovens and the Woodward Iron Co. 60 Wilputte by-product ovens. The Sloss-Sheffield Steel & Iron Co. leased mines and bee-hive ovens at Sayre, Ala., and practically all coke producers in the district rehabilitated old plants. It is estimated that the output of coke for 1917 in Alabama alone was approximately 6,000,000 tons, a marked increase over production in 1916. Spot foundry coke sold at as high as $16 per ton. At the opening of the year this grade was selling at between $6 and $7, while some contracts at $4.72 still were in existence. There was a steady increase in prices and demand grew so rapidly that orders were reduced. Some of the new furnace companies had to go outside the district to get supplies with which to start their plants. Since the government price schedules have been in effect small lots have been sold.

By-product coke is the principal fuel used in the Chicago district by both blast furnaces and foundries. Throughout 1917 the supply of by-product coke in the west was much below requirements.

Rail Orders Decline Sharply in 1917

STEEL rail bookings in 1917, as foreshadowed by the record-breaking purchases in the preceding year, which included large tonnages for as far ahead as 1918, were comparatively small. The bulk of the large inquiries appearing in the year both from domestic and foreign sources, could not be accepted due to the greater need for other finished steel products for the war purposes of the United States and its allies. In fact, virtually every rail mill in this country during 1917 was pressed into the production of large rounds for shell manufacture. The extent to which rail mills were devoted to the latter class of production led to failure in many instances to make deliveries on old rail contracts so that large tonnages, in many cases booked 15 to 16 months ago, are going over for rolling in 1918. Prices as quoted by the leading makers were unchanged during the year at $38 for standard bessemer and $40 for standard open-hearth rails, but these figures were largely nominal during the last nine months. Some makers sold at much higher prices. The Colorado producer in June quoted $45 on open-hearth rails and about the middle of July it sold several tonnages to western roads for 1919 delivery at $50, mill. In November, while the trade generally was awaiting the establishment of a government price, one maker quoted as high as $75, mill, on an inquiry for 14,000 tons for the Texas & Pacific. Price variations also were reflected by small sales of standard rails. In April, lots of 300 tons or less for terminal and switch work and for crane runways and other industrial purposes were selling at $50 to $60, eastern mill. By December such lots were at $80 to $90 and in some cases 5c per pound was done up to 100 tons. In many cases, small tonnages of second quality rails brought the same prices as first quality. By the middle of the year, light rails, including sections weighing from 25 to 40 pounds were bringing around $70. Light rails at all times were as difficult to obtain as standard rails. On Nov. 20, when the market on light rails stood at all the way from $60 to $85, the general committee of the American Iron and Steel institute, in agreement with the government, established the price of light rails at 3c mill, or $67.20 per gross ton.

Outside of government requirements, the greater portion of the rails placed both from domestic and foreign sources during 1917, was entered prior to May. It is estimated that total bookings during the year were 1,250,000 to 1,500,000 tons, compared with 4,500,000 to 5,000,000 tons in 1916. Of the 1917 bookings, at least 200,000 tons were for export. The latter figure does not include the 150,000 tons of 80-pound rails which the United States government distributed in July for the construction of a military railroad in France. Of this business, 90,000 tons went to the United States Steel Corp. and the remaining 60,000 tons to independents, all at a tentative price of $40, mill. Shipments of most of this tonnage were completed by Oct. 1. The government, in August, divided an order for 23,000 tons of 25-pound rails equally between the Lakewood Engineering Co. and the Lorain Steel Co., for military use in France. During October and November, at least 60,000 tons were placed by the government for federal shipbuilding establishments, quartermasters' supply depots and similar plants in this country.

At the beginning of the year, the Pennsylvania railroad had an inquiry out for 205,000 tons for 1918 but this was withdrawn in January. In March, this road placed 68,232 tons, half of which went to the United States Steel Corp. and the remainder to the Bethlehem Steel Co., the Cambria Steel Co. and the Lackawanna Steel Co. All this tonnage was placed at $40.80, mill, an extra of 80 cents being charged for a nick and break test. In October, the New York Central secured reservations for 150,000 tons for 1919, although no formal contracts were made; half of this business was booked by the United States Steel Corp., and the remainder by independents. These were the heaviest domestic orders placed during the year. At the close of the year, heavy inquiries were pending, principally for 1919 delivery. Many export inquiries came into this market during the year; Russia asked 200,000 tons, England 40,000 tons, and Sweden 25,000 tons. Good sized inquiries came from Cuba, Denmark, Porto Rico and other foreign sources but they did not result in business. The largest inquiry which came out was from the Persian Gulf & Mesopotamia Co., of London, which requested prices on 232,000 tons of 65-pound rails to British specifications, together with complete railroad equipment. France placed around 125,000 tons of rails and light rails and Italy 40,000 to 50,000 tons in 1917. Exports of rails from this country during the first 10 months of 1917 totaled 422,453 gross tons compared with 442,202 gross tons for the same portion of 1916.

Definitely reported rail orders, by months for recent years, compiled by THE IRON TRADE REVIEW follow:

	1917	1916	1915	1914
Jan.	175,000	200,000	200,000	175,000
Feb.	170,000	140,000	150,000	215,000
Mar.	140,000	800,000	160,000	60,000
Apr.	185,000	800,000	65,000	60,000
May	75,000	75,000	140,000	110,000
June	10,000	125,000	225,000	215,000
July	195,000	500,000	240,000	130,000
Aug.	50,000	100,000	145,000	70,000
Sep.	175,000	50,000	325,000	40,000
Oct.	100,000	325,000	590,000	30,000
Nov.	25,000*	500,000	150,000	115,000
Dec.	.....	500,000	200,000	30,000
	1,300,000	4,115,000	2,590,000	1,250,000

*Estimated.

Home Output Meets Ferro Demand

Falling Off of Imports and Obstacles to Bringing in Foreign Ore Cause Difficulties to Steel Industry and Lead to Record Domestic Production—Spiegeleisen is Substituted for Ferromanganese—Spot Prices Soar

IN THE face of difficulties which on some occasions produced a dubious outlook American ferromanganese production again rose to the nation's requirements in 1917. Imports fell off nearly 50 per cent as compared with 1916, but the domestic output increased 20 per cent, reaching the record-breaking total of about 328,000 tons. Prospects for an insufficient supply became grave at times during the year, but, due in considerable measure to a conservation policy adopted by the trade, there was enough constantly to go around. Imports of ferromanganese from England showed a consistent falling off throughout the year. English offerings, with the exception of sales of a few hundred tons in June, practically ceased in April as a market factor. This development, combined with the difficulty in securing vessels for bringing in manganese ore, gave such concern, that in May, a committee of ferromanganese makers and dealers was organized to mobilize the situation. This committee took a census to show the requirements of individual consumers, the stocks held by consumers and dealers, the total output of the country and the probable imports. Although the census showed the supply on hand was sufficient to meet the country's requirements for three months, steps were instituted to safeguard this stock. Among the recommendations made was the substitution of spiegeleisen for ferromanganese wherever practicable. The carrying-out of this recommendation by many consumers was a factor leading to an increase toward the end of the year in the amount of metal available in the market. Ferromanganese and the other ferroalloys were among the few products in the iron and steel industry not affected by government regulation of prices. At the close of the year, the application of price control to the ferroalloys was regarded as among the remotest of possibilities. Such price-fixing, owing to our dependence upon foreign ores, necessarily would be to some extent an impracticable undertaking.

Eastern furnaces, because of their accessibility to tidewater ports, made a large percentage of the domestic ferromanganese during 1917, particularly that which was disposed of in the open market.

Those makers who engaged in the manufacture of either ferromanganese or spiegeleisen during 1917 were as follows: Illinois Steel Co., Joliet; Miami Products Co., Chicago; Bethlehem Steel Co., Sparrows Point, Md., and Lebanon, Pa.; American Manganese Mfg. Co., Dunbar, Pa.; Carnegie Steel Co., Pittsburgh; Juniata Furnace & Foundry Co., Newport, Pa.; Lebanon Blast Furnace Co., Lebanon, Pa.; New Jersey Zinc Co., Palmerton, Pa.; Colorado Fuel & Iron Co.; Donner Steel Co., Inc., Buffalo; Seaboard Steel & Manganese Co., Temple, Pa.; Tennessee Coal, Iron & Railroad Co., Bessemer, Ala.; Berkshire Iron Works, Sheridan, Pa.; Wharton Steel Co., Wharton, N. J.; E. J. Lavino & Co., Watts, Pa.; E. E. Marshall, Harrisburg, Pa.; Oriskany Ore & Iron Corp., Lynchburg, Va.; Southeastern Iron Corp., Goshen, Va.; and John B. Guernsey & Co., Inc., Graham, Va.

Prices on spot ferromanganese equaled but did not surpass the record-breaking level which prevailed in March and April of 1916. The market in January opened at $175, and the price increased rapidly until in April, spot carloads were bringing all the way from $400 to $450, delivered, which was the highest level of the year. In July, when general market regulation by the government first definitely was foreshadowed, demand for all ferroalloys was reduced to a minimum owing to the uncertainty as to how such regulation would affect values. The continued dullness of demand led to a decline which at first was easy and later became headlong. The bottom was reached in November, when spot ferromanganese was selling at $225 to $250, delivered. Unofficial assurances that prices on ferroalloys would not be controlled, at that time led to an improvement in demand, which in conjunction with the great difficulty in obtaining vessels for importing manganese ore, strengthened the tone and advanced prices. Early in February, domestic makers were quoting first half at $200 to $250, third quarter at $200, and last quarter at $185. On March 1. the second quarter price was $275 to $300, third quarter $225 to $275, and fourth quarter $200 to $250. Early in July, $400 to $425 was quoted for shipment over the remainder of the year, $375 to $400 for first quarter, and $350 for first half. About the middle of August, $375 to $400 was quoted for the remainder of 1917, and $350 for the first quarter and first half of 1918. About the middle of November, $225 to $250 was quoted for all deliveries. By the middle of December, the market on all deliveries had strengthened to a minimum of $250.

On English ferromanganese the price in January was $164, seaboard, at which time a large tonnage was sold for the last three quarters of the year. Early in February, additional tonnage was sold at this price and an advance then was made to $185, at which at least 5000 tons were marketed for last half. Late in March, several tonnages were sold for second quarter at $205, which was followed by moderate sales at $210. Several hundred tons were sold about the mid-

Imports and Domestic Production of Manganese Alloys; Imports of Manganese Ore

	Production		Imports		Imports
	Ferro-manganese	Spiegeleisen	Ferro-manganese	Spiegeleisen	Manganese ore
1917	328,000	*187,000	*51,800	.....	*663,500
1916	275,204	187,233	90,928	.....	576,321
1915	144,260	114,556	55,263	200	313,985
1914	100,731	76,625	82,997	2,870	283,294
1913	119,495	106,980	128,070	77	345,090
1912	125,378	102,561	99,137	1,015	300,661
1911	74,602	104,013	80,263	20,970	176,852
1910	71,376	153,055	114,228	25,383	242,348
1909	82,209	142,831	88,934	16,921	212,765
1908	40,642	111,376	44.624	4,579	178,203
1907	55,918	283,430	87,400	48,994	209,021
1906	55,520	244,980	84,359	103,268	221,260
1905	62,186	227,797	52,841	55,457	257,033

*Estimated.

dle of April for first quarter of 1918, at $230, and late in June several hundred tons for first half were disposed of at $375. The last sale was of a small tonnage, which went at $400 in July, for shipment in November. This business was booked subject to the granting of licenses by the British authorities. Up to the end of March, English makers managed to ship enough ferromanganese to fill their contracts, but in April, the amount of metal for which licenses were granted was only about 50 per cent of the tonnage for which permits were secured in January, and from then on it became increasingly difficult to secure such permits. In April, the British ministry definitely adopted a policy of refusing to grant further licenses for ferromanganese, except when exported for use by consumers making steel for the allies. It is known that at least 5000 tons, and probably a good deal more, of English ferromanganese was sunk by submarines while en route to this country.

Spiegel Prices Not So High

Spiegeleisen prices did not compare with those established in 1916, and in fact, the figures obtained for this metal were low when contrasted on the unit basis with those obtained for ferromanganese. Substitution of spiegeleisen for ferromanganese therefore not only was advisable for the conservation of the latter, but it resulted in economies to some buyers. The market on spiegeisen in the year opened strong at $55 to $60, furnace. In February, first half prices were quoted at $65 to $75, furnace. Deliveries after July were quoted at $60 to $65. As early as March, inquiries began to come out for 1918, and during that month prices generally prevailed at $75 for shipment prior to Oct. 1 and $60 for beyond. In April, quotations on fourth quarter varied from $60 to $65, but prices on this position were advanced so that by the middle of April, $75 was being asked for the entire year. In May, about 5000 tons of 20 per cent English spiegeleisen were sold at $79, tidewater, for forward delivery. The highest prices reached were in June, when the market on spot was quoted at $85 to $87.50, furnace, with last half at $82 to $85, and first half of 1918 at $75. During the second half, prices declined first slowly and then rapidly until about the middle of November, as low as $59, furnace, for this year and 1918 was done. In December, prices showed a firmer tendency, with $60 as the minimum for all deliveries.

Difficulties in obtaining manganese ore were encountered throughout the year and led to the payment of record prices. While ore, as usual, was obtainable in any quantities at its sources, the great problem was to secure ships for its transportation here. In many cases, it was impossible to secure vessels even by offering fabulous freight rates. On one typical occasion, a seller in this country chartered vessels successively only to have them commandeered and it was not until he had engaged the tenth vessel, that he was able to bring over a cargo of Indian ore. In November and the early part of December, the question of vessels became particularly acute, owing to the great need for vessels for carrying supplies to Italy. At the beginning of the year, Indian and Brazilian manganese ore were sold at 72 and 73 cents per unit at tidewater for second quarter delivery. In the latter part of February, spot Brazilian sold at 73 cents and cargoes leaving India during the first quarter went at 75 and 76 cents per unit at tidewater. At the beginning of April, Brazilian ore sold at 87½ cents per unit for manganese and 10 cents per unit of iron, at tidewater. By August, the maket on foreign ore had reached a minimum of $1.15 per unit at tidewater and from the middle of that month until the end of October, the prevailing prices were $1.20 to $1.25 per unit at seaboard, the highest figures ever known. Early in December, Indian ore for 1918 was sold at $1.10 per unit. Several sales of Brazilian ore were made about that time on the basis of 65 to 70 cents, f.o.b. Rio Janeiro, leaving to the buyer the question of securing shipping space. On domestic ore, the base price was advanced in May from 80 cents to $1 per unit and this price further was advanced on Oct. 25, to $1.20, delivered at consuming points for 50 per cent ore and higher, with differentials for ore having a lower manganese content. Not all the difficulties originated in the shipping situation. In the early part of the year, practically all Cuban manganese ore operations were shut down due to lack of men, damage to property and interference with insurrection in that country. By May, transportation resulting from the inhowever, the Cuban production was being maintained under better conditions and the important mines were being worked under the protection of troops furnished by the Cuban government. In Brazil, car and labor shortages occasionally caused considerable delay in the bringing down of ore and the loading of vessels.

Domestic mining of manganese ore was stimulated greatly by the high prices prevailing and the production was comparatively large. The government is lending its efforts to broaden the home supply of ores for the manufacture of manganese alloys.

Fifty per cent ferrosilicon was scarce all through the year, and during the first four or five months, was almost unobtainable. During that time some melters, not being able to obtain the usual quantities, paid 25 cents per pound for small emergency lots. At that time, the commandeering of power by the Canadian government at Niagara Falls, held output in that district to approximately one-third of capacity, forcing producers to cut down their contract shipments and preventing them from offering spot. For the occasional carloads which were offered from various sources during the first half, it was easy to obtain $250, and in some cases as high as $265 was paid. Concerned over the scarcity, some consumers, as early as June, placed contracts for first half of 1918 at $140, delivered. Later in that month first half became established at $130. Early in July, the supply became easier, and prompt and the remainder of the year could be done at $225, which gave way toward the latter part of the month, to $200. In October and November spot was more plentiful and as low as $150 was done. In December, however, prices showed a stronger tendency. Bessemer ferrosilicon brought high prices in the latter part of June, when as high as $105, furnace, was paid for 11 per cent. A general strike in the Jackson, O., district, temporarily was accompanied by a severe curtailment in production during May.

Prices Vary Widely

Average contract prices of ferromanganese at seaboard during 1916 and previously, and delivered during 1917, are as follows:

	1917	1916	1915	1914
Jan.	$175.00	$110.00	$68.00	$36.00
Feb.	192.50	140.00	100.00	38.00
Mar.	212.50	175.00	100.00	38.00
Apr.	250.00	175.00	100.00	38.00
May	375.00	175.00	100.00	38.00
June	400.00	175.00	105.00	37.50
July	400.00	175.00	103.00	37.50
Aug.	387.50	170.00	105.00	100.00
Sep.	380.00	164.00	110.00	80.00
Oct.	300.00	160.00	105.00	66.00
Nov.	247.50	155.00	100.00	66.00
Dec.	.....	162.50	100.00	68.00

Average monthly prices for 20 per cent spiegeleisen, furnace, for the past three years have been as follows:

	1917	1916	1915
January	$57.50	$32.50	$25.00
February	66.25	42.50	25.50
March	77.50	55.00	26.00
April	76.75	60.00	26.00
May	78.00	60.00	26.00
June	83.00	55.00	26.00
July	85.00	47.50	26.00
August	81.25	47.50	26.00
September	80.50	45.00	29.00
October	73.50	40.00	30.00
November	63.25	45.00	30.00
December	.....	50.00	30.00

Shell Steel Demand Crowds Market

Addition of United States to List of Belligerents Increases Difficulties of Mills in Filling Ordinary Requirements—Prices Advance to Record-Breaking Peak in July Then Soften as Government Regulation Appears

HUGE demands for semifinished products were made upon rolling mills throughout the country during 1917. Makers enter the new year with their books so completely filled that many consumers are left without tonnages and no prospect of getting them. The United States having become a belligerent, capacities already taxed heavily were strained to the utmost to meet the vast new requirements which were given precedence. These, together with the great tonnages taken by the entente, pushed domestic buyers in the background and only by giving the most careful consideration to the wants of their regular customers were the mills able to approach a satisfactory distribution of their output. They were compelled to withdraw from the market leaving unsatisfied many heavy requirements which consumers eagerly sought in vain to cover.

Features of extraordinary and unexampled character prevailed in the market. Prices reached unprecedented levels and it is not possible to say how they would have gone had it not been for government regulation. Billets advanced 66 per cent and sheet bars 75 per cent in the year. Demand was made for all kinds of tonnages from ¾-inch to 16-inch rounds for the manufacture of shrapnel to heavy blooms. In November practically 1,500,000 tons of various-sized rounds and billets for shell making were awarded to steel mills, under the allotment plan followed by the American Iron and Steel institute.

The order was sub-divided and consisted of shell-body steel to be used for shells ranging from 0.4-inch to seacoast size; also between 40,000 to 50,000 tons of cold rolled steel for fuses, and between 4500 to 5500 tons of deep drawing steel for adapters. Shipments of the aggregate order are being made at the rate of between 200,000 and 225,000 tons monthly. At the same time the institute committee also distributed orders for 4.2 and 6-inch shells for one of the allied governments.

The exceptional demand for all finished products prevented most steelmakers from marketing as great a proportion of their semifinished output in the year as in normal periods. So acute was the scarcity that many plants, especially those consuming forging billets, had to close down occasionally or curtail their schedules because of their inability to obtain raw material.

At the outset of 1917 mills were taking but little business, being filled to capacity for the first quarter. Specifications against contracts were heavy and consumers were concerned over deliveries. In the Pittsburgh and valleys districts traffic conditions were particularly bad and users of such tonnages as sheet bars and billets suffered from deferred shipments. Shell steel orders were pouring into the mills in all districts and had to be given immediate attention, thus complicating the situation. Orders of from 100,000 to 150,000 tons of shell steel were placed with valley makers the second week in January. Still heavier tonnages were placed in the Pittsburgh district, and proportionate amounts went to other producing centers. In the valleys at that early date, shell discards in 500 to 1000 ton-lots and more were sold at $43. In the east open-hearth rerolling billets were sold at the opening of the year at $60, mill; shell discards at $45, mill; and skelp at 4c to 4.25c, mill. Levels in the Pittsburgh district were on a similar basis. Bessemer and open-hearth sheet bars, at $60 to $65, and wire rods at $80, Pittsburgh, were in great demand at the beginning of the year. Muck bar commanded $50, Pittsburgh.

July Shows Highest Prices

Wire rods were sold around May 1 at $85, mill. A great portion of the tonnage was for export. The highest level was reached in July, when the minimum average was $95. Open-hearth and bessemer sheet bars and billets also reached their highest prices that month, with an average of $105 and $100 respectively. Forging steel went as high as $130.

Rerollers for export commanded $78, New York, early in May and were sold at about the same level for domestic use. Forging billets then were selling at $90, delivered eastern Pennsylvania. About the middle of May, rerollers were sold by an eastern maker at $90, delivered eastern Pennsylvania, and forging billets were advanced to $115, while slabs were sold in the east by a Pittsburgh mill at $85, Pittsburgh. At the same time shell discards were being sold in the east at around $55, Pittsburgh and Youngstown. By the middle of February makers in the Pittsburgh and valleys districts were selling forging billets at $100. Virtually every consumer in western Pennsylvania and eastern Ohio was after tonnage for the second quarter.

Toward the middle of the year it was rather difficult to sell shell discards in the east at $55, Pittsburgh, and as prices for scrap were reaching record-breaking levels, several mills began remelting a portion of their discards. Some tonnages were sold at $48 and $50, mill. By the middle of June, sales of open-hearth slabs were made around $110, eastern mill, and forging billets at $125. In July bessemer wire rods were sold for export at $93 to $94, New York; open-hearth rods for France at $95, New York, and rerolling billets commanded $90 to $100, delivered eastern Pennsylvania. Early in August prices in the east went up to $140, delivered, on forging billets and rerollers commanded $115. Muck bar was sold at $75, Pittsburgh. Then the market began to soften. During the two or three weeks before prices were fixed, French buyers closed for about 25,000 tons of open-hearth wire rods around $88 to $92, New York. Sales were made rather freely at this time by Pittsburgh and valley producers, soft basic rods going around $85 to $87, while high carbon rods were sold around $95, Pittsburgh. Rerolling billets for export were sold at $95 and higher, eastern Pennsylvania, and at equivalent prices in western Pennsylvania and eastern Ohio.

Difficulty was experienced during all of 1917 in obtaining billets and sheet bars, especially the latter. Toward the close of the year finishing mills were combing the market in a futile attempt to obtain tonnage. Mills in Pittsburgh and the valleys quoted billets and sheet bars at $65 to $70 early in February for shipment in April, May and June and received a heavy demand. They had but little tonnage available for early delivery. By March 1, practically all makers had sold their sheet bar and

billet capacity for second half. Toward the latter part of March billets and sheet bars, both open hearth and bessemer, were sold at $70 to $75, mill. Soon after open-hearth sheet bars took a sharp upward turn and early in May commanded $90 for prompt delivery. About one week later they were sold at $100. Billets had advanced to $75 and $80 by early May. In the mid-month lots of 1000 tons of open-hearth sheet bars were sold by Pittsburgh makers for third quarter at $95 and $100. A finishing mill in the Pittsburgh district at that time paid $95 for ordinary soft steel 4 x 4-inch bessemer billets. An inquiry was out then for 61,000 tons of round billets for export to foreign shellmakers and the business was said to have gone to Pittsburgh and valley producers.

Shortage of steel and lack of vessel space made it unusually difficult to place export business during 1917. By June it was estimated that at least 500,000 tons of semifinished steel had accumulated at Atlantic ports due to insufficiency of cargo space. In most cases where shipment was made to a port, the steel could not be taken aboard because the vessel space that had been reserved for it had been reassigned at the last minute to food or other supplies. Necessarily the difficulty in moving steel lessened the export demand since buyers realized it was a waste of effort to order steel if it could not be shipped. Numerous lots of shell steel were placed by French, British and Italian buyers. Large inquiries came from Russia.

Limited offerings of semifinished steel have been made since the fixing of prices. Various sales of sheet bars at $51, Pittsburgh and Youngstown, of slabs in the east at $50, Pittsburgh, and of open-hearth rerollers at $47.50, Pittsburgh, were made, however. Prices established by the government represented sharp reductions from those that had prevailed in the open market. Levels for bessemer and open-hearth billets and sheet bars were fixed at $47.50 and $51, respectively, Pittsburgh and Youngstown; for No. 5 wire rods at $57, Pittsburgh, and for grooved and sheared skelp at 2.90c and 3.25c, Pittsburgh, respectively.

Tin Plate Mills Meet War Demands

TIN PLATE makers are entering the new year with complete confidence that they can meet the enormous demands that have been and are being made upon them. With new mills put into operation in 1917, the theoretical maximum annual tin plate capacity of coated tin mill products is approximately 38,000,000 base boxes, or about 2,000,000 net tons. Although export demand is extremely heavy when compared to the tonnage that went abroad prior to the war, it is relatively small when considered in connection with the output. In the first nine months of 1916 exports of tin and terne plate totaled 172,687 gross tons, as against 179,147 gross tons for the same period in 1917. There are obstacles that may curtail production of tin plate in 1918 to a point below requirements.

Books were opened by producers in November for first half business, which was closed at the government price of $7.75 per base box, bessemer or open-hearth. With the mills supplied sufficiently with steel, tin, palm oil and sulphuric acid and labor conditions satisfactory, there will be no lack of tin plate. The price of $7.75 is the highest at the opening of any season in the history of the American tin plate industry and is 25 cents a box over the price at which books were opened on April 4, 1917, for last half. Preceding this latter price was that of $5.75, at which the American Sheet & Tin Plate Co. opened its books on Oct. 12, 1916, for delivery during the first half of 1917. Independents had opened books on Oct. 7, 1916, at $6 for first half delivery.

Demand for tin plate in 1917 from all parts of the world, with resultant unprecedentedly high prices, not only attracted more capital and caused more mills to be built, but led existing plants to tin a much greater proportion of their black plate production than is ordinarily the case. The bureau of foreign and domestic commerce, department of commerce, in a statement issued last fall, said this practice will be followed in 1918, judging from figures made public by the tin-plate conservation committee.

War Demands are Heavy

Heavy demand for tin plate for strictly war purposes has come to makers. All small cartridges are partitioned with tin plate and then they are enclosed in a tin box and soldered up air and watertight. The larger shells are placed in individual cans, a 3-inch shell, for example, being sealed in a can 3 inches in diameter by 18 inches long. This is only one of the many demands being made on tin plate outside of the food consuming trade.

In the food trade, increased demand has been phenomenal. For instance, milk, one of the most essential army rations, is being packed in tremendously increased quantities; one concern which bought 18,000,000 cans from the American Can Co. in 1916, had purchased 19,000,000 cans up to May 1, 1917, according to President H. W. Phelps, and on May 1 placed specifications for 68,000,000 cans more to cover the remainder of 1917 requirements.

At the beginning of 1917 makers declined to book contracts for shipment after July 1. Prices as high as $8 and $8.25 per base box were received by the middle of February and kept advancing. Sales for export were made in July at fabulous levels which went up to $20 and $22. These prices were obtained by second hands principally. The highest average monthly price was in July at $10, which was maintained through August, September and October, although most makers were out of the market after July. Shipping orders for more than 300,000 boxes for export were given early in December against 500,000 boxes which had been allotted previously.

New capacity that went into operation in 1917 included six mills of the Wheeling Steel & Iron Co., Yorkville, O.; 10 mills at the New Castle, Pa.; 10 mills at the Farrell, Pa., and 24 mills at the Gary, Ind., plants of the American Sheet & Tin Plate Co., and 12 mills at the Sparrows Point, Md., plant of the Bethlehem Steel Co. On March 1, the Liberty Steel Co., Warren, O., will begin to make shipments from an eight-mill plant. The American Steel Co., Waynesburg, Pa., remodeled and put into operation four mills. This makes a total of 74 hot mills with an annual capacity of approximately 5,920,000 base boxes. Some of the mills also increased their tinning capacity, including N. & G. Taylor Co., Philadelphia; Trumbull Steel Co., Warren, O.; Phillips Sheet & Tin Plate Co., Weirton, W. Va.; Carnahan Tin Plate & Sheet Co., Canton, O., and the American Sheet & Tin Plate Co.

The bi-monthly sheet and tin plate sliding wage scale settlements made at Youngstown on Nov. 12, showed an average realized price of $8.10 for tin plate. The wage rate for November and December was $0.903 per 100 pounds, the highest ever paid, compared with $0.527 for January and February, and $0.848 in September and October.

Plates Bear Heaviest War Burden

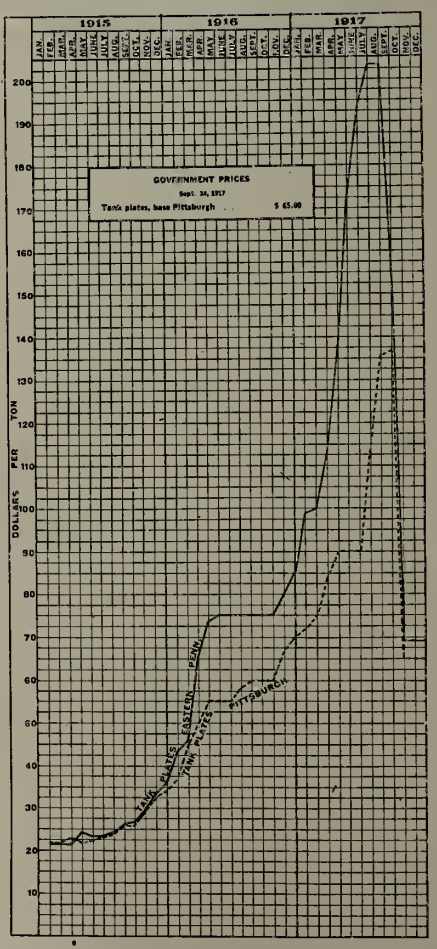
Mills Are Choked by Worldwide Demand at Phenomenal Prices Until Called Upon by Government to Furnish Huge Preferred Tonnage for Ships and Other Military Needs at Greatly Reduced Level

STEEL plates were elevated to a new dignity in 1917. While large tonnages of all kinds of finished steel products were required for war purposes, it was on the country's tremendous capacity for rolling plates that the government was able to rely basically in formulating its shipbuilding program. Plate orders placed by the end of the year for use in shipbuilding, for carrying out the naval schedule, for cars, locomotives, mines, tanks, and countless other direct and indirect war requirements, were absorbing at least 75 per cent of the entire output. Numerous mills, in fact, were operating 100 per cent on government work. Toward the end of the year, government requirements had grown to such volume that they dominated the entire market, and other needs, when the mills consented to accept them, were booked subject to the understanding that government work would be handled first.

All through the year and particularly in the first half, demand was of such proportions as to stagger the imagination. Nothing like the huge inquiries then current, which were utterly beyond the capacity of the mills to book, existed in the memory of the oldest veteran in the industry. During this period the mills thought it unusual if they did not decline to consider inquiries totaling on an average of 100,000 to 200,000 tons weekly. This demand came not only from all kinds of consumers whose requirements had been greatly augmented directly or indirectly by war conditions, but particularly from shipyards in all quarters of the globe which were trying to meet the tremendous demand for ocean tonnage. As early as January orders began to be placed for 1918 and by the end of the first quarter few mills had anything left to sell for 1917. New offerings did not lose their terrific momentum until about the middle of the year. By that time the shipbuilding industry in this country had become nationalized and shipyards were beginning to look to the government instead of to the mills direct for their supply of steel. The mills from that time on discouraged new demand wherever possible, due not only to their already sold-up condition, but also to their desire to hold themselves in reserve for government wants. Plates became so hard to get that structural fabricators even found it impossible in many cases to secure protection on which to base estimates for new construction work they wished to bid for.

Export Shipments Checked

The foreign demand was restricted automatically by the working of the export license policy which became effective July 14, and plate shipments abroad practically ceased on Aug. 15, when the export embargo became operative. The effect of the embargo was particularly drastic with respect to Japan. It was estimated in August that shipments of fully 400,000 to 450,000 tons of steel for that country, of which plates comprised the greater portion, were held up by the embargo. As it was considered likely that arrangements would be effected between the American and Japanese governments whereby steel again would go forward to Japan, many Japanese buyers had tonnages shipped from the mills to the Pacific coast points, in order that they might be available for quick shipment. As a result of this movement, particularly of plates, the accumulation of finished steel at Pacific coast terminals became so acute that in November the railroads embargoed further shipments of this character. Through the United States government further large orders continued to be placed for our allies although they constituted only a fraction of the tonnages that were wanted. For instance, toward the close of the year, England, France and Italy urgently were endeavoring to secure reservations here for a total of at least 1,000,000 tons of plates for delivery in 1918.



TANK PLATE PRICES 1915-1917

Up until the second half, prices almost each week became established at a new record level. The highest prices were those in May and June, when the minimum on tank plates was 10c, Pittsburgh, for any delivery. Prices on Lloyd's specification ship plates then ranged all the way from 11c to 12.50c. Marine steel, United States standard, sold in round tonnages at as high as 20c and round tonnages of Lloyd's boiler steel changed hands at 15c. Tank plates were so difficult to obtain that all kinds of fancy prices were offered and in July moderate tonnages were sold in exceptional cases as high as 12c. The price established a high record.

Shortly after the entrance of the United States into the war, a special price of 2.90c, Pittsburgh, was agreed upon for application to plates for the naval program, which then totaled 610,000 tons of plates, shapes and bars, and this business was distributed among the mills through a general committee of the American Iron and Steel institute in proportion to their capacity. Later other large tonnages for the government were distributed through the same medium, but at prices to be determined in further conferences between the steelmakers and the government. On Sept. 24, the agreed price was fixed at 3.25c, for application not only to government orders but to general domestic business. Several large makers expressed satisfaction

with the 3.50c price, but numerous smaller mills and also some of the large makers whose production is made up largely or wholly of plates, complained that they would be unable to come out whole at the new price. In conjunction with the export embargo, the 3.25c price worked considerable hardship to some of the mills that had large orders on their books for Japan and other countries. In many cases, these plates were rolled from high-priced raw material which made it impossible to resell them without a loss. Accordingly, some of the plates which originally were sold for export were resold at the highest prices the sellers could get. These ranged in September and October from 6c to 8c. By the end of the year it appeared that practically all of this tonnage had been cleaned up.

Sell at Fixed Price

For the first two or three weeks after the 3.25c price went into effect the mills generally refrained from offering at the new figure. Toward the end of October, however, limited tonnages, principally of universal plates, were sold and a number of the mills, finding that government requirements would not take up all of their output, booked some first quarter contracts at 3.25c. Such business was taken only from regular customers, and subject to the understanding that government requirements in all cases must receive prior consideration.

Chicago Made Basing Point

A feature of the price agreement was the adoption of Pittsburgh and Chicago as common basing points. One disadvantage worked by this innovation was that mills shipping to distant points were required to base their quotations on the one of these two centers nearest the destination of shipment. For instance, eastern mills which received orders from the Emergency Fleet corporation to ship plates to Chicago for fabrication into ship steel, were instructed to quote 3.25c, Chicago. The ordinary method of quoting on such business, of course, would be on the basis of mill or Pittsburgh, the consignee to pay the freight.

Car and locomotive building under the impetus of war requirements of the United States and its allies assumed again large proportions during 1917, although the car orders placed did not total as large as for 1916. The government alone during the last half of the year placed 2014 locomotives for use in connection with our military operations in France. The largest buyer of cars also was the United States government, which placed 28,029 cars. All of these excepting 57 were for use in France. Orders were placed here for 40,200 cars for Russia, 12,000 for France, 572 for Java, 750 for Spain, 45 for Cuba, etc.

Car Orders Light

Total car orders placed with American builders by months as compiled by THE IRON TRADE REVIEW for the past several years are as follows:

	1917	1916	1915	1914
Jan.	15,000	21,700	2,500	13,000
Feb.	7,750	12,900	4,000	9,000
Mar.	21,500	8,750	1,100	7,500
Apr.	4,250	7,000	1,500	10,000
May	15,000	4,225	18,000	6,000
June	8,200	1,300	17,000	15,000
July	8,650	2,600	9,500	7,000
Aug.	13,000	15,025	3,000	1,100
Sep.	1,100	15,500	9,000	100
Oct.	42,800	26,000	22,500	50
Nov.	10,000	37,000	11,500	500
Dec.	1,000*	19,600	10,400	2,000
Total ...	148,250	171,600	110,000	70,250

*Estimated.

Year's Wire Needs Exceed Mill Output

MAKERS of wire and wire products entered 1917 with prices at $3 a keg, base Pittsburgh, to which they had been advanced Nov. 24, 1916. This advance represented $3 per ton. The mills then were sold up for several months and specifications against contracts were heavy. Demand continued to be extremely active, although the market was less excited during the latter part of January than it had been 30 or 60 days previously. Cut nails commanded $3.50 a keg the last week of the first month by several of the more prominent makers. Export demand for barbed wire was heavy during the early months but had fallen off greatly until during the last quarter this demand was light. One demand involved 100,000 tons from Russia.

On March 5 the price of nails was placed at $3.20 a keg, an increase of $4 a ton. The leading maker continued to quote this figure for several months. Demand for nails, plain wire, fencing wire, manufacturers' wire and wire rods was heavy and kept on this plane during the entire year. The requests for tonnages came principally from the allies and South America, while the United States government also was a considerable factor. Domestic requirements also involved heavy tonnages and makers succeeded moderately well in taking care of regular customers.

In October, the American Steel & Wire Co. increased prices $6 per ton, advancing wire nails per keg to $3.50, Pittsburgh, and fixing the price of plain wire at $3.25 per 100 pounds, Pittsburgh. The independents for some months since had been selling nails at $4 and other products at corresponding levels over the figures of the American Steel & Wire Co. The latter producer virtually was out of the market for a large portion of the year, owing to heavy bookings taken from the government and from its regular customers. When the government named a figure of $3.25, Pittsburgh, on plain wire in November all makers adjusted prices accordingly. The fixed price on plain wire was followed within a short period by announcements of $3.50 per keg, Pittsburgh, on wire nails, and $3.65 per 100 pounds, Pittsburgh, on painted barbed wire.

Italian Government Buys

In May, the Italian government gave the United States Steel Products Co. an order for 40,000 tons of barbed wire and 5000 tons of plain wire. All through the year there was an active demand from abroad and large quantities of all kinds of wire products, principally plain wire, barbed wire and wire nails, were sold to France and to a smaller extent to Japan and South American countries. Russia several times had out large inquiries for plain and barbed wire but nothing ever came of these. Toward the end of July the government, through the subcommittee on wire products, distributed orders among eight leading makers for 16,000 kegs of nails for the 16 national army cantonments. Later more nails were distributed for the cantonments and also for the various aviation and national guard encampments, and in addition, for United States military construction in France. The grand total appears to have been about 130,000 kegs. About the same time orders were allotted by the government through the wire rope committee for large quantities of wire rope. Orders for several million dollars worth of insulated wire for the signal service also were distributed through the wire and cable committee of the advisory commission of the council of national defense.

Sheetmakers Endure Trying Year

Shortage of Steel and Labor and Inadequate Traffic Conditions Hamper Production When Demands Augmented by War Necessities Reach Tremendous Scale—Much Tonnage Sold for First Half of 1918

MILITARY requirements took enormous tonnages of sheets in 1917. Mills devoted large portions of their capacities to government needs. The percentage of federal tonnages appeared especially large because it was placed on top of domestic orders which had congested the mills. As in all lines of iron and steel, prices reached unprecedented levels. The year entered on a rising market and it advanced sharply up to July, when price-fixing by the government first was discussed. In reality a runaway market prevailed. Combined with demands for the military purposes of the United States and the entente allies, there was an active domestic inquiry during most of the year. But it was not fully met at some period. Sheetmakers were unable to take care of all private business because of war demands. They were forced to curtail production at intervals owing to a shortage of steel, bad traffic conditions and a lack of labor. Shortage of steel now is greatly interfering with operations, which are being maintained at not over 70 per cent of capacity. Many customers will have to go without adequate tonnages for the first half of 1918. Sheet contracts for that delivery are estimated at about 900,000 tons, mostly for domestic use. Producers of nonessentials have been cut off the list of buyers by the sheet manufacturers and others have been unable to make contracts for tonnages.

Prices Go Up Steadily

In the Pittsburgh district the market early in January, 1917, was quoted at 4c to 4.75c for No. 10 blue annealed sheets; black at 4.50c to 5.50c for No. 28 black, and at 6.50c to 7.50c for No. 28 galvanized. The highest levels were reached in July, when the average minimum prices on these grades were 8.50c, 9c and 10.25c, respectively, Pittsburgh. These figures held throughout August, but there was a slight recession in prices of black and galvanized sheets in September. The market softened considerably in October, shortly before government prices were established. Foreign orders were taken frequently at prices considerably higher than those prevailing in the domestic market. At the opening of 1917, makers of farm machinery and electrical equipment asked the mills to reserve tonnages for the second half and were not much concerned about prices. No producers at that time, however, had opened their books for delivery after July 1.

The American Sheet & Tin Plate Co., April 4, opened its books for second half, and during the month sold practically all of its bessemer tonnage for that period at 5c for No. 10 blue annealed, 5.50c for No. 28 black, and 7c for No. 28 galvanized, Pittsburgh. For sheets rolled from open-hearth steel an extra $5 a ton was asked. The government prices fixed Nov. 5 were 4.25c for No. 10 blue annealed, 5c for No. 28 black, and 6.25c for No. 28 galvanized, either bessemer or open-hearth, Pittsburgh. Differentials were fixed by the American Iron and Steel institute in accordance with past trade customs. Books were opened shortly after. Contracts for blue annealed and black sheets were taken for the first half and for galvanized for first quarter.

There was a shortage of galvanized sheets at the beginning of the year

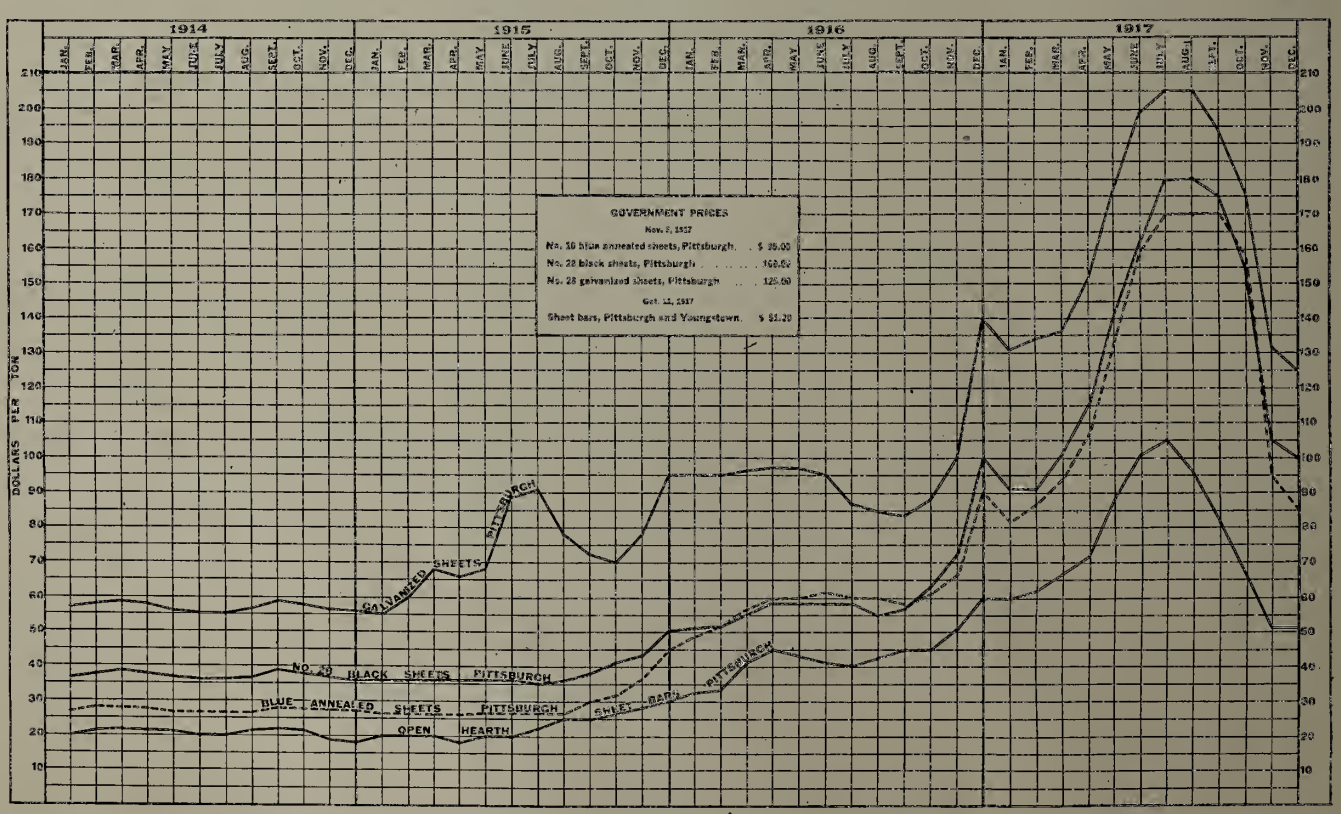


CHART OF AVERAGE MONTHLY PRICES OF SHEETS AND SHEET BARS, 1914-1917

and during the latter part of January only about 33 per cent of the galvanizing capacity and not more than 25 per cent of the galvanizing pots in the Pittsburgh district were in operation. Practically every manufacturer in that territory had enough tonnage to maintain the schedules then in effect to July 1, and there was no disposition to sell for delivery after that time. Inquiries began to come to all mills for military requirements, black sheets being wanted for helmets, and corrugated galvanized sheets for bomb-proofs. Fair-sized tonnages for these purposes went early to many of the producers, some of them in the Youngstown district. Lack of fuel and poor transportation almost forced mills to suspend in the Pittsburgh and valleys district and soon after makers began to drop out of the market temporarily. An advance from 4.69c to 8.94c in No. 28 black sheets between the beginning of the year and the fixing of prices by the government shows the trend of the market in the Chicago district. Prices on blue annealed and galvanized ran about parallel with black in that territory. A factor in the rapid advance and short supply of sheets in all sections was the inability to obtain sufficient sheet bars. By June, priority certificates came into use and sheetmakers used much caution in taking business unless genuine orders from the government were actually in hand. Tonnages were distributed by a sheet committee of the American Iron and Steel institute.

Before the end of June the situation in the Chicago district had reached the point where sheetmakers were unable to entertain inquiries from any consumer not engaged on government work. A better supply of sheet bars then enabled idle mills to be put into service and the total tonnage of sheets was increased so that later in the year, after prices had been fixed, it was possible to take on further domestic orders.

In the east the year opened with the market at 4 to 4.50c, Pittsburgh, or 4.159 to 4.659c for blue annealed No. 10. January witnessed heavy contract buying, especially by automobile and car manufacturers. Some of the business placed called for shipments through the third quarter. The eastern market reached its highest level in July, when No. 10 blue annealed commanded an average of 9.09c, Philadelphia, a figure which was maintained up to the last week in August.

Ship Tonnage by Express

Activity of the market in the Youngstown district was emphasized late in February, when heavy tonnages of sheets were shipped by express due to the anxiety of consumers who were affected by embargoes. Big tonnages of special grades of sheets were also sent by express to eastern centers and to Detroit automobile-makers. Late in March several million dollars worth of sheets were held up in stock, and in shipping rooms of mills in the Mahoning valley awaiting cars. Heavy tonnages of electrical sheets were taken by Pittsburgh mills, during March, for shipment to Europe, South America and the far East, premium prices being paid by foreign buyers.

The market began to decline late in August, due to reports that prices were to be fixed. The market dropped from the high levels reached in July to 6c and 6.50, Pittsburgh, in a short time.

Increased tonnages of sheets were moving by the second week in November and demand was much greater than offerings. The latter mostly were for delivery over the remainder of the year, although there were some for January delivery. Some of the mills virtually were out of the market, being well sold-up at figures higher than those set by the government.

It is probable that the sheet market was more active than any other finished line in November. An estimate was made that sales in that month by independents involved approximately 140,000 tons of various grades. The end of the year saw an extreme scarcity of tin mill black products.

Wages paid to tonnage men in the sheet mills in November and December averaged more than double the wages paid in the spring of 1915. Beginning then and almost till 1916, the wages paid were under the base rates in the scale, 11.2 per cent. September and October averages in 1917 were 85 per cent above the base, while wages for November and December were 96 per cent above. The November-December wages were $0.998 per 100 pounds on No. 28 gage, comparing with $0.945 for September-October, and $0.610 for January-February.

Cast Iron Pipe Breaks Price Record

CAST iron pipe makers had a fairly busy year in spite of high prices which greatly curtailed purchases by municipalities. Inasmuch as pig iron is the governing factor in pipe prices the vaulting range of cost of that material was very effective. It carried cast iron pipe to the highest point in its history. Toward the close of the year business for the pipe shops had dropped low and there was some closing of plants through lack of orders.

Six-inch class B pipe opened the year at Chicago at $41 per ton and at New York at $41.50. With the upward movement of pig iron these prices mounted in June to $65.50 in both these markets. This price held until in September when $33 was established by the government as the price for pig iron and within a fortnight a reduction of $15 per ton was made at Chicago, placing 6-inch pipe at $50.50. This reduction apparently was too severe and during the early part of November an advance of $5 was made to $55.50, Chicago. At New York a reduction of $9 was made in October and a further cut of $2 in November, bringing the quotation in that market to $54.50.

Throughout the year western cities refrained from buying more than actual pressing needs and tonnage to this class was much below normal. The government bought considerable tonnage for army cantonments at a special price. Pipe makers maintained an office in Washington for the distribution of government business and the total amount ran to fully 20,000 tons. The price first made to the government was $59 at northern and $55 at southern foundries. These figures later were reduced to $49 and $45. Industrial demand for pipe was excellent throughout the year and an especially large tonnage of special castings was booked. This class of work is profitable to pipe shops and made up for loss of business to cities. In the east where new industrial cities grew up under the spur of war manufacturing expansion, there was strong demand for pipe. Export business was large with France, Holland and South America, making up in considerable degree for the loss of tonnage in the west. The government inquired in November for 2900 tons for military use in France on which awards have not been made. Following the lead of other iron and steel manufacturers, a conference of leading pipe makers was held in Washington late in November to decide on prices to be recommended to the American Iron and Steel institute for subsequent announcement as the official prices.

Bars Swayed by Remarkable Events

Unprecedented Conditions Rob Market of All Normal Appearances and Dictate Distribution of Tonnage in Strange Fashion—Prices Skyrocket to Record Height and Drop Abruptly Under Government Regulation

EXTRAORDINARY conditions have dominated the bar market during 1917. No such combination of circumstances and events ever has confronted the iron and steel industry. War brought unusual problems and demands and the government took a hand in affairs in a way never before attempted. As in 1916, the industry in the United States was called on to supply the world in a large degree since other large producing nations were engaged in war and needed their entire output. Superimposed on this heavy world demand was the tremendous needs of the United States government for war purposes. Railroad congestion, shortage of equipment, difficulty in obtaining fuel for metallurgical operations and sudden expansion of industrial needs combined to make a condition that gave the steel industry a burden such as never before had been experienced.

Prices on bars ran a course through the year which can be likened most graphically to the path of a skyrocket. Not only was the rise most spectacular and to levels never before attained but the parallel was continued in the abrupt fall which came when prices were fixed by agreement in September. The latter brought about a vertical drop from a high altitude to a base level somewhat lower than that obtaining at the beginning of the year.

Delayed Tonnage is Heavy

At the opening of 1917 many large steelmakers had bar orders on books sufficient to cover their output through the entire year and others were able to give delivery no earlier than third quarter. Some smaller makers, who had avoided taking large contracts for remote delivery, were able through the year to take advantage of premium prices on spot material. Under these conditions, and with deliveries constantly deferred by government needs being put ahead of private contracts, selling to ordinary users was comparatively small. The year closes, however, with a large tonnage remaining on mill books which was contracted for delivery in 1917, but will not be shipped until well in 1918. Most producers have been giving every effort to filling government needs, both direct and indirect. At the same time the mills have used every endeavor to prevent acute shortage to regular customers, as far as has been possible under the stress of war demands.

In the shortage of soft steel bars, many consumers have turned to bar iron and hard steel bars as substitutes for such purposes as they could be used and this has relieved the tension somewhat. This increased demand has carried quotations on these products to unusually high levels and has destroyed in large measure the usual differentials relating them to soft steel.

At the beginning of the year steel bars were quoted in all markets at a minimum of approximately 3c, Pittsburgh, rising to a minimum of 4c, Pittsburgh, in August, an increase of $20 per ton. At this time the probability of prices being fixed by the government became a restraining influence and, as little selling was being done, the price did not exceed a minimum of 4.50c, Pittsburgh. On Sept. 24, the war industries board, by agreement with steelmakers, fixed a price of 2.90c, Pittsburgh and Chicago, which was adhered to until the close of the year. During the weeks when the higher range was in effect, some sales were made up to 6c, for prompt delivery. However, such business involved small tonnages.

Bar Iron Prices

BI-MONTHLY WAGE SETTLEMENTS SHOWING AVERAGE PRICES

	1913	1914	1915	1916	1917
Jan.-Feb.	1.4831c	1.1590c	1.024c	1.40c	2.35c
Mch.-Apr.	1.5434c	1.1760c	1.05c	1.60c	2.45c
May-June	1.5272c	1.1257c	1.10c	1.85c	2.65c
July-Aug.	1.5029c	1.0928c	1.15c	1.95c	2.75c
Sep.-Oct.	1.3931c	1.0847c	1.20c	2.00c	2.85c
Nov.-Dec.	1.2030c	1.037c	1.30c	2.15c	....

ANNUAL AVERAGE OF SETTLEMENT

1916	1.825c
1915	1.137c
1914	1.1843c
1913	1.4421c
1912	1.2645c
1911	1.2598c
1910	1.4423c
1909	1.360c
1908	1.386c
1907	1.627c
1906	1.587c

Demand Exceeds Mill Capacity

In all markets throughout the year demand for bars was enormous, far in excess of the ability of mills to fill. Conservative steelmakers deprecated the rapid rise in price and important interests which had sold for distant periods, maintained quotations far below the top. They could take business in limited tonnages only, however, and only from regular customers. Buyers bid the market up in the endeavor to get material while sellers for the most part would have preferred to have had quotations at a lower level. Through most of the last half important producers were out of the market.

Shortage of raw steel and more insistent demand for other products, notably steel plates for ship and car building and shell rounds, caused diversion of ingots to that purpose and limited the production of bars. Mills at no period in the year were free to offer bars and such selling as was done was to regular customers in great need. It was necessary to establish the existence of an emergency in almost every case where tonnage was booked.

Conditions caused some irregularity in prices early in the year, the east being at a higher level than the west. At the beginning of the year, Chicago and Pittsburgh sold tonnage at 3c, Pittsburgh, while in the east deliveries of 30 to 60 days went at 3.25c, Pittsburgh. Second quarter contracts were made in the east at 3.50c, Pittsburgh, in January, and at the same time some sales to agricultural implement makers were made at 2.90c, Pittsburgh. In March some implement bars were sold at 3.25c and second half contracts were made at 3c.

Prices Go to 6c, Mill

These sales were followed by advances making the eastern market 3.50c to 3.75c, Pittsburgh. At the same time the Chicago market advanced to a minimum of 3.50c and Pittsburgh quotations were about the same level. March and April saw the distribution of large shell round tonnages by the government and as other war needs loomed there was a cessation in selling. Contracting for fourth quarter at 4c, Pittsburgh, was done in the east in May, while a nominal quotation of 3.50c to 3.75c, Pittsburgh, persisted in the west, with practically no selling at that level. By the middle of June, the market reached 4.50c, Pittsburgh, in the east, and 4.75c, at Chicago. Shortage of supply at that time caused some selling at as high as

6c and bars rolled from shell discards were sold at 4.50c to 4.75c, eastern mill.

In June the government distributed about 80,000 tons of shell rounds at an agreed price of 3.75c, Pittsburgh. In September some mills booked considerable tonnages at 4c to 4.25c, Pittsburgh, for last and first quarter delivery. The leading interest in September booked large tonnages for larger customers for first half of 1918 at 3.50c, Pittsburgh.

Concrete or hard bars ranged at about the same level as soft steel bars thoughout the year, but in the absence of a fixed price were at a higher level than soft steel from September to the close of the year. The quotation gradually receded after the fixing of the soft steel bar price until the spread was comparatively small.

Bar iron enjoyed a strong position throughout the year. Inability to obtain steel caused heavier demand for this product as a substitute. At the opening of the quotation was 3c, Chicago and eastern mill, while the Pittsburgh quotation was about 3.25c.

Advanced prices adopted late in 1916 on nuts, bolts and rivets were well established when business was taken early in 1917. Orders were greater than in the preceding year and demands throughout 1917 were unusually heavy. Prices fixed by the government on these products did not meet approval of manufacturers who claimed they were too low, as they could not obtain steel bars at the fixed price.

Heavy demands were made at the beginning of the year on hoop and band mills in the Pittsburgh district. The Carnegie Steel Co. in January quoted hoops at 3.50c and bands at 3c, Pittsburgh, delivery at its convenience. As high as 4.25c and 4c, respectively, was commanded for second quarter. In March, the market went to 4.50c for hoops and 4.35c for bands. In July, both sold at 6c, which ruled through October. Demand for hoops continued active throughout the year, but during the last quarter the band market was quiet.

Requirements offered makers of cold rolled shafting during 1917 were extremely heavy. The government took large tonnages. The end of the year saw mills from three to four months behind on deliveries. However, they were able to take tonnages in certain sizes from domestic buyers. Only limited lots have been sold at the fixed figure of 17 off.

Steel Pipe Makers Fall Far Behind

TREMENDOUS demands for tonnage were made upon makers of tubular goods in 1917. Oil and gas lines took heavy requirements and added to these were tonnages for military purposes, some for shipment abroad. Manufacturers of steel pipe became so heavily booked by the middle of the year that they were compelled to refuse business except that coming from the government and regular customers whose requirements were urgent.

The National Tube Co. at the close of the year was about 18 to 20 weeks behind on deliveries of butt weld pipe and from 58 to 65 weeks behind on shipments of lap weld pipe.

The soaring prices of 1916 were carried well through 1917. The highest price was 42 off list for ¾ to 3-inch pipe, Pittsburgh, a rise of seven points or $14 a ton over the preceding card issued May 1 by independents. The National Tube Co. did not make any advances of its own volition after issuing its 55 discount of April 2 and with the Republic Iron & Steel Co. increased prices only after the war industries board Nov. 6 established the basis for ¾ to 3-inch pipe at 52, 5 and 2½, subject to the regular trade allowance to jobbers. As a result of this, all makers Nov. 7 issued new cards of 51 off on black and 37½ on galvanized. The wrought pipe mills reaffirmed June 30 cards.

Three cards were in force at one time in the case of steel pipe. All adopted the 55 discount card of April 2, some issued a 49 discard card May 1 and a number of the latter put out the 42 discount card of June 25. All iron pipemakers maintained the same cards, issuing their 44 discount card April 2, their 38 discount card May 1 and their 33 discount card June 30.

Heavy demands were also made for boilers and seamless tubes. Steel boiler tubes ran away soon after the April 2 card of 34 off, 3½ to 4½ inches, less carloads, was issued and subsequently there was no recognized set of prices. The American Iron and Steel institute Nov. 14 announced agreed discounts on tubes which were 30 off on 3½ to 4½-inch less carloads for steel and 12½ off for iron. In the accompanying steel pipe price changes in 1917 the cards of 49 per cent, issued on May 1, and the 42 per cent list of June 25 are omitted, the discounts used being those of the National Tube Co.

Changes in Discounts of Standard Steel Pipe

Date	Sizes in inches	Butt Weld Basing Discount Black	Galv.
Jan. 1, 1910 to Oct. 1, 1910	¼ to 6	78	68
Oct. 1, 1910 to Oct. 2, 1911	2 to 3	80	70
Oct. 2, 1911 to Dec. 1, 1911	2 to 3	81	74
Dec. 1, 1911 to Dec. 15, 1911	2 to 3	83	76
Dec. 15, 1911 to Jan. 1, 1912	2 to 3	83	76
Jan. 1, 1912 to July 1, 1912	2 to 3	82	75
July 1, 1912 to July 24, 1912	2 to 3	82	75
July 24, 1912 to Sep. 10, 1912	2 to 3	81	74
Sep. 10, 1912 to Jan. 1, 1913	2 to 3	80	72
Jan. 1, 1913 to Apr. 12, 1913	¾ to 3	80	71½
Apr. 12, 1913 to May 27, 1913	¾ to 3	79½	71
May 27, 1913 to Aug. 8, 1913	¾ to 3	79	70½
Aug. 8, 1913 to Oct. 27, 1913	¾ to 3	80	71½
Oct. 27, 1913 to Feb. 2, 1914	¾ to 3	80	71½
Feb. 2, 1914 to Apr. 20, 1914	¾ to 3	79½	71
Apr. 20, 1914 to Nov. 2, 1914	¾ to 3	80	71½
Nov. 2, 1914 to Feb. 11, 1915	¾ to 3	82	72½
Feb. 11, 1915 to May 1, 1915	¾ to 3	80	69½
May 1, 1915 to June 1, 1915	¾ to 3	79	68½
June 1, 1915 to June 17, 1915	¾ to 3	79	63½
June 17, 1915 to Aug. 15, 1915	¾ to 3	79	57½
Aug. 15, 1915 to Nov. 1, 1915	¾ to 3	79	63½
Nov. 1, 1915 to Jan. 4, 1916	¾ to 3	78	63½
Jan. 4, 1916 to Jan. 20, 1916	¾ to 3	77	62½
Jan. 20, 1916 to Feb. 15, 1916	¾ to 3	76	60½
Feb. 15, 1916 to Feb. 29, 1916	¾ to 3	75	59½
Feb. 29, 1916 to Mar. 15, 1916	¾ to 3	74	57½
Mar. 15, 1916 to Mar. 29, 1916	¾ to 3	73	55½
Mar. 29, 1916 to Apr. 21, 1916	¾ to 3	72	53½
Apr. 21, 1916 to July 24, 1916	¾ to 3	70	50½
July 24, 1916 to Sept. 7, 1916	¾ to 3	70	55½
Sept. 7, 1916 to Nov. 1, 1916	¾ to 3	69	55½
Nov. 1, 1916 to Nov. 15, 1916	¾ to 3	69	55½
Nov. 15, 1916 to Dec. 4, 1916	¾ to 3	68	54½
Dec. 4, 1916 to Dec. 30, 1916	¾ to 3	66	52½
Dec. 30, 1916 to Feb. 14, 1917	¾ to 3	64	56½
Feb. 14, 1917 to Mar. 5, 1917	¾ to 3	62	48½
Mar. 5, 1917 to Apr. 2, 1917	¾ to 3	60	46½
Apr. 2, 1917 to Nov. 6, 1917	¾ to 3	55	41½
Nov. 6, 1917 to	¾ to 3	51	37½

Ships Sustain Structural Industry

Revolutionary Demand Upon Shape Mills and Fabricating Shops for Material for Marine Construction Compensates for Great Slump in Commercial Building Work—Government by Far, Becomes Chief Buyer of Market

PERHAPS the most revolutionary development in the steel industry during 1917 was the extensive application of structural shapes to the building of ships. When shipbuilding was taken in hand by the government, as the one of all instruments essential in winning the war, old-time methods and the supply of ship shapes were found utterly incapable of coping with the situation. To meet the emergency, structural mills and fabricating shops were called upon to furnish huge tonnages. The practicability of this departure already has been demonstrated thoroughly and indications are that the standardized, or fabricated, steel vessel permanently will be a portion of the field served by the structural industry. All through the year plain shapes were exceedingly difficult to obtain. As early as January some of the mills were sold up practically throughout 1917. Demand at that time, although not of the same staggering proportions as for plates, was far beyond the capacity of the mills to accommodate. During the second quarter, bookings had increased to such an extent that many of the mills withdrew entirely from the market and made no more sales during the year excepting to the government. The situation was aggravated by a great restriction in output; not only was the raw steel urgently required for the manufacture of other finished products, but high prices on ship shapes caused numerous structural mills to devote a large part of their capacity to rolling the latter. Other factors were car shortages, scarcity of labor and of fuel which forced the makers to run behind in their deliveries. In various parts of the year deliveries fell off to such an extent as to interfere seriously with the operations of fabricators.

The year was a most difficult one for the fabricators. Not only did the high prices on plain shapes effectually serve to reduce commercial structural work to a minimum but the continued difficulty in getting steel made it impossible in many cases for fabricators to secure from the mills the protection necessary to enable them to quote. Had it not been for the tremendous tonnage called for in connection with our war requirements many fabricating shops undoubtedly would have been idle over protracted periods, and particularly toward the end of the year. Commercial structural work was active during the first quarter but showed a constant decline, so that contracts for hotels, office buildings, apartment houses, auditoriums, churches and similar buildings were almost entirely lacking during the second half. By the end of September only 29 per cent of the entire bridge and structural capacity of the country was contracted for and this figure would have been much lower had it not been for the tonnages previously placed for all kinds of construction necessitated by our participation in the war. In November, after the placing of large tonnages of fabricated ship steel had commenced, this figure increased to 77 per cent and the outlook is that the compilation for December will show a further increase. The government was by far the biggest single buyer and its needs, direct or indirect, absorbed the greater portion of the shape mill and the bridge and structural shop output. In addition to fabricated ship steel, it placed huge tonnages for additions to arsenals and navy yards, for airplane hangars, portable buildings, magazines, a nitrating plant, store houses, and for a large amount of construction for our military purposes in France. In government requirements originated also a large demand for tonnage for the erection of buildings of all kinds to fill war needs. Large tonnages went into the construction of cars, locomotives, mines, etc. The biggest single requirements during the year were those of the Submarine Boat Corp. and the American International Shipbuilding Corp. As agents for the government these interests have placed or are about to place orders for ship steel which are large enough to engage the entire fabricating capacity of the country for more than three months. Large orders also were booked by the American Bridge Co. for the steel for ships to be built by its sister subsidiary, the Federal Shipbuilding Corp., as well as by the Chester Shipbuilding Co., the Merchant Shipbuilding Corp. and the Newburgh Shipyards. Huge tonnages of ship steel still are to be placed. At the beginning of the year the minimum price on plain shapes was 3.10c, Pittsburgh, for delivery at mill convenience, while as high as 3.75c was done on preferred deliveries. The market advanced steadily until the middle of the year, when 4.50c, Pittsburgh, was established as the highest average minimum, with preferred deliver-

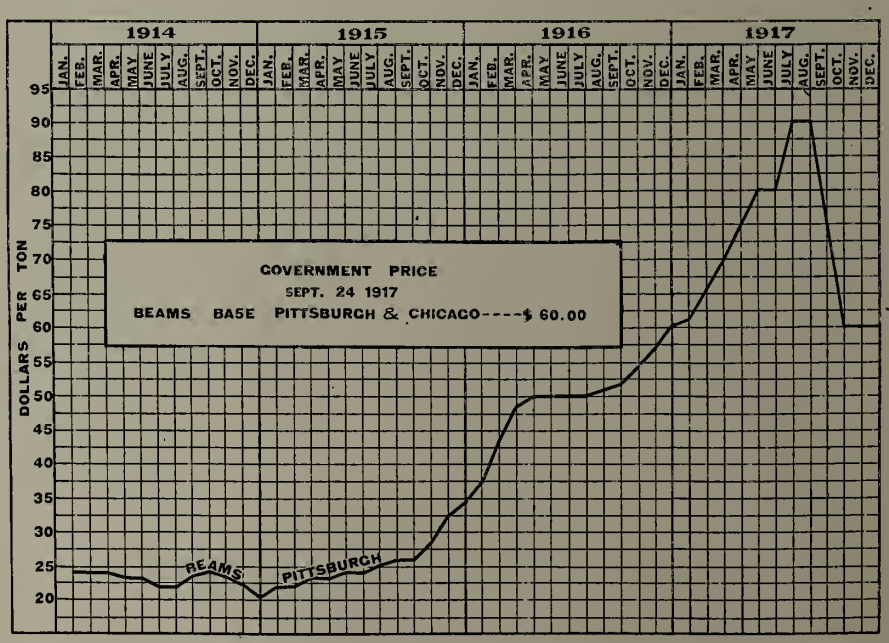


CHART OF AVERAGE MONTHLY PRICES OF BEAMS 1914-1917

ies in some cases as high as 6c. A large eastern maker in fact managed to take on considerable third quarter tonnage at 6c. During the third quarter demand lagged. The high prices had scared off practically all commercial structural work. Furthermore, the fixing of prices under government regulation was foreseen, so that a disposition to postpone buying became general. Owing to the immense amount of tonnage on their books the lull was not unwelcome to most of the mills. On such new business as was placed, however, some of the makers granted concessions, so that just before the establishment of the government base of 3c, Pittsburgh and Chicago, on Sept. 24, the market minimum had declined to 3.75c, with preferred deliveries at 4.25c, and 4.50c, Pittsburgh. A few small mills continued to sell at prices varying from 3.75c to 4.50c, but these cases were exceptional. While all the principal makers recognized and adhered to the new government price, it at first was not quoted on anything excepting government tonnage. In fact, most of the makers continued out of the market through the rest of the year. Early in October shapes began to be offered commercially here and there at the new base and immediately there was a flurry in inquiry. Very little of this, comparatively, was closed. The custom generally adopted in quoting on domestic business on the new 3c base was to name a differential of 10 cents per 100 pounds for special sections and of 50 cents per 100 pounds for shipments out of stock. On export business the general policy continued to be to get the best prices possible.

Export Demand is Huge

Demand from abroad was of huge proportions during the first half, and it was customary for export inquiries to total 25,000 to 50,000 tons weekly. Export orders for structural shapes reached a heavy total during this period. The export embargo which became effective Aug. 15 included shapes and although shipments were made under licenses thereafter, the tonnage was reduced materially. Export demand for ship shapes especially was active during the first half and large orders were booked. Ship shapes also enjoyed a tremendous demand at home and commanded premiums over structural shapes. The highest prices prevailing on ship shapes for domestic sale developed in July, when 6c to 6.50c, Pittsburgh, was paid for large tonnages. For export to Japan ship shapes then were bringing in some cases as high as 8c.

Structural tonnage awarded monthly as compiled by the Bridge Builders and Structural society is as follows:

	1917	1916	1915	1914
Jan.	119,000	119,000	43,000	110,000
Feb.	106,000	129,000	51,000	105,000
March	122,000	175,500	110,000	130,000
April	110,000	125,000	107,500	150,000
May	102,000	137,000	150,000	100,000
June	85,500	100,000	138,000	95,000
July	74,700	83,600	148,000	115,000
Aug.	68,400	110,000	146,000	50,000
Sept.	52,200	99,000	115,000	65,000
Oct.	110,700	133,500	134,000	60,000
Nov.	138,600	134,000	180,000	35,999
Dec.	153,000*	148,000	208,000	60,000
Total	1,242,100	1,493,600	1,485,000	1,075,000

*Estimated.

Jobbers Besieged By Hungry Buyers

STEEL jobbers experienced a demand during 1917 that exceeded anything in the past and extended far beyond their ability to supply. With mills far behind on contracts and buyers unable to place their business as freely as usual, they turned naturally to store stocks to fill out where they were short. This demand was not confined to small tonnages. Buyers attempted at various times to obtain material in what ordinarily is regarded as mill lots. With this pressure from the consumer, the warehouses also found their own deliveries from mills considerably interfered with. The result of these two forces was to keep assortments ragged most of the year. It became necessary to limit sales in many instances to regular customers in need and to refuse inquiries from buyers who had not been steady patrons.

The usual margin of price above mill quotations was not observed during the greater part of the year and at times mills quoted prices higher than stores were receiving. This was due to the rapid increase in quotations arising from pressure of buyers seeking contracts at a time when most mills were not selling.

At the middle of the year the government placed heavy demands for material from warehouse to be shipped to navy yards, arsenals, etc.

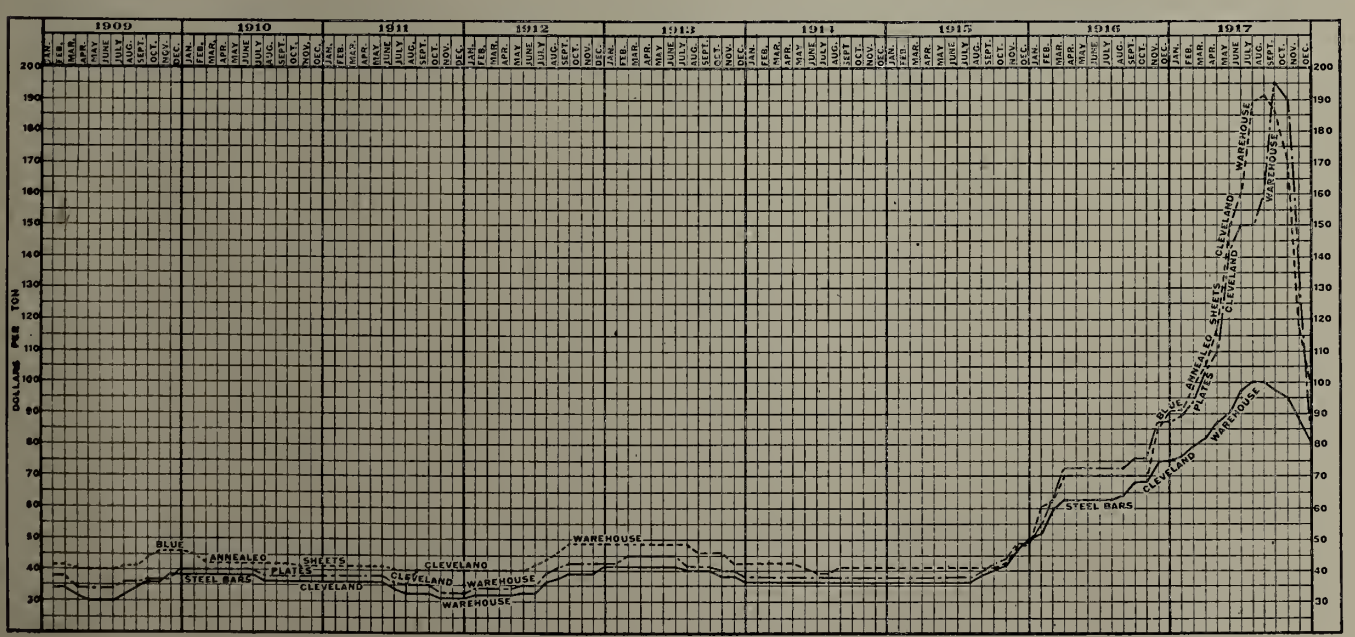


CHART OF AVERAGE MONTHLY PRICES ON LEADING WAREHOUSE PRODUCTS, CLEVELAND, 1909-1917

Scrap Claims New Place in Industry

Prices Are Bid Up to Unprecedented Levels Due to Tremendous Consumption and Shortage of Supply—Substituted Freely for Pig Iron—Traffic Conditions Constitute Effective Drag on Trade

IRON and steel scrap had its most interesting year in 1917. As much as $47.50 per gross ton was paid for heavy melting steel. This is not likely to be repeated in 1918. The past year will be remembered chiefly for its high prices compared with previous periods, which in all probability will remain the record for many years to come. A review of 1917 is interesting for the things that happened in it were superlative and yet they are bound to be forgotten except for the financial considerations involved when the time comes round for the coming year to be seen in retrospect. The two years really must be coupled together to give the true prospective. Conditions brought about by the war have made scrap so scarce in the year past that it has become a more general alternative of pig iron than ever before. Were it not for price regulation by the government, dealers are saying it is not too much to believe that the price probably would equal at least that of pig iron.

Scrap in 1918 promises to be gathered from every nook and corner of the country as it never was sought before. It will be demanded by furnaces, foundries and rolling mills on a scale not before contemplated. The scrap trade promises to pass, if it has not already passed, from being the Cinderella of the steel industry to a distinguished position among the other leading branches of the iron and steel industry. The only limiting factor in the demand for scrap in the latter part of the old year, and which likely will continue of great influence during the year to come, is transportation.

At the outset of the year, in fact, the first week in January, the scrap market in the Pittsburgh district registered sharp declines as the result of the peace offers of Germany. Prices slumped from $3 to $5 under those of the month preceding. Heavy melting dropped to $24, delivered. The market continued to decline and became extremely dull with heavy melting steel commanding $22 and other grades correspondingly weak. Railroad embargoes soon followed, limiting the territories in which scrap could be shipped and conditions were complicated further by the congestion of traffic. During the latter part of February the market had recuperated slightly, heavy melting steel selling at $24 in the eastern Ohio district, although consumers in the Pittsburgh district refused to pay more than $22 or $23. It was at this time that there went into effect the Canadian embargo against shipments of scrap from Canada. This compelled dealers in the United States to buy machine shop turnings and cast borings, previously obtained from Canada, in the open market. Prices

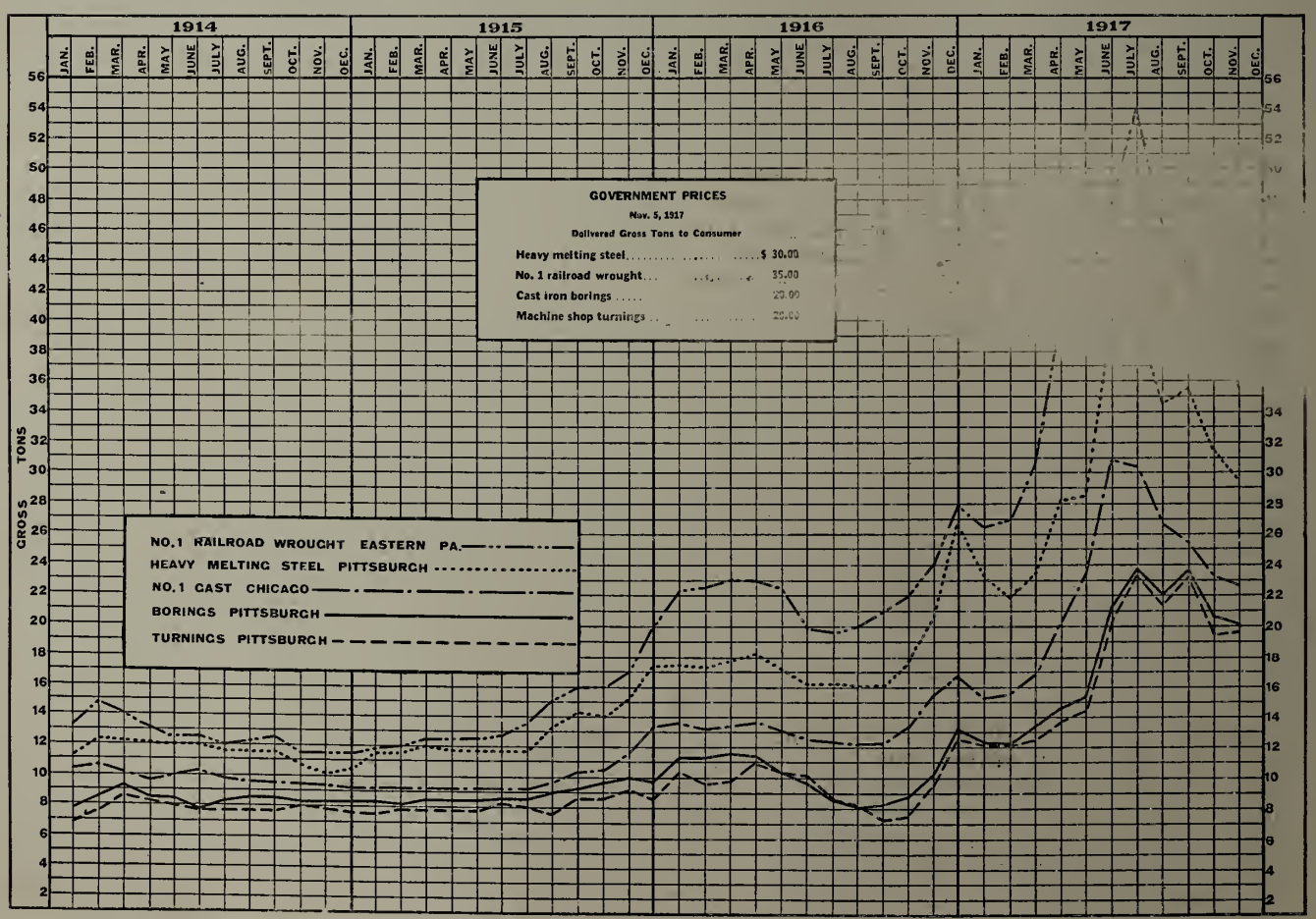


CHART OF AVERAGE MONTHLY PRICES ON LEADING GRADES OF SCRAP 1914-1917

began to harden henceforth. Heavy melting was quoted at $24, rerolling at $30, and low phosphorus at with corresponding levels for her grades. Prices of scrap reached high points in 1917 that they attained. The highest average prices were established in July, with heavy melting steel at $40.25, low phosphorus at $52.75 and No. 1 cast at $34.75, delivered. One of the interesting developments of the year in the trade was the meeting held in Pittsburgh in October by the American Board of Scrap Iron Dealers. Action was taken at that session looking to abatement of the car reconsignment and rejection evils through the creation of a bureau of inspection.

Prices in the scrap iron and steel market in the east as usual traced an erratic course. The general tendency, however, was strongly upward during the first six months and all previous records were shattered. During the third quarter the market reacted, due to the expectations of price-fixing, which materialized Nov. 6. The greatest buying movements were in April and June, when dealers in the Pittsburgh district came east for huge tonnages of heavy melting steel. In April the prices paid by Pittsburgh interests were equivalent to $25 to $26, delivered eastern Pennsylvania. The second largest buying movement started toward the end of May, with purchases around $29 to $29.50, eastern Pennsylvania, and before the movement ended toward the end of June, as high as $45, delivered Pittsburgh, or about $42 to $42.50, eastern Pennsylvania, was being paid. The third week in August there was another spurt, due to heavy melting steel buying by Pittsburgh, but this was short-lived; on the latter movement, Pittsburgh dealers paid between $35 and $37, Pittsburgh. These movements naturally caused a lot of steel scrap to move to Pittsburgh from New York state and New England, which normally would go to eastern Pennsylvania. The largest single lot bought by an eastern Pennsylvania consumer was 25,000 tons. One such lot was bought about the middle of March at $24.50 to $25, delivered, and a block of 15,000 to 20,000 tons was taken by another eastern mill at the end of June at $40, delivered.

Among the grades in which marked scarcity developed at various times were rerolling rails, low phosphorus and wrought scrap. During July, August and September, small transactions were the rule, the market at that time being affected by the expectation of price-fixing. The only grades which were sold liberally were wrought scrap; this was due partly to the fact that prices on bar iron had not yet been adjusted. By the time prices were fixed on Nov. 6, quotations in the east had sagged off to such an extent that the only figure which needed revision downward was No. 1 railroad wrought. This grade always is at a premium in the east as compared with the west and it was necessary that it be reduced several dollars in order to accord with the government figure of $35, delivered.

Fluctuation of Prices

The course of iron and steel scrap in the Chicago district has been a succession of unusual advances, and some small recessions, with the quotations at the end of the year much below the high point and not as far above the figure prevailing at the beginning of the year as had been expected. Heavy melting steel sold at an average price of $20.25 during January, and advanced steadily to a maximum of $40 in June, when a decline took place. This drop continued steadily until November when $26 was reached. At this time the government maximum price of $30 was fixed, but heavy melting steel remained slightly under that figure and did not reach higher than $29 at the end of November. Rerolling rails began the year at $28 and declined during January and February to $25, then started an upward movement which went forward until the end of June, when $50 was reached. A decline then started in common with other grades until $35.50 was reached at the end of October, after which fluctuations were slow. There was a decided shortage of rerolling rails throughout the year, and in the absence of a fixed price buyers refrained from taking more tonnage than was sufficient to cover their commitments of hard steel bars. Most of these users closed the year with comparatively small stocks. Car wheels rose from $20 in January to $40 at the end of June, and then declined with other scrap to $24.50 at the end of October. During November, when the shortage of pig iron developed, an increase began which reached $29 during November and promised to go considerably higher as the shortage of pig iron increased.

The first five and one-half months of the year in the Cleveland market showed little liveliness; no especially important deals were made, and most of the period was rather dull. But in the middle of June the market began to liven up in sympathy with Pittsburgh and other trade centers. When the high mark was reached early in July sales of heavy melting steel had been made at as high as $45 a gross ton. About the middle of July the market began to weaken, and gradually fell into the doldrums. Practically only routine sales involving small tonnages took place during the rest of the year. A little activity out of the ordinary appeared about the middle of September, but until well into November, when the market quickened, trading was colorless.

Buffalo is reputed to have taken considerable business away from northern Ohio at times during the year. Several purchases involving heavy tonnages of heavy melting steel were made by large Cleveland interests. The Buffalo market had the liveliest year in its history. Its response to new buying movements and undercurrents was quick. It was one of the first districts to feel the scrap shortage due to the scarcity of iron.

High tide conditions both as to demand and prices were experienced by dealers in the south during only a few months of the year, although the close of 1917 finds the market in good conditions as compared with the past two or three years. The government schedule of prices fixed a basis considerably in excess of what was actually being received in southern territory. Despite the fact that there were times when the southern scrap market was very active, prices never approached those of other districts. This was due to the difference in grading pursued in that section. Stocks until late in the year were available in great volume. Heavy melting steel in the middle of December was quoted at from $8 to $9 below the government maximum.

An unprecedented demand for every variety of scrap that could be melted or reheated prevailed at St. Louis, and intensive collection combed bare the usual sources of supply. In the closing months the country was sending forward only scant shipments and railroad lists had dwindled until during certain weeks their attenuation reached the point almost of invisibility. A certain element in the trade, and quite a formidable one, was overventuresome early in the year, and spurred by the very high prices sought swift profits by selling the market short. They have had cause since to repent their course, and a large part of profits accruing in bona fide transactions has gone to charge off losses on short contracts. Railroad congestion has been an important determining factor in the St. Louis district and threatens to continue so indefinitely. The end of the year finds the market in a favorable buying position.

New Liberty Mill Now Makes Plates

Mill Built in Record Time to Serve the Nation—Entirely Electrically Driven—Power Obtained from Carrie Furnace Power House—All Subsidiary Machinery Housed in a Special Building

BY R. B. WOODWORTH

THE construction of the 110-inch Liberty plate mill by the Homestead steel works of the Carnegie Steel Co. in six months is an engineering achievement which justly deserves mention even at this present time of rapid construction of buildings for emergency uses.

The Liberty mill is an emergency mill built in the first instance to roll ship plates for boats under construction for the Emergency Fleet corporation, but it has been built in the most substantial way to serve the nation when the war is done. A mill of this size had not been under consideration at Homestead steel works when the order to build the mill was received. There were no spare parts which could be taken from other mills, no engines, no machinery available. No pencil had ever been put to paper in the way of preliminary estimates or designs.

Constructing this mill required the removal of 70,000 tons of scrap and miscellaneous material on the site (2400 carloads), 71,980 cubic yards of excavation, 50,120 cubic yards of back fill, 17,147 cubic yards of concrete, the laying, changing and removal of 40 miles of temporary track, the construction of a 5-foot sewer 1000 feet long; it required the construction of an annex to the Carrie furnaces power house, the addition having a new 46 x 66 twin tandem gas engine direct-connected to a new 3750 kilovolt-ampere generator built by the General Electric Co., Schenectady, N. Y.; the building of a transmission line 2 miles long across the Monongahela river on two towers 115 feet high and 1007-foot span; the building of seven mill buildings with a total area of 215,000 square feet; the manufacture, fabrication and erection of 3390 tons of structural steel, together with the heating furnaces, rolling mill, 4000-horsepower main motor, subsidiary motors, straightening rolls, shears, cranes, etc., necessary for the operation of the mill itself.

The mill was built by men whose hands were already full; men whose works were operated to capacity with unusual difficulties at an unprecedented time; men whose minds were occupied with the problem of insufficient coal supply, scarce and inefficient labor and transportation difficulties. Ordinary labor was practically unobtainable; in consequence steam shovels and machine tool methods were used. Orders were received to build the mill on April 17, 1917, but it was six weeks after that date before it was possible to secure sufficient laborers.

Volunteer labor saved the day. Officials and clerks from various Homestead steel works offices, both gen-

Whipping the Kaiser

NO SINGLE enemy is more deadly to the submarine than the plate mill. Today, the more plates we produce, the greater the number of ships on the waves and the smaller the Kaiser's chances of a successful campaign of frightfulness. As the output of plates grows, the submarine problem shrivels. This was the thought that spurred the superintendents, office men, draftsmen, etc, of the Carnegie Steel Co., Homestead, Pa., to pitch in with pick and shovel to help get their new Liberty mill in commission in the quickest possible time. The important mechanical features of this truly American mill are presented in this article.

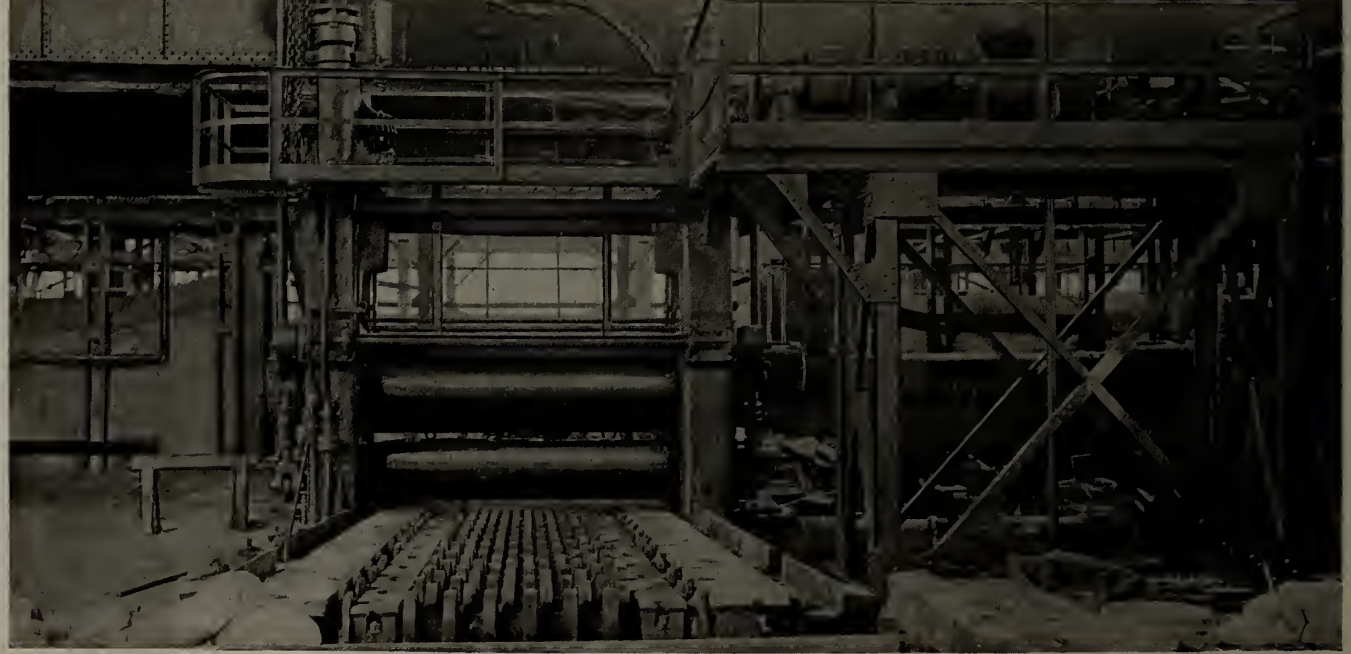


FIG. 1—FRONT VIEW OF THE 110-INCH LIBERTY PLATE MILL OF THE CARNEGIE STEEL CO., HOMESTEAD, PA.

eral and departmental, officials and clerks from the general offices, Pittsburgh, Homestead steel works department heads, mechanics of all trades, skilled and semiskilled mill workmen were represented in the forces which on Saturday afternoon, Saturday night and Sunday cleared up the stagnation which had accumulated during the week on account of the shortage of regular laborers. At one time as many as 450 volunteer workmen were on the job.

Organization Highly Skilled

The work was carried forward under the supervision of A. A. Corey Jr., general superintendent, Homestead steel works; R. H. Watson, assistant general superintendent, and J. W. McGrady, manager, producing departments. Daily conferences were held at the site at 7:30 a. m., and each division of the organization had the direct oversight, including the design and purchase of machinery, of that portion of the new plant which it was finally to operate. The chief civil engineer, F. B. Schaeffer, was responsible for the grading of the site, laying of foundations, sewers, underground work, equipment, back fill, railway tracks, etc. The design of the mill buildings and the general mechanical engineering work was in the hands of A. W. Soderberg, chief mechanical engineer. Cranes, motors and all electrical equipment came under the chief electrician, C. A. Menk. The master mechanic, Richard Moon, had the supervision of the mill machinery, pumps, etc. Charles S. Frye was superintendent of construction, and Kenneth Lean superintendent of transportation and labor. James Horton, efficiency engineer, acted as special ambassador to the various contracting firms building mill equipment. Each department worked out its own problems.

The 110-inch plate mill and its tracks cover an area of 9 acres on the Monongahela river west of the Howard axle works in West Homestead. On this site, April 17, were 70,000 tons of scrap and miscellaneous material or 2400 carloads. Thirty thousand tons of scrap, 2000 tons of loam, 700 tons of black clay and odd lots of sand, gravel, chrome ore, etc., had to be moved before the first pick could be sunk, and the first pick was a 73-ton, 2½-cubic yard steam shovel borrowed from the Union railroad.

Sinking the Foundations

The site was an old river bottom of mixed materials, part of it on cinder fill and all of a treacherous character. At the east end the soil was composed of old ashes and dirt which had been there for a number of years and which had to be removed with a steam shovel. One hundred and ten 40-foot piles had to be driven in the main foundation for the mill and mill motor and to support heavy machinery. The west end was composed of hot slag fill 10 to 15 feet deep which made a perfect foundation.

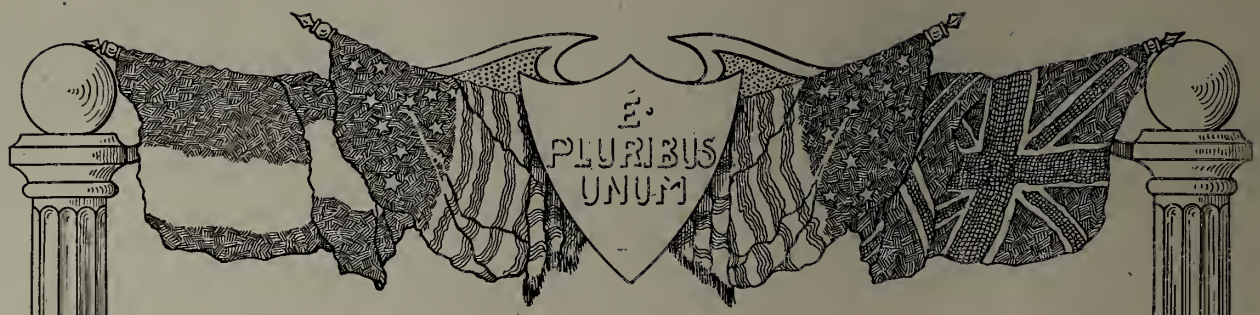
Foundations and Main Sewers

All the foundations are concrete, continuous for the brick buildings and of the single pier type for the main mill building columns. It is customary in the case of the latter to sink individual pits in which concrete forms are placed for pouring. Owing to the scarcity of labor, excavating, except small trenches, was done with the one 2½-yard shovel already mentioned, assisted by two ¾-yard and one 1½-yard shovels. The entire line of column foundations was excavated the whole width and length with the shovels, the piers built and the material back-filled. The main sewer is 5 feet in diameter, made of precast, reinforced concrete pipe. It is 1000 feet long, laid in a trench 30

(*Continued on Page* 107)



FIG. 2—SIDE VIEW OF THE 110-INCH MILL SHOWING A SLAB APPROACHING THE ROLLS



Roll of Honor

MUCH emphasis has been laid on the surmounting importance from a material standpoint of the American iron and steel industry in the present war. The latter, in fact, is the veritable foundation upon which the nation's great effort as a belligerent is being marshalled. Its strength as the right arm of the country's inherent forces, however, is no more notable than the zeal of its patriotic manpower.

Today many iron and steel men are occupying, with distinction, posts of great responsibility in welding the nation's resources into a gigantic war machine. While they are directing the forces behind the line, a great army of men of the office, mill or furnace, are carrying the colors of the industry to the front. On land and sea, wherever the flag flies, they are fulfilling the obligations of loyal and true citizenship. Many of them are in the service as volunteers.

The complete military roll of the iron and steel industry will run into the thousands. The largest organization has unfurled a service flag of 11,490 names. Various single plants have as many as 300 or 400 men enrolled. To publish the names of those of all ranks now in the service manifestly is impossible. THE IRON TRADE REVIEW has been obliged to limit this roll of honor to those filling official or representative capacities with blast furnaces, steel works or rolling mills.

THE ALABAMA CO., Birmingham, Ala.

J. F. Gillem	Asst. Sales Mgr.	Captain	Officers' Reserve Corps
R. W. Leonard	Secretary to Treas.		Aviation Corps
A. S. McElroy	Cashier	Sergeant	Draft Army

AMERICAN ROLLING MILL CO., Middletown, O.

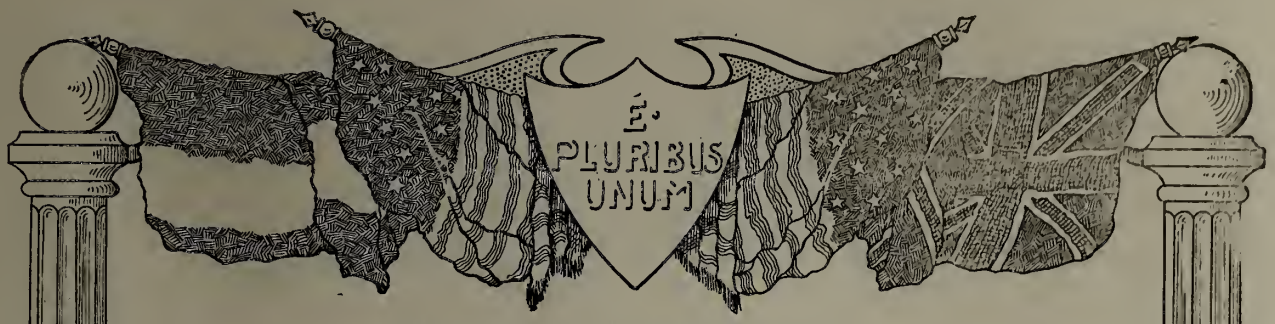
Neuman Ebersole	Asst. Pur. Agt.	Ambulance Driver	Med. Corps
Alan G. Goldsmith	Sales Dept.	Captain	329th Infantry
Sidney E. Graeff	Sales Dept.	Ambulance Driver	Med. Corps
A. P. Preyer	Sales Dept.	Ambulance Driver	Med. Corps
Horace W. Rinearson	Sales Dept.	Ambulance Driver	Med. Corps
Foster E. Wortley	Sales Dept.	Lieutenant	Ordnance

AMERICAN STEEL FOUNDRIES, Chicago

F. H. Bird	Engineer	1st Lieutenant	Ordnance Dept.
J. H. Dore	Claim Dept.	Major	342nd Infantry
J. O. Eddy	Sales Agent	Ensign	Naval Reserves
W. C. Hedgcock	Brake Beam Dept.	1st Lieutenant	Ordnance Dept.
F. M. Hickernell	Sales Dept.	1st Lieutenant	Ordnance Dept.
L. J. Paddock	Sales Dept.	2nd Lieutenant	Artillery
H. R. Potter	Inspector	1st Lieutenant	Infantry
J. G. Russell	Inspector		Royal Flying Corps
M. W. Smith	Engineer	Captain	Engineers Corps

AMERICAN STEEL & WIRE COMPANY.

R. Mattice	Sales Agent	Captain	
H. S. Durant	Sales Agent	Major	Cantonm't Div.
F. H. Taylor	Salesman	1st Lieutenant	Artillery
F. Baackes, Jr.	Asst. Mgr., Manufacturers Dept.	1st Lieutenant	33rd Division
F. A. Pattison	Cashier	1st Lieutenant	Ordnance Dept.



Roll of Honor

ATLANTIC STEEL CO., Atlanta, Ga.

John P. Sutton	Chief Inspector	2nd Lieutenant	Coast Artillery
Marcus P. Lawton	Efficiency Engineer	Training Camp	23rd Cavalry
Walter M. Robinson	Office Staff	2nd Lieutenant	Field Artillery

THE BRIER HILL STEEL CO., Youngstown, O.

W. C. Troescher	Traffic Dept.	Corporal	332nd Infantry
Robert Hamilton	Pur. Dept.	Sergeant	136th Machine Gun Battalion
Fred E. Werner	Cost Dept.	Sergeant Major	331st Infantry
William G. Clark	Advertising Dept.	Colonel's Staff	
Robert C. Barton	Traffic Dept.	1st Lieutenant	Ordnance Dept.
Edward Oarty	Invoice Dept.	Corporal	331st Infantry
Mose Wall	Purchasing Dept.	Sergeant	135th Mach. Gun Battalion
John Stambaugh	Sales Dept.	Captain	136th Field Artillery

A. M. BYERS CO., Pittsburgh

Stephan D. Oliphant	Foreman	Sergeant	323rd Regiment
Chas. Morrow	Salesman	Captain	Aviation Corps
M. J. Cezarneckie	Salesman	1st Lieutenant	Aviation Corps
Harold W. Murphy	Foreman	Sergeant	316th Infantry
Roy Copeland	Foreman	Private	Aviation Corps
Harry G. Ripple	Paymaster	Private	331st Regiment
John W. Kress	Office Staff	2nd Lieutenant	Field Artillery
James W. Marrinan	Office Staff	2nd Lieutenant	Field Artillery

CARBON STEEL CO., Pittsburgh.

Jos. H. Holmes	Director	Captain	Reserve Corps
Holland S. Duell	Director	Captain	Reserve Corps
Charles McKnight Jr.	Metallurgist	Lieutenant	Infantry School of Arms
Harry S. Finkenstadt	Sales Agent	Lieutenant	U. S. Flying Corps
David B. Carson	Sales Agent	Lieutenant	Ordnance Dept.
Charles F. Wilson	Washington Rep.	Captain	Quartermasters Dept.
Richard J. McGovern	Purchasing Dept.	Corporal	Engineering Corps

CARNEGIE STEEL CO., Clairton Works

Lewis E. Anderson	Civil Engineer	Junior Engineer	15th Engineers
F. W. Sterling	Metallurgist	Lieut. Commander	Army & Navy Dept.

THE CARPENTER STEEL CO., Reading, Pa.

Wm. D. O'Gorman	Secretary	1st Lieutenant	Signal Corps
R. V. Mann	Foreman	1st Lieutenant	Ordnance Supply Division
George Luerssen	Foreman	2nd Lieutenant	Infantry

CENTRAL TUBE CO., Pittsburgh

Alexander Laughlin Jr.	Vice President	Captain	13th Infantry
Porter L. Laughlin	Asst. to Gen. Mgr.	Corporal	320th Infantry

COHOES ROLLING MILL CO., Cohoes, N. Y.

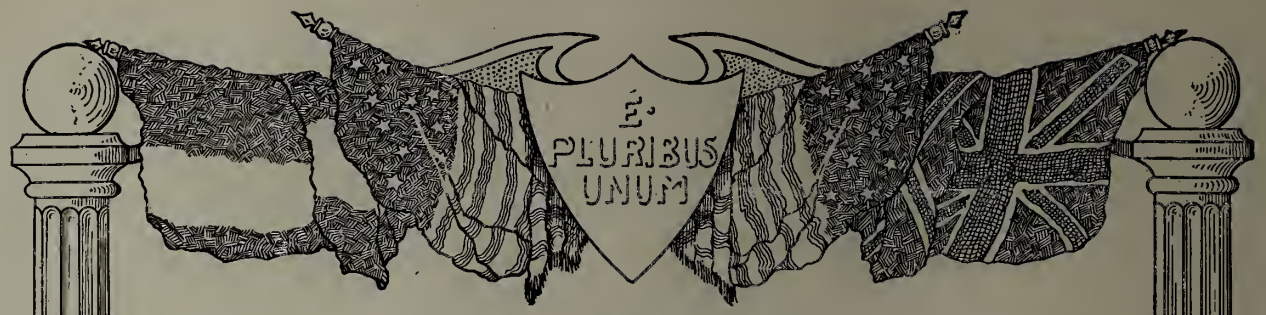
John W. Cooper	Cost Accountant	Corporal	303rd Infantry

COLORADO FUEL & IRON CO., Denver, Colo.

W. E. Madden	Salesman	Lieutenant	Navy
H. R. Tompkins	Salesman	Captain	Field Artillery
S. H. Potter	Superintendent	Captain	Ordnance Dept.







Roll of Honor

CRUCIBLE STEEL CO. OF AMERICA, Crescent Works, Pittsburgh

Henry C. McDonald.	Dept. Supt.	2nd Lieutenant	35th Ordnance
Clyde A. Trotter	Engineering Dept.	Corporal	319th Infantry
Wm. Symonds	Dept. Supt.		National Guard
James Brennan	Chief Engineer	Captain	7th Division Infantry

CURTIN FORGE CO., Curtin, Pa.

H. Laird Curtain	V. Pres. and G. Mgr.	Captain	1st Pa. Cavalry

DANVILLE STRUCTURAL TUBING CO., Danville, Pa.

Carleton Wagner	President		Signal Corps

DELAWARE RIVER STEEL CO., Chester, Pa.

Robert H. McCurdy	Secretary	1st Lieutenant	310th Field Artillery

HESS STEEL CORP., Baltimore

H. E. McCormick	Sales Representative.	1st Lieutenant	
J. B. Melick	Engineer	1st Lieutenant	

LACKAWANNA STEEL CO., Buffalo

Leo W. Hesselman	Comptroller	Lieut. Commander	Naval Militia
Nelson M. Oring	Supt. Shops	Major	Ordnance Dept.

LAKE ERIE IRON CO., Cleveland

Warwick J. Hayes	Asst. Supt.	Lieutenant	135th Field Artillery
Frank Hilfer	Production Supt.	Private	135th Field Artillery
Howard McDonald	Supt's Office	Corporal	331st Infantry

LALANCE & GROSJEAN MFG. CO., New York

August J. Cordier	Asst. Treasurer	2nd Lieutenant	305th Infantry

LIBERTY STEEL CO., Warren, O.

Richard A. Kenworthy	Sec. and Gen. Mgr.	Sergeant	Div. Train 308
John Willard Ford	Director	Lieutenant	Aircraft Board

LOCKHART IRON & STEEL CO.

T. J. Gillespie Jr.	Asst. Treasurer	2nd Lieutenant	37th Infantry

LOW MOOR IRON CO., Low Moor, Va.

George K. Anderson Jr.	Supt. Mines	Sergeant	Ordnance Dept.

MISSISSIPPI VALLEY IRON CO., St. Louis

E. Field Goltra Jr.	Supt. Blast Furnace.	Ensign	Navy
Robert A. Bagnell	Asst. Supt. Blast Furnace	Seaman	Navy
Herman Hannibal	Night Supt. Blast Furnace	Lieutenant	Officers' Reserve Corps

MONONGAHELA IRON & STEEL CO., Pittsburgh.

R. A. Carter Jr.	Manager	Private	320th Infantry

NICETOWN PLATE WASHER CO., Philadelphia

Wheeler Lord	Proprietor	Major,	Ordnance Dept.

ROGERS-BROWN IRON CO., Buffalo

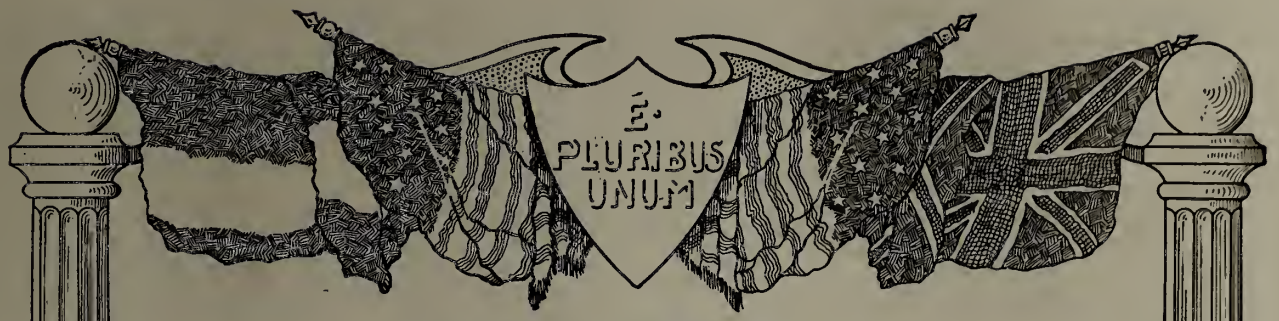
Harold T. Clement	Asst. Treasurer	Lieutenant	27th Division
William S. Rogers	Asst. to President	1st Lieutenant	Field Artillery

SHARON STEEL HOOP COMPANY, Sharon, Pa.

Arthur S. Booth	District Sales Mgr.	2nd Lieutenant	American Expeditionary Force







Roll of Honor

SENECA WIRE & MFG. CO., Fostoria, O.

A. J. Welly	Director	Sergeant	Quartermaster Dept.

THE SHENANGO FURNACE CO., Pittsburgh.

Doyle H. Bugher	Office Staff	Corporal Corporal Eng, Corps.	15th U. S. Engineers

STRUTHERS FURNACE CO., Struthers, O.

E. Wheelock Jahn	Asst. Engineer		107th Field Artillery

THE STANLEY WORKS, New Britain, Conn.

Rodman Chamberlain	Purchasing Agt	2nd Lieutenant	102nd Regiment Co. E
Cedric Powers	Mech. Supt.	1st Lieutenant	Engineering Corps
Richard Pritchard	Mgr. Cost Dept.		Watertown Arsenal
A. J. Griffin	Foreman	1st Lieutenant	
H. B. Hinman	Asst. Supt. Dept.	2nd Lieutenant	Depot Brigade

TRUMBULL STEEL CO., Warren, O.

C. K. Clark	Chief Draftsman	1st Lieutenant	Aviation Corps
C. E. Tousley	Mgr. Service Dept.	1st Lieutenant	Infantry
Herbert Hudnut	Office Staff	2nd Lieutenant	Infantry
Paul Wick	Asst. Sales Mgr.	Seaman	Navy

TYLER TUBE & PIPE CO., Washington, Pa.

Eugene Tyler Davis	Secretary	2nd Lieutenant	Signal Reserve Corps

UNITED IRON & STEEL CO., West Middlesex, Pa.

J. Ronald Wyllie	Asst. Superintendent	Lieutenant	Artillery

U. S. STEEL CORPORATION, New York

Raynal C. Bolling	General Solicitor	Colonel	Air Service

THE WELLSTON IRON FURNACE CO., Jackson, O.

Morris Lee Stephenson	President	2nd Lieutenant	134th Field Artillery

WEST LEECHBURG STEEL CO., West Leechburg, Pa.

Charles A. Todd	Asst. Manager	1st Lieutenant	Ordnance Dept.
M. W. Leech	District Sales Mgr.	Lieutenant	Aviation Corps
Raymond Kuhn	District Sales Mgr.	Lieutenant	Aviation Corps
H. L. Myers	Auditor	Sergeant	110th Infantry
Willard G. McFadden	Accountant	Battalion Sergeant Major	320th Infantry
John R. Alexander	Credit Manager	Sergeant	1st Field Artillery

WHITAKER-GLESSNER CO., Wheeling, W. Va.

W. W. Holloway	Asst. to President	1st Lieutenant	Ordnance Dept.
N. J. Ewing	Safety Director	1st Lieutenant	Ordnance Dept.
R. T. Crawford	Chief Engineer	1st Lieutenant	Engineering Corps
W. M. McCleary	Sales Department	Captain	Ordnance Dept.

WOODSTOCK OPERATING CORP., Woodstock Furnace, Anniston, Ala.

Frank G. Currington	Asst. Supt.	Corporal	17th Engineers

F. W. WURSTER & CO., INC., Brooklyn, N. Y.

F. W. Wurster	Pres. and Treas.	1st Lieutenant	105th Machine Gun Battalion

THE YOUNGSTOWN SHEET & TUBE CO., YOUNGSTOWN, O.

Louis J. Campbell	Vice President	Major	Artillery
S. C. Kneass	Steam Engineer	Sergeant	332nd Infantry





Fixed Prices Reaffirmed

Official Action Taken Extending Present Schedule to April 1—Contracts Beyond That Date Must be Subject to Revision

Washington, Dec. 29.—Official determination that the fixed prices on iron and steel products which are subject to revision or reaffirmation Jan. 1, 1918, has been made by President Wilson. This is in line with recommendations previously put up to the President by the war industries board. An important feature of the President's announcement is that no new contracts are to be made for delivery after March 31 at a specified price unless they contain a clause making the price subject to revision by the authorized government agencies. This ruling is aimed to keep all deliveries after March 31 from exceeding the maximum price then in force, although this material may have been ordered or contracted for during the next three months. This clause is to have no effect on contracts that are in existence at the present time and under which deliveries may extend beyond March 31.

Many contracts especially in pig iron recently have been made for shipment beyond March 31, and quite a number for the third and fourth quarters of 1918 in which it is provided that the contract prices which are at the fixed government level shall not be subject to any subsequent revision of the government schedule of prices.

Errors in Scrap Prices

Several typographical errors appeared in the statement of iron and scrap differentials which were published in the Dec. 27 issue of THE IRON TRADE REVIEW as a part of the additional prices announced by the general committee of the American Iron and Steel institute. The differential over heavy melting steel, on steel rails 56 pounds and heavier for rerolling purposes is $5 per gross ton instead of $3, as published. The differential for guaranteed low phosphorus scrap over heavy melting steel is $10 per ton instead of $19 per gross ton as given, and that for nonguaranteed low phosphorus scrap $5 per gross ton over heavy melting steel instead of $3 as stated.

Structural Awards Few

Quietness prevails in the structural steel market at the year's end. Among the pending projects are: Machine shop for E. W. Bliss Co., Brooklyn, 5500 tons; Grand Central viaduct, New York, 1100 tons; several bridges for the Lehigh Valley railroad, 500 tons; boiler house for the Potomac Electric Power Co., Washington, 400 tons; Chronic Hospital, Brooklyn, 250 tons; and bank at Titusville, Pa., 200 tons.

Contracts placed during the week include: Cleveland municipal electric light plant, 900 tons, to Republic Structural Iron Works; building addition for the West Virginia Pulp & Paper Co., 500 tons, to American Bridge Co.; bridge for the Chesapeake & Ohio railroad, 150 tons, to American Bridge Co.; signal bridges for the Chicago, Burlington & Quincy railroad, 225 tons; Mare Island navy yard, 150 tons, to local contractors.

To Build War Plant

Work is to be started on an extension to the plant of the National Tube Co., McKeesport, Pa., which will be devoted to the manufacture of war material. Originally it was proposed to build a plant for the manufacture of large pipe which had been produced heretofore only in Germany, but the war has altered these plans. The addition to capacity will be so laid out that it subsequently can be co-ordinated with the present mills to produce for commercial purposes.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 2, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 2, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh.....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2 Foundry pig iron, Chic.	33.00	33.00	33.00	30.00
Lake Superior Charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton.	33.00	33.00	33.00	30.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia.	34.25	34.00	34.00	30.50
Ferro mang., delivered.....	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh....	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts..	51.00	51.00	65.50	60.00
Open hearth billets, Pittsburgh.	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	2.975
Steel bars, Chicago.....	2.90	2.90	2.90	3.19
Iron bars, Philadelphia.....	3.685	3.685	4.935	3.159
Iron bars, Cleveland.....	3.64	3.64	4.50	3.00

*1.75 to 2.25 silicon **2.25 to 2.75 silicon.

	Prices Jan. 2, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Iron bars, Chicago, mill.....	3.50	3.50	4.50	3.00
Beams, Chicago	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh.....	3.25	3.25	3.25	3.575
Tank plates, Chicago.....	3.25	3.25	3.25	3.89
Tank plates, Philadelphia.....	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pittsburgh	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	7.875	4.125
Sheets, galv., No. 28, Pittsburgh	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh.....	3.50	3.50	3.875	3.00
Connellsville fur. coke.....	6.00	6.00	.....	7.25
Connellsville fdy. coke.....	7.00	7.00	.....	6.375
Heavy melting steel, Pittsburgh	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	29.00	28.75	26.10	21.50
Heavy melting steel, Chicago...	30.00	28.50	27.00	20 25
No. 1 wrought, eastern Pa.....	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago, net ton	31.00	31.50	31.90	23.75
Rerolling rails, Chicago.....	35.00	35.75	36.00	27.25
Car wheels, Chicago.....	29.00	29.50	25.90	19.75

Big Program

Of New Construction Advanced by Bethlehem Steel Corp. in 1917

The Bethlehem Steel Corp. continued to carry on in 1917 its extensive program of new construction at all its plants. At the South Bethlehem plant blast furnace "B", five stoves and two gas-driven blowing engines were placed in operation. At the No. 3 open-hearth department a 50-ton furnace was installed and at the No. 4 department a 25-ton converter and two 2000-ton tilting furnaces were placed in operation along with cranes, ladles, gas producers, etc. Extensions under way consist of a complete new mold foundry, a 42-inch shape mill, a 12-inch mill for rolling light structural shapes and flats and the installation of a 2000-ton press for hollow forging work. Large extensions to the ordnance plants for the manufacture of various sizes of gun forgings, shell, field carriages and other field equipment are also under way.

At the Steelton plant a new ore bridge, a blast furnace with two gas-driven blowing engines, a 200-ton tilting open-hearth furnace equipped with waste heat boilers and a 20-ton converter were completed in 1917. Three large forging presses will be installed at an early date. Construction has been started on 60 new Koppers coke ovens and by-product plant, a 500-ton blast furnace, new soaking pits and extensions are being made to the splice bar department.

At the Sparrows Point plant a 12-mill sheet and tinplate plant and a 36 x 110-inch three-high plate mill were placed in operation. Additional improvements now under way are two 500-ton blast furnaces, 240 Koppers coke ovens with a complete by-product plant, a complete duplexing plant consisting of four tilting open-hearth furnaces and four converters, a 60-inch universal plate mill, a 40-inch blooming mill, an 18 and 24-inch continuous mill and a salt water pumping station.

The Bethlehem Shipbuilding Corp. has carried on a correspondingly huge program.

Two of the six ore-carrying steamers under construction at Sparrows Point during the past year have been launched and put into service and the remaining four vessels rapidly are being completed.

Many Extensions

Are Made by Youngstown Sheet & Tube Co. in 1917

During 1917 the Youngstown Sheet & Tube Co. made extensive improvements in various departments at its East Youngstown plant. Three 100-ton open-hearth furnaces were completed along with the installation of 12 gas producers, three 616-horsepower waste heat boilers, a low type charging machine, two 100-ton ladle cranes and one 10-ton stock handling crane. To supply the open-hearth department with molten metal, a 1300-ton mixer, said to be one of the largest mixers in the world, was installed. Two additional batteries, each of 51 cross regenerative coke ovens, including the necessary coke and coal handling accessories, have been added. This makes a total of 306 ovens for the company. The output of the by-product plant is being increased 50 per cent. A 9-inch continuous merchant mill with a capacity of 6000 tons of average sections per month was placed in operation last February. A 12-inch continuous merchant mill was completed in September. Construction is under way on an 88-inch plate mill.

Nation Receives Much But Expects More From Iron and Steel Industry

DEPARTMENT,
WASHINGTON.

The Editor,
THE IRON TRADE REVIEW:—

IT HAS become a truism to say that men, however well trained, are worse than useless if they be insufficiently supplied with the materials which have become increasingly important in modern warfare. With the passing of the time for the adjusting of our industrial enterprises to the specific needs of the military establishment, and with the approach of the time when quantity production will have to build up great store of reserve materials, the call upon manufacturing establishments will become more insistent and imperative. I know that the response will not be uncertain or half-hearted. I know that the word may go out to our men over there that the inner line will not fail them.

December 20, 1917.

SECRETARY OF WAR.

NAVY DEPARTMENT,
WASHINGTON.

The Editor,
THE IRON TRADE REVIEW:—

THE response of the iron and steel industry as a whole to the call of the nation for increased production of steel, which is absolutely necessary to the successful prosecution of the war, has been gratifying to the navy department, whose requirements are and will continue to be a large factor in the growing demand. On the threshold of this New Year I desire to express my appreciation of the past efforts of the steel industry generally and my confidence that it can and will meet all the tonnage requirements which will be asked of it in 1918. Every mill must keep rolling and every man must do his part to bring about this result. Ships and munitions and more munitions and more ships will win the war. To supply this essential we must have steel and more steel and still more steel.

December 20, 1917.

SECRETARY OF NAVY.

U. S. Steel Works Outstrip Germany

Ingot Capacity Jumps 25 Per Cent in Last Two Years Giving Present Capacity of 48,500,000 Tons—Gain in Last Nine Months is Double Germany's Increase in Three and One-Half Years

DURING the last 24 months, the steel ingot capacity of the United States has increased 25 per cent. The open-hearth furnaces built during that two-year period can produce annually as much steel as the entire country turned out in 1900. This tremendous expansion in steelmaking capacity has placed the United States in a position to face confidently the colossal demands for steel of modern warfare. The estimated steel-producing capacity of the country on Jan. 1, 1918, is 48,500,000 tons. A year ago, the capacity was set at 43,000,000 tons—a figure which the production records of the last 12 months have verified. At the opening of 1916, the capacity was estimated to be 39,000,000 tons, giving an increase in the last two years of close to 10,000,000 tons.

Set up against these figures the steelmaking capacity of Germany is thoroughly overshadowed. That country is estimated to have a steel ingot capacity of about 20,000,000 tons, but her actual output in 1917 is set by the British ministry of munitions at only 16,000,000 tons. This is only one-third of the present capacity of the United States.

When the kaiser forced Uncle Sam into active participation in the war, he arrayed against the overtaxed steel resources of the Teutonic powers, a country which produces nearly one-half of the world's steel. The world's capacity at the opening of 1918 is set at 100,000,000 tons, an increase of about 16,000,000 tons or 19 per cent since the war opened in 1914. Of this increase, 10,000,000 tons are accounted for by expansions in the United States, leaving 6,000,000 tons as the measure of growth for the remainder of the world. England during her three and one-half years of active participation in the war has boosted her productive capacity from about 8,000,000 tons to 12,000,000 tons. Germany in the same period is estimated to have actually gained somewhat less than 2,000,000 tons. During the nine months since the United States declared war on Germany, this country has thus added to her steel capacity as much as England did in three and one-half years, and more than twice as much as Germany did during the same period.

The accompanying table shows the details by companies and furnaces of the growth in steel ingot capacity during 1917. The number of open-hearth furnaces completed last year was 101 with an estimated annual capacity of 5,413,000 tons. This compares with a record of 105 furnaces with a capacity of 4,300,000 tons, built during 1916. The gain in capacity in the past two years thus amounts to 9,713,000 tons, with an increase of 206 in the number of furnaces.

These two years have marked the period of greatest expansion in steel ingot capacity as the new construction record for 1915 showed that 43 furnaces of 1,759,000-ton capacity were built. In 1914, only nine furnaces of 747,000-ton capacity were built while in 1913, 62 fur-

Open Hearths Completed During 1917

	No. of furnaces	Rated capacity, tons	Estimated annual production
Allegheny Steel Co., Brackenridge, Pa.	1	35	27,500
American Rolling Mill Co., Middletown, O.	2	75	50,000
American Steel & Wire Co., Cleveland	1	60	40,000
American Steel Foundries, Sharon, Pa.	2	40	60,000
Apollo Electric Steel Co., Apollo, Pa.	1	100	70,000
Ashland Iron & Mining Co., Ashland, Ky.	3	75	150,000
Bethlehem Steel Corp., Sparrows Point, Md.	4	200	480,000
Bethlehem Steel Corp., South Bethlehem, Pa.	1	50	35,000
Bethlehem Steel Corp., South Bethlehem, Pa.	2	200	240,000
Bethlehem Steel Corp., Steelton, Pa.	1	200	120,000
Braddock Mfg. Co., Braddock, Pa.	1	25	22,000
Brier Hill Steel Co., Youngstown, O.	2	100	140,000
Canton Sheet Steel Co., Canton, O.	3	50	105,000
Central Iron & Steel Co., Harrisburg, Pa.	1	100	70,000
Central Steel Co., Massillon, O.	2	75	100,000
Corrigan, McKinney & Co., Cleveland	4	75	200,000
Cromwell Steel Co., Lorain, O.	4	75	200,000
Donner Steel Co., Inc., Buffalo	6	100	420,000
Edgewater Steel Co., Oakmont, Pa.	1	35	27,500
Edgewater Steel Co., Oakmont, Pa.	1	75	50,000
Erie Forge Co., Erie, Pa.	1	35	27,500
Federal Steel Foundry, Chester, Pa.	2	25	45,000
Illinois Steel Co., South Chicago, Ill.	2	200	240,000
Inland Steel Co., Indiana Harbor, Ind.	2	75	100,000
Interstate Iron & Steel Co., Chicago	2	70	90,000
Jones & Laughlin Steel Co., Pittsburgh	6	50	210,000
Keystone Steel & Wire Co., Peoria, Ill.	1	75	50,000
Lackawanna Steel Co., Buffalo	1	75	50,000
Llewellyn Iron Works, Torrance, Cal.	2	40	60,000
Lukens Steel Co., Coatesville, Pa.	6	100	420,000
Nagle Steel Co., Rahway, N. J.	1	40	30,000
National Tube Co., Lorain, O.	4	80	220,000
Pacific Coast Steel Co., Seattle	1	40	30,000
Penn Seaboard Steel Corp., New Castle, Del.	3	30	75,000
Penn Seaboard Steel Corp., New Haven, Conn.	2	30	50,000
Pittsburgh Rolls Corp., Pittsburgh	1	25	22,000
N. & G. Taylor Co., Cumberland, Md.	1	25	22,000
United Alloy Steel Corp., Canton	4	75	200,000
Utah Iron & Steel Co., Midvale, Utah	1	50	35,000
Verona Steel Castings Co., Verona, Pa.	1	25	22,000
West Penn Steel Co., Brackenridge, Pa.	1	80	55,000
Whitaker-Glessner Co., Portsmouth, O.	1	65	42,500
Wickwire Steel Co., Buffalo	1	60	40,000
Aian Wood Iron & Steel Co., Ivy Rock, Pa.	3	80	165,000
Worth Steel Co., Claymont, Del.	3	90	195,000
Youngstown Iron & Steel Co., Lowellville, O.	2	75	100,000
Youngstown Sheet & Tube Co., Youngstown, O.	3	100	210,000
	101		5,413,000

Open Hearths Building at the End of 1917

	No. of furnaces	Rated capacity, tons	Estimated annual production
Central Iron & Steel Co., Harrisburg, Pa.	1	100	70,000
Chattanooga Steel Co., Chattanooga, Tenn.	2	90	130,000
Crucible Steel Co. of America, Pittsburgh	4	50	140,000
Donner Steel Co., Inc., Buffalo	1	100	70,000
Erie Forge Co., Erie, Pa.	2	35	55,000
Indiana Steel Co., Gary, Ind.	2	200	240,000
Mesta Machine Co., West Homestead, Pa.	1	40	30,000
Pittsburgh Crucible Steel Co., Midland, Pa.	2	60	80,000
Republic Iron & Steel Co., Youngstown, O.	2	80	110,000
Trumbull Steel Co., Warren, O.	7	100	490,000
Utah Iron & Steel Co., Midvale, Utah	1	50	35,000
Worth Steel Co., Claymont, Del.	1	40	30,000
Youngstown Iron & Steel Co., Lowellville, O.	1	75	50,000
	27		1,530,000

naces of 3,120,000-ton capacity were constructed.

On Jan. 1, 1915, the country's annual steel ingot capacity was estimated to be 37,500,000 tons. The new furnaces built during 1915 brought the capacity at the opening of 1916 up to 39,000,000 tons. During 1916, the addition of more than 4,000,000 tons of new capacity led to an estimate of 43,000,000 tons as the country's steel producing capacity on Jan. 1, 1917. The records of the American Iron and Steel institute indicate that during 1917 the actual output of steel ingots was 42,600,000 tons—a figure which checks closely with the estimated capacity as the many new furnaces added during the year were largely offset by irregular operations at most steel plants.

The construction of 5,413,000 tons of new capacity last year brings the estimated total capacity at the opening of 1918 up to 48,500,000 tons. The prospects for growth during 1918, however, are not as promising as at the opening of last year. As shown in the table, 27 furnaces of 1,530,000-ton capacity are now under construction. This compares with a building program on Jan. 1, 1917, of 95 furnaces of 4,795,500-ton capacity. At the opening of 1916, construction work had begun on 74 furnaces of 3,755,000-ton capacity. On Jan. 1, 1915, there were 43 furnaces of 1,760,000-ton capacity being built and at the opening of 1914, 40 furnaces of 1,830,000-ton capacity.

The new construction record of the past two years has shown the rapidity with which building programs have been carried out. Practically all of the furnaces under construction at the beginning of 1916 and of 1917, were completed during those years despite the difficulties experienced in obtaining supplies. On the other hand, of the 43 furnaces under construction at the opening of 1915, 37 were carried over from the previous year.

Expansion in the iron and steel industry during the past few years had been principally in steel ingot and finishing mill capacity. During 1917, however, extensive additions were made to the pig iron producing capacity. The 14 new blast furnaces blown in last year have an annual capacity of 2,182,500 tons, a greater addition than has been made in any other year during the past decade. In 1916, new blast furnace capacity aggregated only 530,000 tons, and the 1915 record showed exactly the same increase.

The following table shows the capacities of the new blast furnaces blown in during each year from 1905 to 1917:

Year	Gross tons
1917	2,182,500
1916	530,000
1915	530,000
1914	None
1913	550,000
1912	1,000,000
1911	565,000
1910	1,794,000
1909	1,930,000
1908	1,188,000
1907	2,065,000
1906	1,135,000
1905	1,292,000

The country's pig iron production in 1917 was about 38,900,000 tons against 39,400,000 tons in 1916. The estimated capacity of all blast furnaces was set last year at about 40,000,000 tons. New additions during the year bring this estimated capacity on Jan. 1, 1918, up to 42,500,000 tons. This figure takes into consideration only those furnaces which are available for operating at the present time.

New Blast Furnaces

The new furnaces completed in 1917 were: One Madeline, Inland Steel Co.; two Gary, Indiana Steel Co.; one Donner, Donner Steel Co., Inc.; one Haselton, Republic Iron & Steel Co.; one Portsmouth, Whitaker-Glessner Co.; one South Bethlehem, Bethlehem Steel Corp.; one Steelton, Bethlehem Steel Corp.; one River, Corrigan, McKinney & Co.; two Cambria, Cambria Steel Co.; one Eliza, Jones & Laughlin Steel Co.; one Coatesville, Midvale Steel & Ordnance Co., and one Sheffield, Sloss-Sheffield Steel & Iron Co.

At the opening of 1918, construction of 36 furnaces with an estimated annual capacity of 5,415,000 tons had been started or authorized. A year ago only 21 furnaces were being built. The furnaces now being built include: Four, National Tube Co., Gary, Ind.; two, Bon Air Coal & Iron Corp., Nashville, Tenn.; one, Alan Wood Iron & Steel Co., Swedeland, Pa.; four, National Tube Co., Lorain, O.; five, Bethlehem Steel Corp., South Bethlehem, Pa.; two, Bethlehem Steel Corp., Steelton, Pa.; four, Bethlehem Steel Corp., Sparrows Point, Md.; one, Brier Hill Steel Co., Youngstown, O.; one, Donner Steel Co., Inc., Buffalo; two, Ford Motor Co., Detroit; one, Gulf States Steel Co., Birmingham, Ala.; two, Indiana Steel Co., Gary, Ind.; two, Iroquois Iron Co., South Chicago, Ill.; two, Lackawanna Steel Co., Buffalo; one, Mark Mfg. Co., Indiana Harbor, Ind.; two, Minnesota Steel Co., Duluth, Minn.

The Worth Steel Co., Claymont, Del., has completed three open-hearth furnaces, each 90 to 100 tons capacity, and the building and equipment have been arranged for the fourth furnace, which, however, has not yet been installed. The latter will not be built until the plate mill has been started.

The Adamson Machine Co., Akron, O., has put in operation at its plant a new 10-ton open-hearth furnace which permits it to turn out considerably increased tonnage of open-hearth castings in addition to its output of converter steel castings.

Rebuilding Furnace

The second stack of the Alabama Co., Gadsden, Ala., is undergoing repairs and reconstruction. It probably will be blown in by the early spring. The output of the rejuvenated furnace is placed by the officials at 400 to 450 tons daily.

New Mill is Ready

The 14-inch merchant mill of the Donner Steel Co., Buffalo, nearly is ready for operation. Production will be started the first of the month it is believed. Additions shortly to be built by the company involve the expenditure of about $30,000 and include a pyrometer house, yardmaster's office, open-hearth department office, blooming mill locker room, carpenter shop and boiler shop.

Soo Commerce in 1917

Despite the many delays imposed by ice and by traffic congestion on the railroads, the commerce through the American and Canadian canals at the Soo fell off only 2 per cent during 1917. The heaviest losses occur in the shipments of flour, wheat and grain. The 1917 shipments of flour were 17 per cent smaller than those of 1916; the shipments of wheat, 18 per cent smaller; and the grain shipments fell off 28 per cent. Iron ore shipments through the canals amounted to 61,374,090 tons. This brings the 1917 shipments to within 3 per cent of those of 1916, and insures sufficient ore for capacity operations at all blast furnaces tributary to the Great Lakes during the coming winter.

The new plant of the Allentown Standard Mfg. Co., Allentown, Pa., has been completed and is about to be placed in operation. At a stockholders' meeting, Henry J. Franklin was elected president and Samuel L. Perlman, secretary and treasurer. The company will manufacture sheet iron and metalware.

Fitting Mill Tonnage to War's Decree

Unparalleled Transposition of Ingot Output is Brought About by the Pressing Demands of this Critical Period—Plate Mills Speeded to Limit to Combat Submarines —Surplus Rail Mill Capacity Rolls Shell Rounds

BY L. W. MOFFETT

War Fixes Production

WAR with its insatiable demands for iron and steel tonnage has forced a considerable dislocation of normal production and distribution of the mills. Certain lines of manufacture have been overstimulated; others have been suppressed in a proportionate degree. This transposition has been so extraordinary that it has created certain conditions which are likely to outlive the present war emergency. Mr. Moffett covers the various conspicuous examples of a revamped operating condition and interprets their significance for the future.

TREMENDOUS demands of war have brought about a notable realignment of the steel industry in the United States. There has been a remarkable increase in the rolled output. Diversion of finishing capacity in a manner wholly different from the requirements of normal commercial periods has been the cause of this condition. Today the industry is virtually a government enterprise, the greatest on earth, and is humming as a huge war machine. Its individual owners have practically become agents, highly trained and specialized, who are guiding the operations of this great undertaking in an earnest effort to bring the conflict to a successful conclusion. Their task is immense. They share in large part the responsibility of transforming a great nation from one of amazing unpreparedness to a war basis on a scale so enormous that it was not even conceived of prior to the outbreak of the present titanic struggle.

Before the war demands for large tonnages of steel, as tonnages are looked upon now, were comparatively few. When the railroads freely bought rails, bridges, cars and locomotives, a larger demand for steel was created and prosperity reigned. When they didn't, business lagged, and there was plenty of idle capacity. Railroad requirements under normal conditions took from 33-1/3 to 40 per cent of the total steel output. Rail tonnages for domestic roads accounted for an average of 3,000,000 to 3,500,000 tons annually. Demand for structural material for bridge work, terminal facilities, etc., was heavy normally. There was an active market for merchant bars, pipe and structural material for diversified manufacturing pursuits of a peaceful character. General building was an important factor in the steel demand in the pre-war period. Wire, too, always has been an important branch of the industry, as its demand is widely disseminated. The automobile and other industries took large tonnages.

Then the war came. First, there developed orders from the governments of England and France for shrapnel. These began in November and December, 1914, and involved rounds, principally 3 and 3½ inches in diameter, for export and for domestic manufacture into shells. High military authorities in those countries thought that the conflict was going to be fought with small guns. The German militarists evidently anticipated this opinion. They were prepared, not with small guns, but with large weapons and high explosive shells. This situation had to be met and met quickly. It called for more steel being forged or pressed at the mills and finished at such plants as those of the Westinghouse Electric & Mfg. Co., the Pressed Steel Car Co., the General Electric Co., the American Locomotive Co., and many others in all parts of the country. A great tonnage of steel now is going into the heavier classes of shells, including those for guns of 6-inch caliber and larger. At the same time, a considerable quantity is going into the manufacture of ordnance. Included among the unusually large shell rounds which have been called for are 10, 11, 12 and up to 15 and 16-inch diameter. These now are being rolled in numerous mills, whereas prior to the war perhaps not more than two of these plants were equipped to produce rounds larger than 10 inches in diameter. These large sizes then were produced for wheel blanks.

The production of these extra large rounds called for various roll modifications. Engineers say this was a comparatively simple matter. At Midland, Pa., rounds have been rolled on a 28-inch mill. Several blooming mills were changed to produce this form of tonnage. One jobbing sheet mill has made 3-inch rounds after cutting grooves in the rolls. A rail mill at Braddock, Pa., has been engaged in rolling large rounds and sheet bars. A 35-inch structural mill at Munhall, Pa., has rolled rounds up to 16 inches in diameter. A 40-inch blooming mill at Youngstown, O., has been rolling 9 x 9-inch gothic sections. A rail mill at Johnstown, Pa., has also rolled large rounds to make 7-inch shells. Rolling large rounds on rail mills has become a rather common practice in this country since the war and has been followed at Buffalo, Ensley and at other plants.

Next came the submarine warfare. This meant the immediate need for ships which at once required a tremendous amount of steel for plates. Shipbuilding now is taking the largest quantity of steel produced by the manufacturers. The plate capacity in America today is about 400,000 tons a month, or 4,800,000 tons a year, including universal and sheared plates, Of the actual production of plates, at least 50 per cent, and probably more, is going into ships. Heavy steel tonnages also are going into forgings, anchors, etc. The plate capacity at present obviously calls for a much greater ingot tonnage than the normal amount of steel devoted to plate rolling in former years. In order to obtain a greater output of plates, raw steel has been diverted from other finished lines, such as merchant bars wherever the intended use was regarded of a more or less nonessential character. Other finished products were equally affected, such as structural material for office buildings, sheets for automobiles, strip steel for automobiles, bicycles, etc., steel for shoe nails, music racks, etc. War uses of cold rolled shafting have been numerous and tonnages have been taken for airplanes, detonators, trench mortars and for the Emergency Fleet corporation.

Demand for plates has resulted in the completion during the past two

years or the putting under construction of a largely increased capacity, estimated at from 100,000 to 125,000 tons a month. The total production of sheared plates ¼ inch and thicker in 1916 was 1,865,642 tons. Estimates have been made that government merchant ships alone will take approximately 2,000,000 tons of plates in each of the next two years. This does not take into account the heavy requirements for naval vessels or shop construction, for the building of cars and locomotives for American railroads abroad, and of many war plants built by private manufacturers, or for harbor, wharf and munition plant construction in France by the war department and for many other undertakings.

Steel ingot production in 1917, according to an estimate made by the American Iron and Steel institute, will not show more than 42,600,000 tons, compared with 41,401,917 tons in 1916. Estimates were made in the latter part of September, 1917, that the government steel needs for the two months following would be 7,000,000 tons, or the full ingot production of that period. The decline in the output of ingots in 1917, as compared with the previous estimate of 45,000,000 tons, was due to the curtailed production of pig iron brought about chiefly by fuel shortages. The proportion of the plate tonnage to the ingot output in 1916 was approximately 9 per cent, as compared with an estimate of 11 per cent for 1917. In 1912, it was 9 per cent, in 1913 10 per cent, in 1914 9.5 per cent, and in 1915 9 per cent.

Over stimulation in some classes of iron and steel demand, particularly for plates and large rounds, necessarily has brought about a contraction in other lines. It has caused an interesting transposition of steel tonnage. Bar and billet mills have been called upon to produce a tonnage much greater in proportion to total ingot output than under ordinary conditions, and the output of other mills has been reduced accordingly. Rail production in 1917 was relatively light. This enabled rail mills to be diverted to the production of large rounds. A conspicuous case wherein the tonnage has declined to offset the over stimulus in other lines is that in structural shapes, especially for building purposes. This is clearly reflected by the report of monthly fabricated awards presented by the Bridge Builders' and Structural society, as is denoted by an accompanying diagram. The falling off in structural awards in 1917 was most marked. For the 10 months ending with October, the lettings approximated 950,500 tons, or 54 per cent of the annual fabricating capacity of the country. This tonnage furthermore included a large amount of purely war construction. The years 1915-16 saw practically the same totals for lettings, that for the former year being 1,486,000 tons and for the latter year 1,496,000 tons, or in each instance, 72 per cent of the total capacity. These figures compare with 1,073,100 and 1,074,360 tons, or 52 per cent of shop capacity in 1914 and 1913, respectively. These years represented a period of extreme depression. Lettings in 1912 totaled 1,335,100 tons, or 66 per cent of the fabricating capacity.

The decline during November and December, 1913, and all of 1914 was in keeping with the general situation of the industry and the country. But it was entirely inconsistent with the prosperous conditions which have prevailed thereafter particularly in 1916 and 1917. The reason for this seeming trade anomaly is simple. It largely is a question of price. At the same time it must be kept in mind that the high prices of structural shapes have been due not so much to the demand for this product itself as to the fact that there has been a place in some rolled line for every ton of ingots turned out so that all finished lines have been strong.



35-INCH STRUCTURAL MILL USED TO ROLL 16-INCH ROUNDS

Much of the fabricating shop capacity of the country now has been given over to the turning-out of tonnage for the building of merchant ships by the government. An example of the diversion of fabricating tonnage from commercial lines is shown in the case of a large fabricating shop which has about 70 ships on hand. This means a loss of 157,000 tons of steel for bridges and buildings, equivalent to 25 per cent of the entire capacity of the plant.

Ordinarily the rounds which were

produced for military purposes at the outset of the war would be considered merchant bars, or such as are rolled on a merchant mill. With the constant growth of demand, it was found convenient to roll large rounds on rail and shape mills. During the preceding eight years rail mills were operated at a rate far below capacity. Rail demand had decreased at a time when rolling capacity has increased. Today it is impossible to place orders for any sizable tonnage of rails for delivery before 1919, despite the fact that the demand is greatly less than the capacity.

Plates Absorb Big Tonnage

Heavy demand for plates for shipbuilding did not develop early. This is shown by the schedule of prices. The plate market was rather weak throughout 1915, when compared with levels existing for related products. In March, 1916, 18 months after the war began, plates commanded unusually high prices, when considered in connection with levels for other steel products involving virtually similar costs of production. Plate prices continued to increase until in August, 1917, when the average was 8.80c, Pittsburgh, the highest in the history of the industry. The tremendous demand for plates is reflected in the year's record of new capacity added. New mills put in service or now under construction include the following:

Youngstown Sheet & Tube Co., one 84-inch and one 96-inch mill.

Brier Hill Steel Co., Youngstown, O., one 84-inch mill, and one 132-inch mill.

Tennessee Coal, Iron & Railroad Co., one 110-inch mill at Fairfield, Ala.

Donner Steel Co., Buffalo, one 84-inch mill.

Carnegie Steel Co., one 110-inch mill at Homestead, Pa.

Nagle Steel Co., Pottstown, Pa., one 54-inch (rebuilt).

Indiana Steel Co., Gary, Ind., one 160-inch mill.

Lukens Steel Co., Coatesville, Pa., one 204-inch mill.

Jones & Laughlin Steel Co., Pittsburgh, one 128-inch mill at Soho plant.

The General Steel Co., St. Francis, Wis., plan one 104-inch mill.

Industries that work up steel were dislocated extensively. Producers of machinery soon after the war broke out were given huge orders for lathes and other tools. Demands poured in upon them from both domestic and foreign plants engaged in making shells. Orders from the United States government now fill the books of machine tool makers to overflowing. They call for the maximum output of the enlarged industry. In addition, capacity is being further increased. When the war demands called for heavy orders for tools, domestic consumers of similar requirements were either shunted aside, or deliveries on contracts they had placed were greatly deferred. The steel industry suffered. It was not able to fill adequately machine tool requirements. Since the United States entered the war, the government exerted every possible effort to see that nothing interfered with the production of war tonnage, manufacturers having government contracts being given priority in machine tool requirements. The necessity of this kind of equipment in keeping steel highly efficient under war conditions was strikingly emphasized.

In the matter of railroad rolling stock, there was a sharp dislocation in the market. The carriers had been slow in making purchases. Up to July, 1914, they were hoping for a favorable decision in the rate case, then pending before the interstate commerce commission at Washington. It was handed down just as the war broke out and was unfavorable. Great apprehension was felt that, due to the war, billions of dollars of their securities, held in foreign countries, would be dumped on the market. The rate case was reopened and the commission in December, 1914, granted some important concessions to the carriers. In May, 1915, they began to place moderate-sized orders for cars and locomotives. When they became anxious for deliveries many of the car and locomotive plants had branched out into shell manufacture. They had also closed contracts for cars and locomotives for export. Steel had become scarce and high in price. Manufacturers of equipment, supplemental to that produced by car and locomotive shops, also took different kinds of war orders. The railroads were unable to obtain adequate requirements. They received only about 3000 locomotives in 1916, or less than 50 per cent of the number they took in each of the years 1906 and 1907. They received only about 100,000 freight cars, or approximately 50 per cent of the number they had been taking in each of the several preceding years.

Analysis of Future Conditions

The position that the steel industry may be in and the problems it will face after the war by reason of abnormal conditions growing out of the conflict, of course, can be the subject for conjecture only. Well informed men of the trade generally look upon the future hopefully. That intelligent handling of the situation will be necessary to properly adjust it to a peaceful basis cannot be doubted. it is believed certain, however, that normal conditions of the past never will return entirely. While the ordinary commercial business will be restored, it is also true many new channels of demand will have been established.

The three outstanding abnormalities of the industry arising from the war are: The creation of a vast munition-making capacity; the heavy addition of plate capacity, and the general redistribution of ingot tonnage.

By far the greatest portion of the munition-making machinery and plants will be useless after the war. Much of it now in good order will be worn out and thrown aside before that time. Disposition of this direct war industry will be an interesting matter to watch. A portion may be taken over directly and maintained by the government, while part of it may be turned to the production of tools for commercial purposes. So far as the financial phase of the situation is concerned the manufacturers of munitions appear to be on safe ground. The equipment cost through profits realized probably will have been amortized.

Adaptability of Tonnage is Evident

The third point—that of the diversion of tonnage, perhaps will not prove a source of much concern to the industry when peace comes. It is a simple matter to change the rolls on a rail mill that has been making large rounds so that it can resume the production of the material for whose manufacture it was designed originally. And the same may be said of the great proportion of the capacity that now is engaged in producing rolled forms other than those for which it was built. Yet there again must be created a market for the output of these mills, the capacity of which has been diverted. Scattered throughout all of the producing districts are numerous plants which have had to forego partly or entirely the serving of their regular trade. To a great extent it may be assumed there will be no difficulty in regaining old customers and in acquiring new ones. Despite this, the effort may be a more urgent one than is generally surmised.

It would seem that one thing that the trade must strive to do is not only to maintain new avenues built up in the export trade, but to develop additional foreign business. Former Ambassador Gerard has said that menace to the trade of the United States will come from Germany as soon as the war is over, in the great merchant fleet that country has constructed since the struggle began and in a socialized system of buying

and selling. Unless the Sherman anti-trust law is "knocked in the head", and combinations of trade permitted in the United States, he has explained, Germany's concentrated contracts from all the nations will wreck America's system, through competition among American industries. Obviously, too, the United States will have to adopt a constructive program of legislation to insure an adequate merchant marine of its own. There are, however, those who doubt that Germany will be able financially to resume its past practices of building up export business through subsidizing its merchant marine and encouraging its system of cartels. Also, it is the view of many that labor in all countries, including Germany, will decline to go back to the lower wages it received before the war. Such a development would bring the labor market of Europe more nearly in line with that of the United States. At the same time it is recognized that labor in the United States is receiving greatly advanced wages since the war began and the old differences in the wage levels of the European and American market may be continued, in which event industries of this country would still be placed in their former disadvantageous position. This evidently could be overcome by such major safeguards as the maintenance of an American merchant marine, of export combinations and perhaps by a protective tariff.

Tonnage for the increased plate capacity with which the country now is provided may come from numerous sources. The railroads will be obliged to resume car buying on a large scale if they are going to progress as they should and their failure to do so would mean the arresting of the development of the country and all its industrial enterprises. The country's apparent rebirth as a marine power holds possibilities of plate demand that scarcely may be measured at this time. A great tonnage of structural steel will be required to rebuild portions of Europe devastated by the war, together with the resumption of commercial undertakings that have been suspended in both Europe and America as the result of the war. Car buying necessarily will be only one of the numerous activities that the railroads of this country will have to resume. Rails, locomotives and other equipment of all kinds, calling for large steel tonnages, will have to be purchased.

Railroads Must Be Kept Up

The railroads have been greatly overburdened by the immense war business that was thrust upon them like an avalanche. President Hale Holden of the Chicago, Burlington & Quincy railroad recently made a terse statement which plainly indicated the way railroads have been excessively taxed by war demands.

"The people of the country," he said, "might as well get ready to use canals, electric lines, motor trucks, and other means of transportation to take some of the load off the railroads, because in the speeding-up of the great American power machine, the government's demands upon the carriers must be served first." He added that the railroads must be kept in good repair and to do this stood in immediate need of funds. Approximately 25 per cent more freight traffic was handled in 1917 than in 1916, and passenger business of 25,000,000 miles per annum has been withdrawn.

These statements regarding the railroad situation are particularly significant when considered in connection with the view of prominent men in the steel trade that new channels will be open to the industry to help solve the transportation question. Not only do these men agree with the view of Mr. Holden that there will be a broad development of electric and water lines, which will require heavy steel tonnages, but they believe there will be other sweeping changes. For instance, it is believed likely the present system of rural mail delivery will give way to one whereby interurban service will be performed to a great extent by motor trucks with a lessened demand upon railroads.

Viewed in its most far reaching aspects the future of the steel industry is held to be pointed toward a healthy prosperity in the years to come. The United States is and will be in a financial position to give every impetus to the full development of its industrial power. The billions it is spending go to its own business institutions and those that it is lending are amply secured. It remains for the government to adopt legislative policies which will make the United States a vastly greater nation and its industries the leaders of the world.



SECOND ROUGHING STAND OF STANDARD RAIL MILL ROLLING SHELL BARS

How 8 Brothers Run Big Sheet Mill

Country's Largest Specialty Manufacturing Plant Has Been Built Up by Members of One Family, All of Whom Learned Their Trade from Their Father—A Welsh Roller

BARELY a half-century ago, the experimental work carried out by William Kelly in the hills of Kentucky gave birth to the American steel industry. The annals of that 50 years are crowded with reminiscences of fortunes made and unmade almost overnight. The spectacular growth of the industry from one experimental plant to its present position as the source of one-half of the world's supply of steel has furnished the basis for innumerable stories that carry with them the conviction and appeal which fiction lacks.

Eight Brothers Operate Plant

Few of these stories rival in interest the history of the Davey family. The history is barely begun, as the present head of the family is only 46 years of age and their newest plant has been operating only a few weeks. This family is the driving force behind the Mansfield Sheet & Tin Plate Co., Mansfield, O., at present the largest manufacturer of specialties in the United States. The vigor of this driving force is partially explained by the active participation in the company's affairs, from the roller's platform to the president's office, of eight brothers, supplemented by one sister and three brothers-in-law. The full explanation, however, requires an appreciation of the family bond that has led each of the family in turn to serve his full apprenticeship in front of the sheet mills.

The size of the family—eight sons and four daughters—is uncommon enough; the fact that all of the boys took up the same line of work; that they held together, moving from town to town as a family and not as individuals, with the exception of infrequent intervals of brief duration; that they bought out a plant that in other hands had proved a failure and transformed it in three years' time to a powerful factor in the sheet business—all these are not only uncommon but are without precedent.

The Family Start

Just 50 years ago, when the first bessemer converter was still regarded in this country as an experiment, T. P. Davey, a Welsh lad of 18, began his apprenticeship in a tin plate mill in Wales. The skill and dexterity that for many years were held to be the heritage of Welsh rollers were rapidly acquired by the elder Davey.

When his oldest son, Thomas, had reached young manhood, he made the boy his helper. The second son, William, became his father's helper after the oldest son had acquired the art of rolling. Each of the eight sons

An Extraordinary Plant

WHEN an entire family of able men concentrates its energies on the development of a single business institution, an unusual measure of success is a foregone conclusion. In such a case, the policies and methods pursued are freighted with suggestions for the wide-awake plant manager. This article, prepared by an IRON TRADE REVIEW *staff expert, tells how eight brothers manage a big rolling mill. It is replete with new ideas and in addition contains a technical description of one of the country's most up-to-date mills.*

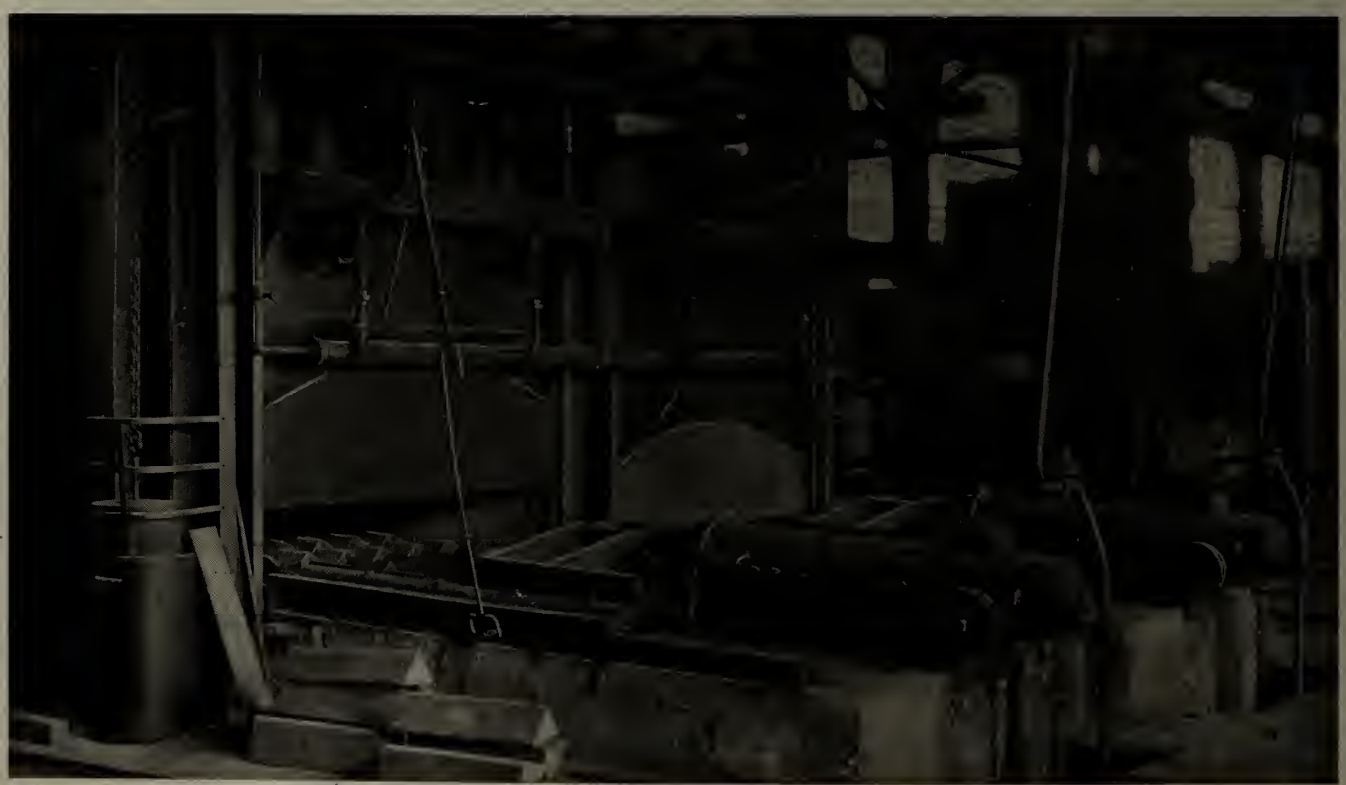


FIG. 1—CONTINUOUS PAIR FURNACES WITH HYDRAULIC CHARGER



A. I. DAVEY
JOHN DAVEY

SAMUEL DAVEY
THOMAS DAVEY

WILLIAM H. DAVEY
JAMES DAVEY

AUSTIN DAVEY
HAROLD DAVEY



FIG. 2—VIEW IN HOT MILL DEPARTMENT

in turn learned his trade from his father, a training that combined the best of Welsh and American practice with the sympathetic tutelage of a parent.

In 1888, after 21 years of experience in the Welsh mills, the elder Davey came to this country. Six months later his family followed him, including the seven sons who had been born in Wales and England, and the eldest of whom already had received their mill training. For six years the family was located at McKeesport, Pa., where the father and oldest sons worked in the Demmler Bros. sheet mill. The next 10 years found the headquarters of the family maintained at Niles, O., where the majority of them worked for the Falcon Tin Plate Co., controlled by Arms Bros., of Youngstown, O. During that period several of the brothers worked in different cities, W. H. Davey, at present president of the Mansfield Sheet & Tin Plate Co., being mill superintendent of the McKeesport Tin Plate Co. for one and one-half years. Later he held the position of general superintendent of the Carnahan Sheet & Tin Plate Co., Canton, O., for three years. He then became associated with A. B. Clark in the construction of the Massillon Rolling Mill Co. plant at Massillon, O., where he remained for six years, or until 1914.

The family had remained closely united during this time, the father and most of the sons following W. H. Davey to Canton and Massillon, O.

In the fall of 1914, W. H. Davey, then vice president and general manager of the Massillon Rolling Mill Co., had an opportunity to purchase the old plant of the National Rolling Mill Co., Mansfield, O., a plant which had been built only a few years previously, but which had operated for only a few months. T. P. Davey, the father, had died only a month before, after spending 47 of the 65 years of his life in the sheet business, and the wish which had been uppermost in his thoughts for years was still fresh in his sons' memories. This wish was that the family remain as a closely knit unit, working together for one common end, the acquisition and control of their own plant. Four weeks



FIG. 3—COLD ROLL DEPARTMENT SHOWING DRIVING MOTOR

after his death the wish was carried out, and with the co-operation of a number of Mansfield business men, the Davey family purchased the Mansfield plant and began its speedy rehabilitation.

One of the Brothers Designs Mill

Sheets were first rolled in the old plant on Jan. 1, 1915, and 23 months later construction was begun on the new plant which has just been put in operation. The plans for this plant were drawn up by Austin Davey, one of the youngest of the brothers. The mill was built under his supervision. It is laid out along modern lines that insure the straight-line progress of the steel from the sheet and pair furnaces on one side to the shipping platform on the opposite side.

The new plant occupies a portion of a tract of 18 acres which was purchased to insure sufficient ground for future expansion. The site is adjacent to the older plant, being separated from the latter by the tracks of the Pennsylvania railroad, which serves the new works. This railroad, together with the Baltimore & Ohio, and through a switching arrangement, the Erie, serve the older plant.

Considerable excavation work was necessary, as the site selected was hilly and somewhat higher than the older property. Swanson Bros., Massillon, O., handled the excavation and removed approximately 40,000 cubic yards. The entire site was leveled so that when desired the construction of additional buildings could be started without delay. The immense but shallow well in which the new buildings lie is enclosed by a wire fence of unusually substantial construction.

The buildings were erected by the Massillon Bridge Co., Massillon, O. The plant includes two parallel buildings, with their long axis running from north to south. These buildings are 546 feet long and 70 feet 3 inches wide, and directly adjoin to form one large structure 140 feet 6 inches in width. On the east side is a standard lean-to, 44 feet 9 inches in width. The lean-to on the west side is 40 feet 5¼ inches in width. Thus the width of the entire mill is 225 feet 8¼ inches.

Specifications of Building

The buildings are of steel construction. The eave troughs of the main buildings are 30 feet 10 inches above the ground level, the height to the eave troughs of each lean-to being 13 feet 6 inches. The crane runways are 19 feet 7¼ inches above the floor. The west lean-to has 7-foot sliding doors throughout its entire length, giving an arrangement that permits excellent ventilation at all times. The upper portion of the sides of each lean-to, as well as the main buildings above the lean-to roofs, are glass. This provides a maximum of light while at the same time these glass windows can be swung open to give increased ventilation, if desired.

The steel and glass construction of the buildings gives a substantial but light structure, as indicated by the fact that the building weighs but one ton to the running foot.

Location of Various Departments

One of the main buildings contains six hot mills, four roughing mills and the bar department. The other main building houses the cold roll and finishing departments. The sheet and pair furnaces are located in the west lean-to, the material being handled on a straight line through the hot mills and finishing departments to the enclosed shipping platform in the east lean-to.

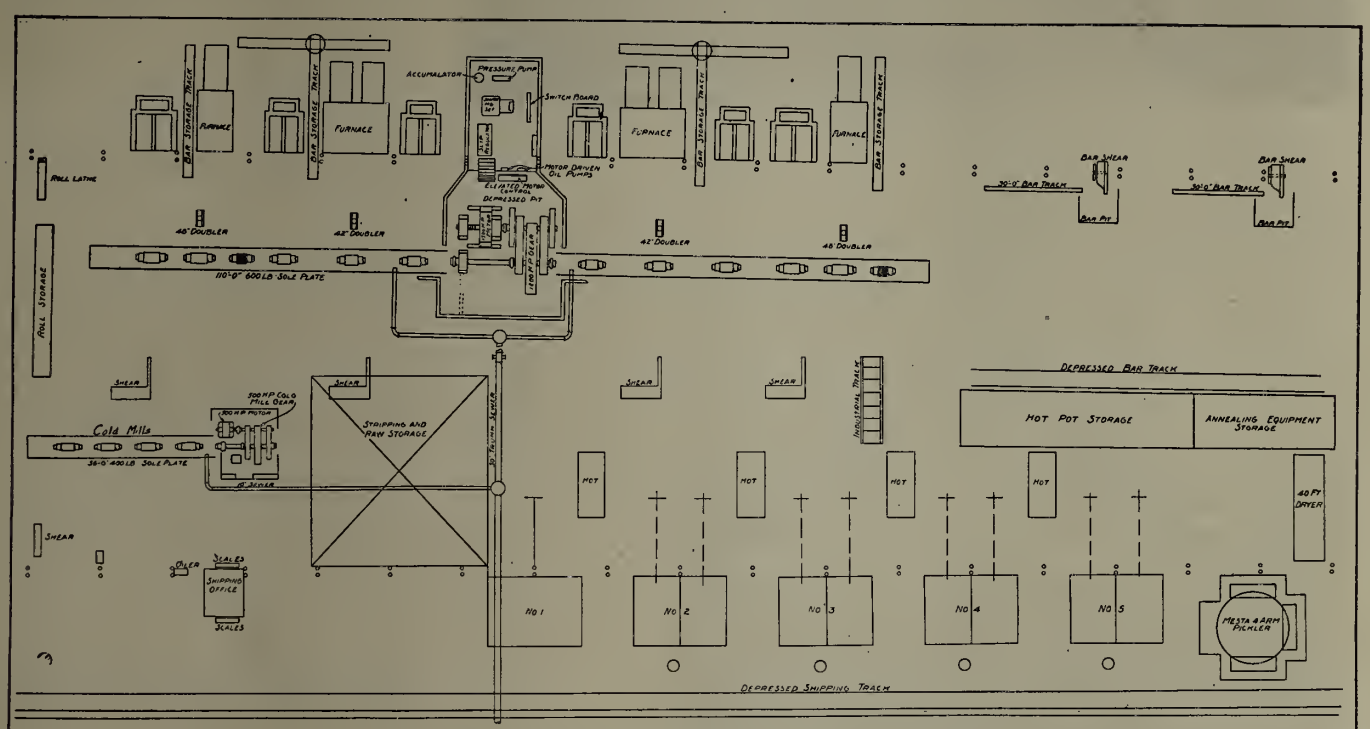


FIG. 4—LAYOUT OF NEW SHEET MILL AT MANSFIELD

The Mansfield mill is the first to be equipped entirely with the Allis type of continuous pair furnaces. The general details of these furnaces may be seen clearly in Fig. 1, which shows the charging side of one of the furnaces. The bars rest at an angle on the corrugated bottom of the furnace. The bars are charged from the rear of the furnace, being pushed into place by a hydraulic charger. The furnace will hold five heats at one time, the cold charge pushing the thoroughly heated bars out at the front end of the furnace. The cold charge is placed in position while the five in the furnace are being heated, so that the actual charging is done rapidly by one man, who operates the hydraulic pusher through a control at



FIG. 5—DRIVING MOTOR AND GEAR FOR HOT MILLS

the side of the furnace. The gas and steam controls also can be operated from the same position. These furnaces were installed by the George J. Hagan Co., Pittsburgh.

Six of these continuous pair furnaces are installed, four being of the double type and two of the single type; these are arranged for operation either on oil or gas. Six sheet furnaces are used, these being of the standard 2-door type. At the present time these are gas fired.

Hot Mill Department

Six hot mills and four roughing mills are installed in the main building directly in front of the sheet and pair furnaces. The hot mills are driven by a 1500-horsepower Westinghouse motor through a driving gear furnished by the Mesta Machine Co., Pittsburgh. The total weight of the gear and flywheels is 370,000 pounds. The rolls are 30 inches in diameter with 24-inch necks. The hot mills, as well as the cold mills, roll lathe and four 156-inch shears, were furnished by the Hyde Park Foundry & Machine Co., Hyde Park, Pa.

In laying out the plant, particular attention was paid to making operating conditions as nearly ideal as possible, thus insuring the maximum of output with the minimum of effort. The hot mill men, for instance, work on water-cooled standing plates. A cold-air system also is provided at each mill. The water-cooled standings are of the Baird type, and consist of a hollow square plate through which cold water is circulated constantly. Fresh air is kept in constant circulation throughout the plant.

The eight cold mills in the finishing department are driven by a 500-horsepower Westinghouse motor through a gear furnished by the Falk Co., Milwaukee. Five double annealing furnaces are installed just north of the cold mills. These are of standard construction, hand-fired, and are designed to handle 10 charges a day. Two 4-arm Mesta heavy type picklers are installed in the north end of this building, the pickling department being the only one in which steam is used. Steam is supplied by a 300-horsepower Stirling boiler, which is housed in a separate structure just east of the pickling departments. The boiler is equipped with stokers furnished by the Combustion Engineering Co., New York.

The auxiliary equipment includes two motor-driven crocodile bar shears furnished by the Youngstown Foundry & Machine Co. These are installed in the north end of the hot mill building, adjacent to the bar bank. Two traveling cranes operate in the finishing department and one in the hot mill department. Two of these cranes are of 20-ton capacity and one of 25-ton. A roll lathe is installed in the south end of the hot mill department, adjacent to the roll storage racks.

Electric Trucks Used

Outgoing shipments are brought to the freight cars on electric trucks furnished by the Automatic Transportation Co., Buffalo. Two of these trucks are used.

The older plant as first rebuilt in 1915 was described in THE IRON TRADE REVIEW, April 22, 1915. The three sheet and three tin mills in service at that time have been supplemented by four additional tin mills.

A Bonnet powdered coal plant is being built just north of the new plant and adjacent to the old mill.

The officers of the company are W. H. Davey, president and general manager; Charles Ackerman, vice president; A. I. Davey, secretary; Samuel Davey, assistant general manager. The board of directors comprises W. H. Davey, Charles Ackerman, A. I. Davey, John Davey, Samuel Davey, Berry Baxter and R. W. Hartman. John Davey is superintendent of the older plant and Harold Davey of the new plant. Austin Davey is construction engineer for the company, while James Davey and Thomas Davey are employed in the hot mill department.



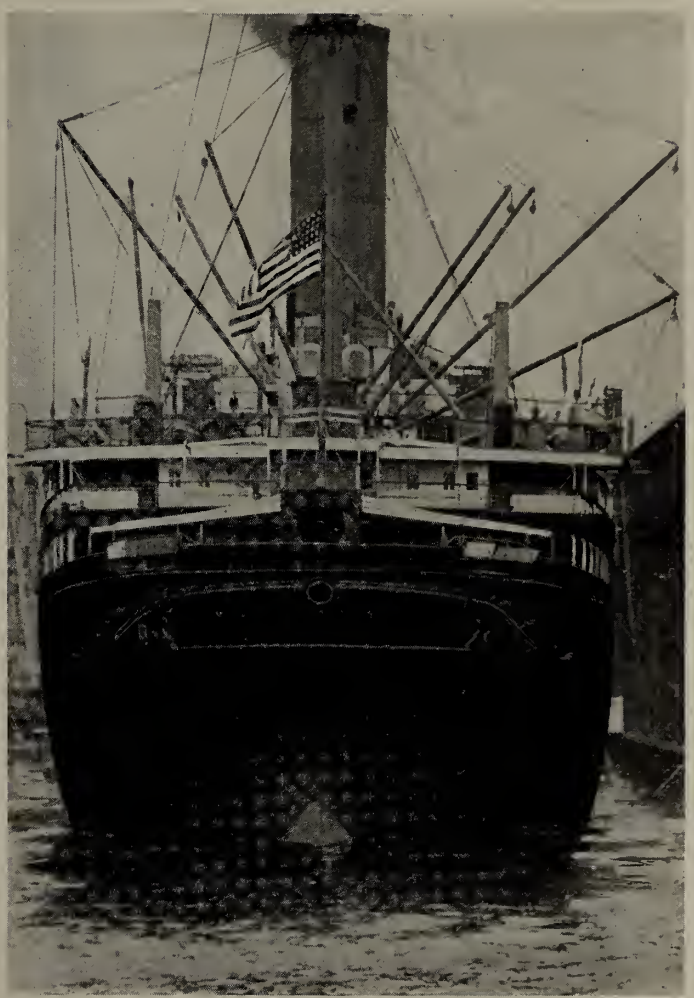
FIG. 6—HOT MILL GEAR

The Welding Tool vs. The Sledge

How Interned German Liners Wrecked by Prussian Vandalism Were Repaired

BY H. COLE ESTEP

The story of a great triumph of American engineering and constructive genius — Radical methods employed to meet an extraordinary situation — A successful counterattack on a thoroughly organized campaign of ruthless destruction — Machinery presumably wrecked beyond repair again placed in service in a few months — German efficiency proved a myth — Over one hundred ships aggregating 675,000 tons have been added to our merchant marine, a priceless acquisition in the present emergency.



THE GIANT VATERLAND NOW U. S. S. LEVIATHAN FLYING THE STARS AND STRIPES



Former German Liners at New York—All Are Now Repaired and Sailing Under the Stars and Stripes

A Counter Attack on German Vandalism

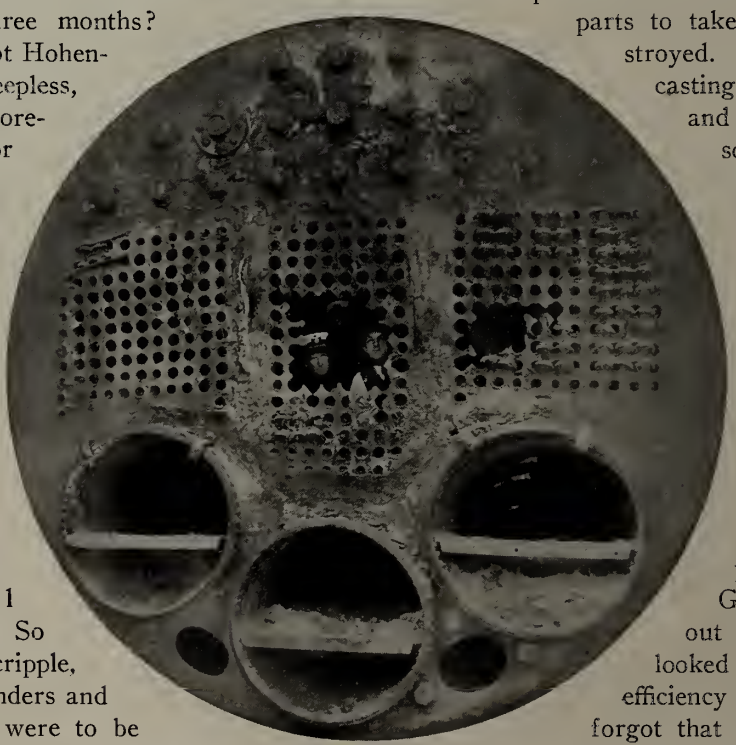
TO all *unterseeboote* commanders: "After Feb. 1 resume unlimited submarine warfare in the barred zones, according to previous instructions."

To the commander of the interned fleet in North America: "Unlimited submarine warfare has been proclaimed. The United States may join with our enemies. She must be prevented from using our ships. *Vorwaerts mit ihren schlageln!* Spare not a single vessel."

Such in effect were the orders spat out from the powerful German wireless station at Nauen a little less than a year ago.

The submarines were loosed. What booted it if America joined the Allies? Would not the war be won in three months? And meanwhile, would not Hohenzollern efficiency, sleepless, painstaking, invincible, forestall any Yankee plans for utilizing the five score or more vessels of the Fatherland interned in American harbors? The plan was simple. The interned ships would be put out of action for the duration of the war. Even Prussianism shrank from their total destruction. They would be needed too soon for the great commercial struggle after the war. So the orders went forth to cripple, but not to destroy. Cylinders and other vital engine parts were to be wrecked, while in the meantime German foundries provided new castings from patterns which they had in readiness for just such an emergency.

For a time events moved smoothly and according to schedule. While neutrality guards policed the piers, Prussian wreckers labored and cursed in the bowels of the interned steamers. For weeks drills were busy; hack saws were active; and battering rams, more ingenious than those rigged before the walls of Carthage, bludgeoned their way through massive and intricate castings. At the same time in pumps and boilers, in fire extinguishers and double bottoms, cunning German minds laid traps to foil American ingenuity. As the work of demolition proceeded in American harbors, German foundrymen paused in their war labors to make new parts to take the place of those destroyed. More than likely these castings were machined, finished and promptly shipped to some convenient port of debarkation, there to await the coming of peace. Thus only could all contingencies be provided for, and the great Prussian god, Efficiency, appeased.



A BOILER DRY-FIRED AND DESTROYED

But even though *Schrechlichkeit* feed on itself, its ends are not always accomplished. In this case the Germans reckoned without their host. They overlooked the difference between efficiency and effectiveness, and forgot that although some men may ruin, others can build. Nevertheless, when the



THE WELDING TORCH MADE LARGE CYLINDERS AS GOOD AS NEW

nation awoke to the fact that many of the German ships seized at the outbreak of the war had been systematically and methodically wrecked, the alarm was general and widespread. In April we were still under the spell of the Prussian efficiency bogey. "The eagle's wings have been clipped," sneered the propagandist. We believed him. We had been sold by the great German advertising campaign with its single slogan, "Invincibility". Visions of an army impotent spread through the country. The deathlike inertia of the shipbuilding program added to our uneasiness. It has always been so with the United States. We are unconscious of our strength and unaware of the vast machinery of production amid which we live.

So while the nation worried over the vandalism practiced on the interned steamers, vast constructive forces were quietly assembled and the work of bringing order out of chaos commenced. Every vessel was thoroughly surveyed and its mashed and broken bones critically examined. Then the remedy was prescribed. It was daring, original, American, suited to the situation. Under ordinary conditions, by methods dictated by the traditions of the ship repairing fraternity, at least 18 months would have been required to place the looted vessels again in commission. Meanwhile, Germany might have breached the western front. Fortunately, however, traditional methods were jettisoned. In their stead ideas new to the marine world were brought into play and as a result by Thanksgiving day all of the 109 German merchantmen that fell into our hands in April, freshly painted, refitted, repaired, reconstructed and in many cases vastly improved, were operating on the Atlantic under the American flag. Under the direction of American naval crews they are now bearing no inconsiderable portion of the traffic burdens of the war. As a matter of fact, the actual work of repairing the damage wrought by German vandals required but little over four months' time; no vessel was delayed for a single day as a result of Prussian vindictiveness. In every case the time necessary to repair the wanton destruction perpetrated by the German crews was less than that required for the ordinary fitting-out operations and for the work of converting the larger liners into transports.

In brief, in a great contest between destructive and constructive forces, the constructive organization won hands down. Prussian efficiency was beaten at its own game. American genius for big undertakings again proved its capacity. And herein lies a story that should be familiar to every patriotic citizen. Before it can be told in any detail, the nature and extent of the damage to the German steamships must be thoroughly understood.



Pieces were broken out of large cylinders and thrown overboard. It was necessary therefore to make a pattern to fit the break and then to cast a new piece, which was welded to the main body of the cylinder. This shows a cast iron patch ready for welding by the oxy-acetylene process. Special clamps are used to hold the patch securely in place for welding. This weld was not caulked and no anchor studs were used.

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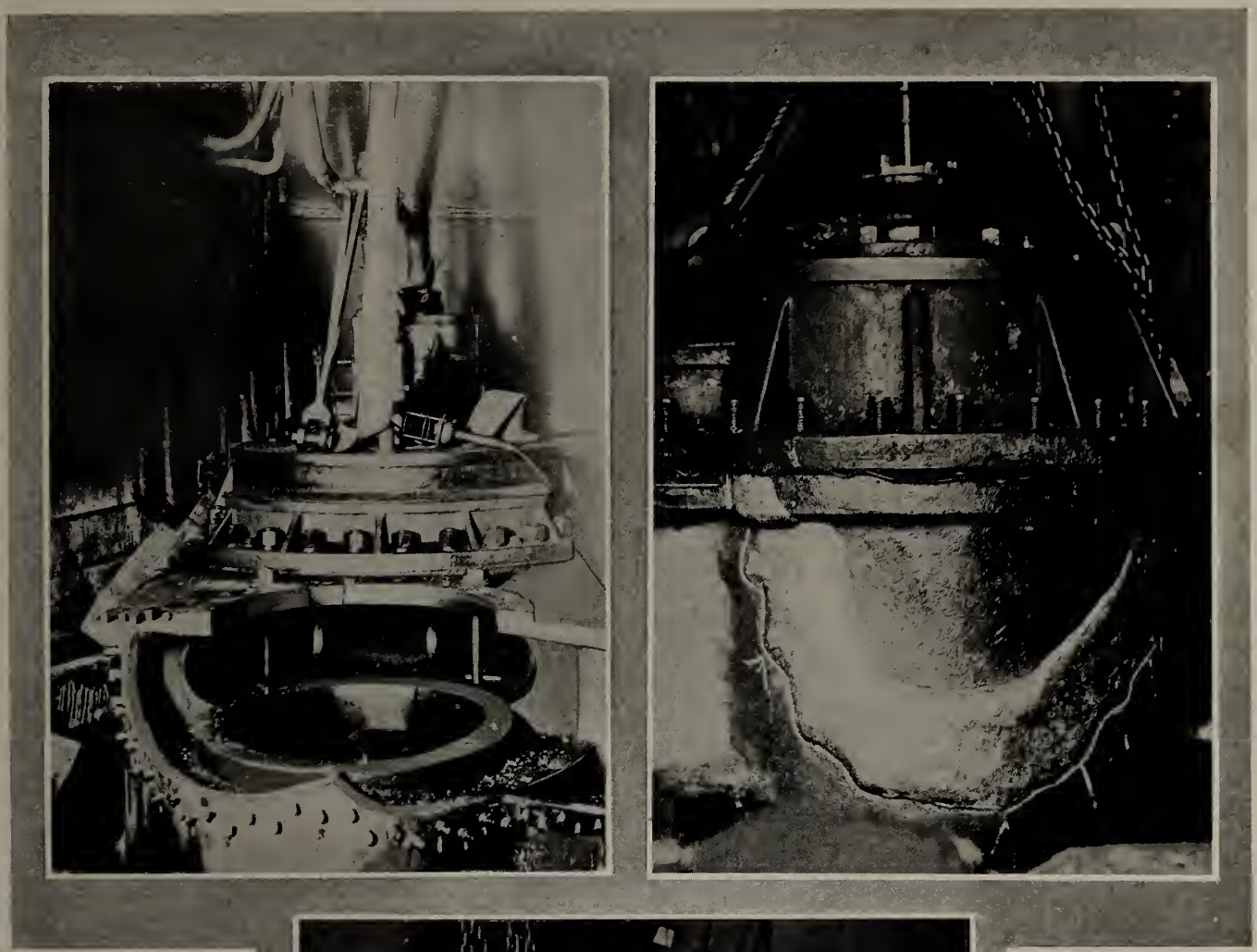
LONG months of idleness on the interned vessel, with nothing more important to do than wind the chronometer, had brought about a relaxation of the strict discipline usually maintained on German merchant ships, so on the morning in question Captain Werner waived the prerogatives of rank and sought out Chief Engineer Richter in his log room, instead of sending for him.

"I haf orders for you," the captain announced.

"Sehr gut," Richter rejoined, laying aside his carved meerschaum pipe. "It is time we got into the active service of the Fatherland. For nearly three years we have done nothing but pump out *der* bilges, while our brothers and all our friends are serving in the armies of the Kaiser. Even though we sink on the way over, we shall be doing something. When do we get up steam?"

"Never," said the captain. "We are not to run the blockade and be helplessly sunk or captured by those dogs of English. Our orders are much more subtle. The high command has seen fit to loose the U-boats. In three months, six at the most, England will be starved. Meanwhile America, nominally at least, may enter the war. Our ships must not fall into the hands of the Yankees, so our orders are to put them out of action for the period of the war."

"Let it be so," muttered Richter, although his dis-



The electric welds usually were anchored by ⅞-inch steel studs screwed into the main portion of the casting along the line of the break. These studs were staggered and the welding metal threaded around them. The two illustrations at the top of the page show a high-pressure valve chest before and after repairing by electric welding.



Cast-steel patches were used on most breaks repaired by electric welding. The line of the weld was trimmed to a V-shape. The welding metal was laid on in layers, using steel welding wire and the arc welding process. Ingenuity was required in arranging the rigging and clamps holding the patch in place while the work was done.

appointment was plainly evident, and his face fell.

"It is on you, *Herr* Chief," the captain continued imperturbably, "that most of the burden of executing these orders will fall. Certain vital parts of the engines and pumps are to be damaged beyond repair, so that by the time the Americans have made new designs, prepared the drawings, worked out the patcrns and finished the castings necessary to replace the parts we are to demolish, the war will be over."

But Richter was thinking only of the machinery he had coddled, nursed and petted for years. "My poor engines," he murmured, "they have served me well. It is like shooting one's dog. A thousand times over would I risk death running the blockade."

The captain was disposed to humor his chief's whims.

"Don't worry," he soothed, "it's only temporary. Our world-encompassing, efficient system overlooks nothing. New castings will be ready for you when you need them."

He handed Richter a packet.

"Here are the orders. Execute them, for the Fatherland!"

A remnant of Richter's three years in the Germany army surged to the surface. He saluted.

"Zu Befehl, Herr Kommander!"

The captain departed and Richter undid the packet of orders. They were brief, but explicit.

"Immediately upon receipt of these instructions," Richter read, "you will commence the work of demolition, taking care to follow our directions accurately, so that the work of reconstruction at a later date may not be hampered. You will smash as large pieces as possible out of the following engine parts: Cylinders, steam nozzles, valve chests, cylinder liners, cylinder covers, and circulating pump casings. This can best be accomplished by first drilling the parts in question with a series of 2-centimeter holes arranged either in the form of a circle or a letter U. The holes should be as close together as possible, so the pieces will break out easily with a hand sledge. Throw the broken pieces overboard. If you have time, you also can crush the valve chests and cylinders by rigging a battering ram from your chain tackle. A piece of spare shafting will serve for a ram. Piston valves should be removed and thrown overboard. Disconnect the throttle valve also and throw it overboard. Smash the engine room telegraph. Remove the glands from the stern-tube stuffing boxes and strew them through the bilges, thus filling the stern-tube compartment with water, necessitating the docking of the ship. Finally, empty the boilers of water and dry-fire until the tubes are destroyed. Take care to so conduct your operations as to avoid suspicion. Broken pieces, valves, etc., that are to be thrown overboard should be discharged at night, not in the daytime. Do most of your work at night."



This illustration shows a large oxy-acetylene weld on the port low-pressure cylinder of the former German steamer RHINE. *The welding seam is* 80 *inches in length. No anchor studs were used on this weld. Slag and other impurities are worked out of the weld by manipulation of the torch aided by a flux. Welds such as this have shown a test efficiency of* 100 *per cent.*

Richter turned to the speaking tube that led down into the engine room.

"Send up Schlamacher," he ordered.

When his assistant had appeared he read him the orders for the destruction of the machinery.

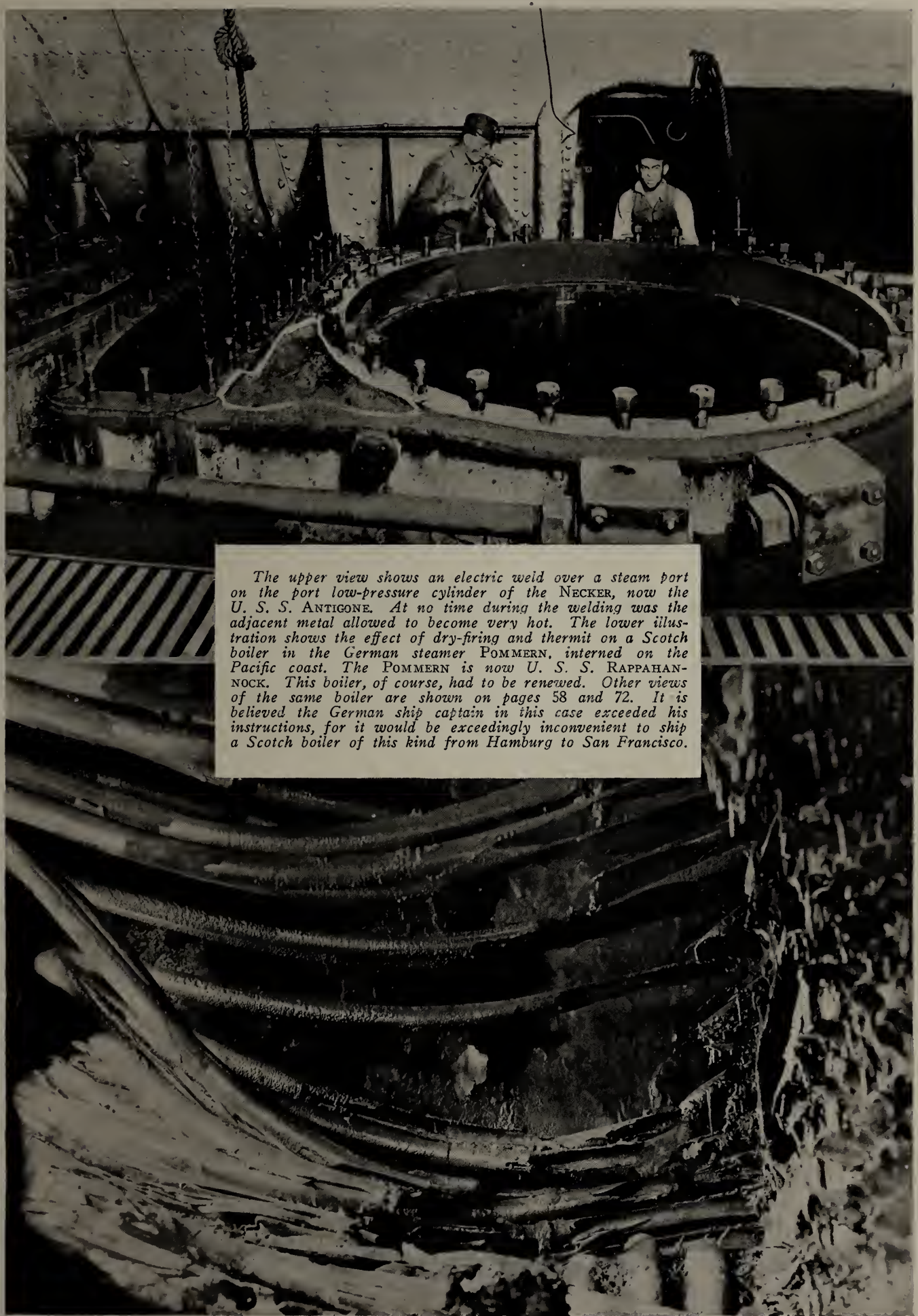
"You will proceed at once," Richter concluded, "and be careful to follow the instructions explicitly. I shall oversee your work myself."

Before long the grinding of drills and the crashing of sledges against metal was mingled with stout German oaths throughout the after portion of the ship. The wreckers were at work.

* * *

ALTHOUGH cast in the form of fiction, the foregoing fragment of narrative describes accurately the more obvious forms of destruction inflicted on the interned German merchantmen in American harbors between the resumption of unrestricted submarine piracy on Feb. 1 and our declaration of war early in April. On the latter occasion, 103 German vessels of all types resting in American harbors were taken over by the authorities of the United States. Since then six more have been added to the list, making a total of 109 vessels now carrying the stars and stripes in place of the black, white and red ensign of the Kaiser. Fully 50 of these ships, when seized by the American authorities were found to have been more or less damaged in accordance with the plan detailed in the foregoing.

The boats along the Atlantic coast in the vicinity



The upper view shows an electric weld over a steam port on the port low-pressure cylinder of the NECKER, *now the U. S. S.* ANTIGONE. *At no time during the welding was the adjacent metal allowed to become very hot. The lower illustration shows the effect of dry-firing and thermit on a Scotch boiler in the German steamer* POMMERN, *interned on the Pacific coast. The* POMMERN *is now U. S. S.* RAPPAHANNOCK. *This boiler, of course, had to be renewed. Other views of the same boiler are shown on pages* 58 *and* 72. *It is believed the German ship captain in this case exceeded his instructions, for it would be exceedingly inconvenient to ship a Scotch boiler of this kind from Hamburg to San Francisco.*



Many steam nozzles were broken. They were repaired by electric welding by the method illustrated at the top of this page. Special clamps were designed to hold the parts together while being welded. The cord-like structure of the weld is clearly shown at the left, while the view at the right shows the effect of peening or caulking.



The view at the left shows the break in the first intermediate pressure valve chest of the Princess Irene now the U.S.S. Pocahontas. The cast-iron patch has been fitted ready for welding. Many saw-toothed breaks such as this were repaired by electric welding. Special efforts were made to avoid overheating which induces shrinking and cooling strains in the weld. The success of the weld depends in a large measure on the skill of the workman.



The view at the right shows the elaborate rigging and blocking necessary to secure the patch in place prior to welding. The preparation of the weld is half the battle. With the patch in place and the edges of the weld properly chamfered the arc welding proceeds by first building up the edges of the V-slot from one end to the other and then filling in between these steel-plated surfaces with the welding material.



Where feasible, anchor studs are placed in the face of the weld as shown at the left. When the weld is finished the whole surface is gone over with an air caulking tool. This has been found to be very important in electric welding. Hard spots are disclosed and porous sections closed up by the peening process. Peening is now considered essential for safety.

of New York, Boston and Chesapeake bay were the most completely wrecked, probably since they were closest to the headquarters of the Germans in charge of the vandalism. It is now believed this work was directed from the Hamburg-American Line offices in New York, with substantial connivance on the part of the German embassy at Washington.

Practically all the boats were damaged in the same manner, which would indicate that general instructions had been issued to all commanding officers by the same central authority. The parts damaged, as a rule, were those probably on hand as spares in the home ports of the vessels, or easily procurable from patterns, jigs, etc., already provided. Had not this country entered the war, the ships could have been again commissioned with a minimum of trouble by utilizing spare parts already provided. Smashing cylinders and valve chests was a favorite form of destruction. On the steamers RHEIN, NECKAR and BULGARIA turned over to the Norfolk navy yard for repairs, 17 of the 24 cylinders on the three ships were damaged, 15 so badly that they required welding.

The reader should not assume, however, that the German vandals confined themselves simply to obvious smashing and plain, unvarnished destruction. On many ships there was evidence of finesse and ingenuity in thinking up clever tricks. In some cases Prussian imagination fairly ran away with itself. On one ship the fire extinguishers were emptied and refilled with gasoline. In another case, electric light globes were ground to a powder which was put in the oil pumps, there to be distributed to the various bearings. Of course, to the nation guilty of the rape of Belgium, such tricks as these must have seemed mere child's play. Probably they represent simply the playful mischievousness of the ship's engineers after they were through with the heavy battering and smashing of their day's work.

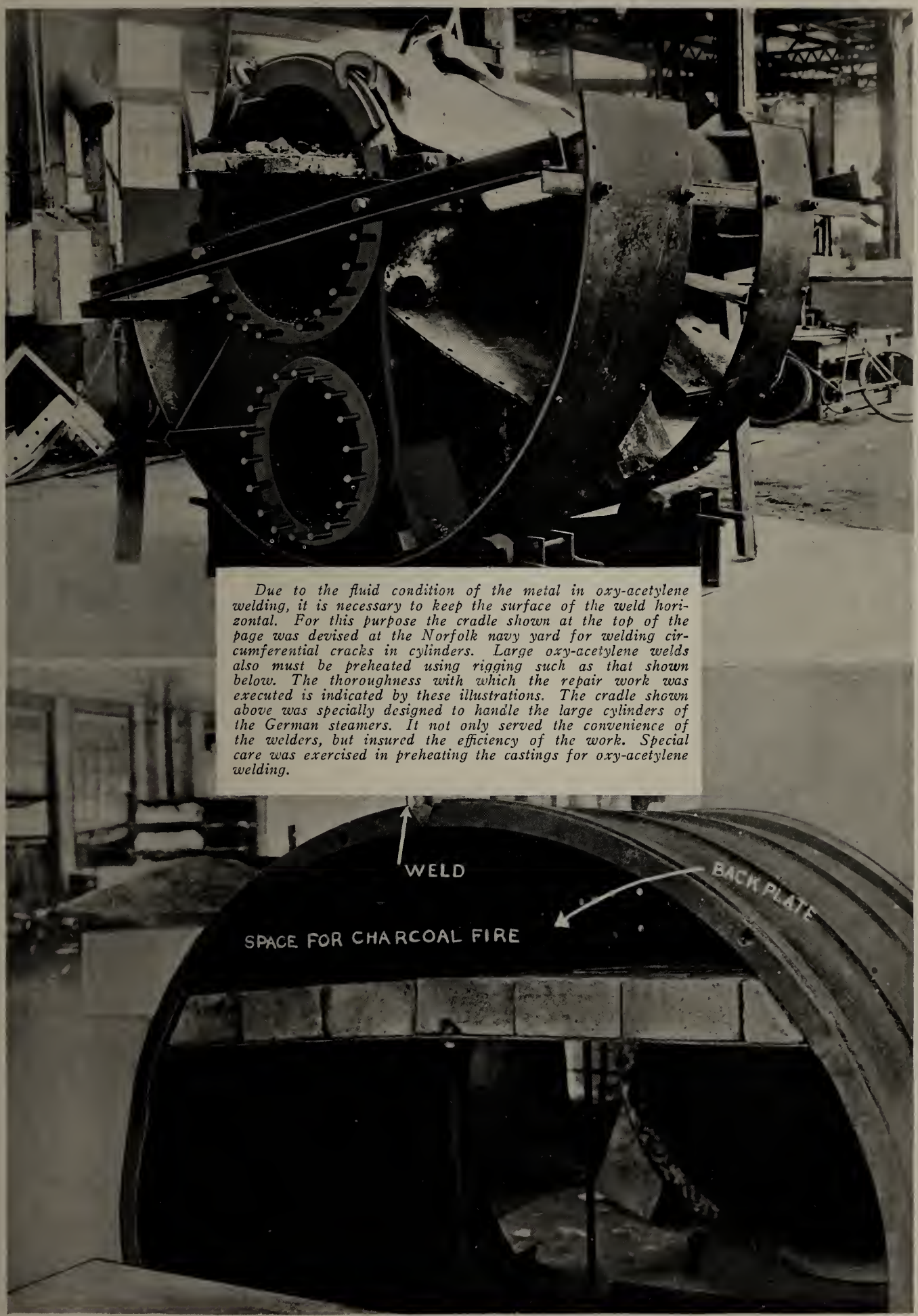
Many other smart tricks were tried, but none succeeded in causing any damage. In some cases small pipes were uncoupled, plugged and screwed together again, to all external appearances in good order. Occasionally check valves were reversed—a simple operation effected quickly by uncoupling the valve and turning it over. On the giant VATERLAND, now the U. S. S. LEVIATHAN, a section of suction pipe to the fire and bilge pumps was found with holes bored in it. The holes had been plugged with putty and red lead and then covered so they would not be discovered. On the KAISER WILHELM II the intermediate piston rod on each engine was badly bent, but not so badly as to preclude its being straightened. On another vessel, the piston and connecting rods were sawed part way through and the saw cuts concealed. In still other cases, staybolts were sawed in two and replaced so they appeared to be in good order. Staybolts also were cut off just outside the plate, so the nuts held only by one thread. The broken ends of the bolts were screwed into the nuts to give the appearance of normal solidity.



GERMAN AUXILIARY CRUISER PRINCE EITEL FRIEDRICH SIEZED BY UNCLE SAM AND NOW IN THE U. S. NAVY

Steam valves were gagged and the indicators tampered with, so that in the case of some large valves, when the indicator showed "open", the valve was merely cracked. On a few ships dynamo connections were tampered with, gratings and runways were smashed and the engine-room telegraphs altered.

In the case of one ship the work of repair was completed and the vessel sent out for trial. At low speed all went well. Immediately after the engine was thrown into full speed, a tremendous knocking



Due to the fluid condition of the metal in oxy-acetylene welding, it is necessary to keep the surface of the weld horizontal. For this purpose the cradle shown at the top of the page was devised at the Norfolk navy yard for welding circumferential cracks in cylinders. Large oxy-acetylene welds also must be preheated using rigging such as that shown below. The thoroughness with which the repair work was executed is indicated by these illustrations. The cradle shown above was specially designed to handle the large cylinders of the German steamers. It not only served the convenience of the welders, but insured the efficiency of the work. Special care was exercised in preheating the castings for oxy-acetylene welding.

developed in one cylinder. The engine was shut down and the cylinder cover removed. A large machinist's hammer was discovered. It had been concealed in one of the steam ports and at low speed the steam velocity was insufficient to blow it out into the cylinder. At high speed it might easly have broken the cylinder head.

* * *

SUCH was the situation when American engineers and naval officers took up the problem of repairing the damage and placing the German ships once more in commission. Not only were cylinders and other vital parts smashed, but "strategy" such as that just outlined had been resorted to to delay and, if possible, prevent the use of the ships by American forces at any early date.

the German reckoned without his host. In this case all of the parts so carefully enumerated were repaired and no new castings were required.

In general, the problem of getting the German boats back into commission divided itself into two parts. First, it was necessary to ferret out and repair all the vandalism. At the same time each ship had to be completely refitted and overhauled to eradicate the effect of three years' idleness and neglect. Many of the boats were found to be in bad shap due simply to natural deterioration. Once more Prussian efficiency was found to have been asleep at the switch, and on most of the ships the work of refitting and overhauling actually required more effort than repairing the actual damage.

While the ships were being overhauled, their obvious

A Few of the Former German Liners With Their New American Names

German Name	American Name	German Name	American Name
Adamsturm	Actaeon	Hermes	Hermes
Allemannia	Owasco	Hohenfelds	Long Beach
Amerika	America	Holsatia	Tippecanoe
Andromeda	Bath	Indra	Tonawanda
Arnallas Vinnon	Chillicothe	Kaiser Wilhelm II	Agamemnon
Barbarossa	Mercury	Kiel	Camden
Bochum	Montpelier	Koenig Wilhelm II	Madawaska
Bohemia	Artemis	Koln	Amphion
Borneo	Nipsic	Kronprinz Wilhelm	Von Steuben
Breslau	Bridgeport	Kronprinzessen Cecilie	Mount Vernon
Carl Diederichsen	Raritan	Leibenfels	Houston
Clara Jebsen	Tioga	Locksun	Gulfport
Cincinnati	Covington	Neckar	Antigone
Coblenz	Sachem	Nicaria	Pensacola
Darvel	Wamsutta	Odenwald	Newport News
Dobek	Monongahela	O. J. D. Ahlers	Monticello
Elmshown	Casco	Pommern	Rappahannock
Elsass	Appelas	President	Kittery
Esslingen	Nyanza	Praesident Grant	President Grant
Farn Gerraux	Farn Gerraux	Praesident Lincoln	President Lincoln
Frieda Leonhart	Astoria	Prinzess Irene	Pocahontas
Friedrich der Grosse	Huron	Prinz Eitel Friedrich	De Kalb
Geier	Schurz	Rhein	Susquehanna
George Washington	George Washington	Rudolph Blumberg	Beaufort
Gouverneur Jaeschke	Watoga	Saxonia	Savannah
Grosser Kurfurst	Aeolus	Staatssekraetar Solf	Samoa
Grunewald	Gen. George W. Goethals	Vaterland	Leviathan
Hamburg	Powhatan	Vogenson	Quincy
Harburg	Pawnee	Willehad	Iroquois

On one German ship on the Pacific the work of destruction seemed so successful to the captain and chief engineer that they took the trouble to prepare a detailed list of the damage for future reference, carefully noting the parts that in their judgment had been wrecked beyond repair. A portion of this list, literally translated, follows:

1.—Starboard and port high-pressure cylinder with valve chest; upper exhaust outlet flange broken off. Cannot be repaired.

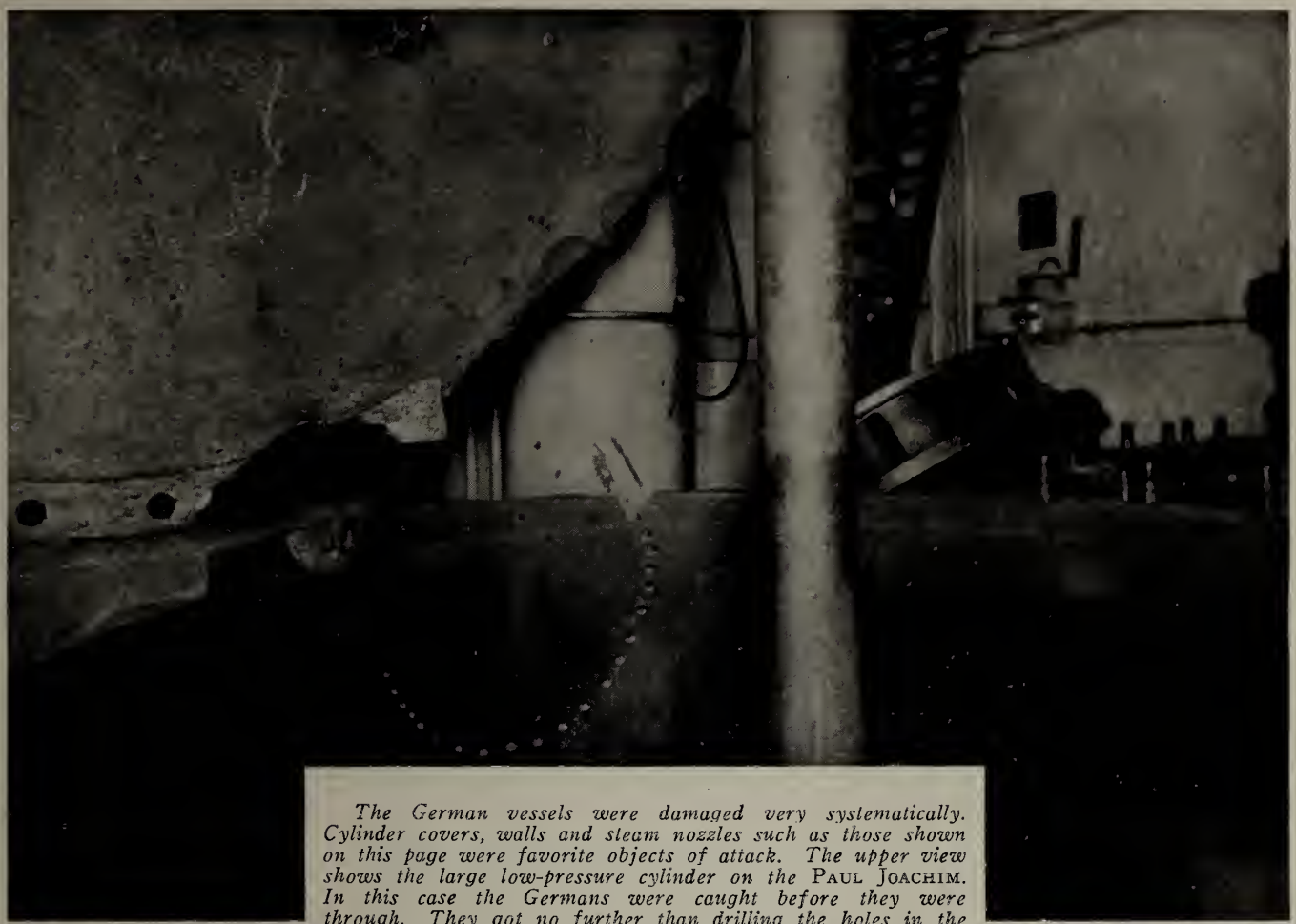
2.—Starboard and port second intermediate-pressure valve chest; steam inlet flange broken off. Cannot be repaired.

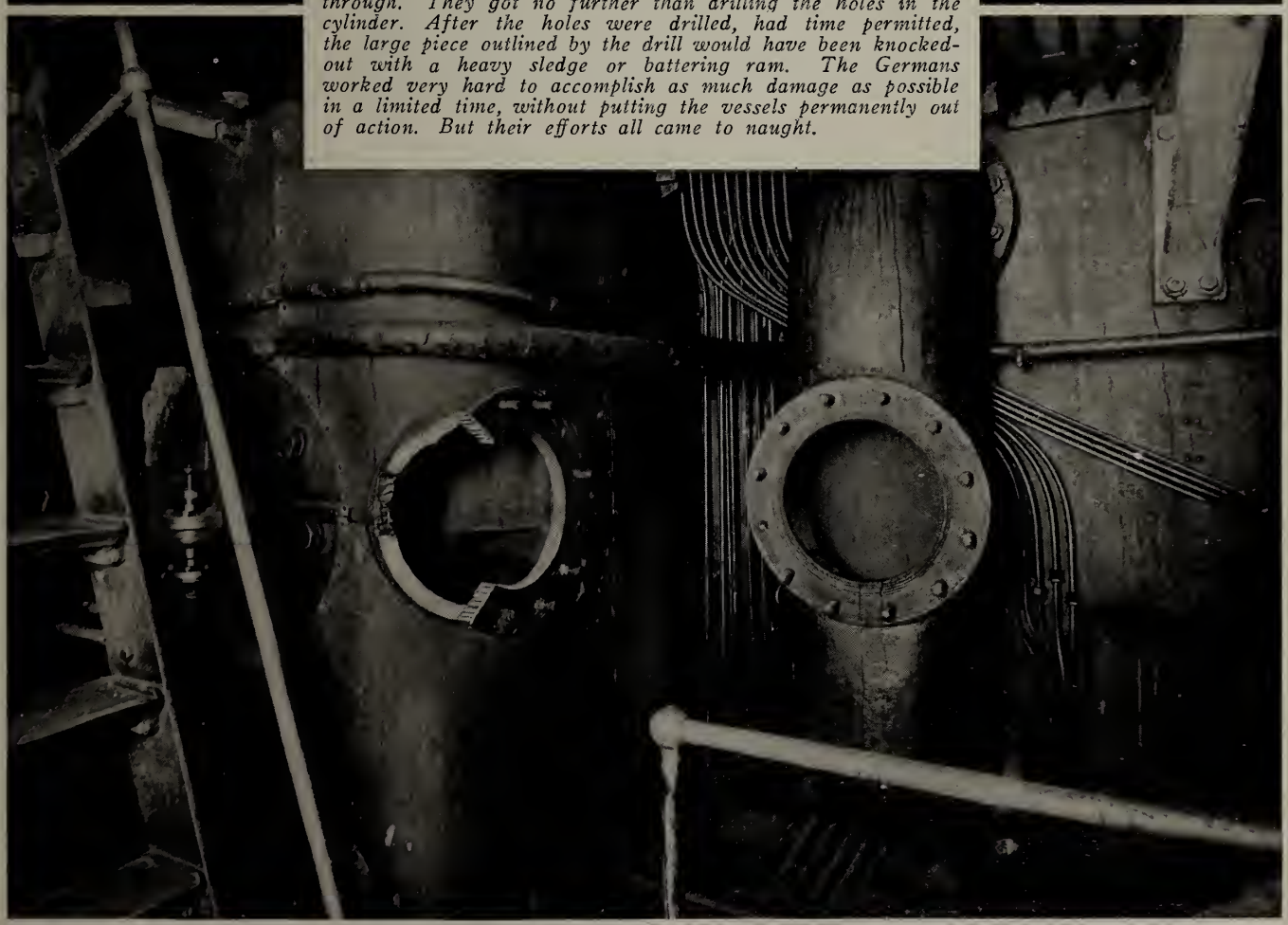
3.—First intermediate-pressure starboard; exhaust pipe of exhaust line to second intermediate-pressure, flange broken off. Cannot be repaired.

4.—Starboard and port low-pressure exhaust pipe damaged. Cannot be repaired.

But as we stated in the introduction to this article, engineering deficiencies, which had been revealed by surveys, were remedied. The boats were found to be far from the paragons of perfection that the continued advertising of German efficiency would lead one to believe. The great VATERLAND, for instance, although equipped with steam lines which in some cases extend over 300 feet, was almost totally unprovided with steam traps, and the few drains that were fitted were arranged to discharge into the bilge. The boilers of the VATERLAND were not fitted with internal feed pipes, and therefore primed very easily. Her turbines were faulty. The casings were subject to heat cracks, and on the last voyage across, the great vessel made the trip on three propellers at reduced speed. Plenty of other evidence was discovered on the internal vessels to prove that ordinary German engineering practice does not measure up to American standards.

In nearly every case the broken castings, including





The German vessels were damaged very systematically. Cylinder covers, walls and steam nozzles such as those shown on this page were favorite objects of attack. The upper view shows the large low-pressure cylinder on the PAUL JOACHIM. *In this case the Germans were caught before they were through. They got no further than drilling the holes in the cylinder. After the holes were drilled, had time permitted, the large piece outlined by the drill would have been knocked-out with a heavy sledge or battering ram. The Germans worked very hard to accomplish as much damage as possible in a limited time, without putting the vessels permanently out of action. But their efforts all came to naught.*

cylinders, cylinder liners, valve chests, pump casings, steam nozzles, etc., were repaired either by oxy-acetylene or electric welding. A few mechanical patches were applied. In some cases steam nozzles were renewed by screwing in new parts with a fine thread. Electric welding was used in a majority of the cases. All of the 31 vessels in New York harbor were repaired by this method. Great credit for the success of the work on these vessels should go to the welding crews and experts actually engaged in the work.

It was due to the fact that railroad experience in welding broken parts was drawn upon freely that the work was executed with such effectiveness and dispatch. To the engineer familiar with modern welding practice in railroad and industrial establishments, the work on the German liners presents no novel features. No new principles were applied or untried methods attempted. In fact, the unusual success attending the entire effort rests largely on the fact that only time tested methods were applied.

The instructions of the navy department were broad; thoroughness, and satisfactory results were the principal factors insisted upon. The orders of the general officer in charge of the work contained the following injunction: "Nothing should be taken for granted. Examine every piece of machinery and piping carefully. Work only by the process of elimination, in order that no vandalism may be overlooked."



This is a particularly difficult electric weld. The method of anchoring the weld to studs and the cord-like structure are clearly visible. This weld was tested four times before passed as tight. In every case the leak was between the welded metal and the cast-iron cylinder wall. No leaks showed where the welded metal joined the cast-steel patch.

In preparing the electric welds, standard railroad practice was followed. Since the broken parts had been thrown overboard, it was first necessary to make castings to replace these pieces. This required a careful survey of each boat, followed by the preparation of drawings and patterns. The new pieces usually were cast out of steel, because steel welds most readily to cast iron by the electric process. The edges of the welds were chamfered in the usual manner. In most cases 7/8-inch steel studs were screwed into the unbroken portion of the casting, along the line of the break so as to form an anchorage for the welding metal. The welds were filled gradually and carefully peened and caulked as the work proceeded. Air caulking was an important part of the process as it served not only to densify the metal, but to close up porous spots and locate brittle sections, which were always cut out and refilled.

As a result of the capable manner in which the welding problems on these boats were handled, some startling economies of time and money were realized. It was estimated that new cylinder castings for the GEORGE WASHINGTON would cost $65,000. The broken parts were actually welded electrically for $15,000. What is even more important, six months time was saved. To replace two broken cylinders on another boat it was estimated an expenditure of $32,000 would be required, together with 10 to 12 months time. The damage was repaired by electric welding in 52 hours at a cost of $2600.

Equally startling and satisfactory results were secured from the oxy-acetylene process. Some details of this phase of the work were included in a paper on oxy-acetylene welding presented at the Boston meeting of the American Foundrymen's association by Stuart Plumley and published in THE IRON TRADE REVIEW, Nov. 22, 1917. Most of the oxy-acetylene welding was performed at the Norfolk navy yard. The cylinders were removed from the boats and taken to the shops where the work could proceed expeditiously. The usual preheating methods were followed. All of the welds were tight and no trouble has developed. Steel anchorage studs, such as were employed for the electrically welded cylinders, were not utilized. Also the broken parts were replaced by cast-iron instead of steel pieces, since by the oxy-acetylene process it is practicable to weld two cast-iron surfaces, using a cast-iron filling rod.

Such are the outlines of the great contest between Prussian vandalism and American constructive genius. The Germans played, and lost. Today our merchant marine and transport service is just 109 ships to the good. These vessels have been reclaimed from the jaws of the Prussian monster and set to work for humanity and freedom. Their aggregate tonnage is nearly 700,000. They are serving the nation in its war for democracy. Best of all, virtually every one of these boats is today a better all around steamship that it ever was under the German flag. Such is true efficiency.



AN UGLY BREAK IN THE HIGH-PRESSURE VALVE CHEST OF THE PRINCESS IRENE

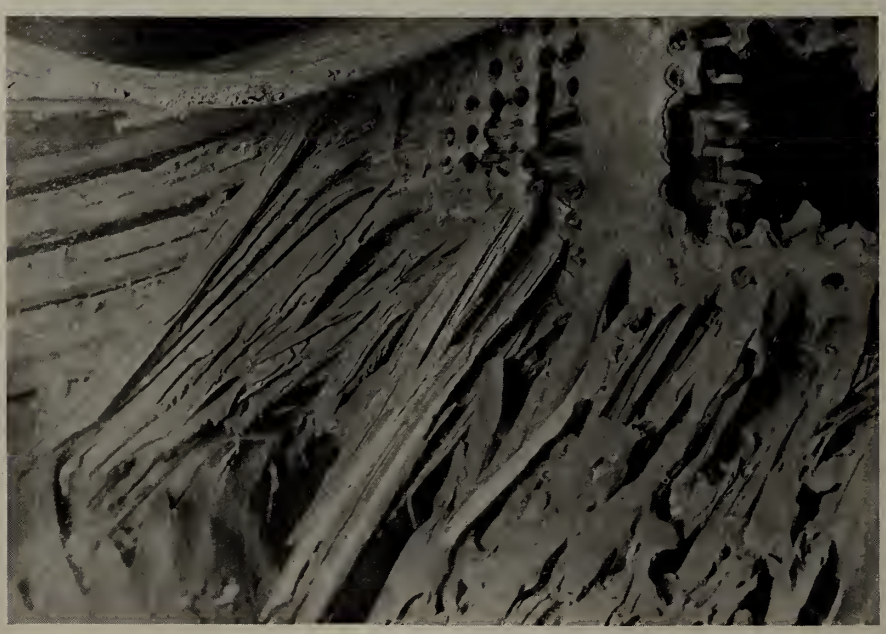
This illustration, and the one below, show in an unusually graphic manner the difficulties the welding engineers had to contend with. Their success was due to their skill and persistence. No chances were taken. Where it was necessary to refinish cylinders on the inside they were either rebored in the shop or ground with a special portable rig.



A COMPLETED ELECTRIC WELD ON THE FIRST INTERMEDIATE CYLINDER OF THE IRENE







A National Triumph

Scores of magnificent vessels such as those shown at the top of this page were gutted by their vicious German masters in their mad rage against America. The two views at the left are typical of the havoc and destruction wrought by berserker Prussians. But all their labor went for naught. American constructive genius was fully equal to the task of repairing the wastage of Prussian barbarism. Every former German ship seized at the outbreak of the war is now in service under the stars and stripes.

How We Can Help Russia—Today

A Suggestion for American Exporters and Manufacturers Interested in Building for the Long Future in the New Republic of the Eastern World —Start an American Counter Propaganda

BY THOMAS H. UZZELL

WHILE Russia is discussing with machine guns the form her new government is to take, it is idle to attempt to state which argument will prevail. Another Czar, a republic, a happy hunting ground for anarchists—nobody knows which it will be. At this writing Kerensky, the sentimental hero of the first days of celebration, has orated himself into oblivion; the communistic *Bolsheviki* ("Majority-ites"), recruited from Siberian prisons and New York's slums, are in possession of Petrograd, wondering what to do with it now they've got it; the army is hot-footing it for home, mother and freedom; educated folks from discreet hiding places are peering into the street, surprised and gratified that no bullets have yet penetrated their persons; the "savage Cossacks, whose sole trade is fighting", have seized the Donetz mining lands of the south, the richest region in Russia, and are organizing them for rapid output; while the old bureaucrats and monarchists, robbed of everything they ever possessed, are encouraging the *Bolsheviki* socialists to raise the devil as much as possible in order that they, the monarchists, may ultimately be called upon to wield the imperial big stick in the interest of law and order.

Impossible to Exaggerate

This diagnosis may seem facetious, unsympathetic; but to exaggerate the chaos in Russia today is impossible; and the present writer's faith in Russia, which he knows from personal experience, is unqualified. The cabled news from Muscovy is history turned comic opera. It would be ridiculous to expound it seriously. Upon one thing only all authorities in Russia are agreed: the fur is flying for democracy; out of the present bedlam some form of republican government is certain to emerge. Great has been the fall of the Romanoffs.

Russia will be democratic. The German kaiser is the one person who could restore the old dynasty; but before this war is over that gentleman will have been attended to. After this war no Metternich will be allowed to arise, as the famous original did after the Napoleonic era, to hand revolutionary Europe back into the hands of sceptered royalists. The United States herself is now earning the right and assembling the power to see to that. The Russian revolution, moreover, is one of the greatest educational campaigns the world has ever witnessed; the Little Father's former subjects have been "put wise". At heart the Slav is democratic, fraternal, a compassionate lover of justice. Because he is also idealistic, prone to fly to extremes, deficient in personal self-control, his new freedom will encounter many set-backs; many turbulent years will ensue before he will have achieved anything like a smooth-running government which will neither stall nor explode all over the premises.



Thomas H. Uzzell

The author of this article is a student of Russian affairs who has had an unusual opportunity to study the now moribund colossus of the east at first hand. He spent three years in Russia prior to the war, during which period his travels and consequent observations were unusually extensive. His position as a writer of experience and a broad student of the economic development of peoples, lends unusual weight to his clear analysis of the situation and to his ringing appeal for an intelligent, organized American business propaganda in the land of revolutions and surprises.

What the Russian revolution will mean to the rest of the world, particularly to the United States, one can also only guess at. Our chief interest in Russia, like our chief interest in South America and China, is commercial; and the effect of the political somersault across the Pacific on Russian-American relations is undeniably great. I have been asked to write of this effect, particularly as it may interest the iron and steel industry of this country. Regarding the future I can only speculate. Certain things, however, any student of Russian affairs can say with confidence, and I set these down for what they are worth.

Russia failed in the war for the same reasons that she failed as a nation: the corruption of the bureaucrats who purported to govern her, bad tools, the ignorance of her people. The first of these weaknesses was really the cause of the other two. In order to insure their existence the bureaucratics fastened ignorance upon the people, and, being ignorant, without technical training, her workmen could not make good machinery, sufficient guns or ammunition. Russia's historic crime has been her government. It is impossible to understand what the future holds forth without comprehending what Russia's former government was.

The Imperial Looting Co.

A proper title for it would have been: The Russian Imperial Looting Co., Divinely Inc. Like Tammany, old Gomez of Cuba, and Wilhelm of Germany, it was in the governing business because it paid. Economics explains nearly everything, even kings. The czar, backed by his cabinet and court, formed the most colossal enterprise for commercial exploitation the world has ever seen. The imperial leech fastened itself upon the largest and potentially richest country in the world, sucked its life blood from it and gave it very little in return.

The czar was the richest man in the world. No man living could exactly estimate his wealth, but it has been estimated variously at from 10 to 30 billions. In his own name he owned 150,000,000 acres of land, including magnificent forests, colossal

mines and agricultural terrain enough to feed a nation of people. His salary was said to be $10,000,000 a year. In his service were some hundred palaces and royal residences, 30,000 servants, 300 automobiles, 5000 horses, and a small army of soldiers and secret service men. Mr. Romanoff in the good old days was in no danger of suffering from the cold in winter or the heat in summer.

The revolution has destroyed the bureaucratic leech. Hereafter all this wealth will be made available to her people and to the world. Think what this means in business development! I am aware that apologists of the old regime argue that it maintained internal order, that railroads, schools, factories had increased during the last half century; but I contend that peace of the autocratic, Romanoff sort is peace at too dear a price, that practically all the other advances achieved were made either to increase its own wealth, to entrench itself further within its own defenses, or indeed were granted, like Christmas gifts, the sort the German kaiser is accustomed to allow, to quiet the clamorous cries of the people.

Under the old order there was only one important business in Russia, the czar's. That modern shibboleth, "Does it pay?" supposed to belong peculiarly to the United States, was asked by Russian officialdom with princely effect. The forests of Siebria, the mines, the deserts of Turkestan, the popular booze, vodka, the banks, the army, the church, concessions to foreigners, the Red Cross, political exiles—everything, everybody, was made to contribute a proper dole to the imperial exploiters.

You wished to start a steel warehouse in Petrograd. You must see Count X., who owns the building you must rent. His terms include a neat royalty on your earnings. You decide to build your own building. It can't be done; there are laws against it, laws passed by Count X.'s friends on the mayor's council. You wish to start a mine. You find that your richest lode runs into some crown land which is absolutely unpurchaseable. Or, the railroad you must use is a government road; your car supply is left to the whim of incompetent, irresponsible officials; you are at their mercy. Perhaps you desire only to start a temperance fund. See her majesty the czarina. She handles all the money for such things.

So it went. In innumerable ways normal industrial development was stifled and foreign investments were discouraged. Some foreign enterprises, to be sure, were established and were succeeding, but they were more diplomatic than commercial successes. They certainy were not founded on Yankee lines. I knew one American business man in Russia the representative of one of the best known firms in the United States, who became so successful and so involved in "diplomacy" that he had to flee the country, leaving his family to represent him in the bankruptcy tangle he left in the courts.

With the passing of the old bureaucratic hierarchy of exploiters, I think one may reasonably prophesy the rapid disappearance of that whole train of social and economic archaisms which it caused and which militated against industrial advance: unscientific tariffs, lack of co-operative banks, confiscation of property without due process, bribery, trade licenses, crown lands, excessively long credit, religious and dynastic holidays (one-third of the calendar formerly being lay-off days), illiteracy, debts to middlemen, scarcity of fuel and railways. After the war American investors and exporters may expect a new commercial treaty with Russia to take the place of the treaty of 1832 which was not renewed in 1912 on account of the treatment accorded Jews with United States passports in Russia. The preferential tariffs formerly existing in favor of German merchandise will undoubtedly be removed.

Aside from these social and economic factors, there are political considerations which brighten the prospect for future trade with Russia. The United States was the first nation officially to recognize the new provisional government. There has never been any commercial jealousy in Russia against Americans as there has long been against Germans. Before the war the energy, the genius, the merchandise of Americans were welcomed and admired in Russia more than the qualities or products of any other foreigners. During the war of 1812 Alexander the First interceded actively with England in our behalf. During the civil war Russia, having liberated her serfs in 1861, stood for the Union against slavery and sent two fleets to this country to attest her friendliness. There is historic

Cossacks to the Rescue

WITHIN the past few weeks the Cossack revolt in southern Russia has assumed extraordinary proportions. The Cossack leaders, Generals Kaledines, Korniloff and Dutoff, have secured the support of all the antiextremist, prowar factions in Russia and the sympathy of the entire allied world. The recently-seceded Ukranian republic, the Provisional government of Siberia, the Knights of St. George, representing peasants controlling 80,000,000 acres, much of Little Russia and Turkestan have all apparently rallied to their cause. They thus control both the industrial and food-producing regions of Russia. The Bolshevists complain that millions in money have been furnished the Cossacks by allied sympathizers. Civil war has been begun. Reports are now arriving daily of clashes at Moscow and other places in middle Russia. It seems probable, however, that only starvation, not fighting, will cause the Bolsheviki to capitulate. The latter still control the Siberian railroad, although an unconfirmed rumor states that the Japanese are ready to assume control of the immense store of supplies at Vladivostok, the eastern terminal. If the threatened colossal drive of the Germans in the west should materialize, the fate of the world may rest with this starvation campaign of Russia's revolting Cossacks.

Russian Scholarships

A PLAN for instituting Russian scholarships in this country has just been laid before authorities in Washington by an American worker in Russia. American export firms are to pay the college tuition for carefully selected Russians in return for a given number of years' service in Russia after their education shall have been completed. No effort will be made to launch the scheme, however, until the war crisis shall have passed.

The immediate need for social and political propaganda in Russia cannot be exaggerated. The Y. M. C. A. in connection with its splendid service in establishing religious and recreative centers in the countries of our allies, now has some 300 men in Russia engaged in much the same work. It is even planning to extend Russia educational assistance in the same way. The government, through the committee on public information, also is gathering its forces. But where is American business? If American business is to share in Russia's coming prosperity, if American business wishes to assist the government, win the war, American business should help —advertise in Russia!



PETROGRAD—RUSSIA'S NERVE CENTER

precedent for deep friendliness bebetween the Russian and American peoples.

Americans love Russian art; Russians admire American inventiveness and enterprise. Russians are vastly curious about American habits and American achievements. In one of Petrograd's street bazaars during the Russian pre-Easter week of fasting ("Pussywillow Week" it is called) I once heard a peasant barker at a booth crying his wares: "American citizens for sale!" I bought one and it turned out to be a little effigy which bobbed up and down rapidly in a glass tube, thus illustrating American energy! The old fellow was selling us at 10 cents apiece. Another time I was sitting, cross-legged beside a native Mohammedan merchant in front of a mosque in Russian Bokhara, Turkestan. While drinking in the color and oriental picturesqueness of the scene and questioning the merchant as to what the mullah was droning from the minaret over our heads, I was suddenly interrupted by the query: "How can I buy an American gas engine?" Any traveler in Russia can multiply such instances indefinitely.

Russia's material resources and her capacity as a future buyer are illimitable. She is the chief commercial seedling of the world. The "land of unlimited possibilities and unfathomable mysteries" has become the promised land of the investor of tomorrow. Her territory, comprising one-sixth of the land surface of the earth, is more than twice that of the United States and exceeds that of any other country. Her population, nearly twice ours, is equal to that of Britain, France, Germany and Austria-Hungary combined and is increasing at the rate of 3,000,000 a year.

Commercially, Russia's present condition is comparable to that of the United States after the civil war. Industrially, she is passing from the age of handicraft to the age of machinery, from the age of fairs and barter to the age of capital and credit. For that reason American genius for extensive industrial development rather than the intensive methods practiced in Europe should find there a peculiarly happy field of occupation. Siberia alone, in spite of its grewsome reputation as a land of exile, is a vast new virgin west waiting the coming of pioneers. In order to people and hold this empire of opportunity the old government appropriated $12,875,000 annually, this sum to be expended in encouraging emigration thither. Three million peasants have already applied for free homesteads and hundreds of thousands have been working as day laborers in western Siberia, awaiting their allotments. To date the authorities have not been able to cope with the situation.

A commission of the Academy of Sciences in Petrograd is now engaged in determining and estimating Russia's vast natural resources, and it is hoped that before very long several volumes containing the results of their inestigations will be available. Russia's continental plains or steppes, enormous mountain ridges, extensive wooded tracts, rivers thousands of miles long, contain an abundance of everything that constitutes primitive wealth. Most of it is in the temperate zone. Professor V. I. Vernadsky, the noted Russian scientist who heads the commission referred to above, states that of the 61 chemical elements utilized by man, 31 have already been found in Russia in combinations that permit of their extraction.

Although her agriculture, judged by modern standards, is still in a crude state of development, she nevertheless is one of the largest producers of rye, wheat, oats and sugar beets. She exports more wheat than the



A RUSSIAN MINING CENTER

United States. While she cultivates only 250,000,000 acres of land, half that cultivated in the United States, she has fully 5,000,000,000 acres of arable land as yet untouched. Her immense forests are nearly treble in size those of this country. Her resources in metals and coal have hardly been scratched. Although Russia has only 46,000 miles of railroad track as compared with 256,000 in this country and has outlined a program for the expenditure of over $300,000,000 for further construction within the next few years, she already boasts of



MANGANESE ORE MINE IN RUSSIA

the longest single line in the world.

Before the war, 16,600 annual fairs provided the chief means for the purchase and distribution of produce. One fair alone, that at Nizhni-Novgorod, yearly returned $75,000,000. Ten billion roubles, or half as many dollars, represented the total volume of commercial and industrial business in Russia in 1913. It is a foregone conclusion that, with the removal of the political brake on the economic development of the country, internal and especially foreign business will move forward on high gear. Russia's foreign trade, exports and imports, in the year 1913 had already reached 2,894,169,000 roubles.

Few commercial fields in Russia hold forth brighter prospects for rapid development than do those of iron, steel, coal and heavy machinery. Although rich deposits of iron and coal have been discovered and worked in European Russia, there are those who believe that still more valuable deposits are yet to be found in Siberia. Judged by the number of workers involved, the mining and metals industry in Russia is second in point of size, textiles being first and food production third. No other industry is more inadequate to the needs of the population. The annual production of pig iron is 0.03 ton per head, as compared with 0.11 in England and almost 0.33 in the United States. The total production of pig iron in 1916 was 4,174,000 net tons which is about two-thirds of the capacity of the existing mills. The price of pig iron rose from $15 in 1910 to $40 this year. In this connection it is interesting to note that before the war 13 per cent of Russia's imports were base metals and manufacturing machinery.

The three most important mining centers in Russia at the present time are located in South Russia along the river Don, in the Ural mountains and about Moscow. Of the total amount of pig iron output in 1916 the southern region produced 75 per cent, the Ural 21 per cent and the Moscow district 4 per cent. (The Polish iron belt which, in 1913, totaled 466,000 short tons and which is now in the hands of the Germans, is omitted from these calculations.) The production of iron and steel half-manufactured products amounted in 1916 to 4,696,000 short tons. Finished iron and steel products amounted to 3,706,000. The total number of employes in the metallurgical branches in 1916 was 427,502.

The Ural mountain region, the first to be worked, is still conducted on primitive methods. Wood is largely used for fuel and the ore and metals are transported by water down the Kama and other rivers. Since 1900 its output has declined. Here are to be found iron, coal, gold, copper, salt, precious stones and 96 per cent of the world's supply of platinum.

The real Pennsylvania of Russia is located in the south, in the provinces of Ekaterinsolav, Kherson, Tauride and the Don government, along the Don river. This Donetz basin, as it is called, is larger in area than England and Ireland combined. Its potential virility is incalculable. Coal, bituminous and anthracite, iron ore, manganese, rock salt and many

species of refractory earth are found there in abundance. Donetz anthracite is remarkably pure, containing 95 per cent carbon. One estimate places the deposits of both kinds of coal in the Donetz basin at 17 milliards of tons, 12 being anthracite.

Only Eight Steel Mills

In this region are 18 establishments with blast furnaces and eight steel mills. There are also foundries, sheet steel works, engineering shops, agriculture machinery works, etc., all conducted with modern appliances and scientific knowledge. The railways there use 1,320,000 cars. The water outlets are the Azov and Black seas. The capital involved in these works is mainly French and Belgian.

Notwithstanding Russia's wealth in minerals and metals of all kinds, and the endeavors made by the government to encourage mining, including the imposition of protective tariffs, one discriminating even against Finland, this and related industries are still in a low state of development. The remoteness of the mines from industrial centers, want of technical education and capital, vexatious regulations, aggravated by the disturbed condition of country are among the most serious causes which have hindered credit, confidence and enterprise in the Russian iron business. The latest cables from Petrograd declare that General Kaledines, the Cossack chieftain, has taken possession of the Donetz mining area and is endeavoring to operate it by means of industrial committees. This move is but one of the paradoxical pranks of revolutionary chaos. Ultimate foreign control of these mines is inevitable. Russia's need of capital to tide her through her coming epoch of economic awakening will bring this about, if nothing else will.

Whether or not the United States will play an important commercial or financial role in building up industrial Russia is problematical. That she should do so few will question. James A. Farrell, president of the United States Steel Corp., has declared: "We can no longer talk of foreign trade merely as an adjunct to domestic prosperity. There can be no stable prosperity at home unless we are able to make liberal sales of American manufactures abroad."

In mastering commercial Russia, there are difficulties, serious ones, to be overcome: The risks of political instability, the distance, lack of a merchant marine, Russia's lack of sea ports, ignorant labor and the language. Melodramatic descriptions of Muscovy have unfortunately given her a lurid reputation. Now she will become, we hope she will become, like us—without our faults. Statesmanlike vision, governmental co-operation, a sympathetic study of the Russian people as they really are, a voluminous interchange of commercial information, daring to accept necessary risks, much traveling, much language study—these are some of the prices which we will have to pay to hold our own in Russia with England, France and Germany.

Before the war Russia did 34 per cent of her foreign marketing in Germany, 15½ per cent in the United Kingdom and only 9½ per cent in the United States. Germany's Russian trade is ours if we will take it. Taking it will not be a race to the Yukon; it will be cultivating pleasant fields whose yield will be astonishing.

Cultivating Russian Trade

Our promoters and salesmen will have to learn that the prevailing color of Russia is not the red of the revolutionists nor the yellow of the sensation-mongers, but rather white (golden, if you will), white unto the harvest with a quiet tinge of gray, representing the melancholy moodiness of her people. They will have to learn a language as difficult as Greek or Latin. They will have to learn to pronounce *Kupecheskaya Upzava* (board of trade) and understand its control of Russian business. They will have to strive not to fall dead when their Russian friends say *arshine* instead of *yard* and *funt* instead of *pound*. They will have to drink tea, keep late hours, accept hospitality. Mr. Kupetz (*kupetz*, merchant), being inordinately proud of his table, may attempt to get at them through their stomachs, but they will get at him only through his heart. They may wax eloquent about their windmills and motor trucks, but he will want to know why we lynch our negroes. Why doesn't Russian capital circulate? They will have to learn that. A Russian merchant smiles when an American says, "Money talks." To fathom that smile will be an interesting and important study in race psychology. For a time at least our commercial pathfinders in Russia will have to cultivate much patience—and learn to wait.

Wanted—An American Propaganda

Of all the many things to be done to make the dollar popular in Russia, I wish, in closing, to speak specifically of only one. I believe its importance is overlooked. To make the dollar popular we must make the American popular. He has been popular; we must keep him so. Nothing in all the history of the two peoples has done as much to embarrass possible future trade relations as the malicious anti-American propaganda disseminated in Russia by the thousands of Russian socialists and other political exiles who returned to Russia from this country after the outbreak of the revolution. The commissioners sent to Russia by President Wilson had much to say on this point on their return. These disgruntled radicals, some of whom now form the "government" in Petrograd, one of whom carries the title of foreign minister, freely malign the United States as a country of exploiting capitalists, slave-driving bosses, money-mad freaks of nature.

Business Follows Propaganda

Germany has learned and has shown the world that it pays a nation to advertise. In the winning of some of her victories a basket of leaflets has been worth more than a field gun. A large part of her propaganda admittedly is treacherous. There is, however, an honest and friendly sort of propaganda, just as there is an honest and useful brand of advertising. Little in a commercial way can be done in Russia now; but we can advertise. We can see that the United States is fairly represented to the wakening intelligences of Russia's millions. Our consular and diplomatic service is not enough. Now is the time to begin. Business follows propaganda. It is the first law of the decalog of the new age. Before the war German agents were invading Russia at the rate of 50,000 a year. It is expensive; you may think our goods should speak for themselves. You are wrong. Like it or not, that is the way to win Ivan!

If the present administration of this country were thoroughly in earnest in its announced willingness to assist foreign commercial conquests, it would do something more than modify the maritime laws so as to secure the development of American shipping, than extend the federal reserve act to further facilitate the establishing of banks in foreign countries, than amend the antitrust act to permit the co-operation and union of American firms striving for export business; it would itself send or encourage big business interests to send another small army of young men to Russia; and this army would learn the language, where they did not already know it; they would ask intelligent questions; they would tell the truth about the United States; they would be the advance patrols for a drive of American capital and enterprise which would be a satisfaction to both countries and an economic blessing to the world.

Reshaping Automotive Industries

How the Demands of Motorized Warfare Are Transferring the Energies of Automobile Manufacturers from the Production of Pleasure Cars to the Making of Battle Planes and Trucks

BY E. L. SHANER

MOTORS will win the war. On land or sea, or in the air, the victory which precipitates peace will be the outcome of motorized warfare. The crackling staccato of the army truck, patrol boat or airplane engine is as essentially a part of modern fighting as the rattle of the machine gun or the drum-fire of heavy artillery.

Three and a half years of conflict have conclusively demonstrated the importance of internal combustion motors. Crushing defeats administered by onrushing German armies twice have been turned to victories for the allies through the unfailing service of motor trucks. At sea, marine motors, driving scout patrol boats, trawlers, etc., have proved their worth in the constant vigil for submarines. As the power units of the air fleets, motors have contributed to a new style of warfare which bids fair to become a deciding factor in the final outcome of the struggle.

The story of Verdun has been told time and time again, but in few instances have the indispensable motor-truck fleets been given due credit. For five months, during the early part of 1916, the forces of the crown prince hammered at the gates of Verdun in the vain effort to continue their march to Paris. Throughout this trying period the ring of forts defending the city were fully 30 miles from the nearest railroad station. Most of the troops, supplies and munitions were carried in trucks over a single road connecting Verdun with Bar-Le-Duc, a town on the railroad from Paris to Nancy. During the long drawn out siege, thousands of trucks hurrying over this slender line of communication enabled France to repulse the enemy. The 34-mile road between Verdun and Bar-Le-Duc, part of which was continually under German fire, was divided into five districts, each in charge of a traffic manager. Trucks traveled in squads of five each, and under no circumstances were the formations allowed to be broken. Breakdowns were handled promptly and effectively. Unless the repairs to a disabled truck could be made in a few minutes, the truck was simply pushed from the road to allow the following transports to proceed. Trucks carried the belongings of the citizens of Verdun to the rear when that town was evacuated; they brought up the thousands of tons of ammunition to defend the town; carried fresh troops to the relief of those who needed rest; moved the wounded soldiers back to the hospitals; and in addition maintained a steady stream of food and supplies to the men at the front. Night and day the double line of trucks, always running at the uniform speed of 9½ miles per hour, administered to the needs of the defending army. At the end, when the forces of the crown prince were effectively repulsed, the world realized that France had triumphed. Motor trucks had saved the day.

At the battle of the Marne, motor vehicles also forestalled a great disaster. With the invading Huns almost within sight of the capital city, the military governor of Paris rushed thousands of troops in trucks and taxi cabs to the battle front. The augmented line of defense held, and again the relief of averted calamity spurred France to new efforts.

The development of the flying machine to its present state of reliability has an influence, the full importance of which is yet to be demonstrated. The activities of the air fleets of the various nations are demanding more attention from military critics as the war progresses, and there is a well grounded belief in many quarters that the conflict may be decided by aerial supremacy.

Commenting on the increasing impor-

Winning With Motors

THE tremendous tonnage of special and alloy steels required for the government's airplane and motor-truck program connects this phase of our war preparations vitally with the iron and steel industry. In this article, Mr. Shaner points out how our automobile industries are being reshaped and what this means to the steel maker. Within one great industry—the manufacture of automobiles—another is being created. The author, E. L. Shaner, formerly engineering editor of THE IRON TRADE REVIEW, *is now in the National army.*



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UNITED STATES ARMY PLANES DRAWN UP FOR INSPECTION AT AN AVIATION TRAINING CAMP

tance of aerial warfare, Lord Montagu of Beaulieu recently stated to a representative of the *New York World:*

* * *

"Man power is dwindling at different rates on all fronts except the Russian front, where it is temporarily disorganized, and it is inevitable, therefore, that Great Britain, France, Italy, Austria and Germany have for some time been turning to machine power and air power to make good the dimunition of human material. For the past two years we have seen examples of this tendency in the extended use of machine guns and artillery, and a still more notable instance now is the daily increase in the intensity of the air warfare, especially on the Flanders front.

"Two years ago air warfare rarely was mentioned in the official communiques. A year ago, there were accounts every two or three days of the deeds of our airmen, while today there hardly is an official communique from the British or French front which does not recount the varying fortunes of the air forces of the allies....We see, therefore, the greatest ingenuity and energy being displayed by all armies in an attempt to obtain air supremacy—that is, the power of keeping the enemy's aeroplanes from seeing what you are doing while you can see everything the enemy is doing.

"If this can be achieved, combined with continual bombing raids of destructive character upon lines of communication and troop centers, the side which obtains and keeps for a period this advantage is on the high road to victory, present and future."

Fighting in the air is the most spectacular kind of modern warfare. Airplanes are now used for at least four distinct purposes, and late official reports contain frequent references to each of these uses. The machines are employed for scouting and observation, fighting enemy aircraft, firing upon enemy's land troops and bombing enemy territory. It is impossible to guess how extensively aircraft will be used in the present war. "The War in the Air", the predictive story of German air supremacy written by H. G. Wells shortly before the war, was considered a fantasy only a few years ago. The bombing of London and New York, as told by Wells, seemed ridiculous, but history already has partially fulfilled his prophecy. Claims for the airplane which we now are inclined to take with a grain of salt, are likely to be substantiated at an early date. At any rate, past performances force us to look upon the airplane with respect in considering the possibilities of its future.

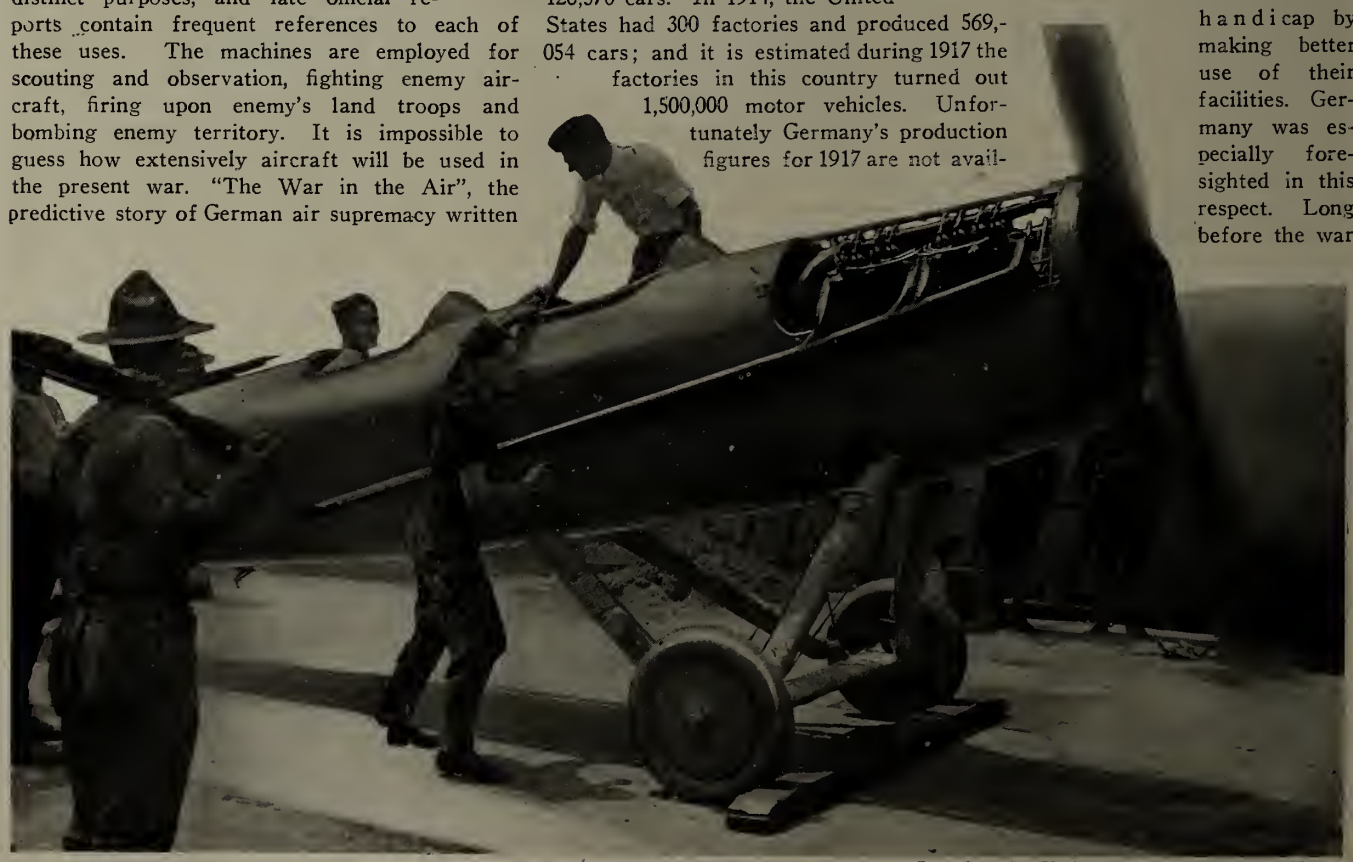
Inasmuch as motors have played such an important part in the war up to the present time and give promise of becoming more essential to success as the conflict continues, it is not strange the United States has embarked on a tremendous program of motor construction. Trucks and airplanes are to be turned out by thousands for the armies of the United States and its allies. Fortunately the industries of America lend themselves readily to this emergency.

A comparison of the relative capacity of the various warring powers in the manufacture of automotive machines is best obtained from the records of the automobile industry, as it existed before the war. Germany in 1911 had 56 automobile factories, with an annual aggregate output of 9368 cars. Of this number, 790 were commercial vehicles, the remainder consisting of pleasure cars. The United States in 1909 had 265 automobile plants which turned out a total of 126,570 cars. In 1914, the United States had 300 factories and produced 569,054 cars; and it is estimated during 1917 the factories in this country turned out 1,500,000 motor vehicles. Unfortunately Germany's production figures for 1917 are not available, but by allowing an increase from 1911 to 1917 proportionate to the actual increase in America's production from 1909 to 1917, the enemy's present production amounts to 111,000 cars. In 1912 the 12 automobile builders of Austria-Hungary produced only 400 cars. Therefore, allowing an almost impossible increase in production in the two principal central nations, the United States still has approximately a 10 to 1 advantage over her enemies.

As for the number of motor cars in use in the various countries, statistics recently published in the *New York Times Magazine* show that in the United States today there are seven times as many automobiles as were in use in the 10 leading European countries at the beginning of the war. The figures follow:

Year	Nation	Cars in use
1917	United States	3,512,996
1913	Austria	13,160
1913	Belgium	9,400
1913	Bulgaria	3,050
1913	France	98,400
1913	Germany	71,455
1913	Great Britain	276,690
1913	Italy	13,000
1913	Russia	15,360
1913	Serbia	120
1913	Turkey	525
1913	10 leading European belligerents	501,160

These figures are imposing, and if they indicated the true strength of the opposing nations in ability to move troops and supplies, the allies would have nothing to fear from the central powers. However, the European countries, despite their lack of capacity for automobiles, partially had overcome this handicap by making better use of their facilities. Germany was especially foresighted in this respect. Long before the war



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TUNING UP THE MOTOR IN ONE OF UNCLE SAM'S LATEST WAR PLANES (Passed by the Censor)

the government inaugurated a plan of subvention for industrial cars. Each factory building trucks of the required size, weight and capabilities furnished demonstration cars for the subvention trials of the German army. The subvention allotments were then distributed in accordance with the results of the trials, the largest orders going to those makers of cars which stood highest in the tests. This plan, or a similar one, was also employed by the other leading European powers previous to the war. It enabled each nation to promptly assemble large fleets of commandeered trucks, sufficiently standardized to form the nucleus for larger numbers of motor cars employed later in the war. Germany drafted every commercial truck into military service at the outbreak of the war, while Great Britain utilized thousands of London motor busses which were converted into transports and supply wagons. France pressed Paris taxicabs into emergency service; England, France and Russia promptly ordered hundreds of heavy trucks from several well known manufacturers in this country.

Up to the time the United States sent Pershing into Mexico to catch Villa, little attention had been paid to the forming of an adequate system of motor-truck transportation in our army. The government hurriedly rushed thousands of trucks to the border from a number of large truck manufacturing plants. The trucks were operated in squadrons, and in many cases drivers and mechanicians from the manufacturers were in charge of the fleets. The service these cars rendered on the stifling deserts of Mexico gave the army officials a wonderful demonstration of the importance of the motor car in war. Moreover, it emphasized the great advantage offered by standardization. Thanks to the elusiveness of the Mexican bandit and his nondescript army, which led Pershing 200 miles into the interior of Mexico, the United States had a considerable number of trucks when Von Bernstorff was given his passports. Had the nation been as fortunate in regard to airplanes, the industrial transformation of the automotive industry now in progress would have been unnecessary.

Whereas the United States was head and shoulders above the European powers in the production of motor-driven land machines, it was pitifully behind in the production of aircraft when the war clouds burst. In point of air machines in use, it was at even a more serious disadvantage. Just before the war, Great Britain was reported to have 250 airplanes available for military service, and critics were condemning the government for its lack of foresight in not providing a larger fleet. As nearly as could be estimated at the time, France had about 500 machines, which were well organized for instant action. Germany had at least 500 machines available, and Austria was in position to press about 150 planes into service when the crash came. Russia possessed about 170 machines and Italy was reputed to have about 150 "efficient" airplanes in 1914. Compared with these 650 machines owned by the central powers and the 1050 held by the entente allies, the United States had less than 100 planes in 1914. Whereas practically all of the European nations had well equipped plants for making airplanes, there were only a few aircraft factories in this country. The principal manufacturer, the Curtiss Aeroplane & Motor Corp., was just getting under way at Buffalo. Airplane building in the United States up to that time had been carried on in a limited manner, and production was at a deplorably low ebb.

Thus the situation in February, 1917, when the United States broke with Germany, was unique. The country possessed remarkable resources for making automobiles and trucks but lacked adequate facilities for producing aircraft. The entente required large numbers of both land and air machines. America's lopsided automotive industry had to be molded to more desirable proportions. In brief, the motor-car production had to be focused to meet the combined requirements of the European allies and the United States, and in addition, the output of aircraft had to be increased several hundredfold. This meant the transformation of one of the country's greatest industries, for it was early apparent that the automobile industry must carry much of the responsibility of providing for the aircraft program.

Fortunately, as pointed out by the *New York Times* in May, 1917, the automobile manufacturers were able, while caring for private demands, to produce 300 government trucks and 4000 passenger cars per day. The problem then resolved itself into one of standardizing the design of trucks to simplify repairs in France and speed up production in the United States, and to swing over to the aircraft industry a sufficient proportion of the automobile building resources to insure the success of a program of



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THE FIVE-POINTED STAR WITH THE ROUND RED CENTER IS THE EMBLEM OF AMERICA'S AIR FLEET

airplane production more extensive than anything ever attempted in any country. Simultaneous with the revamping of the motor car industry came the problem of increasing the output of the many airplane building plants which had sprung up during the past few years.

A Drawing Board Romance

One of the first steps necessary to place the production of aircraft on a firm basis was to design a standard airplane engine in order to simplify the problem of repair and maintenance. The perfection of this design, developed under the guidance and assistance of the aircraft production board, the war department and the bureau of standards, is considered as one of the big accomplishments of the United States since its entry into the war. The story of the production of the first engine, known as the "Liberty engine", is remarkable, and loses nothing in romance at the hand of the secretary of war, who announced the completion of the first engine. A few sentences from the secretary's interesting announcement indicate the high-pressure activity which led to the achievement:

"Two of the best engineers in the country were brought together at Washington. Their first conference, on June 3, lasted from afternoon until half past 2 o'clock in the morning. For five days neither man left the suite of rooms engaged for them. Consulting engineers and draftsmen were brought to Washington to assist them. The work in the drafting room proceeded continuously, day and night. Consulting engineers and motor manufacturers gave up trade secrets under the emergency of war needs. Twenty-eight days after the drawings were started the new engine was set up. This was on July 3.

"Parts for the first engine were turned out at 12 different factories located all the way from Connecticut to California. When the parts were assembled the adjustment was perfect. Both the flying and altitude tests of the new engine have been gratifying. One test was conducted at Pike's Peak and one of the engines in an airplane broke the American altitude record in a recent flying test. The new engine amounts practically to an international model. It embodies the best there is in American engineering and the best features of European models."

Motor Trucks While You Wait

Hardly less spectacular was the development of military trucks for the use of Pershing's army. The Society of Automotive Engineers, automobile manufacturers and the quartermaster's department of the army cooperated in designing the engine and truck parts. After the blue prints were sent to various part builders, progress was reported almost hourly. The dies for the engine crankshaft were sunk in five days. The pattern for the aluminum crank case and the first casting were completed in five days. One motor company had an engine running 11 days and 7½ hours after receipt of the blue prints. The first truck was completed three days ahead of schedule, and proceeded at once under its own power to Washington for official test.

With a standardized motor for airplanes and standard specifications for engines and parts for 3 and 5-ton military trucks, the groundwork for high-speed production of automotive war craft was firmly established. From September, 1917, when these designs were perfected, to the end of the war, the problem has been and will be one of production. The designers have practically completed their task; production engineers and manufacturing experts now are having their inning.

Shifting the Efforts of Industry

Shortly after the United States entered the war, there were signs of significant changes in the automotive industries. Large orders for airplanes from foreign countries had induced the builders of aircraft to extend their plants to many times their pre-war capacity. This was especially true of the Curtiss plant at Buffalo, which soon became the world's largest airplane factory. The change was also evident in the number of automobile accessory manufacturers who entered the airplane field, even while continuing their motor-car work. Then came indications of a growing interest of automobile builders in the airplane industry. The Willys-Overland Co. assumed a dominating interest in the Curtiss Aeroplane & Motor Corp., and immediately a gigantic plant was in the course of construction to take care of the large orders of the United States and foreign governments. Then Henry M. and Wilfred C. Leland, who had been prominent in the automobile field for many years, severed their connections with the Cadillac Motor Car Co. to form the Lincoln Motor Co., Detroit, a $1,500,000 concern, to build airplane motors. The Nordyke & Marmon Co., Indianapolis, undertook the building of airplanes in addition to its automobile work, and proceeded to erect a new plant for aircraft production.

One cannot view the change in the automotive industry without realizing that the American trait of specialization is a valuable aid in the present emergency. Had each of the 500 automobile builders in the country been equipped to make every part of the machines they produce, the burden of increased airplane output would have fallen heavily on a few of the larger companies. However, the automobile industry is made up of nearly 2000 concerns, over half of which specialize on one, or possibly a few, automobile parts. Thus in many cases a completed car represents the work of a score of factories.

A Wide Interest Shown

Therefore, when the airplane program attracted the attention of the automobile industry, not only the builders of cars, but also the manufacturers of carburetors, bodies, motors, roller bearings, ignition and lighting systems, lubrication devices, etc., entered the new field. Because of this wide distribution of work, the airplane program will be handled with much less confusion and with less detriment to the motor-car industry than would have been possible had specialization been undeveloped in America.

Airplane manufacture naturally divides into two parts. The power plant and the plane each requires a definite specialized type of equipment. Consequently the motors must be made by companies already building aircraft engines, by automobile builders equipped to make automobile motors, or by makers of accessories who have concentrated on motor production. The burden of supplying carburetors, oiling systems, ignition devices, etc., will fall on the manufacturers who have made these parts for the motor-car trade. In many instances the engines will be cast in one plant and machined in another. Moreover, the engine work may be still more widely distributed, as the types vary, gray iron and semisteel castings, and hollow hydraulic forgings being used for cylinders. The crankshafts will provide work for the makers of forgings, as will the connecting rods. Aluminum employed in pistons, crank cases and numerous small parts will absorb the effort of another branch of industry. The gear reduction between the engine and propeller will provide work for concerns which cut gears, while the propeller is the basis of an industry as yet largely undeveloped in this country.

Piano Makers Will Help

The structural part of the machine requires a wide variety of material. Spruce for the spars and struts is readily obtainable in America. Wire and rope for strengthening purposes are products easily secured in this country. Already the piano industry has been called upon to bear part of the burden of constructing the planes, an emergency measure employed by the Germans, who have taken over

the great Perzina piano factories in Schwerin to assist in airplane work. The engines must be hung and the planes fastened together by light, strong castings. An aluminum bronze alloy developing a tensile strength of 98,000 pounds with 34 per cent elongation has been adopted by one American airplane firm for this purpose. This metal can be cast in thicknesses of less than 1/16-inch.

The fuselage requires hardwood, sheet metal and canvas. The automobile body builders are perhaps best qualified to enter this field, and already one motor-car bodymaker, the Fisher Body Corp., has received an order for $5,000,000 worth of aircraft bodies. This part of airplane building will absorb a considerable tonnage of automobile sheets, a product which the steelmakers have been furnishing at the rate of about 600,000 tons annually. It is thought that the Curtiss company will bear the heaviest burden of fuselage construction.

The wings are the basis of a highly specialized industry in which women have been employed with great success in European countries. The framework, consisting of wood or steel, is the product of still another branch of industry. Seamless and welded tubing are employed on some types of machines.

Clocks, barometers, revolution counters, gasoline gages, radiator thermometers, pressure indicators for fuel systems, fire extinguishers, compasses, drift and wind gages and sets of specially made tools are accessories of airplanes which can easily be made by the hundreds of companies which make similar articles for the motor-car trade.

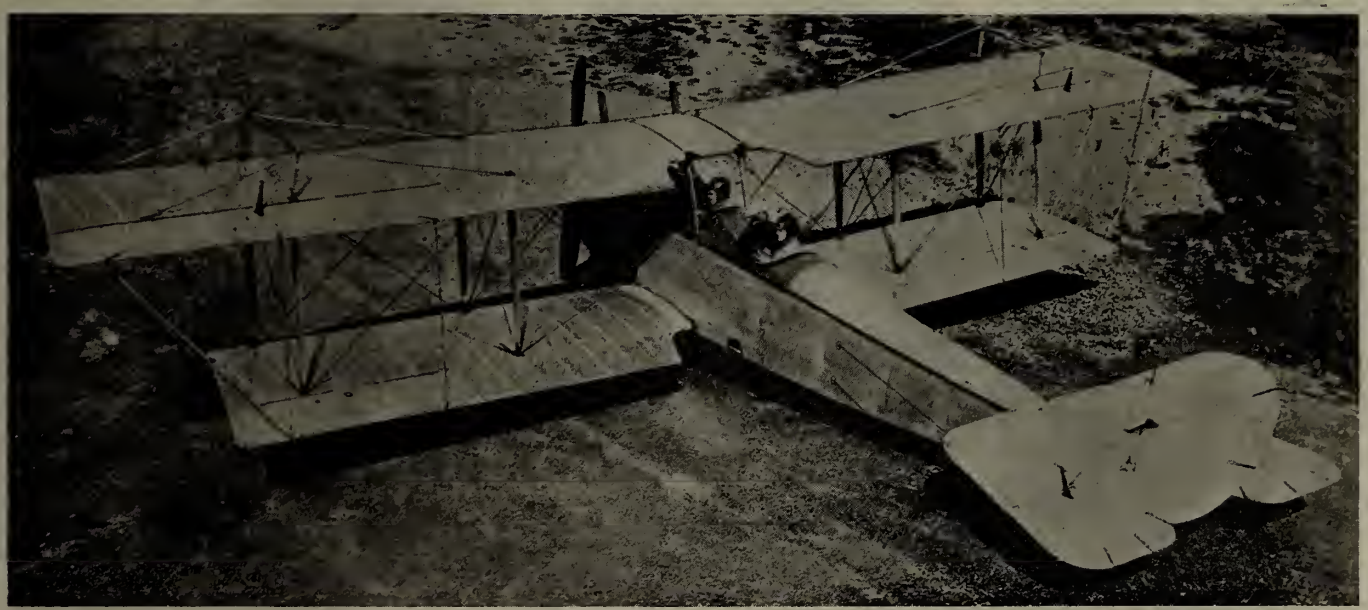
From the foregoing review of the many industries affected by the airplane program, it is evident that there is scarcely a branch of the iron and steel and metal working trade that will not share in the government aircraft appropriations. An appreciable demand has been and will continue to be noted by the steelmakers and producers of nonferrous metals. The finishing mills, especially those engaged in rolling light plates and sheets, will be affected. Makers and fabricators of structural steel have shared indirectly through the vast construction work required to prepare new plants, notably those of Curtiss, Nordyke & Marmon, Lincoln Motor, Wright-Martin and others. Machine-tool builders have likewise been called upon for a vast amount of equipment. In this connection, it must be remembered that although about 25 per cent of America's fleet of 22,000 airplanes are to be built and assembled in the plants of the Brasier and Renault automobile companies in France, the materials and equipment are being purchased in America.

Moreover, the length of the war will have an important influence on the magnitude of America's aircraft industry. The newspapers have published fantastic stories of the average life of an airplane, some of which would indicate that a machine is ready for the scrap heap after a few flights. Three years of the war, however, have proved to the satisfaction of the French chiefs of aviation that a military plane may be counted upon to give good service for four months. It is considered necessary to provide four planes for every aviator to insure an adequate reserve and to allow for machines temporarily out of commission for repairs. Thus to maintain a force of 5000 air pilots in France, the United States must produce at least 60,000 machines annually for the duration of the war. In the light of this reasoning, the government's decision to build 22,000 machines will have to be altered to meet a far greater demand than was anticipated. Accordingly, the end of the transformation of the automotive industry is not in sight, nor is its magnitude capable of even rough estimation.

Building aircraft to win the war is naturally the thought uppermost in the minds of those who are now engaged in the new industry. However, one cannot help but be curious as to the status of airplanes after the war. France and Italy are now operating aerial postal planes. The Caproni triplanes in the United States already have proved that great loads may be supported by large, heavy-powered machines. An amendment authorizing the placing of aircraft unfit for military purposes at the disposal of the post office department has received favorable action at the hands of one branch of congress. All signs point to the belief that after the war the heavier-than-air machine will hold a recognized position in the world's accepted methods of transportation.

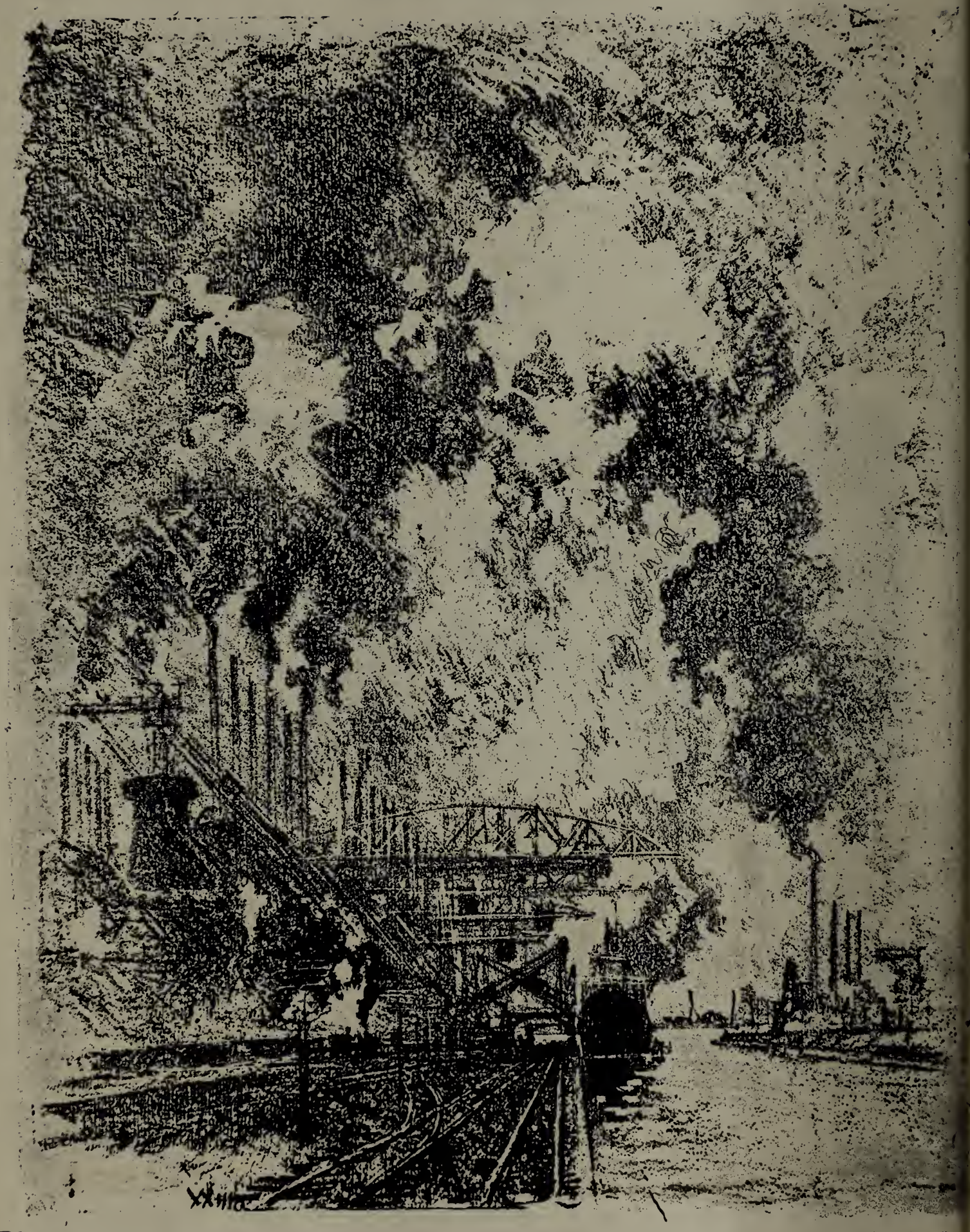
The automotive industry is sure to progress along broad lines, not only during the war, but afterward. This is not only true of aircraft production, but holds equally good for the output of commercial trucks.

For the present, however, the allies must be motored to victory. In this great task, America, far better equipped than any other nation, will succeed



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ONE OF THE LATEST MACHINES BUILT FOR UNITED STATES FORCES IN FRANCE (Passed by the Censor)



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UNLOADING IRON ORE AS VIEWED BY JOSEPH PENNELL

How Ore Districts Meet War Demand

Recent Exploration and Development Work in Lake Superior Fields Has Uncovered Sufficient Ore to Match Record Shipments of Past Two Years—Quickened Interest in Labor Saving Equipment Brings Out New Devices

BY R. V. SAWHILL

GERMANY'S suicidal attempt to wrest Verdun from the grip of its French defenders was based on a motive to which the hope of breaking through to Paris was only incidental. That motive was iron ore. A few miles from that battered shrine of France is the Briey ore basin which, beginning in French territory, extends through the old French province of Lorraine into Germany and Luxemburg. Geographically, Germany before the war controlled most of this basin. Actually the smaller French area held the bulk of the good ore.

The war was only a few hours old when Germany attacked and captured from France the latter's holdings in the Briey basin. At one stroke she placed the French steel industry under a handicap from which it still suffers and at the same time assured for herself, as long as the basin remained in her hands, a sufficient ore reserve to hold at bay for three and and a half years at least, the combined strength of France and the British empire.

Iron ore thus furnishes the explanation for much of Germany's success in both the early and late stages of the war. Iron ore in the same way will be the underlying cause of her defeat. The specific iron ore by which that defeat will be effected is that which annually pours out in such colossal tonnages from the Lake Superior district.

Table I

Approximate Shipment by Ranges

	Gross tons 1917	1916
*Mesabi	40,583,474	42,525,612
*Vermillion	1,545,602	1,947,200
*Cuyuna	2,407,983	1,716,218
Total Minnesota	44,537,059	46,189,030
*Gogebic	7,707,809	8,489,685
*Marquette	4,219,754	5,396,007
*Menominee	6,043,287	6,364,363
Mayville, etc.	175,000	219,381
Misc. shipments by rail	2,100,000	†
Totals	64,782,909	66,658,466

*Includes lake shipments only in 1917.
†Absorbed in range figures for 1916.

Today that district is recoiling quietly but efficiently from the depleting effects of the second of two successive years of abnormal demand upon its reserves. After bolstering up France and England for two years, the operators of the Lake Superior district face 1918 with the knowledge that the preservation of the United States itself now depends in a large measure upon their efforts.

America's education in modern warfare has brought with it a realization that her industrial independence was insufficient in many lines. The campaigns against waste on one hand, and for increased production on the other, which have been and are being carried on in the case of coal, petroleum, foods, etc., reflect the difficulties which are being encountered in satisfying the needs of ourselves and our allies for these essential materials. The absence of any such campaign in the case of iron ore reflects in the same way the efficient and satisfying manner in which the ore district has met the war demand.

A study of conditions in the Lake Superior district at this time is particularly interesting as the new year will witness the first exertion of the splendid strength of the newly created



THE WONDERFUL MESABI RANGE IS MAKING POSSIBLE OUR EFFECTIVE PARTICIPATION IN THE WAR. TYPICAL MINES SHOWN ARE: (1) ALBANY; (2) MORRIS; (3) SCRANTON; (4) AGNEW; (5) YORK, SHOWING WASHING PLANT; (6) SUSQUEHANNA



THE BIG MAHNOMEN OPEN PIT ON THE CUYUNA RANGE SHOWING DEVELOPMENT

American army in the struggle in western Europe—possibly against that very ore basin which above all other things, is vital to Germany's participation in the war.

Ore Reserves Unimpaired

The quiet confidence of the American steel industry in the sufficiency of its iron ore supplies has been disturbed on several occasions during the past two years as the result of a disbelief in the ability of the transporting facilities to bring this ore to the furnaces, but never from any fear of the inability of the ore district itself to place alongside the shipping tracks as much ore as might be needed. Anyone not in active and constant association with the Lake Superior ore fields, however, undoubtedly feels that the stupendous consumption of that ore during the past two years must necessarily have brought with it a decline in the available supplies. But despite record shipments and a somewhat slackened search for new deposits, the ore reserves in the Lake Superior district show only a slight decrease. In Minnesota, for instance, which holds the bulk of the ore, the reserve on May 1, 1917, was only 11,250,000 tons less than in 1916, a decline of 0.008 per cent.

For two years the ore producing district has had abounding confidence in its ability to supply all the ore that might be required; the ore consuming districts have had intermittent and recurring doubts concerning the placement of sufficient tonnages on the blast furnace yards to keep operations at the desired maximum. Today, with two years of successful performance in its favor, the ore producing district retains its calm confidence, while the fears of the ore consumers have practically disappeared.

The ability of the Lake Superior district to meet the 1918 demands of the iron and steel industry is beyond question. The transportation agencies again introduce the only doubtful factor into the situation and these agencies in turn have back of them two years of successful performance.

Freight Carrying on Lakes

The reaction of the lake fleet to war demands is a familiar story. Only a comparatively short time ago the maximum ore-moving capacity of the lake fleet during the short season of navigation on the Great Lakes was



ORE YARDS OF D. M. & N. AT PROCTOR, MINN., THE LARGEST IN THE



WORK WHICH HAS BEEN CARRIED ON ACTIVELY FOR SEVERAL YEARS

fixed by many of the vessel owners themselves at 53,000,000 tons. Yet in that same season of 1916, these bulk freighters actually carried 64,734,198 tons, while in 1917 they brought down 62,498,901 tons. Last year's record in many ways afforded a better index to the capacity of the lake fleet than did the heavier movement in 1916. The unusual severity of ice conditions in the early spring cut off practically one month of the season of navigation, it being early in June, in fact, before the full fleet began to approximate its greatest efficiency. In 1916, on the other hand, all of the connecting waterways between the lakes were open by April 22. Last year the fleet thus labored under a severe handicap from the opening of the season—a handicap which it was able only partially to overcome. In 1918, new factors will control the lake situation. The shortage of ocean bottoms has brought about the removal to salt water of most of the ships which can be taken through the Welland and St. Lawrence river canals; first through individual sales and, during the closing months of last year, through federal action. While only several of these vessels were of the bulk freighter type and were adapted for transporting iron ore, the removal of so many of the canal-size steamers has shifted to the bulk freighter fleet an additional freight burden. This is true particularly of the grain trade and a number of large ships which have not carried grain for a number of years brought down such cargoes during the closing weeks of the 1917 season.

Transportation conditions on the ocean, however, threaten to cut down the capacity of the bulk freighter fleet in another way, that is through the restriction of new construction. Whether or not the construction of many new ore carriers would have been started during recent months with costs at their present levels is highly problematical, but the fact remains that lake shipyards for some months past have not been in a position to accept additional orders for these large bulk freighters with any prospect of delivery before the spring of 1919.

Ocean ship owners, fortified by the high freights which they have been receiving, were in a position to disregard costs and all of the old lake shipyards and several new ones are concentrating every facility upon the production of canal-size steamers,



WORLD. MILLIONS OF TONS ARE HANDLED YEARLY THROUGH THIS YARD

practically all of which will be shifted to salt water as soon as completed. This construction now, of course, is in the hands of the Emergency Fleet corporation. Unless the disparity between the tonnage of ocean ships and ocean freight is more nearly adjusted, construction of bulk freighters on the Great Lakes is likely to continue practically at a standstill throughout the duration of the war.

Seven large bulk freighters were launched during 1916, the aggregate carrying capacity of these new vessels being about 82,000 tons. During 1917, there were 11 bulk freighters of 125,000-ton carrying capacity launched, but lake yards now are bare of such construction. However, several of the new boats operated during only a portion of the 1917 season, so that a slight increase is indicated in the 1918 capacity of the ore-carrying fleet—an increase which is more apparent than real owing to the shortage of small ships.

To Control Lake Trade

The new factor which promises, however, to have the most important bearing upon the ability of the lake fleet to transport iron ore during 1918 is the plan to place the operation of the ships under centralized control. The critical situation developed early last summer by the tardiness of the season's opening, for a time threatened seriously to result in an actual shortage of iron ore due to the inability of the lake fleet to begin moving freight. As an emergency measure, the distribution of the iron ore was placed in charge of a committee acting with the iron and steel committee of the council of national defense. Under this plan of distribution, the ore was allotted to docks in accordance with the supply of railroad cars. The distribution of the ore from the docks themselves also was centrally controlled in order to supply all furnaces with their minimum requirements and thus avoid overstocking some furnaces while others were closing down for lack of ore.

These war measures, coupled with the pooling arrangement under which the coal trade was handled, were effective in cutting down the restrictions imposed by the severe traffic congestion on the railroads leading from the ore-unloading docks, and in holding the time lost by the vessels through delays at unloading ports to a minimum. This kind of centralized direction has been broadened by the vessel owners themselves and the details of a comprehensive plan for placing the 1918 operations of practically all ore-carrying fleets under the central guidance of a committee of five are now being worked out. This committee will have duties similar to those of the war industries board organized by the railroads. The work of this committee is expected to bring about a maximum movement of iron ore, grain and coal on the Great Lakes next summer.

Various favorable physical conditions have materially assisted the lake fleet in the past two years in hanging up new freight carrying records. The most important of these has been the high water level, which permitted deeper loading of the vessels. Comparatively few accidents occurred in either year.

Labor Conditions Improved

In the ore districts a year ago, the labor situation stood out prominently as the factor which might interfere most seriously with the movement of iron ore. In the same way the opening of 1918 finds the conditions in the labor market introducing the greatest element of uncertainty. The situation now, however, is radically different from that of a year ago and the uncertainty over the maintenance of a sufficient supply of workmen arises from totally different causes. The unrest and agitation which outside influences had excited in the ore districts a year ago, simmered down during the winter and spring, had practically no appreciable effect during the summer, and at the present time seems to have disappeared as an element worthy of consideration. At the present time mine operators are giving more consideration to the effect which this country's entrance into the war may have, particularly the declaration of war early in December against Austro-Hungary. The percentage of alien miners in the ore districts is high and among these foreigners the subjects of Austro-Hungary are most numerous. However, the miners of many nationalities who emigrated to America from that polyglot nation have clung industriously to their picks and shovels up until this time and America's formal declaration of war against Austro-Hungary, in the opinion of most of

Table II

Shipments by Ports and Railroads

	—Gross tons— 1917	1916
C. & N. W., Escanaba	5,208,733	5,348,199
C. & N. W., Ashland	6,484,166	6,716,089
C. M. & St. P., Escanaba	1,948,321	2,109,245
D., S., S. & A., Marquette	718,379	945,390
L. S. & I., Marquette	2,488,766	2,912,702
M., St. P. & S. Ste. M., Ashland	1,113,675	1,341,725
M., St. P. & S. Ste. M., Superior	1,712,962	1,279,064
N. P., Superior	695,021	417,012
G. N., Superior	11,570,757	11,090,970
D., M. & N., Duluth	20,567,419	21,837,949
D. & I. R., Two Harbors	9,990,990	10,735,853
Totals	62,499,099	64,734,198



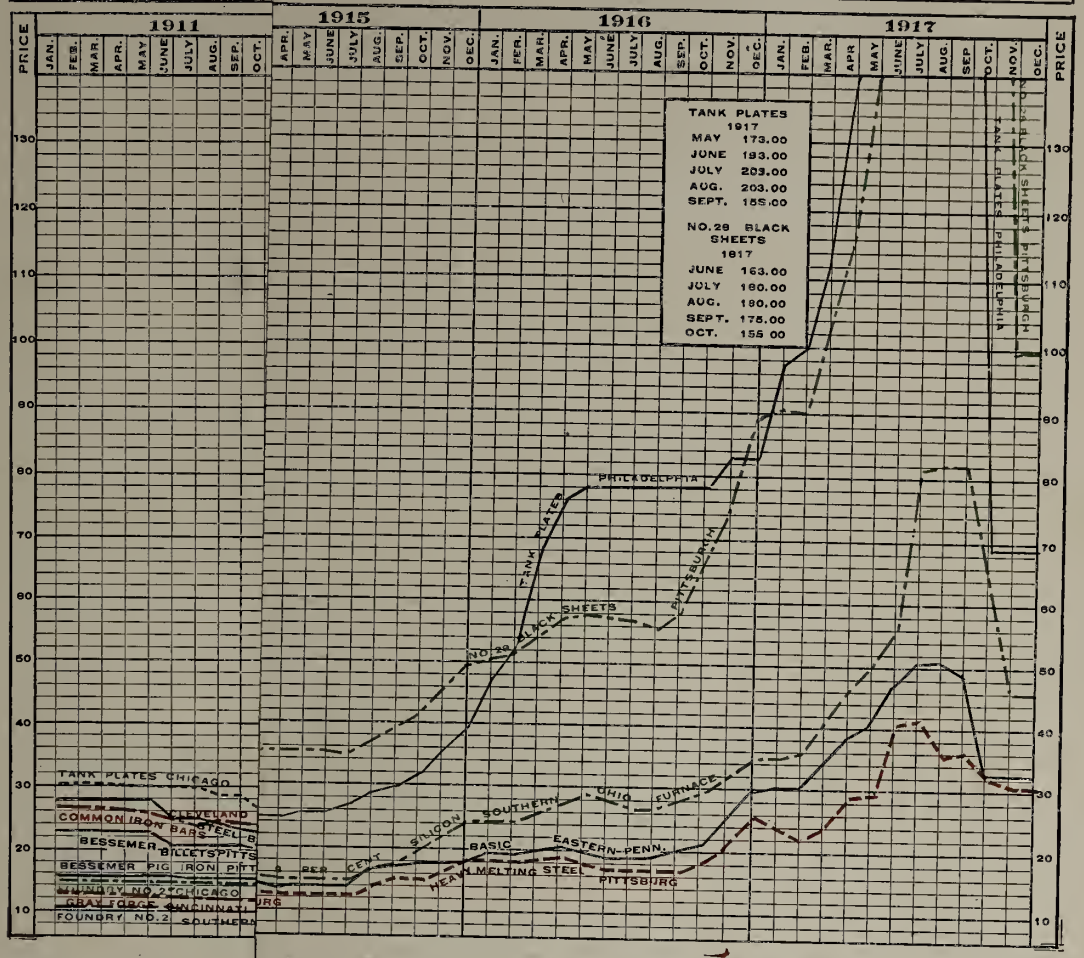
CROFT, ONLY BESSEMER MINE ON THE CUYUNA

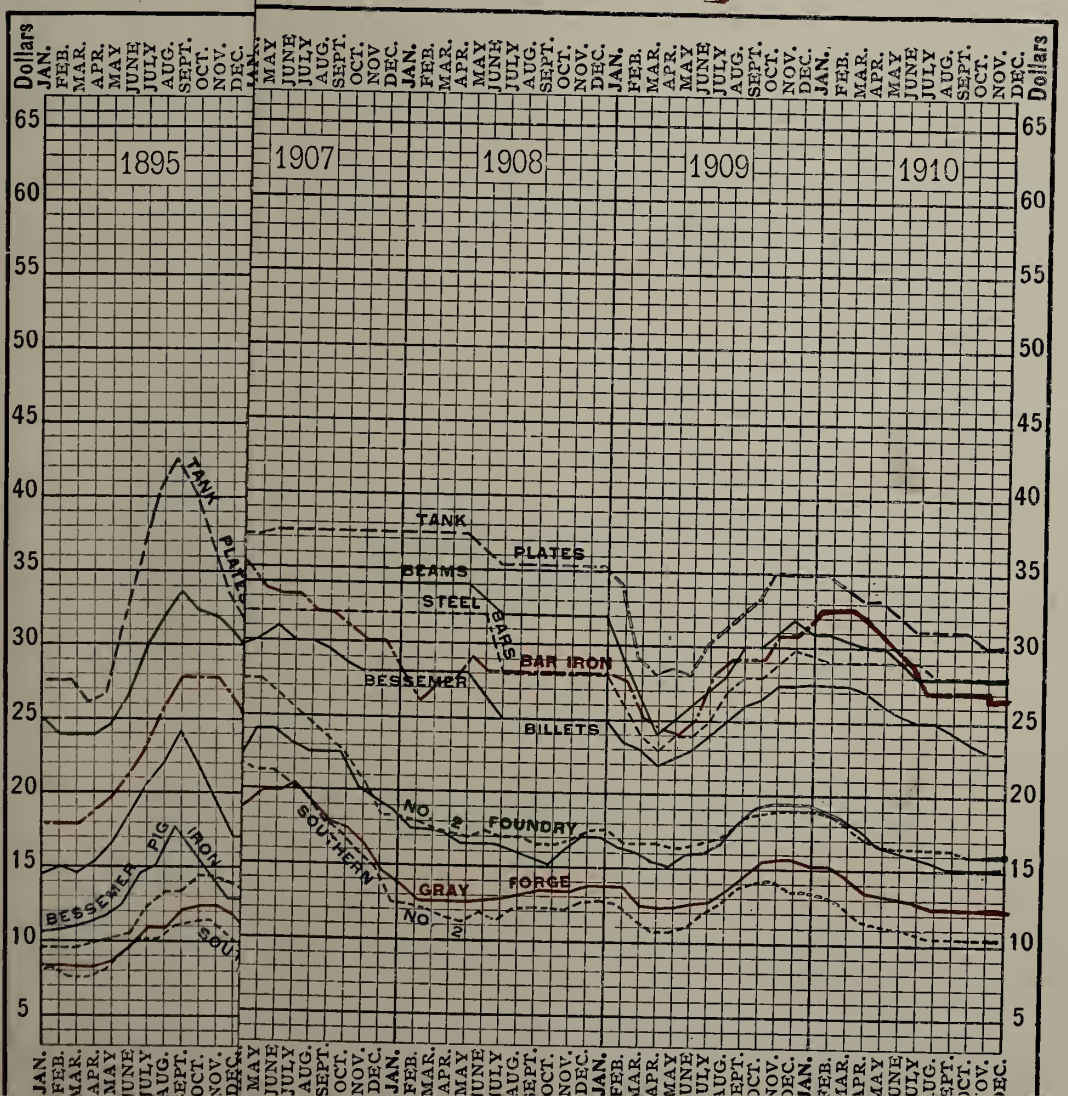
FLUCTUATION
PRICES FOR

Supplement to the issue

FINISHED PRODUCTS IN NET TONS
PIG IRON AND BILLETS IN GROSS TONS

Tables of Prices on which these Charts are based are published in The Iron Trade Review, of Jan. 3, 1918





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C. & N. W., Escanaba	5,208,733	5,348,199
C. & N. W., Ashland	6,484,166	6,716,089
C. M. & St. P., Escanaba	1,948,321	2,109,245
D., S., S. & A., Marquette	718,379	945,390
L. S. & I., Marquette	2,488,766	2,912,702
M., St. P. & S. Ste. M., Ashland	1,113,675	1,341,725
M., St. P. & S. Ste. M., Superior	1,712,962	1,279,064
N. P., Superior	695,021	417,012
G. N., Superior	11,570,757	11,090,970
D., M. & N., Duluth	20,567,419	21,837,949
D. & I. R., Two Harbors	9,990,990	10,735,853
Totals	62,499,099	64,734,198



CROFT, ONLY BESSEMER MINE ON THE CUYUNA

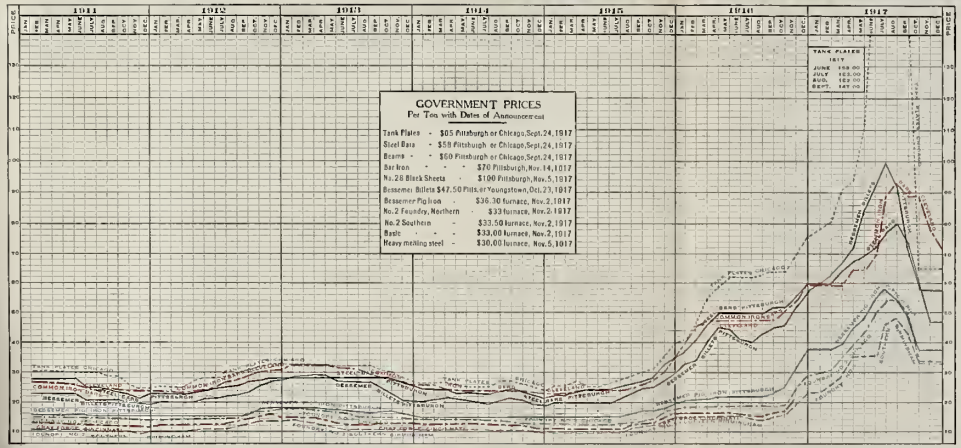
FLUCTUATIONS IN IRON AND STEEL PRICES FOR TWENTY-THREE YEARS

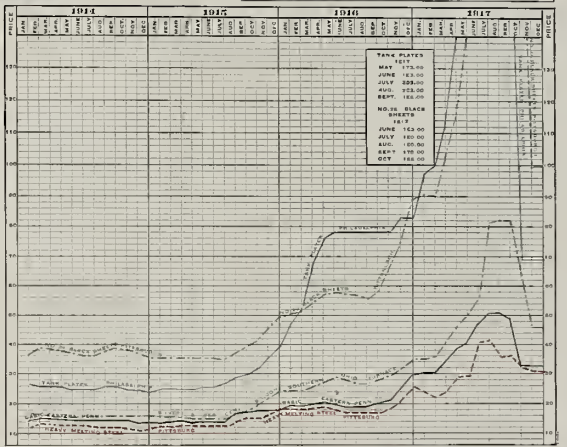
Supplement to the issue of Jan 3, 1918 THE IRON TRADE REVIEW

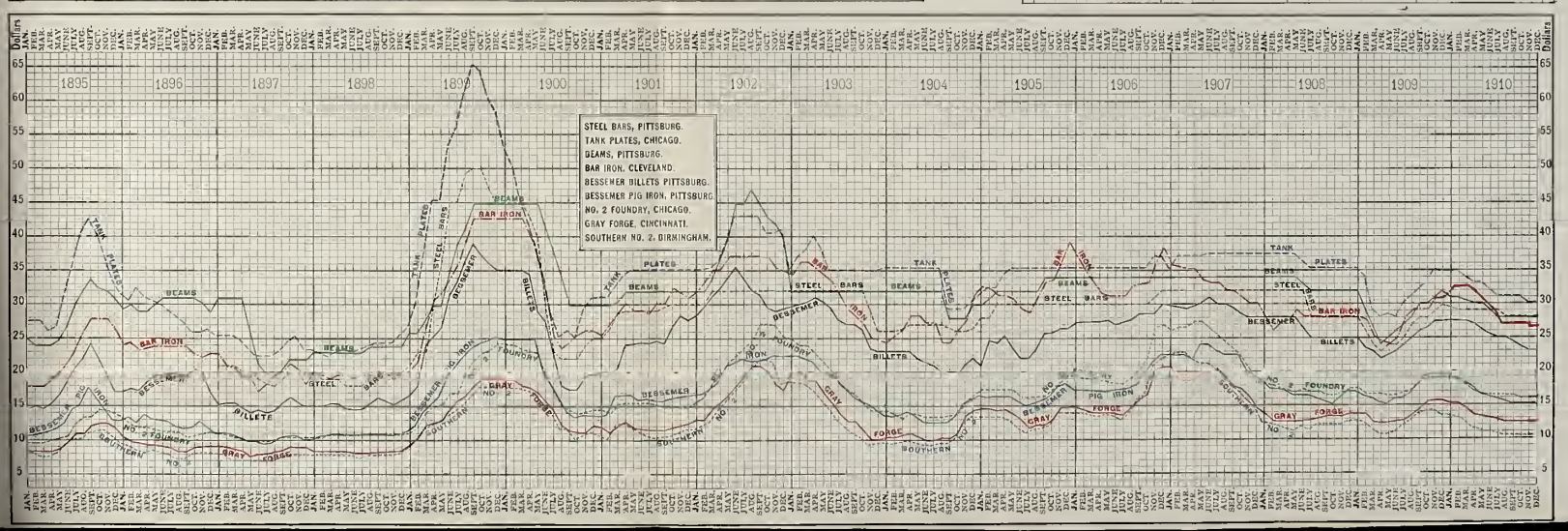
THE IRON TRADE REVIEW

FINISHED PRODUCTS IN NET TONS
PIG IRON AND BILLETS IN GROSS TONS

Tables of Prices on which these Charts are based are published in THE IRON TRADE REVIEW, of Jan. 3, 1918







the mine operators in the Lake Superior fields will have little if any effect upon the willingness of these miners to remain at their labors provided federal restrictions are not imposed against the employment of these enemy aliens.

Ore Shipments in 1917

The shipments of iron ore in 1917 are estimated at 64,782,909 tons, a decrease of 1,875,557 tons from 1916, but 14,835,793 tons greater than 1913, which stands in third place. The decrease last year amounts to approximately 2.8 per cent from 1916, which in turn had shown a gain of approximately 41 per cent over the previous year. The following table, showing the lake movements by months, gives a clear insight into the splendid record hung up by the lake fleet after the ice barriers had finally been broken:

	Gross tons	
	1917	1916
April	211,532	1,658,411
May	6,283,612	8,449,580
June	9,639,991	9,507,576
July	10,241,633	9,750,157
August	10,146,786	9,850,140
September	9,536,152	9,600,786
October	8,193,892	9,116,196
November	7,333,828	5,715,452
December	911,475	1,085,900
	62,498,901	64,734,198

In its efforts to relieve the crisis occasioned by the late opening, the lake fleet was driven at high pressure. Although weather conditions in June were less favorable than in the corresponding month of 1916, the record for the month showed an appreciable gain over the tonnage which the fleet had been able to move in June of any preceding year. The high mark of 9,850,140 tons set in August, 1916, which had been the highest level ever reached in a monthly movement of iron ore, was outdistanced in July when shipments for the first time on record shot over the 10,000,000-ton mark. The August total dropped off slightly from the July figures, while during September and October the shipments were seriously retarded by delays imposed largely by congestion on the rail carriers. The 1917 records for those two months showed decreases from the corresponding months in 1916, but the splendid movement in November, when the fleet moved more ore than in any November on record, insured the year's movement being sufficiently large to take care of the requirements of the furnaces during the closed winter season. December's total was cut down by the severe cold weather which came early in the month.

Shipments of the Minnesota ranges accounted for practically 69 per cent of the lake movement while the all-rail movement from the ranges in that state were larger than usual. The three Minnesota ranges forwarded a total of 44,537,059 tons by lake against shipments from the three other ranges of 17,970,850 tons. Shipments from the Gogebic range were large, the movement from that range during the last two years having been heavily augmented by the recently developed open pits.



HEADFRAME AND TRESTLE, PHILBIN MINE

All-Rail Shipments

The all-rail movement for the season probably ran well over 2,000,000 tons. This compares with an all-rail movement in 1916 of 1,924,268 tons. The influence of the shipments entirely by railroads has increased remarkably during the past two years, as prior to 1916 the normal all-rail shipments in any one year averaged around 900,000 tons. The present increase of more than 100 per cent is accounted for partially by the normal increase in demand and specifically by the heavy tonnages which now move to the new plant of the Minnesota Steel Co., at Duluth. Shortages of ore in spotted instances during the winter of 1916-17 also caused some ore to be shipped all-rail to furnaces which normally receive their supplies by boat. Some ore moved all-rail as far as St. Louis, a fact which explains the experimental shipments made in 1917 of iron ore from Minnesota ranges to the head of navigation on the Mississippi river and thence by barge to St. Louis. The sharp appreciation at the present time of the need for greater utilization of the country's inland waterways, together with the increasing demand for greater productive capacity has led the backers of this experiment to predict that

Table III

Minnesota Ore Reserves and Assessed Values

County	May 1, 1916 Ore in the ground Tons	May 1, 1916 Ore in the ground Assessed value	May 1, 1917 Ore in the ground Tons	May 1, 1917 Ore in the ground Assessed value
St. Louis	1,226,594,919	$249,129,433	1,227,883,575	$265,451,446
Itasca	161,997,784	18,680,793	158,151,458	18,990,435
Lake	169,758	45,199	256,320	68,246
Crow Wing	77,072,354	6,228,306	69,277,417	6,807,023
Totals	1,465,834,815	$274,083,731	1,455,568,770	$291,317,150

County	Ore in stock pile Tons	Ore in stock pile Assessed value	Ore in stock pile Tons	Ore in stock pile Assessed value
St. Louis	8,450,002	$3,063,722	6,869,594	$3,319,094
Itasca	411,575	68,236	462,792	80,436
Lake	70,133	46,671	77,399	77,399
Crow Wing	340,469	69,635	882,431	455,847
Totals	9,272,179	3,248,264	8,292,216	3,932,776

County	Total merchantable ore May 1, 1916 Total in iron ore Tons	Total merchantable ore May 1, 1916 Total in iron ore Assessed value	Total merchantable ore May 1, 1917 Total in iron ore Tons	Total merchantable ore May 1, 1917 Total in iron ore Assessed value
St. Louis	1,235,044,921	$252,193,155	1,234,753,169	$268,770,540
Itasca	162,409,359	18,749,029	158,614,250	19,070,871
Lake	239,891	91,870	333,719	145,645
Crow Wing	77,412,823	6,297,941	70,159,848	7,262,870
Grand totals	1,475,106,994	$277,331,995	1,463,860,986	$295,249,926











Throughout the Lake Superior district, more attention is being given annually to the development of labor-saving equipment. The past year has witnessed the wider adoption of many such devices in order to keep production at a high level despite the shortage of labor. More of the mammoth steam shovels of the type shown in the upper corner at the right are now in use. The view shows a shovel stripping at the Burt-Sellers property. Pneumatically operated 20-ton steel cars, as illustrated, are replacing the hand-operated, 7-ton wooden cars. Track layers are more common. Small views show a drag-line excavator.





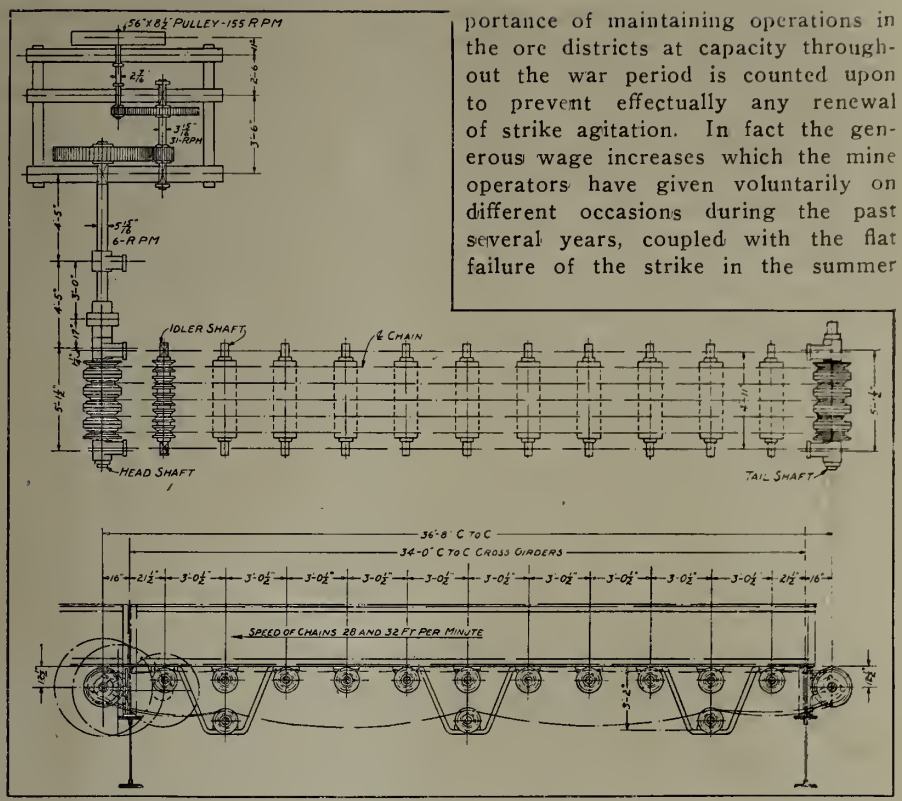


this new ore route will become of increasing importance.

The heavy shipments last year depleted the stockpile balances of most of the operators, but the actual tonnage now held in stockpile is slightly larger than that in reserve a year ago. Balances then were at a low point. The delays experienced in 1917 in shipping ore which the operators had contracted to deliver, held back a considerable tonnage and while mining operations were slackened to meet this condition, some of this ore is being carried on the stockpiles. These balances are being built up as rapidly as possible during the winter. Practically all of the mining companies on the old Mesabi and Cuyuna ranges are working as large a force as possible, not only to build up their stockpile balances, but to insure their mining organizations being held intact in preparation for efficient operation during the summer of 1918.

Labor Shortage Not Acute

The present efficiency of these mining organizations is higher than that which most manufacturers throughout the industrial districts of the country have been able to maintain. The influence of the present shortage of labor has of course extended into the ore fields but with decreased effect. The nation's call to war service has made large inroads upon the mining organizations in the Lake Superior district where the patriotic response has been surprisingly large in view of the importance attached a year ago to the anarchistic influence of agitators in the fields. Despite this loss, however, few operators were hampered last year by a shortage of workmen although the individual efficiency of the laborers is less now than it was a few years ago when wages were lower.



CHAIN GRIZZLY OF BARR TYPE

The principal element of discussion in the labor situation in the ore fields at the present time is the possible influence on the miners of this country's declaration of war against Austro-Hungary. The essential importance of maintaining operations in the ore districts at capacity throughout the war period is counted upon to prevent effectually any renewal of strike agitation. In fact the generous wage increases which the mine operators have given voluntarily on different occasions during the past several years, coupled with the flat failure of the strike in the summer of 1916, have been effective in clearing up that phase of the labor situation.

The problem of the enemy-alien miner, however, is a new one and the solution is expected to be found in Washington rather than among the miners themselves. Practically no statistics are available today showing the exact distribution of the many nationalities represented among the miners in the Lake Superior fields. An analysis of the war's effect upon the miners employed in the Lake Superior fields, presented in the Jan. 6, 1916, issue of THE IRON TRADE REVIEW is particularly pertinent at this time. It was pointed out then "that at the outbreak of war there was considerable fear in the iron ore country that the exodus of foreigners to join the armies in their native land might prove embarrassing. There is now nothing to indicate that there was any foundation for this anxiety: it is evident that the great bulk of the unnaturalized foreign laborers in the United States are well content to work in peace and security. Nationality statistics recently compiled by the Oliver Iron Mining Co. indicate that on the Mesabi range about 56 per cent of its employes are Austrians; approximately 14 per cent are Finns; and 11.5 per cent, Italians. Only about 10 per cent are Americans and the most of these occupy clerical or supervisory positions of some sort. In a typical district employing 1000 men, 17 nationalities are

Table IV

Shipments by Ports and Months

1917

Month	Escanaba	Marquette	Ashland	Superior	Duluth	Two Harbors
April	190,407	.....	.....	21,125	.....	.....
May	1,105,086	98,048	732,951	1,383,294	1,765,683	1,198,550
June	909,804	527,701	1,176,517	2,121,663	3,363,211	1,541,095
July	932,274	643,887	1,238,326	2,231,502	3,543,873	1,651,771
August	951,620	629,426	1,278,118	2,444,632	3,326,254	1,516,736
September	1,078,531	509,754	1,199,297	2,174,530	3,190,347	1,383,693
October	995052	461,284	978,029	1,876,525	2,497,629	1,385,373
November	838,096	327,113	900,241	1,516,162	2,583,620	1,168,596
December	155,984	9,932	94,362	209,308	296,802	145,087

1916

Month	Escanaba	Marquette	Ashland	Superior	Duluth	Two Harbors
April	398,214	53,258	147,852	211,340	538,281	309,466
May	1,045,186	561,555	955,041	1,722,341	2,671,044	1,494,413
June	1,159,424	539,327	1,101,370	1,945,234	3,116,665	1,645,556
July	1,044,368	680,779	1,302,682	1,986,631	3,012,492	1,723,205
August	1,061,285	634,786	1,289,439	1,950,249	3,380,066	1,534,315
September	922,517	557,140	1,255,328	1,945,171	3,455,611	1,465,019
October	876,488	519,806	1,218,134	1,732,865	3,298,314	1,470,589
November	772.417	273,801	665,339	1,132,642	1,982,872	888,381
December	177,545	37,640	122,629	160,573	382,604	204,909

Table V

Reserves by Ranges

	Tons, 1916	Tons, 1917
Mesabi	1,376,546,544	1,374,949,595
Vermillion .	12,215,917	11,341,758
Cuyuna ...	77,585,593	69,277,417
Totals ...	1,466,348,054	1,455,568,770

recognized. In this same district, about 300 of the 1000 employes are voters and about 250 more have taken out their first naturalization papers."

A census at this time probably would show a reduction in the percentage of Austrian laborers as many Serbians, Bulgarians and Roumanians who emigrated from the Dual Monarchy and registered originally as Austrians have little love for the country to which nominally they owe allegiance. At this time they probably would register as subjects of Serbia, Bulgaria or Rumania. A considerable percentage of others probably would seek to avoid the restrictions imposed upon Austro-Hungarians now by affirming allegiance to one of the Balkan states. Proper handling of the situation at Washington is expected by the ore operators to dispel thoroughly the cloud hanging over the enemy-alien situation. A few of the foreigners in the district may attempt to cause trouble, but the influence of any German propaganda has been negligible in the ore fields and little trouble is expected from such intrigue.

Wages Are Boosted

Two wage increases were granted by the mine operators during the year, bringing the pay for common laborers up to $3.45 a day. This represents an increase of 10 per cent over the wage in effect after May 1, 1917, when common labor was raised to $3.15 a day. The latest increase was granted on Oct. 1. The following table reveals at a glance the wages paid in the ore district now and at various periods throughout the last two years. In 22 months the wages of common laborers jumped from $2.25 to $3.45; those of company account miners from $2.60 to $4, and those of contract miners from $2.75-$2.85 to $4.70-4.75. The wage table is as follows:

	Daily wage		
	Dec. 1, 1915	Dec. 1, 1916	Dec. 15, 1916
Com. labor....	$2.25	$2.60	$2.85
Miners (co. act.)....	2.60	2.90–3.00	3.20–3.30
Contr. miners.	2.75–2.85	3.50	3.85

	May 1, '17	Oct. 1, '17
Common labor	$3.15	$3.45
Miners (co. acct.).....	3.40–3.50	3.70–4.00
Contract miners	4.25	4.70–4.75

In the ore fields common labor includes dump and track men and ordinary surface workers and in general men who work in gangs. A flat daily wage is paid to company account miners, while contract miners work on a piece work basis. While most of the contract miners are now averaging from $4.70 to $4.75 a day, many of them are earning much higher wages. Most of the Lake Superior miners prefer the contract system as it permits the miner to earn a larger wage. The rate of pay on contracts is fixed at the beginning of each month and in most cases the rate is never changed during the month except to grant an increase. While the average pay of miners working on company account is from $3.70 to $4 a day, the pay varies at different mines and in some instances runs up to $4.25 and higher.

Labor-Saving Equipment

A study of labor conditions in the Lake Superior district at the present time reveals the serious consideration which practically all operators are giving to the problem of developing labor-saving equipment and expanding its use. The use of larger steam shovels is becoming more widespread, while more attention is being given to the use of track layers and dirt spreaders. With these machines, dirt after being dumped from the cars can be leveled quickly and the track shifted to the new edge of the dump without delay. The method, of course, permits a considerable reduction in the number of men required, from the old method of spreading the dirt by hand and tearing up and rebuilding the tracks each time a shift was necessary.

In line with the same development, more attention is being given to the use of heavier mine railroad equipment. Twenty-ton steel cars, as shown in one of the accompanying illustrations, are rapidly coming into more general use. Heavier locomotive equipment also is being used with a consequent demand for stronger and heavier track equipment and for the tamping machines. The 20-ton steel stripping cars take the place of hand-operated wooden cars which had a capacity of only 7 tons. The steel cars are pneumatically operated.

Some experimental work also is being carried on in developing ore loaders for use in underground mines. Progress has been made in reducing the weight and head of loaders. Tests were conducted in the Virginia district a few weeks ago with a new type of unloader which is built along the same lines as a steam shovel.

The Oliver Iron Mining Co., the mining subsidiary of the United States Steel Corp., shipped 27,856,451 tons in 1917 against 31,673,131 tons in 1916. The company's share of the total movement last year was 43 per cent compared with 47.52 per cent in 1916; 47.63 per cent in 1915; 49.01 per cent in 1914; and 49.06 per cent in 1913. This comparison shows clearly the steadily mounting importance of the independents. In 1908 the Oliver company handled 56 per cent of the total movement. Since that time, with the exception of 1909 and 1911, the independents annually have handled more than half of the ore shipped.

While the heavy drafts on the ore reserves during the past two years have been countered largely by the active prosecution of development and exploration work, many of the larger companies are fortifying themselves by the purchase or lease of properties upon which ore tonnages have been proved. While the taking over of the last of the active Hill mines by M. A. Hanna & Co., Tod-Stambaugh Co., Inland Steel Co. and Jones & Laughlin Steel Co. furnishes the most striking example of this tendency, a number of other sales and leases have been concluded by various independent firms. Coates & Tweed, for instance, have disposed of the big Plymouth mines, a new open pit on the Gogebic range adjacent to the Wakefield mine. Stripping was begun at the mine just two years ago and ore shipments already aggregate close to 1,000,000 tons. This mine will be operated by Pickands, Mather & Co., a new company, the Plymouth Mining Co. having been formed to take over the mine. The other firms interested in the Plymouth Mining Co. are the Youngstown Sheet & Tube Co., Lackawanna Steel Co., Alan Wood Iron & Steel Co. and the Steel Co. of Canada. Coates & Tweed also have concluded negotiations with Pickands, Mather & Co., by which the latter in conjunction with the Republic Iron & Steel Co., will take the entire output of the York mine on the Mesabi range. This is an open pit which shipped this year for the first time and which will probably forward about 200,000 tons in 1918. The ore is of bessemer grade. Stripping with a drag line excavator is now being continued at the York property. The ore is hoisted from the pit by means of a balanced skip.

Retirement of Hill Interests

The acquisition by various large independent operators of the bulk of the Hill ores probably marks the retirement for some years of the Hill interests in either an active operating or leasing capacity. The Arthur Iron Mining Co. which was formed immediately prior to the surrender by the Steel corporation of the Hill lease and which for several years has been the operating agent for the Hill interests on the Mesabi range, has given up all of its mining activities.

The leases concluded by the Hill

interests during the year included practically all of the properties which have either been developed or are available for early exploitation. The remaining Hill properties contain an immense tonnage of ore, much of which, however, is not profitably available for use at this time. M. A. Hanna & Co., who took over some 40,000,000 to 50,000,000 tons, have been carrying on active operations on their properties. Included in the Hanna lease were the Leonard, Harold, Thorne, Wabigon No. 1, Wabigon No. 2, Fay, Enterprise and Mesabi Chief mines, as well as the Great Northern interests in the North and South Uno properties. The Jones & Laughlin Steel Co. has been carrying on work on the properties they leased last year including the big Hill Annex mine and open pit, and the South Agnew, an underground mine. A new shaft is being sunk at the latter mine. Pumps are now at work unwatering the old underground Mississippi mine, the other property taken over by the Jones & Laughlin Steel Co.

The Republic Iron & Steel Co. is carrying on drilling work at the Gordon property of the Northern Pacific interests just south of the Bray mine. Another Northern Pacific property, the Washoe, now known as the Danube, originally taken over by the Tod-Stambaugh Co., is now controlled by Pickands, Mather & Co. The big Dunwoody open pit which had been taken over some time previously by the Tod-Stambaugh Co. and the Inland Steel Co., was operated throughout the year and is in shape to continue heavy shipments.

While the Oliver Iron Mining Co. is not developing any large new properties, active work is being done in uncovering ore at developed mines and the company is in a splendid position to forward its usual heavy tonnage. The largest project which the Oliver company is now carrying on is the stripping of the Missabe Mountain property in the Virginia district. This mine is a state lease formerly operated as a part of the Virginia group in conjunction with the Norman, Ohio and Lone Jack mines. The Missabe Mountain is understood to contain 55,000,000 tons of ore. The development work on one part of the mine revealed a reserve of 20,000,000 tons where early explorations had indicated that no ore would be found. Stripping is being pushed actively and this mine will shortly rank among the heaviest shippers of the Mesabi range. Three shovels are at work in the Missabe Mountain mine this winter and more than 1,000,000 tons probably will be shipped durng 1918. The Ohio and Lone Jack mines have both shipped, but the bulk of the ore is being held in reserve. The Norman mine is approaching exhaustion.

The Arcturus, a big open pit property on the western Mesabi which has been under development by the Oliver company for several years, shipped 300,000 tons in 1917. The Kerr mine, which entered the shipping list in 1916, forwarded more than 1,500,000 tons last year. This mine is located west of the Hull Rust which last year shipped 6,376,422 tons. In 1916 the Hull Rust mine shipped 7,665,611 tons, giving in the last two years total shipments of more than 14,000,000 tons from this great property. The Sauntry-Alpena mine, formerly an open pit, now is being worked entirely by underground methods. The Oliver company on Jan. 1 gave up its lease on the Graham mine.

One of the biggest exploration and development projects ever carried out on the old ranges has just been started by the Republic Iron & Steel Co. The company has taken over a large tract immediately west of the Montreal mine. The tract includes all of section 31, township 46, range 2; section 6, township 45, range 2; and practically all of section 32, township 46, range 2. Some ore was shipped years ago from old mines on this tract. In section 32 are the old Father Hennepin, Pence and Snyder mines. These have all been explored more or less, but two of them have not been worked for 25 years. In section 6 is the Plumer mine. Both the Pence and Plumer mines have been operated in a small way in recent years, the Plumer having been owned at one time by the Oliver Iron Mining Co.

Unusual interest attaches to this big exploration by the Republic company as the properties lie at the extreme western end of the Gogebic range and if the Republic company is successful in discovering ore a considerable increase in the size of the Gogebic deposit would be indicated. On the Plumer property is a 1300-foot shaft which will be used in carrying on the sinking and drilling underground. Five drills are now being employed. Under the supervision of Francis J. Webb, Duluth, general manager for the Republic Iron & Steel Co. in the Lake Superior district, all of the land contained in these three sections will be thoroughly drilled and explored. F. H. Cash, superintendent of the Kinney mine on the Mesabi range, is acting as superintendent of construction, with L. L. Wilcox, chief engineer in the Lake Superior district for the Republic Iron & Steel Co., in charge of explorations.

The Republic company has been operating its developed mines steadily and is pushing work this winter.



ONE OF THE BIG BULK FREIGHTERS BUILT DURING 1917

A new level is being opened at the Pettit mine on the Mesabi, while a new shaft is being sunk at the Franklin mine to remove the ore left in the old shaft pillar. The electrification of the Antoine (Clifford) mine on the Menominee range will be completed this year.

M. A. Hanna & Co. are sinking a new five-compartment shaft at the Hobart mine on the Mesabi. A modern steel headframe is being built. Underground operations at the Sliver mine will be finished this spring. The mine is being continued as an open pit. The Frantz mine near Buhl was operated in 1917 after some years of idleness. The Hanna company has just completed sinking the No. 2 shaft at the Thorne mine and will reach the orebody soon. This is an extension of the Thorne No. 1 deposit which will be exhausted at the end of this year. The Leonard mine is being put in shape for operation, the open pit having just been pumped out. The Alexandria mine which the Hanna company operates for the Donner Mining Co., has been fully electrified.

The estimates of the tonnage of ore still remaining in the Minnesota ranges, as prepared by Rukard Hurd, director of the department of mines and natural resources of the Minnesota tax commission, indicate a slight decrease in the reserve on May 1, 1917, as compared with the corresponding date of 1916. The estimates are shown in Table III.

Huge Ore Reserve

The ore estimated to be in the ground on May 1, 1917, aggregated 1,455,568,770 tons, a decrease of 10,266,045 tons from May 1, 1916. On the same dates Minnesota stockpiles held 8,292,216 tons, and 9,272,179 tons, respectively, a decrease on May 1, 1917, of 979,963 tons. The aggregate tonnages both in the ground and in stockpiles on the two dates were 1,463,860,986 tons and 1,475,106,994 tons respectively, a net decrease in 1917 of 11,246,008 tons.

As indicated in Table V, the decrease in reserve occurred largely on the Cuyuna range. The commission estimated that on May 1, 1917, the Cuyuna range reserve was 69,277,417 tons against 77,585,593 tons on May 1, 1916. The loss of 8,300,000 tons resulted partially from shipments and largely from revisions of earlier estimates of the tonnages in reserve on the newest range. The estimate for the Vermillion range reserve showed a decline during the year ending May 1, 1917, of about 875,000 tons. The remainder of the decrease for the Minnesota ranges, or about 1,600,000 tons, occurred on the Mesabi range face of the shipments during the calendar year 1916 of 42,525,612 tons. As indicated in Table III, the assessed value of the ores increased materially despite the slight decrease in the taxable tonnage. For the ores on the three Minnesota ranges the assessed value on May 1, 1917, was placed at $295,249,926 against $277,331,995 on May 1, 1916.

The loading facilities at the head of the lakes have been increased by the completion of the new dock of the Soo line at Ashland, Wis. This dock is 80 feet high and 59 feet from outside to outside of pockets. It has 150 pockets of 350 tons capacity each, giving a total capacity of 52,500 tons.

New Washing Plants

The close attention which has been paid in recent years to the problem of handling lean ores is evidenced by the rapid construction of washing plants on the western Mesabi. During 1917 new washing plants were placed in service at the York mine of Coates & Tweed, the Kevin mine of Butler Bros. and the Pearson mine of the Shada Mining Co. New plants are now being built at the Majorca and Danube mines of Pickands, Mather & Co., and at the new Draper mine of the Draper Iron Co. At the present time the following plants are in service or under construction for handling western Mesabi ores: Trout Lake, Oliver Iron Mining Co.; Hawkins, Wisconsin Steel Co.; Crosby, Cleveland-Cliffs Iron Co.; LaRue, M. A. Hanna & Co.; Madrid, C. K. Quinn; Quinn-Harrison, Butler Bros.; York, Coates & Tweed; Kevin, Butler Bros.; Pearson, Shada Mining Co.; Majorca, Pickands, Mather & Co.; Draper, Draper Iron Co.; Danube, Pickands, Mather & Co.

The Pearson mine is an underground property and the plant there has just been started. It has a capacity of about 75 tons an hour. In its first year of service, the York plant handled about 60,000 tons of ore and will probably handle between 175,000 and 200,000 tons in 1918. At the Majorca mine is a one-half unit plant with tables. The Draper plant also is of one-half unit size. This mine is located about 1 mile from the Majorca mine which in turn is adjacent to the Hill Annex mine.

Pickands, Mather & Co. will probably place in service this year a full unit plant at the Danube mine between Taconite and Bovey on the western Mesabi. This plant will be the largest of any on the range with the exception of the big Oliver plant at Coleraine. The Kevin plant is a one-half unit one, while an additional half unit has been added to the Quinn-Harrison plant, making it of unit and one-half size.

The electrically driven hoist which was built for handling ore from the York pit was successfully operated during 1917 and other hoisting systems of this type are now being employed. This system was described in THE IRON TRADE REVIEW of Jan. 4, 1917. It is particularly adapted for comparatively small open pit properties where the construction of an adequate approach is difficult. A system of 2-ton capacity hoists is used at the Pearson mine, while 3-ton skips will be in service at the Majorca and Draper mines.

An interesting development in the design of washing plant is being carried out at the Danube mine of Pickands, Mather & Co. At this mine it was found advisable to crush the ore before sending it to the washing plant. All of the ore will be put over a chain grizzly, the undersize going to the bins and being then drawn by a chain conveyor to the mill. The oversize, that is the material not passing through the grizzly, will go to a large 48-inch steel conveyor so arranged that the large chunks of rock and taconite can be rolled off in the same manner as from a picking belt. The remainder will be delivered by the conveyor to an all-steel, 48 x 36-inch jaw crusher and crushed. From the crusher it will be sent to a cross conveyor, reaching the mill by means of the main conveyor.

The washing plant at the Danube mine is of full unit size with a large revolving screen, two 25-foot washers, four 18-foot washers and complete table equipment. All table concentrates will be dewatered. The concentrates will reach the bins from shuttle conveyors—an arrangement which is designed to secure a better mixture of the different grades of concentrates.

Rock-Separating Devices

Pickands, Mather & Co. are placing in service at the Albany mine this month a screening plant. The problem of screening also has been yearly assuming greater importance and various different types of rock-separating devices have been developed. A screening device developed at the Susquehanna mine of the Rogers-Brown Iron Co. to meet a condition similar to ordinary rock separation, was described at length in the Jan. 4, 1917, issue of THE IRON TRADE REVIEW. The new screening plant at the Al-

(*Continued on Page* 108)

Making Good With Tradition Discarded

By A. O. BACKERT



Fig. 1—Section of One of the Pipe Casting Pits in the Foundry of the American Cast Iron Pipe Co., Birmingham, Ala. In the Foreground is the Shake-out Grating and at the Right is a Large, Double Sand Bin

ACIPCO is not Utopia. It is a suburb of Birmingham, Ala., which has grown up around the activities of a cast iron pipe foundry where the human element is considered the basic factor upon which industrial success depends. It is the conviction of the owners and operators of this plant that a man expects, and has a right to expect, something more than the sum he gets in his pay envelope, and by carrying into execution this conviction Acipco has been made possible. Lacking a better term it may be characterized an industrial community—but it is more. Not mere welfare, but fraternity has been sought and this spirit has been fostered and attained among it inhabitants. At this community the American Cast Iron Pipe Co. daily converts more than the output of a modern blast furnace into castings. Here more than a thousand men are employed, three-fourths negroes, into whom has been instilled the spirit that the success of manufacture depends on them, regardless of how insignificant may be their tasks. The reciprocal spirit of the company is its unlimited interest in their troubles, trials and tribulations, and it stands ready at every turn to give them aid if they are worthy. And fraternalism has welded employer and employe into a mighty and efficient industrial force.

With tradition in the discard in its relations with its employes, the company likewise has consigned it in the operation of its plant. The industrial and technical philosophy of Acipco is simplicity itself. *"Nothing is impossible of achievement,"* expresses it completely. This is the spirit that successfully developed the 16-foot cast-iron pipe in this foundry several years ago. A more recent innovation is the use of hot metal from a neighboring blast furnace, which is mixed with the cupola metal in varying amounts to obtain the specified analysis for cast pipe. That sound pipe could not be produced in greater than 12-foot lengths was one of the many traditions of pipe foundry practice. Its advantages never were questioned, but the fact that it had never been made before seemed sufficient reason for not producing it now, until the problem was solved by this company. Sizes from 4 to 12 inches are being made in 16-foot lengths effecting a saving to the purchaser of 25 per cent in bells and a reduction of one-fourth in number of joints. The reduction in the cost of labor and material in laying 16-foot pipe as compared with the established standard of 12 feet, is estimated to be about $2.75 per ton under prevailing conditions. Furthermore, the lessened number of joints makes a more efficient pipe line. Owing



FIG. 2—SHAKING-OUT CAST IRON PIPE BY OPENING THE HINGED FLASK. THE SAND FALLS INTO THE GRATING SHOWN IN FIG. 1

to the favorable location of the foundry in the heart of the Birmingham iron producing district, where it is practically surrounded by blast furnaces, the use of direct metal with cupola iron was facilitated. Introduced at a time when record prices were prevailing for coke, the fuel economy was considerable when spread over approximately 70 tons of iron daily, none of which had to be remelted with coke. Even at today's prices for coke, the saving is considerable and the success of the venture has been proved. A tremendous sand-preparing and conveying plant which serves two of the double pits is another improvement that must be characterized as an innovation for a plant engaged in the manufacture of this product.



FIG. 3—DRAWING FOUR PIPE PATTERNS IN ONE OPERATION

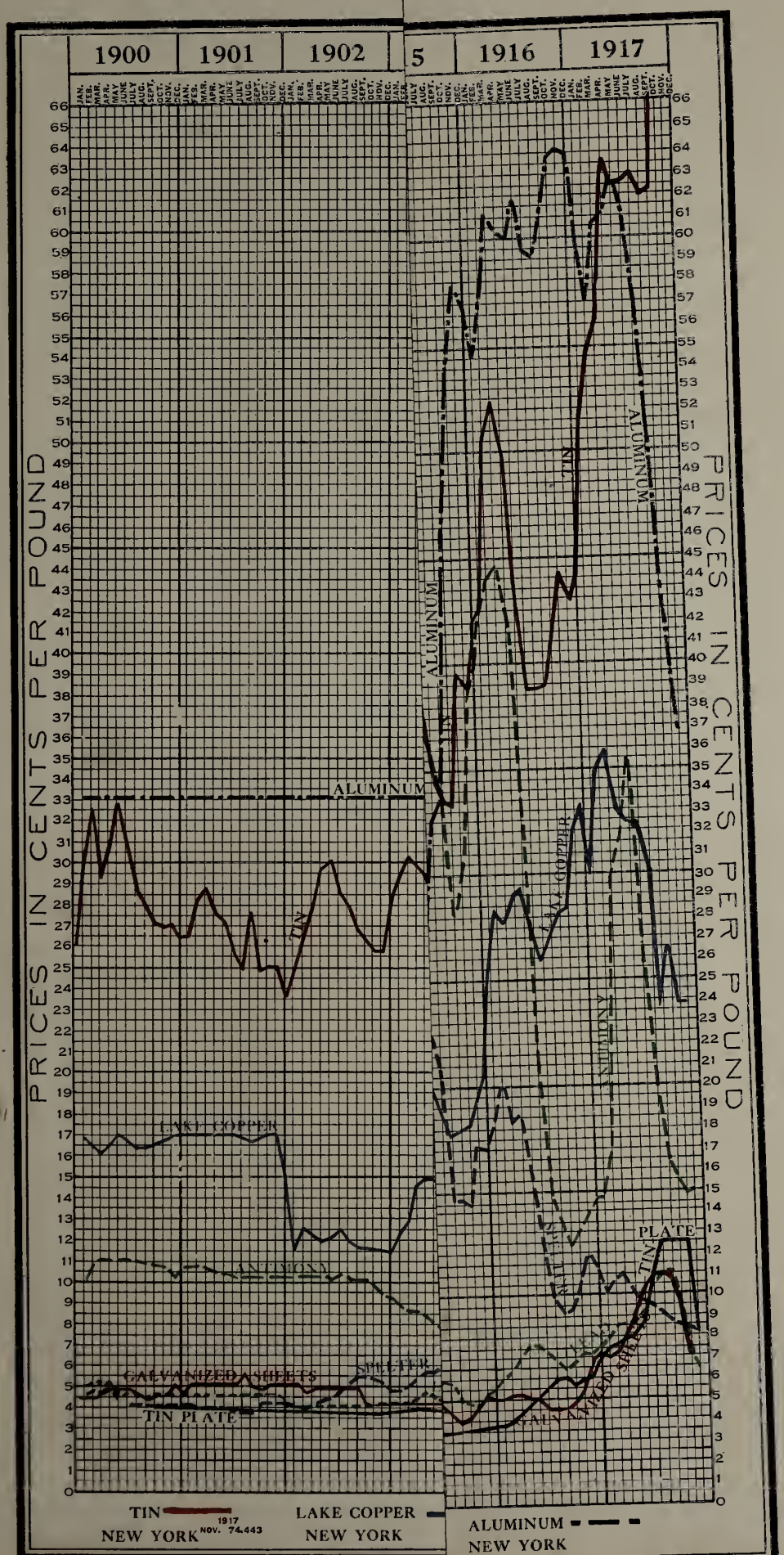
FIG. 4—SETTING THE CORES IN CAST IRON PIPE MOLDS

Located on the outskirts of Birmingham, the company's property spreads over a total of over 200 acres, which is ample for the growth of the plant and has made possible the building of a model industrial community. The output of the foundry aggregates about 120,000 tons of cast iron pipe and fittings and special castings annually, or at the rate of 400 tons of pipe daily and 200 tons of miscellaneous castings monthly. The pipe is cast in four, double, circular pits served by eight cranes and in two square pits wheel flanged and bell and spigot pipe is made. Two of the circular pits are constructed for the production of 16-foot lengths and two for 12-foot, the latter being produced in diameters as great as 24 inches. Operations are carried on in 9-hour shifts and the task system prevails. By this plan of operation, when a shift has done a given amount of work the men are at liberty to go home, but if a shift works sufficiently fast and efficient and produces more than its alloted task, each man on the shift is paid a pro rata bonus on each extra pipe, according to his regular rate. On the other hand, if the output of the shift falls below its allotted task, no reduction is made from their wages. The task system first serves as an incentive for the men to complete their task and to be relieved from further work for the day, and second, it keeps their output at the highest possible point for the bonus money involved. The shift, while at work, is kept informed of its losses, so that these can be replaced with good pipe to complete the task. For example, a 6-inch pit may have for its task 103 pipes per shift. When the 103 pipes are made the day's work is done, regardless of what the time may be when the task has been completed. If the men of the



FIG. 5—THE FOUR LARGE CUPOLAS AND THE METAL DISTRIBUTING TRACKS

Fluctuations in prices eets, 1900-1917



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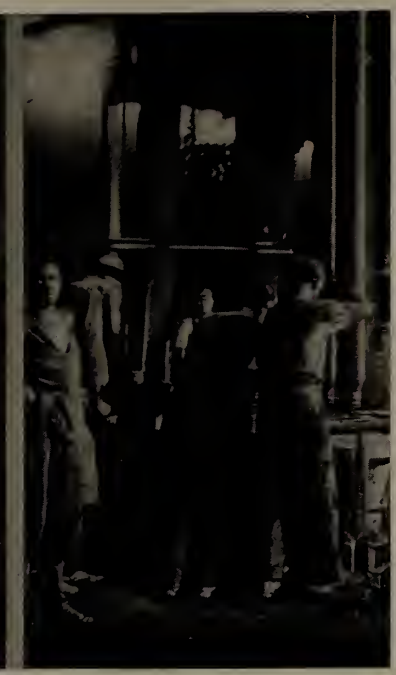


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THE IRON TRADE REVIEW

Fluctuations in prices of pig tin, aluminum, antimony, lake copper, spelter, lead, tin plate and galvanized sheets, 1900-1917

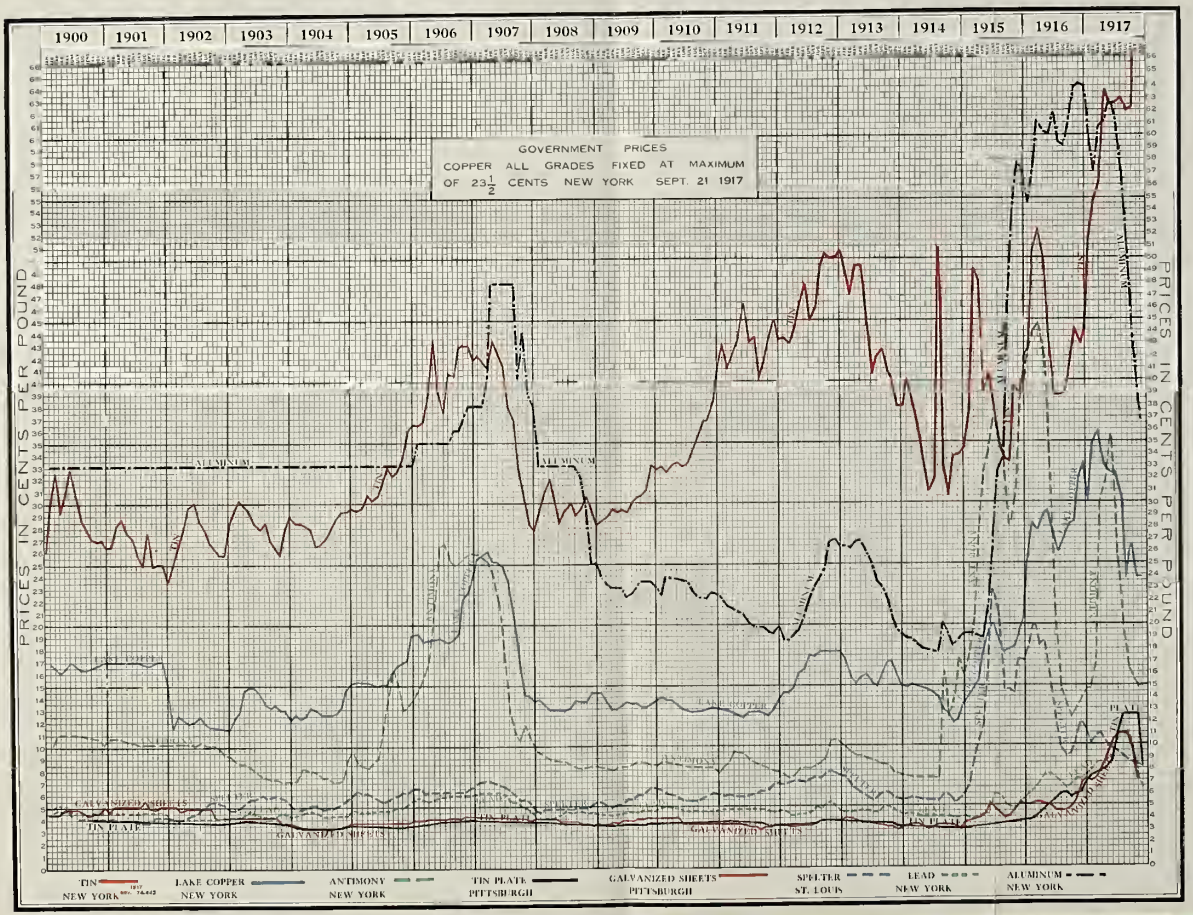




FIG. 6—THESE TUYERES ARE OF THE STEEL WORKS TYPE AND ARE RARELY SEEN IN USE ON FOUNDRY CUPOLAS



FIG. 7—THE HOT METAL BUGGY LADLE DELIVERS MOLTEN IRON FROM THE BLAST FURNACE TO THE FOUNDRY

shift care to and have time to make additional pipe before the next shift comes on the pit, each man of the shift receives a bonus for each extra pipe made. It will be assumed that a workman on a shift is earning $3.09 a day, which is equivalent to 3 cents per pipe for the task of his shift; then if 10 extra pipe are made, he will receive a bonus of 30 cents, or a total day's wage of $3.39. The task system has been worked out in great detail and is



FIG. 8—SCRAP DISTRIBUTION IN THE CUPOLA IS FACILITATED BY CHARGING THROUGH UPPER DOORS

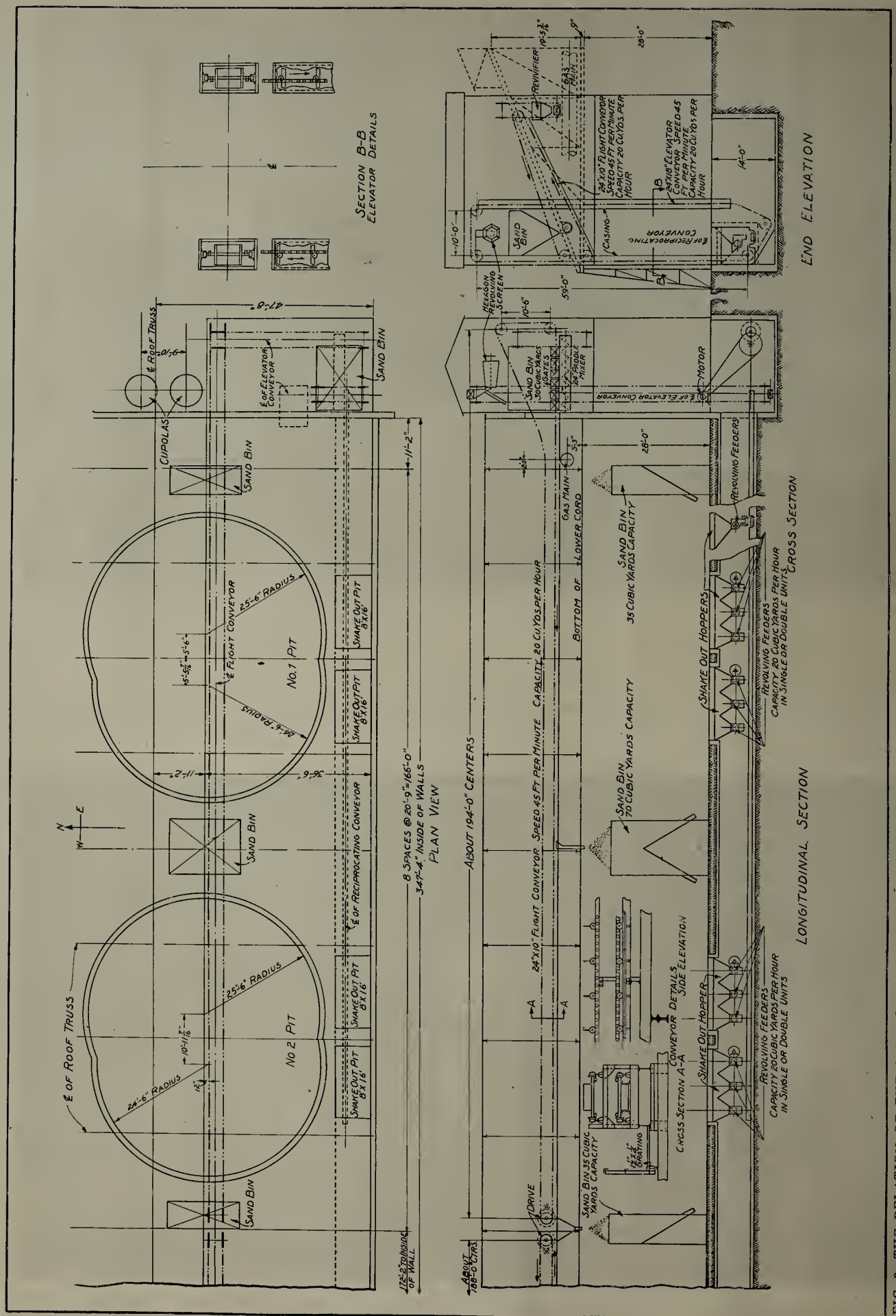


FIG. 9—THE RELATION OF THE SAND CONVEYING AND PREPARING MACHINERY TO THE CASTING PITS AND THE CONSTRUCTION OF THIS EQUIPMENT IS SHOWN IN PLAN, LONGITUDINAL SECTION AND END ELEVATION

applied if possible to every operation.

As previously stated, one of the greatest innovations made in the art of casting pipe, was introduced successfully at this plant about six months ago. While it involved the building of a hot metal track to connect with the mine-to-furnace railroad of the Thomas furnaces of the Republic Iron and Steel Co., this enormous expense has been more than justified by the accruing results. Daily, four ladles, containing about 18 tons of hot metal each are delivered to the foundry from each of the four casts of one of these blast furnaces. The hot metal is mixed in the large tapping-out ladles with the cupola iron and fortified with a knowledge of the analysis of the metal from the furnace, the cupolas can be charged to obtain almost any desired mixture. Since the output of the furnace may vary considerably, at times from cast to cast, one of the chemists from the



FIG. 10—THE REVIVIFIER—AN ESSENTIAL PART OF THE SAND-PREPARING MACHINERY

pipe plant makes a test analysis of every cast at the furnace. The results are telephoned immediately to the foundry where the charges are made up to conform to the analysis desired for the pipe. In this way, the mixtures are controlled and small additions of the hot metal are made to each ladleful of cupola metal.

Aside from maintaining a high standard of metal the saving in the cost of melting approximately 70 tons of metal daily was no small economy when coke was selling at $16 a ton and was obtainable only spasmodically.

Temporarily, at least, it is not intended to increase the consumption of hot metal, but plans are under consideration which will further advance and improve this practice materially. A view of one of the hot metal ladle cars on the depressed track on which it is delivered to the foundry is illustrated in Fig. 7. For pouring the metal into the cupola ladles the back end is tilted by a chain operated by a trolley. Metal is melted in four cupolas of large size, two being 84 inches in diameter, and two, 72 inches. Since the plant is operated two shifts, two of the

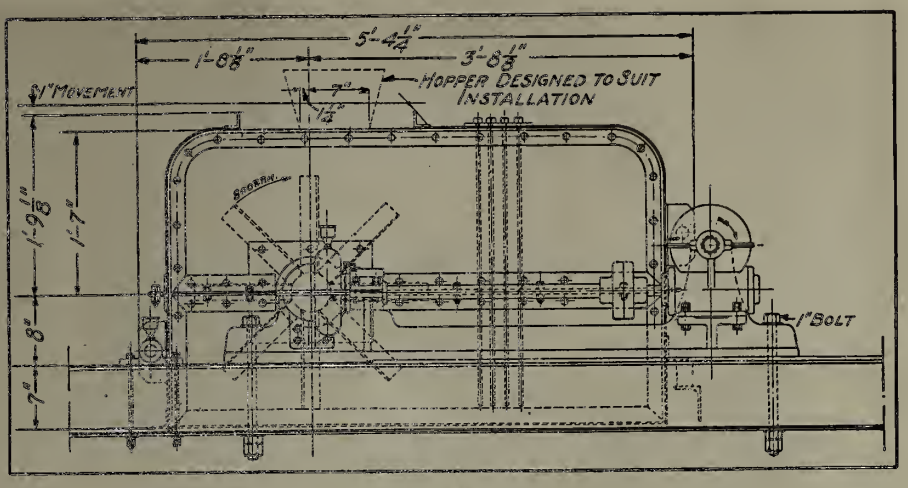


FIG. 11—SIDE ELEVATION OF THE SAND REVIVIFIER

cupolas are in blast from 5 a. m. to 3 p. m., and the other two from 5 p. m. to 3 a. m. This makes a total of 10 hours for each furnace, and notwithstanding the duration of the heats no difficulty is experienced from the stock hanging in the stacks. The cupolas are slagged continuously, a practice that may be followed to advantage by foundrymen making long heats. A view of the four cupolas is illustrated in Fig. 5, which shows the tracks for distributing the metal and the switch at the side leading to the depressed track where the hot metal charges are obtained.

Each cupola is equipped with two rows of six tuyeres and their unique construction, so far as foundry practice is concerned, is illustrated in Fig. 6. Tuyeres of this type are installed on cupolas furnishing molten iron to bessemer steel plants and owing to their known efficiency these furnaces were so equipped. For the purpose of facilitating the distribution of scrap charges, two of the cupolas, Fig. 8, each have been provided with two sets of charging doors. The scrap is charged through the upper doors, as shown from pans filled in the yard. The pan, loaded with scrap, is elevated to the charging floor, where it is deposited on the high platform car illustrated, which raises the lip of the pan to a level with the lower sill of the charging door. One end of the pan is engaged by a hook suspended from a trolley and the charge is dumped into the cupola.

Preparing the Sand for Pipe Molds

Contributing to the efficiency of the foundry in the production of an improved quality of pipe and in the reduction of casting losses, is the sand-preparing and conveying plant. Two of the four double casting pits now are being served in this way and all of the difficulties involved in tempering and handling so great a volume of sand as used in a pipe shop have practically been eliminated by this equipment which was installed by the Link-Belt Co., Chicago. One of the chief obstacles to the success of sand conveying machinery in continuous or semicontinuous casting plants is the inability to return

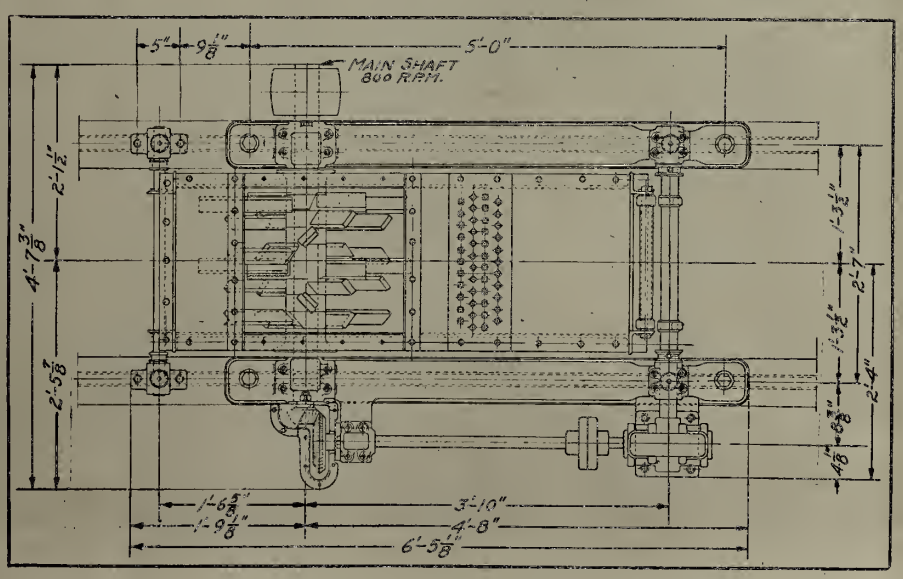


FIG. 12—PLAN VIEW OF THE SAND REVIVIFIER



FIG. 13—THE SAND-PREPARING PLANT AND DUST ARRESTER

FIG. 14—THIS DOUBLE SAND BIN SERVES TWO CASTING PITS

FIG. 15—UPPER RUN OF THE FLIGHT-CONVEYOR-ELEVATOR DISCHARGES SAND INTO THE REVOLVING SCREEN

FIG. 16—SAND BIN EQUIPPED WITH GATES FOR DISCHARGING CONTENTS INTO THE PADDLE-CONVEYOR-MIXER

the material to the molding floors in a sufficiently cool condition for repeated use, and in a pipe foundry, where the sand is heated to redness when shaken-out, this problem is an unusually difficult one to solve. This equipment, however, has been constructed sufficiently large in all of its parts to allow an ample period to elapse from the time the sand falls into the shake-out hopper until it is returned to the molder to enable it to cool and be in prime condition for ramming. The sand makes a complete circuit in about 24 hours and its cool condition when delivered to the floors is greatly appreciated by the men, particularly in this southern climate in the summer time.

A complete layout of the sand-handling



FIG. 17—REVOLVING FEEDERS UNDERNEATH THE SHAKE-OUT HOPPERS

and preparing machinery, showing its relation to the two double pits which it serves, is presented in Fig. 9. Briefly described, the hot sand falls into shake-out hoppers over which the flasks are opened, the pipe being skidded on horses to the cooling racks. The hoppers have gratings at the floor level to prevent clamps, etc., from passing through with the sand which is very hot and is delivered by automatic feeders into a reciprocating conveyor. Some water is added to the sand in the conveyor to cool it and reduce the dust. The sand is delivered to the sand-preparing house, where it is discharged into a special elevator and this, in turn, delivers it to a hexagonal screen that removes any small pieces of iron or other foreign



FIG. 18—PREPARED SAND IS DELIVERED TO BINS BY THE OVERHEAD CONVEYOR

matter which might have passed through the grating over the shake-out hoppers, and drops the sand into a bin. From the latter it is fed, as required, into a paddle mixer, to which the proper amount of claywash is added to impart the proper temper to the sand. The paddle mixer delivers it to an inclined flight conveyor which feeds the tempered sand into a revivifier where it is aerated and thoroughly mixed. Any remaining clods of sand are broken up and a thoroughly mixed product is delivered to the storage bins in front of the pits where the molds are rammed. These bins are provided with a series of over-cut gates extending across the whole front, so that the sand can be delivered wherever most convenient for the men who shovel it into flasks.

The proximity of the larger double sand bin to the adjoining casting pits is illustrated clearly in Fig. 1, and in the foreground is the grating through which the sand falls into the shake-out hopper. The operation of shaking-out a pipe onto the horses is shown in Fig. 2. After knocking off the clamps, the longitudinally-hinged flask is opened by crane hooks engaging loops on either side, dropping out the pipe casting and the molding sand.

Details of Sand-Handling Machinery

A plan view of the sand-handling machinery, together with a longitudinal section and an end elevation, are shown in Fig. 9. It will be noted that the three shake-out hoppers under each grating are equipped with revolving feeders that have a capacity of 20 cubic yards per hour. The reciprocating conveyor which travels in a concrete tunnel under the foundry floor, is about 160



FIG. 19—END OF RECIPROCATING CONVEYOR AND BOOT OF ELEVATOR







feet long. The 24 x 10-inch flight conveyor which travels overhead at a height of 32 feet above the foundry floor operates at a speed of 45 feet per minute and has a capacity of 20 cubic yards per hour. Each of the two double casting pits is served by two sand bins with a capacity of 35 cubic yards each. Between the two pits is the double bin illustrated at the right in Fig. 1, and an enlarged view is shown in Fig. 14, which clearly outlines the construction of the over-cut gates.

One of the most essential features of the sand-preparing machinery is the revivifier. The used sand which has been returned through the reciprocating conveyor, elevator and screen, to the storage bins over the mixing machinery, is delivered, as required, through sliding gates, into the paddle conveyor mixer where a suitable combination of clay and water is added and mixed before it drops to the inclined conveyor that delivers it into the receiving hopper of the revivifier. Fig. 11 is a side elevation of the revivifier, Fig. 12 is a plan view, and the enclosed machine with a chute leading into it from the sand

FIG. 20—EVERY COMFORT FOR THE NEGRO EMPLOYES IS PROVIDED BY THESE HOUSES; FIG. 21—THIS IS A FIVE-ROOM COTTAGE IN THE NEGRO SECTION THAT RENTS FOR $15.00 PER MONTH; FIG. 22—ONE OF THE STREETS OF THE NEGRO VILLAGE WHICH HAS BEEN NEWLY LAID OUT TO PROVIDE FOR NEW EMPLOYES

receiving hopper is illustrated in Fig. 10.

The main shaft of the revivifier operates at 800 revolutions per minute and is equipped with flat steel beater arms, set at such an angle that they drive two streams of sand forward across each other and across the center line against the curtain of suspended, ½-inch round rods, staggered in four rows in a position which does not permit any particles to pass through in a straight line. The violence of impact breaks any remaining lumps of sand, the open curtain of rods prevents the formation of currents of air swirling around the shaft and the streams of sand crossing each other thoroughly mix the particles.

To prevent moist sand from accumulating on the rods and on the inside of the casing, it is so arranged that the casing and suspended rods shall receive 10½ jolts per minute, by hinging the rear of the casing. The front end is raised by cams and dropped on a wooden bumper at every turn of the camshaft. The bottom of the casing being open, discharges the prepared sand onto a conveyor which delivers it to storage bins.



FIG. 23—STREET SCENE IN THE VILLAGE FOR WHITE EMPLOYES. THE HOUSES ARE OF A SUBSTANTIAL CHARACTER AND PROVIDE EVERY FAMILY COMFORT; FIG. 24—ONE OF THE MORE PRETENTIOUS HOUSES OCCUPIED BY ONE OF THE PLANT EXECUTIVES; FIG. 25—REAR VIEW OF A ROW OF HOUSES IN THE NEGRO VILLAGE. THE BACKYARDS ARE AMPLE IN SIZE FOR VEGETABLE GARDENS FOR ONE FAMILY

Fig. 13 is a view of the sand-preparing, plant built outside of the foundry. It rises to a height of over 60 feet. The dust collector, extending above the top of the house, is in the foreground. The upper run of the flight conveyor-elevator is illustrated in Fig. 15; it discharges into the revolving screen over the sand bin. At the foot it receives sand brought from the casting pits by a reciprocating conveyor. Fig. 16 is the sand bin provided with gates for discharging into the paddle conveyor-mixer. It delivers the sand to an inclined apron conveyor which feeds the molding-sand revivifier. The revolving feeders that deliver the sand to the reciprocating conveyor from the shake-out hoppers are illustrated in Fig. 17, and Fig. 18 is a section of the overhead conveyor that takes back the sand from the revivifier to the bins at the casting pits. Fig. 19 is the boot of the elevator that delivers the sand to the hexagonal screen from the end of the reciprocating conveyor in the concrete tunnel.



FIG. 26—THIS MEDICAL DISPENSARY OPERATING ROOM WOULD GRACE ANY METROPOLITAN HOSPITAL

In conjunction with the pipe shop, a large foundry is operated for the production of fittings, special castings, etc. It has an output of approximately 200 tons per month. Operations are facilitated and economies effected by the use of cast-iron flasks shaped to conform to the contour of the castings made in them, thereby reducing the amount of sand required and embodying the other well-known advantages of such metal equipment. Special rigging also has been devised to expedite the molding, core-making and shaking-out operations. These rigs reflect great ingenuity in their design and construction. Jar-ramming machines are employed for making the molds and the flasks are equipped with roll-up hinges which facilitate the drawing of the patterns and the closing of the molds. In Fig. 30 is illustrated a green sand mold and core for a tee made in a roll-up hinge flask and a floor of such molds in process of shaking-out is illustrated in Fig. 29. The operation of jar-ramming a fitting is shown in Fig. 32. A frame is set on top of the flask for holding additional sand while ramming and this is removed when the flask is struck-off. In addition to ramming molds, the large jarring machine is employed for shaking-out the flasks, as shown in Fig. 31. A cast-iron frame is set on top of the table, being recessed at the corners for directing the flow of sand to the floor. The operation of uncovering the molds is as speedy as it is simple. After removing the clamps from the flasks, two molders pass two chains from the crane underneath the corners of the cope flask, and in succession they place the lifted cope from one flask onto the neighboring flask from which the cope is to be lifted. This operation is repeated until the chain slings are filled, the number being measured by the size of the flasks. In Fig. 29, it will be noted, three cope flasks are in the slings ready to be conveyed to the jar-ramming machine for shaking-out and the castings that have been uncovered are in the foreground.

The method of making the cores for fittings is another interesting operation. The hinged core boxes are set on cast iron frames where the cores are rammed by hand. In Fig. 33 the core box for a tee is in open position for making the core. The cast iron core arbor is in place and after ramming both halves, the core box is closed and the upper half is rolled back into its original position.

The kinship that exists between the man who employs and the man who works receives full recognition at the plant of the American Cast Iron Pipe

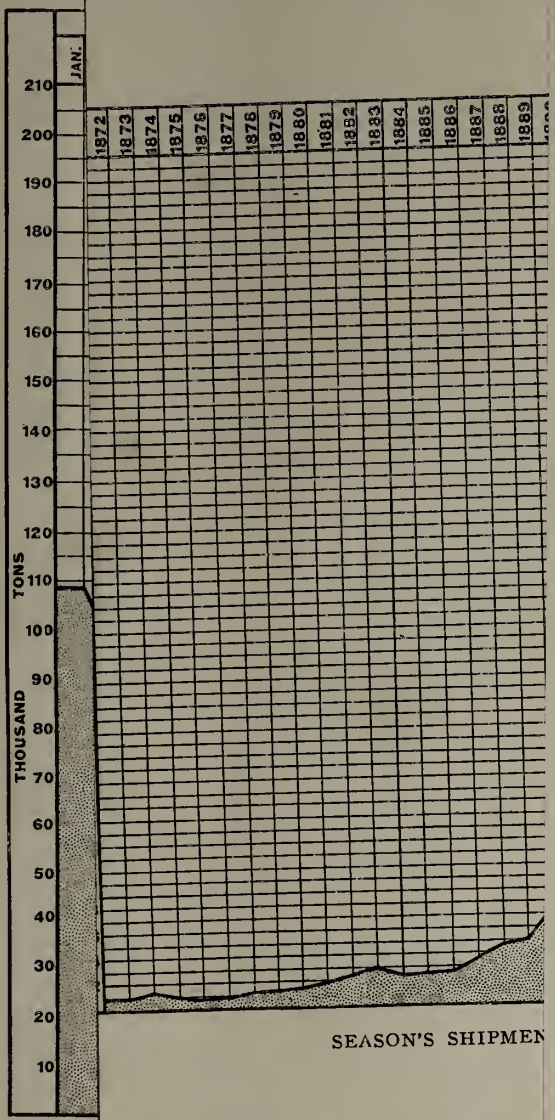


FIG. 27—THE DOMESTIC SCIENCE SCHOOL BUILDING IN THE NEGRO VILLAGE

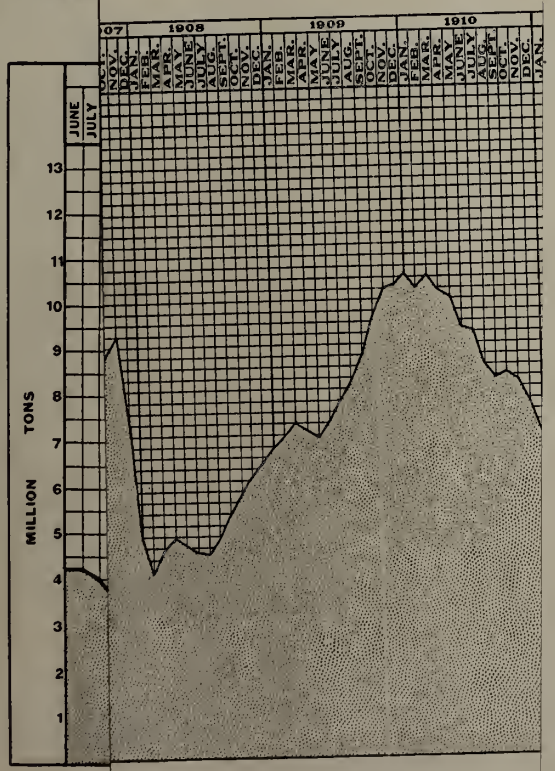


FIG. 28—ANOTHER STYLE OF ARCHITECTURE IN THE NEGRO VILLAGE

Chnited States Steel Corpor



SEASON'S SHIPMEN



DAILY AVERAGE PRODUCT

Supplement

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FIG. 26—THIS MEDICAL DISPENSARY OPERATING ROOM WOULD GRACE ANY METROPOLITAN HOSPITAL

In conjunction with the pipe shop, a large foundry is operated for the production of fittings, special castings, etc. It has an output of approximately 200 tons per month. Operations are facilitated and economies effected by the use of cast-iron flasks shaped to conform to the contour of the castings made in them, thereby reducing the amount of sand required and embodying the other well-known advantages of such metal equipment. Special rigging also has been devised to expedite the molding, core-making and shaking-out operations. These rigs reflect great ingenuity in their design and construction. Jar-ramming machines are employed for making the molds and the flasks are equipped with roll-up hinges which facilitate the drawing of the patterns and the closing of the molds. In Fig. 30 is illustrated a green sand mold and core for a tee made in a roll-up hinge flask and a floor of such molds in process of shaking-out is illustrated in Fig. 29. The operation of jar-ramming a fitting is shown in Fig. 32. A frame is set on top of the flask for holding additional sand while ramming and this is removed when the flask is struck-off. In addition to ramming molds, the large jarring machine is employed for shaking-out the flasks, as shown in Fig. 31. A cast-iron frame is set on top of the table, being recessed at the corners for directing the flow of sand to the floor. The operation of uncovering the molds is as speedy as it is simple. After removing the clamps from the flasks, two molders pass two chains from the crane underneath the corners of the cope flask, and in succession they place the lifted cope from one flask onto the neighboring flask from which the cope is to be lifted. This operation is repeated until the chain slings are filled, the number being measured by the size of the flasks. In Fig. 29, it will be noted, three cope flasks are in the slings ready to be conveyed to the jar-ramming machine for shaking-out and the castings that have been uncovered are in the foreground.

The method of making the cores for fittings is another interesting operation. The hinged core boxes are set on cast iron frames where the cores are rammed by hand. In Fig. 33 the core box for a tee is in open position for making the core. The cast iron core arbor is in place and after ramming both halves, the core box is closed and the upper half is rolled back into its original position.

The kinship that exists between the man who employs and the man who works receives full recognition at the plant of the American Cast Iron Pipe



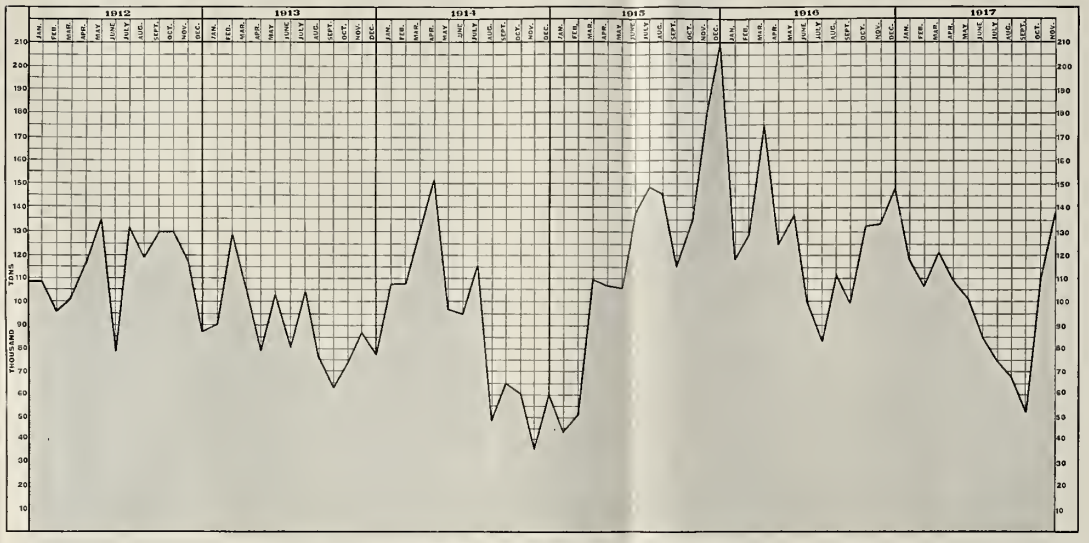
FIG. 27—THE DOMESTIC SCIENCE SCHOOL BUILDING IN THE NEGRO VILLAGE



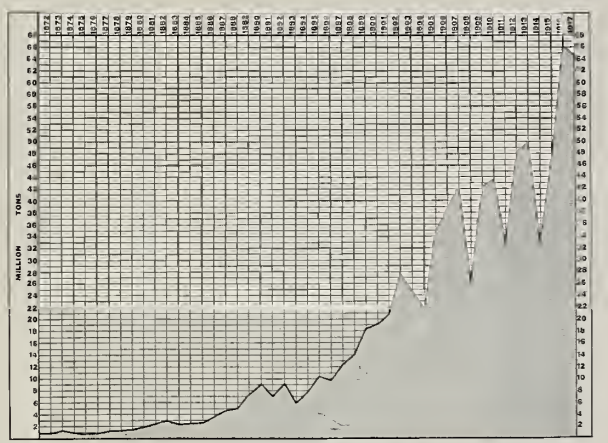
FIG. 28—ANOTHER STYLE OF ARCHITECTURE IN THE NEGRO VILLAGE

THE IRON TRADE REVIEW

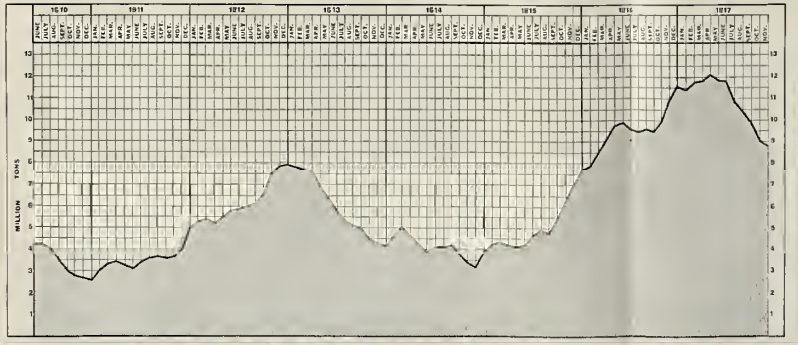
Charts showing monthly structural awards, production of pig iron, unfilled tonnage United States Steel Corporation, net earnings United States Steel Corporation and shipments of Lake Superior iron ore.



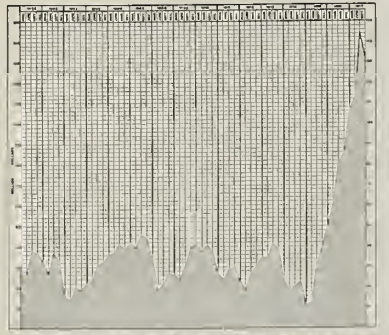
FABRICATED STEEL AWARDS BY MONTHS 1912-1917



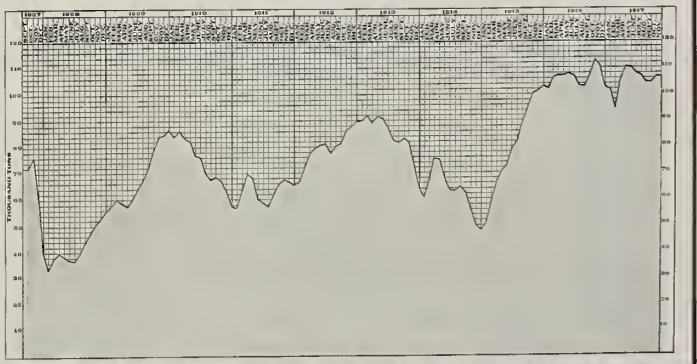
SEASON'S SHIPMENTS LAKE SUPERIOR IRON ORE 1872-1917



MONTHLY UNFILLED TONNAGE UNITED STATES STEEL CORP. 1910-1917



NET EARNINGS BY QUARTERS UNITED STATES STEEL CORP. 1902-1917



DAILY AVERAGE PRODUCTION COKE AND ANTHRACITE PIG IRON SEPTEMBER, 1916 TO DECEMBER, 1917

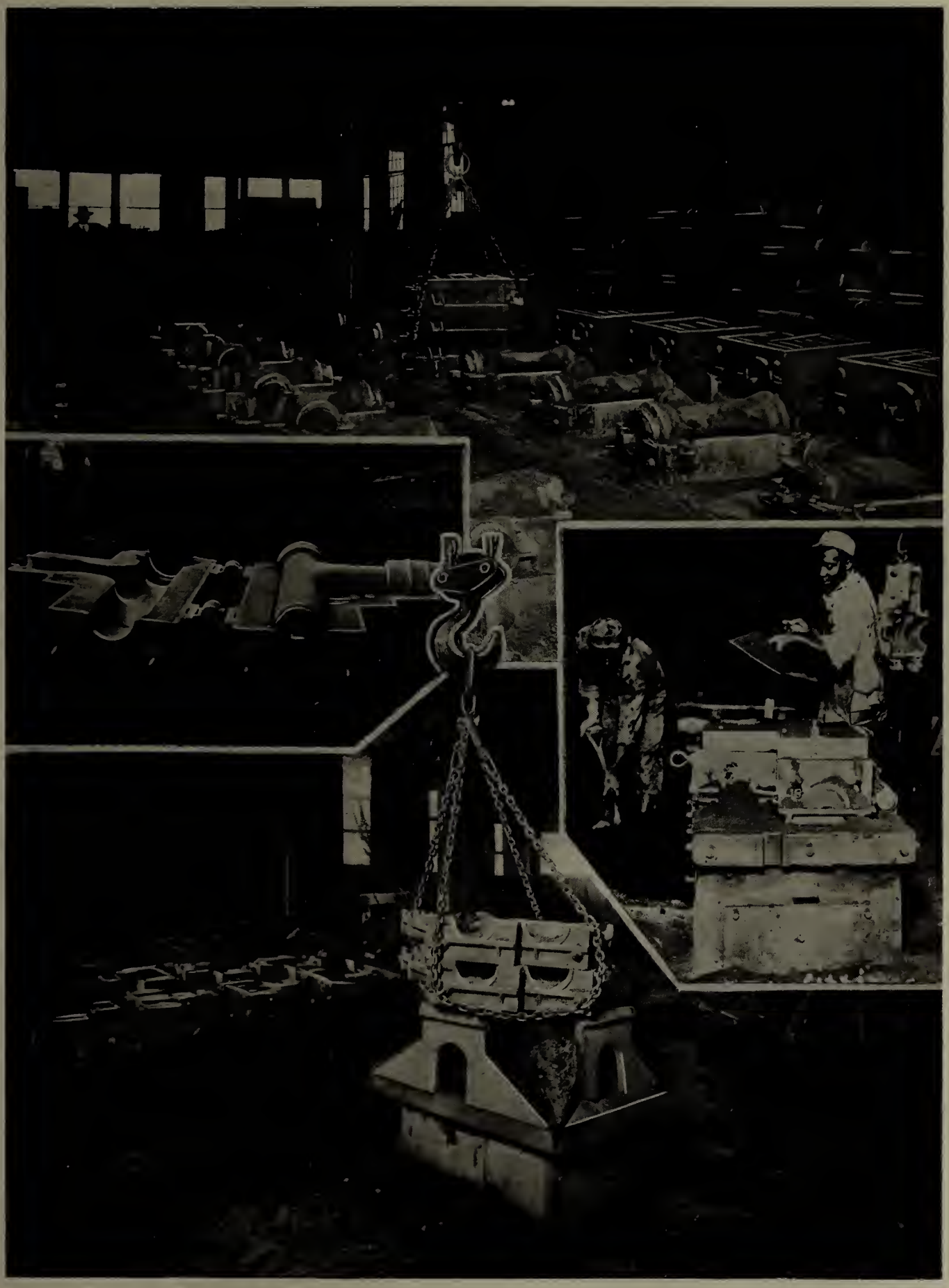


FIG. 29—UNCOVERING MOLDS BY LIFTING OFF COPE FLASKS IN SUCCESSION AND CONVEYING THEM BY CRANE TO THE JAR-RAMMERS FOR SHAKING-OUT

FIG. 30 — ROLL-UP HINGE ON FLASK OF GREEN SAND MOLD AND CORE

FIG. 31—UTILIZING THE JAR-RAMMER FOR SHAKING-OUT AS WELL AS RAMMING

FIG. 32 — MOLDING FITTINGS BY MEANS OF A JAR-RAMMING MACHINE

Co. Three-fourths of the laborers in this shop are negroes who have been found to be as dependable as any class of labor, and in making them so, the pick-handle method never has been employed. Probably in no line of work will men get as dirty as in a pipe foundry and the bathhouse provided for all of the employes is liberally patronized. During a period of 12 months, from Oct. 1, 1915, to Sept. 30, 1916, the negro employes took 166,477 baths and the white employes, 25,753. It is claimed that with the negroes the bathing habit is infectious and is communicated to their families and friends. Medical and dental service is provided for every employe and his family on a co-operative basis and every applicant for a position is given a thorough physical examination. If any condition is present that might endanger the health of other employes, the applicant is refused a position. The medical service rendered is in striking contrast to that of the traditional *company doctor*. It insures the men and their families medical attention which they would never get otherwise. The men are kept in good health and at a high degree of efficiency. A benefit association is maintained into which the company pays an amount equal to the dues of its employes. Benefits are paid for illness, injury and death and are awarded by a board of trustees elected from among the ranks of the workmen.

To encourage the white employes to own their own homes, a real estate department is conducted which finances these operations and constructs their houses. Branches of the Y. M. C. A. for the white and negro workmen are maintained with paid secretaries, where restaurants are open night and day to serve meals at cost. Free moving picture shows are given twice weekly and religious, social and athletic activities are promoted and organized. A field secretary operating under the instruction of the Y. M. C. A. daily visits the homes of the employes, advising with the housewives regarding sanitation, health, economy, etc.

Each autumn a negro agricultural fair is held at which numerous contests are scheduled and live stock, agricultural and domestic exhibits are made and cash prizes are awarded. A branch of a local savings bank also is located at the works. A suggestion box is maintained and cash prizes are awarded for the best recommendations. Bonuses are paid the employes based on their yearly earnings.

That Acipco is being developed into a model town of fine homes under the auspices of the company is indicated by the accompanying illustrations. Wide streets in the sections for the white and negro workmen and their families are constantly being opened and new houses are being built. The style of architecture is varied to avoid the sameness of the usual type of company houses. All dwellings, whether for the negro or white population, are provided with toilets and baths, and to enable negroes to obtain greater comforts at lower costs than elsewhere, the houses are rented on the basis of $3 per room per month. The smallest contain three rooms and the largest, five. Recently, during the period of construction of a lot of 50 houses for the negroes, 110 applications were made for these dwellings.

The corner of a street in the negro village is shown in Fig. 20, and Fig. 21 is a view of one of the houses. It will be noted that it is amply provided with windows for light and ventilation and the spacious porch insures comfort during the hot summer season. The varied style of architecture is illustrated in the view of another street of the negro section, Fig. 22. Fig. 23 is a street scene in the section of Acipco for the whites, and Fig. 24 shows one of the more pretentious houses of one of the plant executives. The rear view of a recently laid-out street in the negro village is illustrated in Fig. 25. Spacious yards surround each house where a vegetable garden may be maintained to provide for the needs of a family. A domestic science school building for negroes also has been erected recently, as shown in Fig. 27. A school for negroes also is being built. It will be turned over to the municipality. A community church is being constructed at the present time. The medical department includes a thoroughly equipped operating room, consultation rooms and dental parlors for both races, together with a drug dispensary. This establishment is conducted by two doctors, one a high-class surgeon and general practitioner, and the other a physician; a white trained nurse, two negro trained nurses a dentist and several of the leading specialists of Birmingham.



FIG 33—INGENIOUS EQUIPMENT FOR MOLDING LARGE FITTING CORES



FIG. 34—THE FINISHED CORE WITH THE BOTTOM OF THE BOX LOWERED AWAY

New Liberty Mill

(*Continued from Page 39*)

feet wide and 18 feet deep, dug with a 73-ton shovel and back-filled.

All concrete was mixed in eight concrete mixers built by T. L. Smith & Co., Milwaukee, four of them of 1/3-cubic yard capacity, and the other four the small mixerette, 5 cubic foot size. The concrete for the heating furnace and mill buildings was placed from a stationary tower, 160 feet high, through spouts which could be swung to any desired location within the radius of the tower. This was supplemented by a portable tower 45 feet high. In addition to these two towers, concrete was also placed from a portable mixer carried on a flat car which was readily moved from pier to pier as the work progressed. Most of the concrete used was gravel aggregate though a great deal of it was also made with blast furnace slag. The usual practice at Homestead steel works has been to make concrete with blast furnace slag, but in this case, due to untoward circumstances, the Duquesne Slag Products Co. was not able to furnish sufficient blast furnace slag to carry the work forward as desired, and in consequence for the first time in eight years gravel concrete was employed in foundations.

The group of buildings comprise seven distinct units at West Homestead in addition to the power house extension at Carrie furnaces. The slab yard building is 70 x 293 feet; the heating furnaces building, 106 x 293 feet; the mill building, 70 x 293 feet; the shipping building, 80 x 364 feet; and the shear building, 80 x 764 feet. These are concerned with the operation of the mill proper and are steel-framed buildings with glass sides set in steel window sash manufactured by the Detroit Steel Products Co., Detroit. The metal sash and frame sections were rolled by the Carnegie Steel Co. at the Youngstown, O., mills. All these buildings have straight truss roofs with ventilator louvres. The shear and shipping buildings have roofs of a saw-tooth type. They are covered with 18-gage, copper-bearing, corrugated sheeting made by the American Sheet & Tin Plate Co. The mill superintendent's office, 46 x 64 feet, is of semifireproof construction and contains offices, vault, toilet and rest rooms. It is built of brick covered with wooden sheeting and specified roofing supplied by the Barrett Mfg. Co., New York.

Machinery Separated from Mill Proper

It is customary in rolling mills to have the mill building itself contain equipment in the way of pumps, motors, accumulators, etc. In this installation all of the subsidiary machinery has been removed from the main mill building and concentrated in a special mill office, comfort and power building, 242 feet long by 40 feet wide, built of brick and covered with specification roofing. This building contains three 500-kilowatt transformers built by the Pittsburgh Transformer Co., Pittsburgh, two 1500-cubic foot air compressors built by the Bury Compressor Co., Erie, Pa., two 5⅝ x 12-inch Epping-Carpenter duplex pressure pumps, two water filters, return water tank, 24-inch accumulator, and in addition the physical testing laboratory, physical test bending room, physical testing machine shop, locker and wash room with 288 steel lockers, inspector's offices, janitor's room, oil room, toilet room, rest room, vault, etc. It has its own heating plant in the basement.

The separation of machinery from the mill proper has made the installation clean, clear and safe. The 4000-horsepower motor which drives the mill is housed in a separate brick station built under the main mill roof and containing a separate room for the switches, resistance coils and other accessory electrical equipment.

All steel work for the mill buildings was designed by the American Bridge Co., New York. It was fabricated in part by the Ambridge plant of that company and in part by the Upper Union mills fitting shop of the Carnegie Steel Co. Work was begun on Thursday, Aug. 2, and finished on Sept. 22 in the record time of 49 days. The erection was performed chiefly with a locomotive crane fitted with an extra long curved mast. The steel work for the Carrie furnace power house extension was detailed at Homestead steel works and fabricated in its own shop. The ability of the works to manufacture and fabricate its own steel and to do machine shop work was quite a factor in the rapid construction of the buildings.

Buildings and machinery were designed and ordered without any rechecking. Drawings came out of the drafting room daily, and the most remarkable feature of the engineering work was that there were absolutely no mistakes. Not one piece went out of the shops that had to come back.

This mill is the first electrically-driven plate mill to be operated by the Carnegie Steel Co. It is entirely electrically driven from start to finish. The main motor is rated at 4000 horsepower and was built by the



FIG. 3—SHOWING THE 110-INCH AND THE TWO 144-INCH SHEARS AND THE PLATE STANDS

General Electric Co., Schenectady, N. Y. The crane motors, table motors, shear motors, motors for driving pumps, etc., were built by the Westinghouse Electric & Mfg. Co., South Pittsburgh. The power furnished is alternating current, 3-phase, 25-cycle, 6600 volts, developed at a central power station at Carrie furnaces by a 46 x 66-inch Snow twin-tandem gas engine, directly connected to a 3750-kilovolt-ampere generator built by the General Electric Co. Power is transmitted to the mill by overhead lines carried on poles. These lines span the Monongahela river on two towers, 115 feet high, and having 30-foot bases. The main mill motor takes current at the original voltage and the auxiliary motors at 220 volts.

The Rolling Mill Machinery

The mill itself is a three-high plate mill with 110-inch length of roll body. Top and bottom rolls are 36 inches in diameter and the middle roll 21 inches in diameter. The rolls are chilled iron and were made by the United Engineering & Foundry Co., Pittsburgh.

The mill was designed by the Homestead steel works and built jointly by Mackintosh, Hemphill & Co. and the Mesta Machine Co., Pittsburgh. The former company built the mill and housings, the large castings for charging machines and the cranes, all of which were machined at the Homestead steel works. The Mesta Machine Co. manufactured the pinions, the pinion housing, the pinion shoes and the mill shoes. The practice on motor-driven mills has been to use machine-cut pinions. For this mill, however, the pinions were machine molded and operate as noiselessly as any cut gears.

The mill is served by one 16-ton crane in the slab yard, one 50-ton crane in the mill building, three 10-ton double trolley cranes in the shipping building, two 10-ton single trolley cranes in the shear building, and two 10-ton overhead traveling charging machines in the heating furnaces building. All these cranes and their equipment were made by Homestead steel works. The two side shears with 144-inch knife and the end shear with 110-inch blade, shown in Fig. 2, were built by the Morgan Engineering Co., Alliance, O. The two scrap shears were made by the Cleveland Punch & Shear Works Co., Cleveland. The straightening rolls shown in Fig. 3 were made by R. S. Newbold & Son Co., Norristown, Pa., and consist of a machine with nine rolls 14 inches in diameter and 116 inches long. The roll tables were made by Homestead steel works in its own shops.

Eight regenerative heating furnaces are housed in a separate building. This is an unusually large number for a plate mill which can generally reach its maximum rolling capacity with four or six. Extra heating furnaces were provided to care for unforeseen contingencies due to the use of cold slabs. At present the furnaces are heated with natural gas. They may be heated with either natural gas, oil or tar. Ultimately when the full schedule of improvements is completed the method of heating will be by gas brought from the Clairton coke ovens in conjunction with a small quantity of tar.

The construction of this mill so that it would be ready for operation in six months was made possible only by the closest co-operation of builders and manufacturers of structural steel and machinery. The construction record contains many incidents worthy of note. One may be mentioned. The Wheeling Mold & Foundry Co., Wheeling, W. Va., furnished the large rotary spider casting for the 4000-horsepower mill motor which the General Electric Co. was unable to cast in its own foundries due to prior business and was unable to get at any eastern foundry. The earliest delivery promised by eastern foundries was too remote. The Wheeling Mold & Foundry Co. made a new pattern and cast the spider in three weeks. The traffic manager of the Homestead steel works moved the spider and other castings from Wheeling, W. Va., to Schenectady, N. Y., in three days.

In a like manner, the General Electric Co. experienced difficulties in getting the shaft for this motor. It was made on time in the armor plate department of the steel works, and the General Electric Co. by a most extraordinary performance in its shops reduced the time of shipment of the complete motor from eight months to a little over five.

Slabs are rolled into plates up to 100 inches wide and from 5/16-inch up to 2 inches thick. However, sufficient steel for the mill is not available at present from the Homestead plant. The slabs are shipped from the Farrell steel works, Farrell, Pa., the Ohio steel works, Youngstown, O., and the Donora steel works, Donora, Pa.

The best production to date, using six heating furnaces, is 266 tons per 10 hours. With an ample supply of steel and orders of a character suitable for maximum production the mill will produce 16,000 tons of plates per month. The cost of the mill will approximate $2,500,000, including the cost of the new gas engine, generator, etc., at Carrie furnaces. On double turn it will employ approximately 250 men. The average number of men employed under the Homestead steel works organization in October, 1917, was 12,132. The production of steel ingots was about 200,000 tons, which is below maximum, the tonnage having been reduced by reason of transportation difficulties, lack of coke, labor shortage and other deterring factors.

How Ore Districts Meet War Demand

(*Continued from Page* 94)

bany mine is of the Barr-Hutchinson type and is being installed by the Allis-Chalmers Mfg. Co. The plant consists essentially of a stationary grizzly, the material passing over the grizzly being waste, while that passing through falls into pockets and is then drawn off by an apron feeder leading to a 60-inch revolving screen. The oversize from this screen is waste. The grizzly is set at 10 inches.

At the Danube mine of Pickands, Mather & Co., a new type of screening device known as the Barr-Hutchinson, will be installed by the Allis-Chalmers Mfg. Co., Milwaukee. This type of grizzly has alternate chains which run at different speed. The chains are separated by stationary rods. The grizzly is set directly over the bins. It is said that a 50-ton car can be screened, on an average, in three minutes, although on one occasion this time was reduced to 1½ minutes. This chain grizzly is designed to screen to 4½ inches. It is electrically operated being driven by a 20-horsepower motor. The details are shown in an accompanying illustration.

Some exploratory work is being carried out on the Vermillion range by independent operators. At the Section 30 mine the operators, it is understood, have located ore at the 1000-foot level. Mining has been carried on at the 550-foot level. Coates & Tweed are drilling in the Ely district in section 7, township 61, range 14, while the Chippewa Iron Co. and W. G. LaRue are both carrying out explorations.

The Cuyuna range forwarded 2,407,983 tons of ore in 1917, compared with 1,716,218 tons in 1916. Work has been pushed actively at some of the iron ore and manganiferous properties on this range. A number of drills are at work.

Tools Back Up Nation's War Power

Tremendous Requirements of Military Supplies for American Army and Navy Force Development of Highest Efficiency in Machine Tool Building—Much Old Equipment is Reclaimed—Government Lends Effective Aid

BY HOWARD MARKT

MACHINE tools are so overwhelmingly important in the prosecution of modern warfare, that it has become increasingly common to think of the machine shop as a part of the primary line of defense, the trenches as a secondary line. The stand which the British and French armies made during the first year of the war, when they matched rifles against cannon is an enduring epic of physical valor. The rapid, industrial transformation which shifted the machine shops of those countries from a moderate peacetime pace to efficient wartime speed, is an epic equally enduring if not as romantic.

America now is passing through the same crisis. Our machine tool industry is finding that the terrific speed which the demands of England, France, Italy and Russia had forced upon it is insufficient to satisfy the requirements when Uncle Sam is a belligerent. The pressure for production has been growing almost daily. Relief from this pressure must come entirely from the country's own resources as no neutral now occupies the position this country held a few years ago—that of possessing the capacity, the skill and the advanced methods to bolster up any belligerent.

Accelerated production, at first regarded as the sole solution of the problem, is not being effected without difficulty. Labor is becoming increasingly difficult to obtain; deliveries of raw materials are being hampered; and machine tool builders because of the unusual demand for heavy equipment, are being forced to concentrate on machines which, perhaps, their plants are not adapted to build most efficiently. These factors furthered a confused condition for some time, but the vigor with which these problems are being attacked, as well as the tenacity of purpose which is being displayed largely are instrumental in bettering the existing situation.

Many builders are meeting the situation by increasing their manufacturing facilities. This is taking form largely in the construction of extensions to existing shops. A survey of shops throughout the country shows that much of the building and engineering work which is being done in the nation may be attributed directly to the machine tool industry. New England and the central west,

Speeding Up Efficiency

TREMENDOUS demands are being made upon the machine tool industry and builders are being forced to contend with constantly changing production problems. Raw materials are hard to obtain; transportation difficulties are serious, and labor is somewhat of a variable. In this article are sketched interesting changes in shop methods, which have enabled the builders to meet the government's tremendous rush requirements. By the war crisis efficiency has been made the watchword of the tool plant in a more positive fashion than ever before.



MACHINE TOOL ARRANGEMENTS IN THE FOLLOWING PLANTS: UPPER LEFT, LANDIS MACHINE CO.; BELOW, CLEVELAND MILLING MACHINE CO.; RIGHT, CUTLER-HAMMER MFG. CO.

both the centers of long-established machine tool builders, are especially active in this respect. Additions are being built, existing plants are being remodeled and the activities of the greatly curtailed building industry otherwise are being augmented by operations of this kind. Machine tool builders patriotically are turning their profits into extension work of this kind without fear of the excess profits specter which eventually may exact a heavy toll from this industry.

The acceleration of production without rearrangement of existing facilities, is being accomplished by a study of the personal factor in various shops, by effecting co-operative working plans, by increasing the rate of production through shop efficiencies, and by installing bonus systems. No industry probably is responding more liberally when considered as a composite unit in providing increased compensation for its workmen in accordance with the greater demands made upon the latter. Restricted as to labor supply by an inflexible draft system, machine tool builders are being forced to contend with a new force—that of filling the thinning ranks of skilled workmen. In some cases production is being greatly increased through the so-called dilution of labor whereby the skilled mechanic is assigned to the delicate and difficult operations, while the comparatively unskilled workman is given tasks commensurate with his skill. A gradual breaking down of the time old precedent of keeping women out of industrial work is in evidence. In the production of machine tools where skill, accuracy, patience and ingenuity are imperative, a growing tendency to employ women now is shown. While this expedient is not being resorted to widely in the United States, it is probable that as the ranks of skilled mechanics become still more depleted through the formation of additional draft units, women generally will come to take the place of the skilled male mechanics.

Machine tool production, during the past three years has equaled that of the total production of the 10 years preceding. As a result of this heavy output builders now are vigilant for any indications pointing toward the necessity for after-war curtailment. Consequently many are seizing upon the expedients of effecting maximum production by a rearrangement of existing manufacturing facilities and by effecting shop efficiencies. Many valuable lessons are being learned from the automobile manufacturer, who through scientific arrangement has been able to intensify production. Then, too, the use of modern systems of shop transportation, of improved methods for the handling of products and similar refinements of manufacture are helping to further the solution of the problem.

In the manufacture of machine tools a tendency is manifest to increase production by the grouping of various machines into large units. This, it is said, results in a highly systematized department. This breaking up of the shop into component units renders it possible for each unit to be put under the guidance of an efficient foreman and enables a specialization which is highly beneficial in the solution of new manufacturing problems. On the other hand, an arrangement of machines, such that parts are handled from machine to machine, where there are no groups of individual machines, but a sequence of machines arranged in such a way as to finish a given part with the greatest expedition, has been found very effective, especially in the building of a large number of parts of one kind. This condition prevails largely when the builder concentrates production upon one machine.

In general the use of multiple-purpose machines where skilled mechanics are available is proving to be of value; but it has been learned that where unskilled mechanics are available to fill the ranks of the skilled workman, single-purpose machines permit of much greater production under the conditions. More time is, of course, required in setting a machine which is designed to do a single thing, but it has been found that where the production is such as to warrant the use of this plan, that accuracy and intensified production are the result of attendant conditions. Much has been said in favor of both plans, but it is asserted that under conditions as they exist noteworthy results are being achieved by the use of the former system.

Perhaps no greater impetus is being given to increasing production, than by a study of transportation and carrier methods for the conveying of parts from one machine to another and finally to the assembly floor. Various forms of trucking systems,



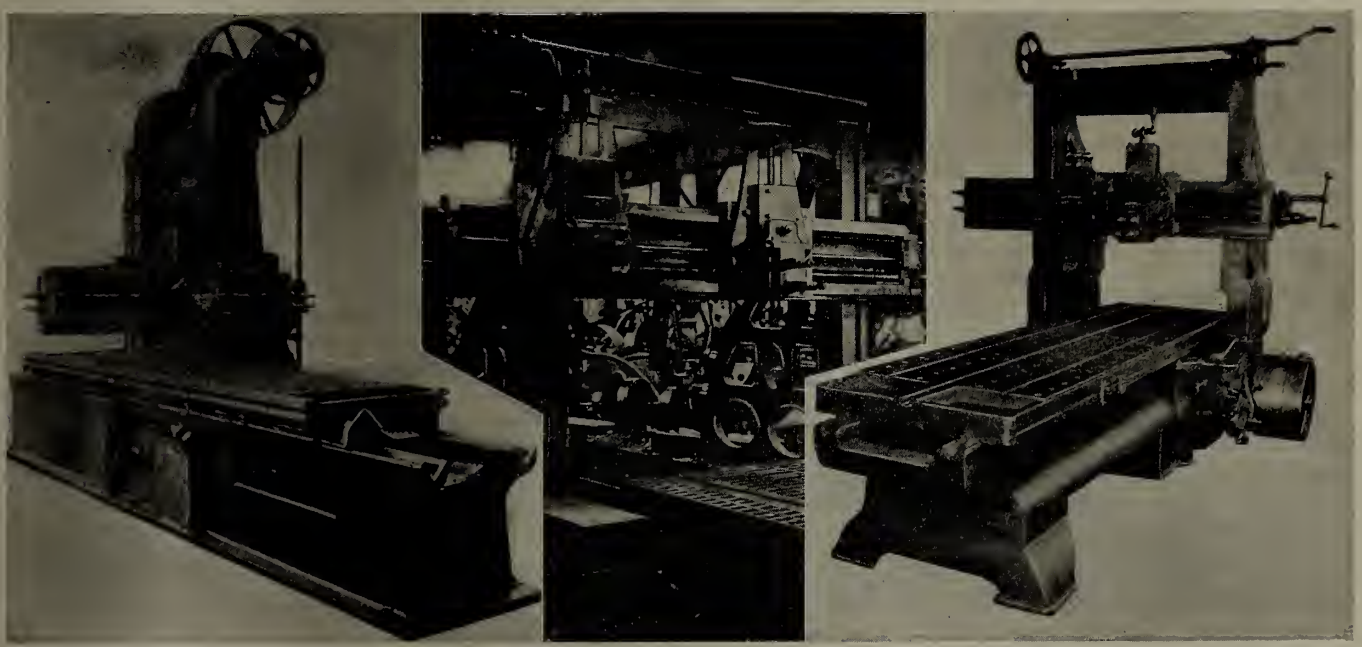
ROOMY ASSEMBLY FLOOR AT PLANT OF LANDIS MACHINE CO.



ROOFED IN ALLEY-WAY SUPPLIES FITCHBURG MACHINE TOOL WORKS WITH ADDITIONAL ASSEMBLING FACILITIES

either hand or motor-operated are being installed and noteworthy results are being obtained. In one instance instead of having the work and fixture taken from machine to machine on tracks, a roller type of conveyor was run parallel to the line of machines, with switches branching off to individual machines.

Trivial though it may seem, but representative of a large number of similar improvements which are being made is a noteworthy labor-saving feature evolved by one builder which resulted in a considerable saving in time. After an investigation into shop operating conditions it was learned that much time was being consumed in moving shafting from the racks in course of construction, there is a pronounced movement toward expediting the work of the assembler and relieving him from all unnecessary handling of parts. Some of the drawbacks to this plan are the initial investment required and the question whether it is advisable to install equipment of this kind in view of the uncertainty as to the market demand for machine tools after the cessation of hostilities. A manufacturer of shapers, has solved the transportation of parts to, and finished shapers from the assembly floor, in a simple, inexpensive and thorough manner. Elevating hand-operated trucks were determined upon as a means of solving the problem. After the completion of the



SECOND-HAND OPEN-SIDE PLANER WORTH $4800

REBUILT PLANER SOLD FOR $7500

PLANER THAT ADVANCED 10 PER CENT IN VALUE

in the stock room to the hacksaw where the pieces having been sawed, the remainder was returned to the stock room. Finally it was decided to reverse the process; that is, to construct a portable saw and move the saw to the stock bin, so that the required amount of stock could be sawed off without carrying the full piece to the saw and returning the remainder to the bin. The shafting is kept in bins arranged one over the other and the portable saw operates at a variable height. Under the former arrangement, it was often necessary to employ several men to move shafting to and from the saw. Now the operation is performed easily by one operator.

Assembling methods also are being perfected. While there is no tendency to burden plants with any complex equipment for handling the component parts of the machine tools finished parts, the small parts are collected into boxes, while the larger ones are placed on small platforms. Then by means of hand-operated lift trucks, the parts are transported to the assembling floor. Following the assembling of the various parts a truck is run underneath the skid, and the skid and completed machine are wheeled to the shipping room from which after crating the machine is transported in the same manner to the loading platform.

Machine tool builders in the present emergency are rapidly learning the soundness of some of the principles which builders of automobiles have been practicing for several years. Up to within three years ago the machine tool builder had not been pushed to capacity in the matter of production in the same manner as the builder of automobiles. Fortunately, the machine tool builder since then has come to recognize the need of such highly systematized methods. A builder of lathes in the central west had observed that there were many unnecessary and wasteful methods in use in his shop. An investigation was conducted with a view toward ascertaining and remedying these inefficiencies. It was learned that the greatest source of the shop's inefficiency was the faulty working conditions which prevailed. After carefully studying the conditions it was learned that the assembling department was at fault in many respects. A large amount of time was spent by the men in making trips to the stock room for supplies, in delivering the work to the next department after the operation had been completed, and by men loitering at their work, while on their way to the stock-room, due no doubt to attendant working conditions. To obviate any further losses of time, it was decided to develop a method to provide for the distribution of stock so that it became unnecessary for the assembler to leave his work.

Great relief is being given the order-choked machine tool market by a number of manufacturers who have been and are disposing of their surplus machinery. As a result, many dealers are conducting a lucrative business in used equipment. Obviously many of the second-hand tools that are offered are almost entirely rebuilt and serve the purpose nearly as well as new tools. Machine tools of this kind are particularly valuable because of their almost immediate availability for service after repairs or rebuilding.

Three years' demand on the second-hand machine tool market has greatly depleted the number of machines; but old machines constantly are being discarded even at the present time. A number of instances are known of companies which have completed various contracts and which meanwhile charged the cost of equipment off against their contracts so that when they found it necessary to replace their equipment after a year of hard and intensive service owing to the exactness of the work required, a number of machines became available to the rebuilder. With careful rebuilding, many of these have been increased in value sufficiently to command prices higher than their original market value. Several munition plants are scrapping their equipment after such equipment has been in operation but a short time. During the past year two companies that had been engaged in munition work appeared in the market, having for disposal upward of 1000 machine tools. This was occasioned, it is believed, by the sudden decision of the companies to abandon the manufacture of munitions after having undergone a disagreeable experience in meeting exacting requirements.

A feature of the present used equipment market is the high prices which prevail. Not a few factors govern the prices of old equipment. The length of time the machine tool has been in service; the kind of service it has performed; the present conditions of the machine and local market conditions all share in determining the price. But the fact that a used tool almost instantly is available for service overshadows all other factors in importance at the present time in fixing the price of the used tool. These prices are unprecented in the history of the machine tool industry, when a comparison between the original and the present cost of the machine is made. It is understood, however, that although the prices of some kinds of used tools are seemingly exorbitant when compared with the original cost of the machine, the prices of new tools are keeping pace with those of old tools. This is particularly true at the present time of heavy lathes, planers and similar equipment, all of which are in great demand.

Indicative of the way in which the used tool market is being combed for heavy planers, lathes and other heavy equipment, and prices accordingly raised, two illustrations are given on page 111. The central illustration shows a 72 x 60-inch x 14-foot planer in use for many years. Except for a widening of the planer, it is practically the same as when new. This old planer has a present worth of $7500 owing to prevailing market conditions while a 60-inch planer of the same type if purchased new today would cost approximately $6800, or 10 per cent less than the old planer. Upon a consideration of the facts that deliveries are from 9 to 12 months removed and that the prices of machine tools, both old and new have advanced in different ratios, the statement does not appear so paradoxical. At the right on page 111 is a planer which sold at $4800, 10 per cent over the cost of a similar new machine today. Actually this machine cost $2600 when new. Specific instances show that while new boring mills advanced in price 52 per cent during the period from 1914 to 1917, old boring mills have increased 177 per cent; that milling machines have risen 80 per cent while old machines have advanced 200 per cent; that shapers have increased 93 per cent, while old machines have risen 100 per cent.

Government Assists Builders

The government is assisting the machine tool builder in many ways. Recently government buying of machine tools has been organized to reduce the number of conflicts between departments and to improve deliveries. This reorganization took form in the appointment of G. E. Merryweather, president of the Motch & Merryweather Machinery Co., Cleveland, in charge of the nation's machine tool requirements. Mr. Merryweather is the head of the organization which has for its object the coordination of the machine tool-producing units of the country. As a means of effecting a solution of the problem, the government, a short time ago, forbade the exportation of all heavy machine tools by private owners for use in other countries. Evidence of this is found in the refusal of the government to grant export licenses for a heavy planer and a heavy lathe lately to an American mining company for use in its mines in Mexico. The government, in addition to refusing licenses for export, even threatened to commandeer the machines in question. Further governmental aid is being given by the machine tool division of the war industries board. This department has made a careful survey of the machine tool industry with a view toward ascertaining the number of machine tools to be built in the United States during the next six months. Builders have been asked to furnish data relative thereto and dealers have been asked to submit lists showing the machines they expect to have in stock during that period. This, it is thought, will enable the government to put its finger almost instantly on any needed tools. Substantial aid also is being given to machine tool builders through the co-operation of the priorities committee. Realizing the imperative need for more tools, the government is helping builders in securing needed materials.

A short time ago it was advocated that the government lend financial assistance to machine tool builders. Many builders, it is said, could greatly enlarge their output and would do so were it not for the uncertainty prevailing as to the probable status of business after the war. With government aid, the builder would incur but few financial obligations and still be able to realize a good return for his time and services. This plan gives every indication of being a speedy means of stimulating production.

American machine tools under the fostering hands of the government and builders are attaining world recognition to an even greater extent than in their illustrious past. Builders are aware that the enormous proportions to which the industry has expanded will be more than sufficient upon the conclusion of hostilities, to supply the needs of this country and foreign buyers on the prewar scale. Consequently builders even now are preparing for their re-entrance into the foreign trade field more extensively than ever before. That there will be an enormous demand for machine tools after the war is indicated in the case of Belgium where the German war lords have ordered the plants stripped of such equipment. Germany probably will be forced to return these tools upon the termination of the war but it is probable that the intense usage to which they have been put will render them practically useless for accurate work. New tools will then be bought and because of the present favorable attitude of the Belgians toward the United States, it is thought that American tools will occupy a preferred position. This is only one example of the great market that is expected to unfold with the coming of peace. Other nations which have not participated actively in the war also will be in great need of tools. Included among these are many of the South American countries, Spain, Sweden and others which previous to the war had relied on Germany for the larger part of their machine tools. American bankers have developed plans to aid in this expansion of trade. Through machine tools, American manufacturers are to receive a new opportunity for predominance in the markets of the world.

Stabilizing Steel Trade's Future

Romantic Development from Meager Origin of Powerful Export Organizations During Period of War Signalizes Dawn of New Worldwide Vision for American Enterprise—What it Signifies—Will it Endure?

IF BRICKS and steel could talk, Broadway's towering skyscrapers might tell many a romantic business story. They might tell of brilliant coups, successful long shots and of thriving companies grown from small beginnings. Then, too, they could tell stories of failure, decay and disappointment. But even though the skyscrapers are inanimate, paper can talk, so here may be narrated one of those stories of successful business development, to which there is no reverse side. This is an account, not of a single company, but of the growth of an entire industry —the American steel trade overseas.

Not long ago, Secretary of Commerce Redfield said to an official of a steel export house, "I consider the importance of your industry as second only to those industries which are engaged in work directly connected with the conduct of the war. The degree of success which attends the efforts of American export houses will be proportionately reflected in economic conditions in this country after the war."

He said this of an industry which has been developed since Aug. 1, 1914. Prior to the war, the United States Steel Products Co., export branch of the United States Steel Corp., was the only organized effort for foreign trade and even the Steel corporation rarely devoted more than 10 per cent of its capacity to foreign business. Efforts on the part of independent steel companies were spasmodic and for the most part futile. There were a few import and export houses which occasionally accepted foreign orders for steel products as something of incidental importance. But only the domestic market was open to the great bulk of the output of this country's independent steel companies. The development, then, in three years, of an industry whose successful continuance is of the greatest importance to the future prosperity of the nation, is one of the most remarkable stories in American business annals.

Just as the development of the business as a whole has been remarkable, the growth of some of the companies

Building from Without

FEW such spectacular movements ever have been shown in American business annals as the meteoric rise of great iron and steel export companies during the past three years. The industry suddenly finds itself possessed of a strong new arm for overseas distribution which, if maintained and vigorously exercised, will mean much to iron and steel prosperity after the war. What the export companies have done and are doing to bulwark their future, is most interestingly told in this article.



THIS IS THE ORDER DEPARTMENT OF A STEEL EXPORT HOUSE WHICH LESS THAN A YEAR AGO EMPLOYED ONE STENOGRAPHER AND NOW HAS OVER 50 EMPLOYES IN ITS GENERAL OFFICES

engaged therein has been phenomenal. Several of the largest of these companies still are to celebrate their first birthday, while the pioneers are not yet of three years' standing. Some companies whose office forces a year or so ago consisted mainly of the firm and perhaps a stenographer or two now number their employes by the score and have branch offices all over the world. One house started in business less than a year ago with a capital of $500. Last month its gross business amounted to $75,000 and its cable tolls alone amounted to $1600. Although these aware of the probability of formidable European competition after the war. But they are undaunted. They expect to stay right where they are and keep on growing. The export trade admits it is a war infant in the American business family, but insists it will be a full grown adult in peace times.

Nation was Provincial

It is not necessary to describe in detail for iron and steel readers the causes which led to the present development of the steel export trade. Modern industrial history dates from Aug. consumers. They were not disposed to make any vigorous effort to gain the foreign markets.

On the other hand, our competitors of England, France and Germany had made long strides in the non-producing markets, especially in South America. They had established banking facilities, adapted their organizations to their customers' methods of doing business; sold their customers the goods they wanted; granted liberal credits; obtained the advantage of lower freight rates from utilization of their own shipping to carry goods direct from their own to



THIS IS ONE SMALL SECTION OF THE OFFICES OF A STEEL EXPORT HOUSE WHICH WAS NOT EVEN DREAMED OF A YEAR AND A HALF AGO

houses have risen almost over night, they are building on rock foundations, not on sand. They are spending money lavishly to establish themselves firmly in the foreign markets. Specialists in both steel and export fields have been engaged and trained to sell steel abroad. The role of names of men prominent in the steel export trade contains many which were well-known in the steel industry long before the present export business was dreamed of and their participation is a good indication of the stability and permanency of this new field of American enterprise. The steel export houses appreciate the added difficulties thrown in their way by America's entrance into the war. They are 1, 1914. Prior to that date the American public in general lived in "splendid" isolation from the rest of the world, existing in blissful ignorance of international relationships and of diplomatic cross currents and of the value of foreign markets. Years of insular legislation had stunted our merchant marine until we had a tonnage hardly adequate for the commerce of a third class power. Frequent and hastily devised changes in our tariff schedules kept upsetting the entire fabric of our foreign trade. Our merchants were bound by the commercial treaties and customs of 50 to 100 years ago. Our manufacturers and bankers generally were provincial in their attitude toward foreign foreign ports; and laid down their goods in the foreign ports at lower prices than this country's merchants could effect. Even in our own market manufacturers were anxious, for the coming of a new administration had spelled the doom of the protective tariff. Steel prices were scaled down with startling swiftness, all through 1914. Industrial activity dwindled to low ebb and mills and furnaces were idle all over the country. This was the situation in the United States when the German siege guns battered down the walls of Liege.

America's business machinery almost stopped with the first shock of world conflict. Then Charles M. Schwab came

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Philadelphia Office: 603 Widener Bldg.
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AGATHON STEEL TRADE MARK.

Say you saw it in THE IRON TRADE REVIEW

back from England with a pocket full of war orders and other war contracts quickly followed. Then the steel industry sprang phoenix-like from its ashes and in the period following was born the American steel export business. Hemmed in by the allies, Germany, Luxemburg, Belgium, northeastern France and Austria-Hungary ceased to figure in the world's markets. England also soon found that to manufacture war supplies it must give up much of its commercial work so she gradually abandoned most of her neutral customers. In the meantime allied orders for shell steel and other munitions had brought American industrial activity to high pitch and this activity has been maintained to the present day. Domestic demand, stimulated by unprecedented prosperity and high wages assumed unparalleled proportions. Then the neutral markets also deprived of their usual sources of supply, knocked at our doors.

Machinery of Trade Lacking

The trade for which our European competitors had striven so long, was coming to us of its own volition. Yet the American steel manufacturer still labored under the same disadvantages which had barred him from foreign markets prior to the war. First of all, the country needed ships. Its foreign credit methods were obsolete. Its manufacturers had no knowledge of the foreign field and what its needs were. They could not afford, most of them, to open offices in the various neutral countries and thus develop foreign organizations. Some of them tried, even going so far as to open offices abroad. Others placed their products in the hands of agencies. But the results were not satisfactory. To overcome this difficulty, it was suggested and widely advocated that legislation be passed by congress legalizing combinations of American manufacturers for export trade. A measure, the Webb bill, was introduced in congress but failed to pass. Only within the past month was it finally enacted.

Consequently, the need for a link between the American steel manufacturer and the foreign consumer became felt. The steel export house is that link. At present, the steel manufacturer has only to lay his goods down at tidewater to receive his money. All the complex details of the transactions, including sales, credits, shipping, insurance, etc., are assumed by the export houses.

Since steel demand has been so sweeping the past two years, some manufacturers have found selling at home so easy that they apparently have underestimated the value of opportunities presented by the foreign markets and seem not to have recognized that the export houses have a real function to perform. In this connection, let us return to Secretary Redfield's statement and see what basis exists for his opinion.

It is generally estimated that steel ingot capacity of the United States is almost 50,000,000 gross tons, whereas on July 1, 1914, the ingot capacity was about 37,000,000 gross tons. Thus the increase in slightly more than three years would be about 13,000,000 gross tons. Actual ingot output amounted to 32,000,000 tons in 1915; 24,000,000 in 1914; and 31,000,000 tons each in 1913 and 1912. Production in those years was sufficient to take care of domestic wants and allow for an exportation which rarely reached 4,500,000 tons per annum. Even in this rapidly developing country, domestic requirements will not have increased by 13,000,000 tons in three or four years, so it is evident America will have capacity to produce millions of tons more of steel than she can consume herself, with the return of normal conditions. Eugene P. Thomas, president of the United States Steel Products Co., in an address before the American Iron and Steel institute at Cincinnati in October, estimated that from 8,000,000 to 12,000,000 tons of finished steel would be the surplus which must find its way into foreign consumption after the war. Opinion generally favors the higher figure.

Samuel A. Benner, in an article "What Peace Means to the Steel Trade," published in The Iron Trade Review April 19, 1917, published a number of valuable statistics, which attracted widespread interest in the trade, and from which he drew the following conclusions:

1.—In three years and one-half, (to Jan. 1, 1918), the world's yearly steel ingot capacity in gross tons will have increased from 85,000,000 to 102,000,000 or by 17,000,000, or by 20 per cent.

2.—In three years and one-half, the United States' yearly ingot capacity will have increased from 37,000,000 to 48,000,000, or by 11,000,000 or by 30 per cent.

3.—Prior to July 1, 1914, the United States controlled 44 per cent of the world's ingot capacity; after Jan. 1, 1918, it will control 47 per cent.

4.—Of the new capacity, the United States will control almost two-thirds.

In this article Mr. Benner pointed out that there are two great competing districts, producing 90 per cent of the world's iron and steel supplies. These two districts are the American, extending from Milwaukee and St Louis on the west to New York and Baltimore on the east; and the European, extending from Great Britain on the west to southern Russia on the east. These districts manufacture iron in its various forms not only for home consumption but also for shipment to the great non-producing markets, Latin-America, Asia, Africa and Australia. For the past quarter century neither district has shipped much to the other, the exchanges being negligible to the output. But since 1900 American shipments to overseas neutrals have gradually increased and since the beginning of the war have grown rapidly.

At the time Mr. Benner wrote this article, the United States occupied the enviable position of a prosperous neutral, the only country able to supply iron and steel for the international markets. As Mr. Benner pointed out, there were some factors favoring the United States in the prospects for after war competition. Whereas European manufacturing costs had always been lower than ours, due to cheaper labor, the necessity for heavy taxation for years to come to pay the interest and sinking fund charges of the European government's war loans promised to equalize more clearly the manufacturing costs of foreign nations with ours. On the other hand, the European district, as Mr. Benner wrote, still enjoyed tremendous advantage over the United States in the control of an extremely large percentage of all the freight carrying boats of the world. The lack of an adequate merchant marine had long been considered one of the principal obstacles preventing American participation in foreign markets.

Will Shipping Position Hold?

Our entrance into the war changed this. We too will have to pay heavy taxes in the coming years because of the present government war loans, thus losing the opportunity to gain a more advantageous position with regards to relative manufacturing costs. However, the heavy loading of freight cars in this country has enabled exporters to lay goods down at seaboard here about as cheaply as the foreign exporter could lay his goods down at his seaboard, even before the war, so there may be little change in the competitive positions in this respect. On the other hand, the need for cargo boats to defeat the intent of the German admiralty has given this country a fair start toward a merchant marine of its own. The United States government was building 1240 ships of 7,619,000 tons in 114 shipyards in this country prior to Dec. 1, 1917, including 412 ships which had been requisitioned while building for private buyers or foreign governments. On Dec. 1, the Emergency Fleet corporation was prepared to distribute 400 additional ships of 3,300,000 tons, bringing the total up to 10,919,000 tons. It is hoped to put all this vast tonnage in the water during 1918. In any event the United States shipping board is determined that 6,000,000 tons shall be completed by Dec. 31, 1918. After that, if the necessity

New Year Resolution



Say, why don't you start the New Year right? Same as I did three or four years ago.

Fill up the old Housings with HUBBARD SPECIALS and watch the difference in your tonnage records.

MORAL

If you want to tighten down on upkeep, use HUBBARD ROLLS as they sure give the service.

Rolling Mill Jim.

Hubbard Steel Foundry Co.

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All Kinds of Iron and Steel Rolls and Steel Castings.

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continues, the United States will be able to launch 10,000,000 tons yearly. Thus, in the course of a year or so, the United States is to return to its old position in the front rank of maritime powers. The question is, will she remain so in peace times? Or will history a few years hence find our present growing fleet rusting at its anchorage? All farsighted men are anxious that the American merchant marine regain and retain its former high position in world shipping. To these men the National Foreign Trades Council, of which James A. Farrell is chairman, recently issued an appeal urging them to co-operate with the United States shipping board in an effort to revise the navigation laws so as to lift the handicap from American vessels. Five years after the war all government operation of merchant vessels will cease. By that time the government must sell, lease or charter these vessels to private citizens.

It is still early to formulate definite policies of our merchant marine, but this much is certain, the Iowa farmer, the Louisiana planter and the Minnesota lumberman have been aroused as never before to the necessity for a merchant marine and in the future will be inclined to lend a more sympathetic ear to those who endeavor to maintain a prominent position for this country's shipping

Steel Scarcity Aggravated

Thus this country's prospects as to after war competition have improved materially in one great essential since Mr. Benner wrote his article. But this country's entrance into the war has aggravated the scarcity of steel and rendered the situation more complex. In order to conserve the supply of materials needed for the war work of this country and the allies, as well as to prevent material from finding its way into enemy hands, a war trade board has been formed at Washington. This board has imposed some rigid embargoes on export, until now it is impossible to export many descriptions except where destined for direct use in connection with the war. Early in August ship steel exports to Japan came under the ban, although that country had on order some 400,000 tons, for use in its huge shipbuilding program. From that time on a series of negotiations took place, together with a visit of a Japanese commission to this country, to effect a plan by which Japan might be allotted a certain amount of steel in return for a given amount of vessel tonnage diverted to the Atlantic trade. Other embargoes later were imposed on exports to neutral countries, thus seriously affecting our export trade. Then the transportation of American forces and military supplies brought about the diverting of many ships from coastwise and other neutral trade to transatlantic routes. These are some of the problems with which the steel export houses now are contending. However, the United States department of commerce has indicated its realization of the value of maintaining our present foothold in foreign markets and any steel supplies which can be released will be shipped to these markets. The shipping situation will improve, no doubt, as tonnage now building is put into operation.

Millions Into Upbuilding Work

Facing the prospect of having to market 1,000,000 tons of finished steel a month after the war, the steel export houses are spending millions to establish a market for American products abroad. They are advertising trade marks, nursing along customers and paying attention to the individual wants of each customer. They are educating men who will have technical knowledge of the steel industry and at the same time know export trading and comprehend the needs of foreign markets.

Yet the burden should not fall upon the shoulders of the exporters. They should receive full co-operation, both from manufacturers and from the government. It will be up to the government to see that our merchant marine is operated at reasonable rates, so that American shippers can compete with foreigners. The government must be wise and farseeing in the forthcoming making of commercial treaties and trade agreements. The tariff schedules must be revised skillfully to meet the needs of the times. If any of the belligerents proceed, as frequently suggested, to unify their foreign trade efforts, concentrating their buying and selling organizations, our government must authorize and encourage similar steps. It is essential that measures similar to the Webb bill be passed.

Some of the responsibility also rests with the manufacturers themselves. As they now sow, so they probably will reap. An official of one of the most powerful export houses in the country criticized the policy of certain of the steel manufacturers. "If our company should desire to erect an office building in New York," he said, "we would be quoted a certain price for structural steel, with terms of 30 days net. But if we endeavor to buy the same steel for export, we are quoted a higher price and cash payment is demanded though the credit back of the purchase is the same in both cases. Why are the manufacturers so much more rigorous in their demands when they sell for export? It seems to me that if anything they should make more lenient terms on sales for export. By this statement I am not advocating a policy of "dumping" but that steel manufacturers should realize the necessity for building up the foreign markets as much as possible now to smooth the way for the future."

It is also incumbent upon manufacturers that when they undertake to supply the requirements of a foreign customer, they reserve tonnage for this customer, instead of appearing in the market intermittently, when they have a surplus to sell. They should bear in mind this customer's interests as they do their domestic customer's. Supporting the permanency of the trade, the banks have been enabled, by revision of the national banking laws, to open branches in foreign countries, and excellent banking facilities now are being developed abroad.

As for the export houses, it rests with all of them to foster the best possible feeling toward American products among foreign consumers, that they sincerely look after the best interests of their customers and dissipate any remnants of ill-reputation for sharp or careless practice such as may have been caused by a few irresponsible traders and has been magnified by German propoganda.

Much might be written of the steel export houses upon whom has fallen the heavy burden of marketing our surplus steel production after the war. Space does not permit a detailed description even of all the important houses, nor even of a listing of all the names of houses engaged to a greater or less extent in steel exporting, for at present there are 1042 importing and exporting houses in New York alone, many of whom are participating in the steel export business. But here are a few representative instances showing the rapid growth and the prominent position gained by the steel export trade together with opinion expressed by some of the leaders in the export trade:

Powerful Companies Developed

One of the youngest companies in the steel export field, yet potentially one of the strongest, is the American International Steel Corp., subsidiary of the American International Corp., 120 Broadway, New York, which owns all of its nominal capital stock of $1,000,000. The steel export company is only one of many ramifications of the mother company, which is primarily a financing house, sponsored by Frank A. Vanderlip and backed by the National City Bank of New York. The holding company was formed two years ago to assist in developing American enterprises abroad and already has great accomplishments to its credit. It has built a waterworks system in Uruguay. It is building a thousand miles of railroad in China. It owns coffee and tea import houses. It is financing American muni-

GETTIN' IN LINE WITH THE BIG BOSS

The Big Boss is all smiles and him and Little Jimmy are eating out of the same spoon. It's all on account of an order filled by the Hubbard for MACHINE MOULDED GEARS which are "some pumpkins". The B. B. slapped me on the back and says: "Jim! You should be in New Orleans playing the ponies as your tips always bring home the bacon."



My 4-11-44 Special: ***Brothers***

Let the Hubbard handle your MACHINE MOULDED GEAR requirements and you will cash in all bets.

So long,

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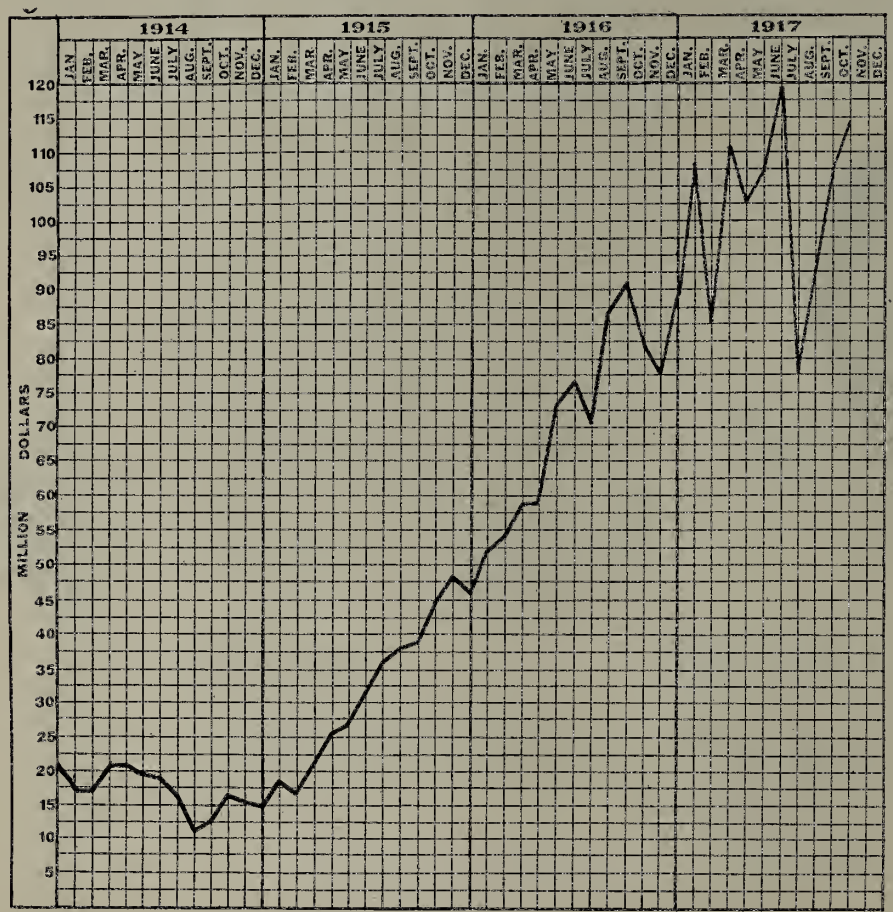
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tion companies. But its most important activities at present are in the fields of shipping and shipbuilding. Last year the corporation negotiated the sale of 165,000 tons of rails to Russia. Last June it secured the services of Edward M. Hagar, formerly president of the Universal Portland Cement Co., who immediately began to organize a steel export company. This company was formally incorporated as the American International Steel Corp., Sept. 1, 1917, and already has opened offices in Buenos Aires and London, and is preparing to open offices in Paris, Tokio and Brazil.



GROWTH OF AMERICAN IRON AND STEEL EXPORT BUSINESS SINCE 1914

It expects eventually to have representation all over the world. President Hagar says that the company is prepared to handle all forms of steel, from nails to rails, so that the foreign consumer will have only to place his order with the nearest branch and all the rest is done for him. The officers of the American International Steel Corp. are: President, Mr. Hagar; vice presidents, Morris Metcalf and J. W. Hook; treasurer, T. W. Streeter; secretary, Cecil Page.

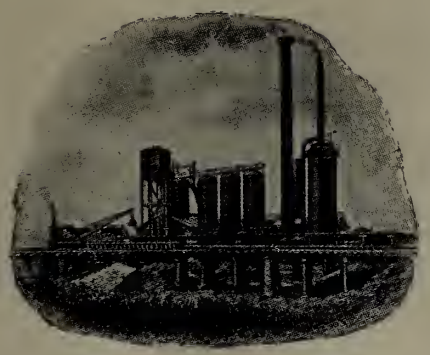
Triangle of Foreign Trade

Mr. Hagar said: "The three essentials of foreign trade are the material involved, ships and financing. The American International Corp. controls the Pacific Mail Steamship Co.; has a big interest in the International Mercantile Marine; is also in the United Fruit Co.; is associated with W. R. Grace & Co. in its shipping enterprises; owns the New York Shipbuilding Corp.; and just now is engaged in the construction of an immense government shipbuilding plant at Hog Island, Pa., with a contract to build 120 fabricated steel cargo ships at this plant. With these facilities the American International Steel Corp. doesn't need to worry about adequate shipping facilities. As it has the credit of the National City Bank of New York behind it, the steel export company is able to finance any purchase it may want to make and the strength to extend necessary terms to the foreign buyer. As for the prospects after the war, I think that this depends a good deal upon the course of the war itself. If the Germans are driven back slowly, they undoubtedly will follow their past tactics of destroying all plants and everything else in their track which of course would entail an increased amount of steel and equipment needed for reconstruction purposes and delay active competition in the neutral markets. If, on the other hand, peace were to come soon, the period of rehabilitation would be relatively shorter and competition come so much the sooner. I believe that the success of American export merchandising of steel products abroad depends to a large extent upon how soon and how thoroughly the steel industry and the general public realize this export development is vital to future prosperity in the United States"

Buys French Ship Material

The Liberty Steel Products Co, Inc., Woolworth building, New York, was organized May, 1917, by Charles J. Graham, an experienced steel man of Pittsburgh. The company's first important undertaking was its appointment as agent to purchase material for 40 ships being built by the Foundation Co, New York, for the French government, in yards at Portland, Ore., and Tacoma, Wash, which was one of the largest foreign ship orders ever placed in the United States. The Liberty Steel Products Co., Inc., is equipped for the handling of all ship material and for reconstruction work of every kind. A subsidiary company recently was formed in Paris under the name of the Societe Centrale Industrielle, which is composed of some of the leading business men of that country. This branch will handle the company's affairs in France, Spain and Belgium. Arrangements also have been made with Henry Coe, formerly of the firm of Coe & Clerci, to open a branch office in Italy, the Balkan states, Greece and Switzerland. The company is also negotiating for offices in Bombay, India, Rio de Janeiro and Shanghai, China. The Liberty Steel Products Co., Inc., has close manufacturing affiliations and its board of directors includes some of the best known steel men in the United States. Mr. Graham is president of the company; Frank J. Lanahan is vice president; J. Rogers Flannery is treasurer and P. G. Buerk is secretary.

A pioneer of nearly three years standing in the steel export field is the American Steel Export Co., Woolworth building, New York. This company, whose success and expansion have been extraordinary, was organized in June 15, 1915, by officials of the Cambria Steel Co., to secure for the Cambria Steel Co. a large share of the export offerings which were beginning to appear at that time. But the company's business developed so rapidly that the output of other mills had to be sought for the foreign buyers and up to this time the company has sold products for about 70 plants in all parts of the country. In March, 1915, the Cambria Steel Co. sold the controlling interest in the American Steel Export Co., to H. W. McAteer, formerly assistant to the president and controller of the Cambria Steel Co., and to C. B. McElhany, formerly vice president and manager of sales. These gentlemen became president and vice presi-



DELAWARE RIVER STEEL COMPANY

MANUFACTURERS OF PIG IRON

CHESTER, PENNSYLVANIA

CHEMISTRY

100 WORDS

To Pig Iron Consumers:

Our last message gave you the facts concerning the physical uniformity of our pig iron. The chemistry of our iron is even more astounding. In a series of thirty tests eighteen showed no variation in silicon and sulphur throughout the entire cast. The differences in the remainder were within the personal equation of the most exact chemist. The uniformity in analysis of our iron is our appeal to you. It is cast on a pig machine and does not vary from our high standards. It is as uniform as these hundred word messages. For these reasons, when buying, buy "Delaware".

DELAWARE RIVER STEEL CO.



dent respectively of the American Steel Export Co. Kurt A. Orbanowski, formerly general manager of the steel and machinery departments of Gaston, Williams & Wigmore, Inc., New York, became a director and treasurer of the American Steel Export Co. J. P. Beal is secretary and assistant treasurer.

Allies Compete Vigorously

Mr. McElhany, discussing current conditions in the steel export field, said he thought this branch of American business had become as important as any domestic industry. "In order to keep up our gold reserves we must export as well as import," he said. "Foreign trade acts as a balance wheel to American industry and its importance should be recognized and encouraged. We are training men here especially for foreign service and are spending much money to secure a firm foothold for American products abroad. I think the government should take every step possible to promote our foreign trade interests. It is probable the country's steel ingot production now approximates nearly 50,000,000 tons a year, which means that a vast tonnage must be marketed abroad every year after the war is over. We should all bear this in mind and have an eye to the future. Of course we all realize now that the government's war needs are all important and know that many ships must be diverted from their usual routes to carry men and munitions to France. But we feel the line should be drawn no tighter than necessary lest all the work that has been done and the time and money that have been spent in developing foreign trade, be lost. There is one thing that strikes me as being worthy of consideration by Washington, and that is the continued activity of the allies in the neutral markets. We are loaning billions to the allies, yet they are competing with us on credits in South America. Recently France obtained the financing of a Brazilian railroad in competition with American bankers. Of course, this secures the future purchasing by this railroad of French products. All over South America we find that English and French houses are competing with us on terms, which seems hardly fair when we are helping finance those countries. Our representatives also are compelled frequently to meet English sellers' quotations on commercial steel products, while our country is furnishing the allies with war steel at the lower prices fixed by our government."

In February, 1917, the W. J. Crouch Co., 253 Broadway, New York, was organized, to specialize in the export of steel products. This company has also made long strides since it was formed. Victor E. Karminski, vice president and general manager of the corporation recognizing the possibilities of the foreign market for steel products, enlisted the interest of W. J. Crouch of Lafayette, Ind., who already has been successful as an exporter of horses to the allies. The company grew rapidly in size and influence, until now it is maintaining offices in Yokahoma, Barcelona, Paris, Havana, San Juan, Porto Rico, Shanghai, and expect soon to open an office in Bombay. The company's officers are as follows: President, Mr. Crouch; vice president, Mr. Karminski; treasurer, I. Smullyan; secretary, J. J. Smart; assistant treasurer, Gerold G. Freeman; sales manager, H. Lad Landau.

Export Future is Assured

Mr. Karminski said: "Today we have probably reached the 50,000,000-ton mark of production—in three years we have increased our steel capacity by 25 per cent. And still the demand for American steel exceeds the supply. Our government is making heavy requisitions and the war requirements of the allied nations must be taken care of. Lastly, the needs of the American public must be met. After all these needs have been satisfied, there remains only a very small tonnage for the export trade. This condition is only temporary. With the return of peace and normal conditions, steel production probably will exceed domestic demand by 10,000,000 tons. It will then be not only welcome but vital to the industry to dispose of its surplus in foreign markets. Considering all factors and allowing for economic and political changes to come, the future of the steel export trade is assured. The steel manufacturers who will follow sound and constructive policies aiming at a permanent export business, will benefit themselves and the industry."

Oldest and largest of all the steel export organizations in this country is the United States Steel Products Co., subsidiary of the United States Steel Corp. Under the wise guidance of James A. Farrell, now president of the Steel corporation, and later under the leadership of its present head, Eugene P. Thomas, the export branch gradually assumed an important position in the foreign markets, even prior to the war. Owning its own ships and having the strong financial backing of the Steel corporation, the Products company was able to dispute foreign territory even against keen European competition. After the war the Products company will continue an important factor in the non-producing markets, regardless of any conditions now likely to arise. But it is pointed out it is to the interest of the Steel corporation that the surplus product of independent mills also find an outlet in export trade. The corporation's export branch is of minor importance compared with its vast domestic business, which would be directly affected by an unstable domestic market resulting from inability of independents to market their surplus output abroad. Discussing the prospects for the more distant future, President Thomas expressed the opinion that a new era of railroad construction all over the world will appear as a big outlet for steel. He said:

"It should be safe to predict that the 10 years succeeding the conclusion of peace will be such an era of railroad construction as the world has not seen. And, where the railroads go, into lands old and new, there will be created a demand for the utmost volume of manufactures in the service of an improved agriculture, of irrigation, of mining, of the utilization of water power, and of the processes of an expanded and diversified industry. No "glut" of steel should be apprehended in the saner, soberer and chastened world which will emerge from the stern ordeal of the awful struggle by which it is now convulsed, because what we call the process of reconstruction will simply be the beginning of an unexampled development of the productive energy of the newly enfranchised nations.

Co-ordination is Essential

"But it should be recognized that our share of this process will be small or great in proportion as we are able to co-ordinate our vast and varied productiveness to a common end.

"All of the European countries now at war will be under the most urgent necessity of exporting their products to the greatest possible extent as a means of rehabilitating exchange and of paying for needed imports. We may expect, as a consequence of the experience gained during the war, that the manufacturing nations of Europe will have learned the absolute necessity of organization, co-ordination and co-operation. If we are to meet them in foreign markets on terms of equality, it will be necessary not only that we establish methods of mutual co-operation, but that our government aid and protect us at least as effectively as our competitors will be aided and protected by their respective governments."

Back in the earliest days of the war, the directors of the international banking house of Raymond, Pynchon & Co., saw the possibilities of developing the export trade of the United States and a coalition was formed with S. C. Munoz, who long had been identified with American steel and machinery affairs. The first contracts taken consisted of exports of horses and mules, of which over 100,000 were shipped. It was during these early transactions that the Federal Export Corp. was formed, with

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Good, reliable castings mean fewer broken parts. Fewer broken parts mean more dependable products — which in turn mean *"boosts"* instead of *"knocks"*. And that's just what you want.



To those of you for whom we have made castings, we do not have to mention, *"quality"*— for to *you*, "Farrell-Cheek" and "quality" mean one and the same thing. But to those of you who have *never* called upon us to fill your requirements, we would say "We heartily assure you that you will find the quality of Farrell-Cheek Castings well worth considering."

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NEW YORK PHILADELPHIA CHICAGO



Mr. Munoz as its president. Later, to expedite deliveries, a subsidiary company was formed, the Federal Shipping Co., of which J. R. Munoz was made vice president and general manager. The first ships chartered were for the sole purpose of carrying horses and when they were delivered it was found each vessel had space for 4000 to 5000 tons of cargo, which the owners had filled with coal for ballast. Conditions arose that made this combination of cargo, commercially impossible. The Federal company then had its charter revised so that it had the extra space at its disposal and looked about for materials which were essential to the conduct of the war. The success with which the horse contracts had been filled inspired confidence in the company on the part of French buyers, and orders for steel and machinery began to pour in. Mr. Munoz brought H. D. Tremper, who had been closely associated with the development of the General Electric Co., to organize this branch of the business. From that time forward many skilled men were added to handle the different lines of the company's work. Among the first of these men were Willis H. Mason, who had been export sales manager of Marcus, Mason & Co. and who had much experience in designing machinery for use overseas; Stacy Pugh of Cambria Steel Co.; Ernest G. Bliss of Westinghouse, Church Kerr Co. As steel demand grew more insistent, a steel export department was formed, with Dwight S. Guthrie, manager of the Chicago office of the Republic Iron & Steel Co., in charge. This branch was organized primarily to supply the allied governments, but later it extended its facilities to cover the other great districts abroad and by the summer of 1917 the company was firmly established in all the foreign markets. An engineering department is being organized to provide means for financing and supplying many reconstruction projects in northern France and Belgium. Mr. Guthrie, accompanied by Guy L. Bayley, who was chief engineer of the Panama-Pacific exposition, and by others of the company, is in the orient, establishing the territory from the Straits settlement to eastern Siberia. Recently Samuel A. Benner, formerly foreign and domestic sales manager of the Carnegie Steel Co. took the co-management of the steel department, to which he has added such men as Edgar I. Mills and George Summers of the Carnegie Steel Co.; P. J. Phillips of the South American department of the United States Steel Products Co., and William L. Buck of the Cambria Steel Co. In charge of the financial affairs of the Federal Export Corp. is Fred L. Watson, well known for his long services as treasurer of the American Steel & Wire Co. Some time ago, A. F. Mack, formerly general traffic manager of the United States Steel Products Co., formed the Cosmopolitan Shipping Co., with which arrangements were made by the Federal company to handle its shipments abroad. The Federal Export Corp. has outgrown its present quarters and on May 1 will remove to the 21-story building at 42 Broadway, which will hereafter be known as the "Federal Export building."

Sees Bright Outlook

Vice President Benner discusses the outlook in the steel export field as follows: "In my judgment the outlook for the export of all lines of iron and steel from the United States is brighter than it has ever been. To open up and settle this great country of ours we were compelled to develop great railroad systems and immense establishments for making steel. In consequence, our freight cars and locomotives and our blast furnaces and steel works are of the largest capacity per unit of any in the world. These large units enable us to obtain low costs per ton in both transportation and steel making, so that for some years past we have been able to deliver steel to our Atlantic seaboard ports at costs comparing favorably with those in Europe, even though the latter has had lower labor rates.

"All we needed to develop an export trade in iron and steel of huge proportions were two things: a surplus capacity in this country, and a merchant marine. We will have both of these in large proportions when the war is over.

"We will not be able to ship much iron and steel to Europe after the war nor will Europe be able to send much to North America. Each district will supply its own needs and will have a large surplus for the overseas nonproducing markets. These are Latin-America, Africa, Asia and Australia, and these immense areas have just begun to develop."

Another example of marvelous growth is found in the Vulcan Steel Products Co., 120 Broadway, New York. This company was organized in October, 1916, at that time consisting chiefly of an idea, and obscure room and a few energetic men. Recently it celebrated its first anniversary by inaugurating an advertising program to reach the uttermost ends of the earth. Today this organization has offices on five floors of the world's largest business structure, the Equitable building, and has representatives in every trade center in the world. Hardly a day passes without some expansion on the part of this company to meet its steadily growing business. Unsettled conditions of the mails have necessitated the conducting of the greater part of the Vulcan company's business by cables, and the messages became so numerous that the department handling them recently was compelled to move to more spacious quarters. Ten thousand letters are produced and sent out of the mailing department each day. Additions have recently been made to the photographic rooms, where hundreds of pictures are made daily of machinery sold by the engineering division. These pictures are shown by the salesmen where it is not possible to show actual samples. The company's directorate is comprised of men prominent in the financial and industrial world. Despite the disorganization of transportation facilities, the Vulcan company, by its association with the Otrophon Steamship Corp., has been assured of direct service to Brazil and Chile, while the company has favorable connections with other railroad and shipping interests. The Vulcan Steel Products Co. handles steel, iron and machinery, while other raw and manufactured products are handled by the Vulcan Trading Corp.

Unfortunately, space does not permit a detailed description of all of the important houses in the merchandising of steel overseas, for their work entitles them to all the credit and prominence they can be given. The country has witnessed in these houses an example of unparalleled growth the past three years, until now they have become one of the foundation stones of the nation's industries. Perhaps it would be more accurate to say that they have become the gyroscope which is to promote the equilibrium of American business after the war. The steel export trade developed because of the European war, which diverted international trade from its accustomed channels. Where before such foreign trade was desirable, it now has become essential because of the increased steel production stimulated by war demands. The biggest problems of our overseas trade have arisen since this country became an active participant in the war. Shortage of steel, diverting of cargo ships and the utilization of domestic transportation facilities to carry war supplies to seaboard may interfere to an increasing extent with our trade in the nonproducing markets as time goes on, for the principal business in hand just now is to win the war. Of next importance, however, is the economic welfare of the nation after peace comes. So it is hoped that war conditions will not interfere more than is absolutely necessary with our growing trade overseas.

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DEAD SOFT

Standard Bessemer Steel Pipe

EASY TO CUT AND THREAD

SATISFIES ALL THE REQUIREMENTS OF EXACTING SERVICE
AND SAVES THE PRACTICAL PLUMBER AND STEAMFITTER

TIME, TROUBLE AND MONEY

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Controlled at Every Stage of Manufacture in Our Own Mills
FROM ORE TO FINISHED PRODUCT

Tubing, Casing, Line Pipe, Drive Pipe

FOR OIL AND GAS WELLS

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Highest Grade

Bright Coke Tin Plate

Made in the Most Modern Plant in the World
ANNUAL CAPACITY TWO MILLION BASE BOXES

DISCRIMINATING CONSUMERS
ARE OUR BEST CUSTOMERS

WHEELING STEEL & IRON COMPANY

WHEELING, W. VA.

Average Monthly Prices of Pig Iron, Rolled Products and Old Material in Principal Districts in 1917

Average Prices of Leading Materials at Pittsburgh

Pig Iron:—	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer	$35.95	$35.95	$37.45	$42.20	$44.95	$55.20	$57.95	$53.55	$48.30	$37.25	$37.25	$37.25
Basic	30.95	30.95	32.85	39.20	42.15	50.20	53.20	52.75	46.20	33.95	33.95	33.95
Foundry No. 2	31.95	33.95	36.55	39.95	43.55	51.00	55.95	55.55	48.95	33.95	33.95	33.95
Malleable	31.95	34.45	36.95	39.95	43.65	51.05	53.95	55.55	50.525	35.20	34.45	34.45
Gray forge	30.95	30.95	32.75	38.20	42.25	49.60	52.95	52.95	47.425	32.45	32.95	32.95
Ferro-Alloys:—												
Ferro-silicon (50 per cent)	$122.50	$156.25	$175.00	$187.50	$230.00	$230.00	$237.50	$225.00	$212.50	$171.25	$157.50	$172.50
Ferro-sil. (10 per cent) fur.	42.00	42.00	49.80	57.50	67.00	82.50	92.25	95.00	95.00	80.00	55.00	55.00
Semi-Finished:—												
Bessemer billets	$60.00	$62.50	$67.00	$72.50	$85.00	$93.75	$100.00	$93.00	$73.75	$58.75	$47.50	$47.50
Open hearth billets	60.00	62.50	67.50	72.50	85.00	93.75	100.00	93.00	73.75	58.75	47.50	47.50
Bessemer sheet bars	60.00	62.50	67.50	72.50	88.00	101.25	105.00	96.00	82.50	65.50	51.00	51.00
Open hearth sheet bars	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	51.00	51.00
Wire rods	73.75	75.00	75.00	83.75	88.00	92.50	95.00	96.00	90.00	73.50	57.00	57.00
Coke:—												
Spot furnace	$9.56	$9.75	$9.90	$7.65	$9.20	$11.15	$12.50	$13.20	$11.15	$6.00	$6.00	$6.00
Contract furnace	7.25	8.00	7.60	7.25	8.00	8.50	9.60	10.00	9.65	6.00	6.00	6.00
Spot foundry	10.40	10.90	11.30	9.65	9.65	11.20	15.00	12.70	13.35	7.00	7.00	7.00
Contract foundry	6.40	6.50	6.90	7.90	8.50	10.90	12.40	13.50	12.50	7.00	7.00	7.00
Rolled Products:—												
Structural shapes base	3.10c	3.25c	3.45c	3.70c	4.00c	4.00c	4.50c	4.50c	3.75c	3.00c	3.00c	3.00c
Plates, base	3.60c	3.75c	4.20c	4.50c	4.50c	4.50c	5.65c	6.80c	6.85c	3.25c	3.25c	3.25c
Steel bars, base	2.95c	3.00c	3.20c	3.40c	3.50c	3.65c	3.90c	4.00c	3.725c	2.90c	2.90c	2.90c
Bar iron, base	3.25c	3.25c	3.25c	3.40c	3.90c	4.60c	5.00c	5.25c	5.25c	5.25c	3.90c	3.50c
Shafting, discount	10.00	10.00	10.00	10.00	10.00	5.00	5.00	5.00	5.00	6.25	17.00	17.00
Steel pipe, ¾ to 3 in., disc.	64.00	63.50	60.00	55.00	49.00	47.25	42.00	42.00	42.00	42.00	49.00	51.00
Standard spikes	3.40c	3.40c	3.50c	3.65c	3.90c	4.20c	4.70c	6.20c	6.50c	6.15c	5.00c	4.75c
Hoops	3.50c	3.50c	3.90c	4.10c	4.70c	5.75c	6.00c	6.00c	6.00c	6.00c	4.60c	3.50c
Bands	3.00c	3.00c	3.35c	3.35c	3.60c	5.50c	6.00c	6.00c	6.00c	6.00c	4.30c	2.90c
Structural rivets	4.25c	4.25c	4.50c	4.75c	5.05c	5.25c	5.25c	5.25c	5.25c	5.25c	5.00c	4.65c
No. 28 black sheets	4.55c	4.55c	5.05c	5.75c	7.00c	8.15c	9.00c	9.00c	8.75c	7.75c	5.25c	5.00c
No. 28 galvanized sheets	6.55c	6.80c	6.80c	7.55c	8.80c	9.95c	10.25c	10.25c	9.70c	8.80c	6.60c	6.25c
No. 10, blue annealed sheets	4.10c	4.35c	4.70c	5.35c	6.65c	8.00c	8.50c	8.50c	8.50c	7.85c	4.75c	4.25c
Tin plate	$6.85	$7.00	$7.50	$7.50	$7.90	$9.25	$10.00	$10.00	$10.00	$10.00	$8.75	$7.75
Wire nails, base	3.00	3.00	3.16	3.20	3.50	3.65	4.00	4.00	4.00	3.90	3.50	3.50
Plain wire, base	2.95	2.95	3.08	3.18	3.45	3.60	3.95	3.95	3.95	3.85	3.25	3.25
Old Material:—												
Heavy melting steel	$23.25	$21.90	$23.40	$28.15	$28.40	$40.00	$40.25	$36.60	$35.50	$31.30	$29.60	$30.00
Low phosphorus	32.00	30.00	33.00	34.25	36.60	43.50	52.75	43.00	47.25	43.50	39.00	39.00
No. 1 cast	20.00	19.75	21.50	23.35	24.60	33.25	34.75	35.00	32.50	28.00	28.50	28.50

Average Prices of Leading Materials at Chicago

Pig Iron:—	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lake Superior charcoal	$33.75	$34.50	$37.50	$42.25	$49.25	$51.80	$59.50	$59.50	$59.50	$48.50	$37.50	$37.50
Northern No. 2 foundry	30.00	31.25	35.70	39.25	43.20	51.00	55.00	55.00	49.50	33.00	33.00	33.00
Southern No. 2 foundry	27.50	27.65	30.20	36.50	40.00	44.25	50.00	50.00	50.00	43.75	37.50	37.50
Malleable	30.00	31.25	35.80	39.00	43.20	50.50	55.00	55.00	49.50	33.35	33.50	33.50
Rolled Products:—												
Bar iron, base	3.00c	3.00c	3.00c	3.19c	3.39c	4.00c	4.50c	4.50c	4.50c	4.50c	4.10c	4.10c
Steel bars, base	3.19c	3.14c	3.40c	3.54c	3.84c	4.50c	4.50c	4.50c	4.10c	2.90c	2.90c	2.90c
Structural shapes, base	3.19c	3.38c	3.65c	3.79c	4.34c	4.63c	5.88c	4.94c	4.46c	3.00c	3.00c	3.00c
Plates, base	3.89c	3.94c	4.59c	4.69c	5.49c	7.92c	9.64c	9.59c	7.33c	3.25c	3.25c	3.25c
No. 28 black sheets	4.69c	5.00c	5.19c	6.01c	6.99c	7.82c	9.69c	9.22c	8.94c	7.826c	7.83c	7.83c
Old Material:—												
No. 1 R. R. wrought	$23.75	$24.00	$25.75	$29.80	$32.60	$41.75	$39.13	$35.40	$36.25	$31.90	$30.60	$31.50
Heavy melting steel	20.25	21.65	23.00	26.65	28.70	37.00	35.50	33.10	32.65	27.00	28.50	28.50
Rerolling rails	27.25	25.65	27.25	31.90	36.80	46.00	46.25	41.90	41.25	36.00	35.70	35.75
Car wheels	19.75	18.30	20.30	23.25	27.20	37.00	36.75	30.70	31.00	25.90	27.50	29.50

Average Prices of Leading Materials in the East

Pig Iron:—	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Basic, eastern Pa.	$30.15	$30.50	$33.80	$38.25	$40.80	$46.40	$50.75	$51.00	$46.50	$33.50	$33.50	$33.50
No. 2X fdy., Philadelphia	30.50	31.75	36.90	41.75	43.75	47.50	54.35	53.40	47.80	34.65	34.15	34.00
No. 2X, Virginia, furnace	26.50	28.25	34.50	38.40	41.00	46.50	52.25	51.90	46.50	33.50	33.50	33.50
Stand. low phos., Phila.	54.50	57.50	66.70	75.50	77.00	85.00	92.50	92.50	91.00	73.25	55.50	55.50
Stand. gray forge, east. Pa.	29.50	30.25	33.10	38.25	38.85	44.00	50.15	49.50	42.50	32.00	32.00	32.00
Rolled Products:—												
Tank plates, base, Phila.	4.909c	4.959c	5.409c	6.059c	6.359c	8.159c	9.409c	9.459c	7.735c	3.435c	3.435c	3.435c
Struc. shapes, base, Phila.	3.609c	3.559c	3.809c	4.859c	4.354c	4.509c	4.409c	4.509c	4.535c	3.185c	3.185c	3.185c
Steel bars, base, Phila.	3.159c	3.309c	3.459c	3.709c	3.959c	4.259c	7.009c	4.759c	4.285c	3.085c	3.085c	3.085c
Bar iron, base, Phila.	3.159c	3.209c	3.559c	3.659c	4.059c	4.209c	4.609c	4.909c	4.935c	4.935c	4.435c	4.435c
No. 10 blue anl. sh., Phila.	4.409c	4.809c	5.109c	6.359c	6.959c	8.109c	8.759c	8.759c	8.685c	7.635c	4.935c	4.435c
Open hearth billets, Phila.	$60.00	$62.50	$65.00	$77.50	$81.00	$97.50	$102.50	$102.50	$95.00	$50.50	$50.50	$50.50
Old Material:—	Delivered Eastern Pennsylvania.											
No. 1 heavy melting steel	$21.75	$20.25	$23.50	$25.00	$26.00	$32.60	$37.00	$32.80	$30.75	$26.00	$26.80	$28.00
No. 1 R. R. wrought	27.00	26.75	30.00	36.00	40.80	47.85	54.05	46.20	44.50	41.81	35.35	35.00
No. 1 heavy cast	20.75	20.15	22.50	26.75	30.00	34.75	38.35	34.10	32.90	30.00	30.50	32.00



The new Upholstery Building of The Pullman Company, Pullman, Illinois, another step in a reconstruction plan evolved from a comprehensive analytical study made by THE ARNOLD COMPANY.
The building shown was designed and constructed by

THE ARNOLD COMPANY

ENGINEERS - - CONSTRUCTORS
ELECTRICAL CIVIL MECHANICAL

CHICAGO: 105 South La Salle Street NEW YORK: 111 Broadway



Say you saw it in THE IRON TRADE REVIEW

Average Monthly Prices of Iron and Steel Products, 1906-1917

Finished Products in Net Tons. Pig Iron and Billets in Gross Tons

1917

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$30.00	31.23	35.70	39.23	43.20	51.00	55.00	55.00	49.50	33.00	33.00	33.00
Plates Chicago	$79.60	78.80	91.80	93.80	109.80	158.40	192.80	192.00	146.60	65.00	65.00	65.00
Billets (Bess.) Pittsburgh	$60.00	62.50	67.00	72.50	85.00	93.75	100.00	93.00	73.75	58.75	47.50	47.50
Bessemer Pig Pittsburgh	$35.95	35.95	37.45	42.20	44.95	55.20	57.95	55.55	48.27	37.25	37.25	37.25
Basic Pig Pittsburgh	$30.95	30.95	32.85	39.20	42.15	50.20	53.20	52.25	43.95	33.95	33.95	33.95
Beams Pittsburgh	$61.50	65.00	69.20	74.00	80.00	80.00	90.00	90.00	75.00	60.00	60.00	60.00
Bar Iron Cleveland	$60.00	60.00	60.00	65.00	65.00	70.00	90.00	95.00	90.00	90.00	78.80	73.00
Steel Bars Pittsburgh	$59.40	60.60	64.20	67.80	70.00	72.40	77.00	80.00	74.40	58.00	58.00	58.00
No. 2 Foundry Birmingham	$23.00	24.50	28.00	35.80	35.75	35.75	46.00	48.00	43.50	33.50	33.50	33.50

1916

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$18.50	18.50	18.70	19.00	19.00	19.00	19.00	19.00	18.65	19.15	25.00	29.25
Plates Chicago	$41.00	47.00	55.00	59.00	62.00	62.00	62.00	63.00	64.00	64.00	69.20	75.00
Billets (Bess.) Pittsburgh	$33.75	34.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	58.75
Bessemer Pig Pittsburgh	$21.32	21.45	21.55	21.95	21.95	21.95	21.95	21.95	22.20	24.33	30.35	35.95
Basic Pig Pittsburgh	$19.20	18.77	19.20	19.20	18.95	18.95	18.95	18.95	19.08	20.83	25.95	30.95
Beams Pittsburgh	$37.20	40.60	48.00	50.00	50.00	50.00	50.00	50.00	52.00	54.00	57.60	60.50
Bar Iron Cleveland	$40.00	45.80	48.00	48.00	48.00	48.00	48.00	48.00	48.00	51.00	54.00	60.00
Steel Bars Pittsburgh	$37.20	40.20	46.80	50.00	50.00	50.00	50.00	50.00	52.00	52.00	55.60	58.50
No. 2 Foundry Birmingham	$14.50	14.63	15.00	15.00	15.00	14.45	14.00	13.60	14.38	15.13	19.60	23.00

1915

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.38	13.80	14.44	17.12	18.00
Gray Forge Cincinnati	$11.40	11.40	11.28	11.25	11.65	11.46	11.50	12.90	13.20	13.65	15.03	16.20
Plates Chicago	$25.60	25.40	26.80	25.60	25.80	26.20	27.80	28.80	29.80	31.10	35.80	39.40
Billets (Bess.) Pittsburgh	$19.50	19.50	19.50	19.50	19.50	19.87	21.40	23.00	24.60	25.50	27.75	29.60
Bessemer Pig Pittsburgh	$14.70	14.63	14.55	14.55	14.55	14.58	14.88	15.89	16.80	16.95	17.45	19.85
Basic Pig, Pittsburgh	$13.42	14.09	13.96	13.90	13.90	13.90	13.90	13.90	13.90	13.75	13.45	13.45
Beams Pittsburgh	$22.00	22.00	23.00	23.00	24.00	24.00	25.00	26.00	26.80	28.10	32.50	36.00
Bar Iron Cleveland	$23.00	23.00	24.00	24.40	24.00	24.00	24.00	24.50	26.26	27.75	30.00	35.00
Steel Bars, Pittsburgh	$22.00	22.00	23.00	24.00	24.00	24.00	25.20	26.00	26.80	28.20	32.50	34.80
No. 2 Foundry Birmingham	$ 9.50	9.50	9.38	9.35	9.75	9.56	9.60	11.00	11.30	11.75	13.12	14.20

1914

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$14.25	14.19	14.25	14.25	14.25	14.19	14.00	14.00	13.63	13.30	13.00	13.00
Gray Forge Cincinnati	$12.75	12.75	12.87	12.75	12.75	12.69	12.30	12.25	12.25	12.25	11.90	11.40
Plates Chicago	$26.60	27.35	27.60	26.36	25.80	25.60	25.60	27.35	27.35	26.04	25.00	24.00
Billets (Bess.) Pittsburgh	$20.00	20.75	21.00	20.80	20.00	19.75	19.30	20.00	21.00	20.60	19.00	18.50
Bessemer Pig Pittsburgh	$15.00	15.09	15.15	14.90	14.90	14.90	14.90	14.90	14.90	14.85	14.70	14.70
Basic Pig, Pittsburgh	$13.42	14.09	13.96	13.90	13.90	13.90	13.90	13.90	13.90	13.75	13.45	13.45
Beams Pittsburgh	$24.00	24.00	24.00	23.60	23.00	22.38	22.20	23.50	24.00	23.50	22.20	21.00
Bar Iron Cleveland	$26.00	26.00	24.75	24.60	24.00	24.00	24.00	24.00	24.00	24.00	23.75	23.00
Steel Bars, Pittsburgh	$24.00	24.00	24.00	23.00	23.00	22.20	22.20	23.40	24.00	23.40	22.00	21.00
No. 2 Foundry Birmingham	$10.50	10.50	10.60	10.50	10.50	10.44	10.05	10.00	10.00	10.00	9.88	9.50

1913

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$18.00	18.00	17.62	17.25	16.70	16.12	15.20	15.00	15.00	15.00	15.00	14.50
Gray Forge Cincinnati	$15.75	15.25	15.25	14.25	13.50	12.75	12.75	12.75	13.25	13.25	13.00	13.25
Plates Chicago	$33.60	33.60	33.60	33.60	32.80	32.60	32.60	32.60	31.60	30.80	28.85	27.60
Billets (Bess.) Pittsburgh	$28.20	28.87	29.00	29.00	27.37	26.50	26.50	26.12	25.00	23.00	20.87	20.00
Bessemer Pig Pittsburgh	$18.15	18.15	18.15	17.92	17.90	17.26	16.65	16.52	16.65	16.60	16.09	15.90
Beams Pittsburgh	$29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	28.25	27.40	26.00	25.00
Bar Iron Cleveland	$33.00	33.00	33.00	33.00	32.50	32.00	31.20	29.25	28.25	27.40	27.90	26.00
No. 2 Foundry Birmingham	$13.70	13.50	13.00	12.50	11.75	10.60	10.50	11.00	11.00	11.00	10.75	11.00

1912

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$14.00	14.00	14.00	14.25	14.50	14.50	14.62	15.30	16.37	17.30	17.87	18.00
Gray Forge Cincinnati	$12.50	12.50	12.50	12.85	13.00	13.50	13.90	14.75	15.70	16.18	15.75	
Plates Chicago	$26.00	25.76	25.90	27.55	28.60	28.60	29.60	30.40	31.35	32.60	33.60	33.60
Billets (Bess.) Pittsburgh	$20.00	20.00	19.88	20.00	21.10	21.88	22.25	22.40	23.75	25.70	26.75	27.00
Bessemer Pig Pittsburgh	$15.15	15.00	15.02	15.15	15.15	15.15	15.15	15.43	15.93	17.75	18.05	18.15
Beams Pittsburgh	$23.00	23.00	23.00	23.40	25.00	25.00	26.00	27.40	28.60	28.60	29.00	29.00
Bar Iron Cleveland	$24.00	23.50	23.50	24.00	24.40	25.25	27.00	27.25	29.00	30.20	31.00	31.00
No. 2 Foundry Birmingham	$10.00	10.00	10.06	10.50	10.95	11.00	11.25	11.65	12.50	13.45	13.75	13.50

1911

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.50	14.50	14.50	14.00	14.00
Gray Forge Cincinnati	$13.35	13.25	13.15	13.05	12.90	12.50	12.05	12.05	12.05	12.00	12.00	12.00
Plates Chicago	$31.60	31.60	31.60	30.60	30.60	30.60	30.60	29.60	29.60	26.60	25.00	25.00
Billets (Bess.) Pittsburgh	$23.00	23.00	23.00	23.00	23.00	21.00	21.00	21.00	21.00	20.00	19.70	19.25
Bessemer Pig Pittsburgh	$15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.39	15.10	15.15
Beams Pittsburgh	$28.00	28.00	28.00	28.00	28.00	27.00	27.00	27.00	26.40	24.00	22.60	23.25
Bar Iron Cleveland	$27.00	27.00	27.00	26.75	26.20	24.75	24.00	25.00	24.75	24.00	24.00	24.00
No. 2 Foundry Birmingham	$11.00	11.00	11.00	11.00	10.75	10.25	10.00	10.05	10.10	10.00	9.75	10.00

1910

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$19.00	18.75	18.25	17.00	16.75	16.50	16.50	16.50	16.50	16.00	16.00	16.00
Gray Forge Cincinnati	$16.50	16.38	15.75	14.88	14.56	14.35	14.12	13.75	13.75	13.75	13.75	13.75
Plates Chicago	$35.60	35.60	34.60	33.60	33.60	32.60	31.60	31.60	31.60	31.60	30.60	30.60
Billets (Bess.) Pittsburgh	$27.87	27.50	27.50	27.00	26.12	25.50	25.00	25.00	24.50	23.38	23.00	23.00
Bessemer Pig Pittsburgh	$19.90	19.42	18.90	18.15	17.09	16.73	16.40	16.21	15.90	15.90	15.90	15.90
Beams Pittsburgh	$31.00	31.00	30.40	30.00	30.00	29.20	28.20	28.00	28.00	28.00	28.00	28.00
Bar Iron Cleveland	$33.00	33.00	33.00	32.50	31.00	30.10	28.00	28.00	28.00	28.00	27.80	27.00
No. 2 Foundry Birmingham	$14.00	13.88	13.00	12.12	11.81	11.60	11.38	11.00	11.00	11.00	11.00	11.00

1909

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$17.44	16.75	16.50	16.46	16.21	16.41	16.90	17.37	18.20	18.87	19.00	19.00
Gray Forge Cincinnati	$14.75	14.62	13.50	13.25	13.31	13.50	13.95	14.62	15.25	16.62	16.75	16.75
Plates Chicago	$35.60	34.10	29.60	28.60	28.95	28.60	30.60	31.60	32.80	33.60	35.60	35.60
Billets (Bess.) Pittsburgh	$25.00	23.50	23.00	22.00	22.50	23.00	24.00	25.00	26.00	26.50	27.50	27.50
Bessemer Pig Pittsburgh	$17.34	16.78	16.34	15.80	15.48	16.13	16.37	17.13	18.33	19.68	19.90	19.90
Beams Pittsburgh	$32.00	29.00	26.00	24.00	25.00	26.00	27.00	28.00	30.00	30.00	31.00	32.00
Bar Iron Cleveland	$29.00	28.75	26.20	25.25	25.00	26.20	29.25	30.00	30.00	30.00	32.00	32.00
No. 2 Foundry Birmingham	$13.00	12.70	11.75	11.00	11.00	11.31	12.30	13.00	14.00	14.50	14.50	14.00

1908

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$18.24	17.87	17.42	17.21	17.00	17.31	17 00	17.00	16.75	16.50	16.75	17.35
Gray Forge Cincinnati	$14.45	14.06	13.63	13.60	13.50	13.75	13.70	14.00	14.25	14.25	14.25	14.75
Plates Chicago	$37.60	37.60	37.60	37.60	37.60	36.60	35.60	35.60	35.60	35.60	35.60	35.60
Billets (Bess.) Pittsburgh	$28.00	28.00	28.00	28.00	28.00	26.50	25.00	25.00	25.00	25.00	25.00	25.00
Bessemer Pig Pittsburgh	$19.00	17.90	17.86	17.49	16.92	16.90	16.73	16.11	15.90	15.48	16.74	17.40
Beams Pittsburgh	$34.00	34.00	34.00	34.00	34.00	33.00	32.00	32.00	32.00	32.00	32.00	32.00
Bar Iron Cleveland	$28.80	27.00	28.00	28.40	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
No. 2 Foundry Birmingham	$12.80	12.59	12.12	11.90	11.50	12.00	11.60	12.06	12.50	12.50	12.50	13.00

1907

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$26.00	26.50	26.75	27.50	27.40	26.50	25.40	24.50	23.60	22.60	20.60	19.00
Gray Forge Cincinnati	$22.60	22.50	22.70	21.50	21.90	21.35	20.55	19.95	18.85	18.45	17.35	15.50
Plates Chicago	$35.30	37.30	37.30	37.30	39.40	39.60	39.60	39.60	36.60	37.60	37.60	37.60
Billets (Bess.) Pittsburgh	$29.75	29.50	29.25	29.75	30.25	31.00	30.00	30.00	29.50	28.50	28.00	28.00
Bessemer Pig Pittsburgh	$22.92	22.78	22.85	22.16	24.10	24.10	23.30	22.90	22.90	22.80	20.60	19.90
Beams Pittsburgh	$34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.05	34.00
Bar Iron Cleveland	$39.00	36.50	36.00	36.00	35.00	34.00	34.00	33.00	33.00	32.50	31.00	31.00
No. 2 Foundry Birmingham	$23.00	23.00	22.75	22.00	21.40	21.25	20.50	19.80	18.12	17.65	16.00	14.91

1906

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No. 2 Foundry Chicago	$19.25	19.25	19.00	18.75	18.50	18.10	18.30	18.90	19.75	21.50	26.50	27.00
Gray Forge Cincinnati	$15.75	15.05	14.85	14.75	14.75	14.65	14.55	15.40	16.50	17.50	21.70	22.00
Plates Chicago	$35.30	35.30	35.30	35.30	35.30	35.30	35.30	35.30	35.30	35.30	35.30	37.30
Billets (Bess.) Pittsburgh	$27.00	27.50	27.65	27.75	27.00	26.25	27.00	28.00	28.50	28.50	29.00	29.75
Bessemer Pig Pittsburgh	$17.32	17.29	17.25	17.25	17.24	17.38	17.57	17.96	18.44	20.06	21.96	22.75
Beams Pittsburgh	$34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Bar Iron Cleveland	$38.00	35.50	34.00	33.00	32.00	32.00	32.00	33.50	34.00	36.00	39.00	39.00
No. 2 Foundry Birmingham	$14.00	14.00	13.70	13.65	13.75	13.50	13.00	14.15	16.00	17.15	21.25	22.00

Charts based on above prices are published as a supplement of today's issue.



Crane Type Slab Chargers

For charging a single line of furnaces with slabs, blooms, ingots, etc., the W-S-M Crane Type Charger will be found most efficient.

These machines are self-propelling, being electrically operated throughout, and provided with the motors and controllers necessary to place the charger properly before the furnace, to grip and pick up the piece of material to be handled and to charge it into and withdraw it from the furnace, depositing it on Roll Table, Car or Transfer Table as required.

You will find the W-S-M line of slab chargers complete—we have or can make the type and size best suited to your requirements.

The W-S-M Crane Type Slab Chargers pictured above are in the service of the National Tube Company, McKeesport, Pennsylvania.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Iron and Steel Prices

Corrected to Wednesday Noon

PIG IRON

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	37.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern).....$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)..... base plus 50c
2.75 to 3.25 silicon (No. 1X, No. 2 soft).....base plus $1.50
Over 3.25 silicon..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.00 to 35.25
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.00 to 34.25
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.50 to 33.75
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern, Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern, furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Wise county foundry	7.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00

FERRO ALLOYS

Ferromanganese delivered	$250.00 to 255.00
Spiegel, 20 per cent fur.	60.00 to 62.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$51.70
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia.	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Philadelphia	3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.25c
Cotton ties, Pitts., Dec.	$2.17

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pittsburgh.	4.50c to 5.00c
Spikes, railroad, Chicago	5.00c to 5.25c
Track bolts, Pittsburgh	6.50c to 7.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh.	4.35
Barb wire, painted, Pittsburgh.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	....

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts. 8.00c
Sheet piling, base, Pittsburgh 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

War Doubles Prices

Below are freight rates on coke, effective June 15, 1917, from Connellsville region of western Pennsylvania, per net ton of 2000 pounds:

Destination	Rate
Baltimore	$1.95
Buffalo	2.00
Canton	1.55
Chicago	2.65
Cleveland	1.75
Columbus	1.80
Detroit	2.25
E. St. Louis	2.95
Erie	1.80
Harrisburg	1.85
Joliet	2.65
Louisville	2.65
Milwaukee	3.00
New York	3.00
Philadelphia	2.20
Pittsburgh	.90
Port Henry, N. Y.	2.95
Pottstown	2.10

SHEETS

(In cents per pound.)

SHEET MILL, BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chic.	5.215c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chic.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pittsburgh.....$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l. 30
Iron, 3½ to 4½ inches, c. l. 12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	58.50
Six-inch and over, Chicago	55.50
Four-inch, New York	57.50
Six-inch and over, New York	54.50
Four-inch, Birmingham	48.00
Six-in. and over, Birmingham	45.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pittsburgh, carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh.	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

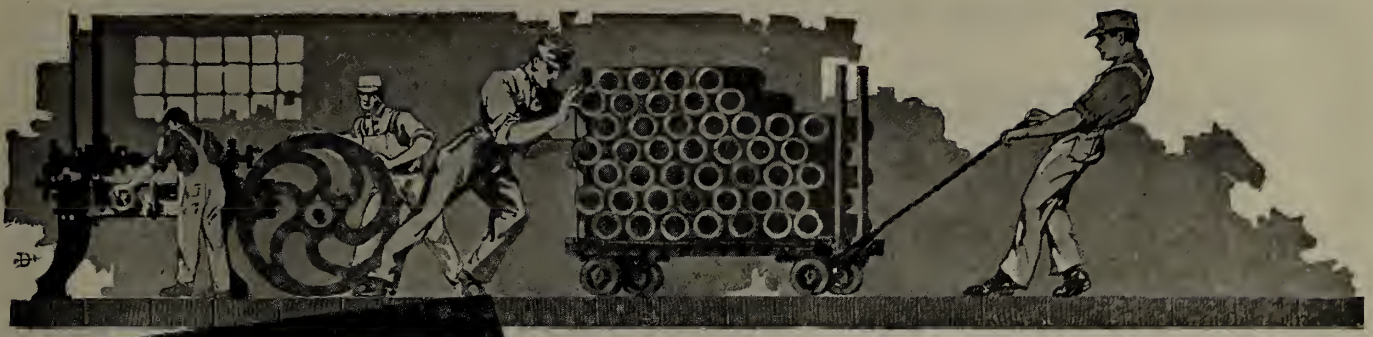
MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off



A and L INTERIOR WOOD BLOCK FLOORS

"The Most Satisfactory Flooring That We Have Ever Found for a Boiler Shop"

Such is the opinion of Mr. M. F. Moore, Assistant to President, Kewanee Boiler Co. It is supplemented by the further statement:—

"We do not know of a manufacturing plant that is as hard on flooring as a boiler factory; as a matter of fact we have tried a number of different kinds of floor."

This is the word of the man who knows. The photograph bears out what he says about the severity of the service. It also shows how wonderfully the floor has stood up.

Beneath these blocks the concrete base bears up the load of these huge boilers. The pitch binder welds block to block and block to base. The surface grows more and more compact as the tough wood fibre mats together to form a wear resisting cushion.

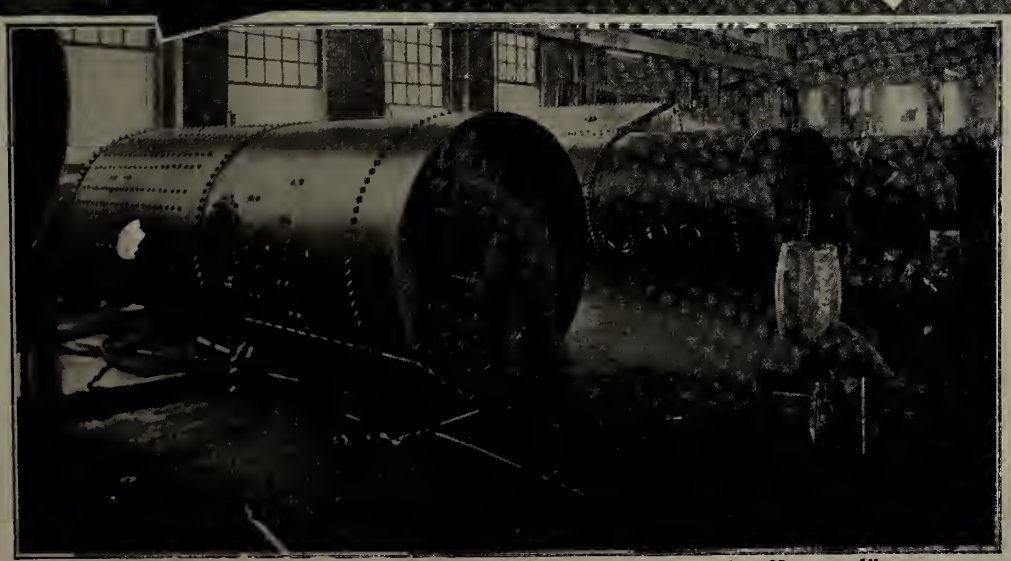
This proves that sound principles govern the construction of the A and L Wood Block Floor, and sound material assures it a life of usefulness at lowest upkeep cost.

Surely when you are considering the flooring question you will avail yourself of such an unequalled guarantee of service.

Write for our Booklet—telling all about this floor. Our Engineering Department is especially well able to advise you on any flooring problem.

Ayer & Lord Tie Company
INCORPORATED
Department C, Railway Exchange, Chicago
BRANCH OFFICES:

NEW YORK
2 Rector St.
PHILADELPHIA
902 Land Title Bldg.
DETROIT
406 Empire Bldg.
CLEVELAND
221 Society for Savings Bldg



A and L Interior Wood Block Floor in plant of Kewanee Boiler Co., Kewanee, Ill.



Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.08½c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.08½c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.18½c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.43c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.00c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., shets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.43c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.65c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	8.00c
Hoops, Detroit	6.50c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	22.00 to 22.50
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	26.00 to 26.50
Frogs, switches, guards, St. L.	29.00 to 29.50
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	28.50 to 29.50
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	25.00 to 25.50
Heavy melting steel, east. Pa.	27.00 to 29.00
Heavy melting steel, N. Y.	26.00 to 26.50
Heavy melting steel, St. L.	27.00 to 27.50
Heavy melting steel, Birming.	21.50 to 22.50
Hydraulic press. sheets, Cleve.	25.00 to 25.50
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Low phos. steel, Buffalo	40.00 to 42.00
Low phos. steel, Pittsburgh	38.00 to 40.00
Low phos. steel, eastern Pa.	35.00 to 37.00
Shoveling steel, Chicago	28.50 to 29.00
Shoveling steel, St. Louis	26.00 to 26.50
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	31.00 to 32.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	16.00 to 16.50
Stove plate, St. Louis	16.50 to 17.00
Stove plate, N. J. points	20.00 to 20.50
Stove plate, Birmingham	18.50 to 20.00
Stove plate, Buffalo	22.00 to 23.00
Stove plate, eastern Pa.	22.00 to 23.00
Stove plate, Cleveland	19.00 to 20.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$21.00 to 22.00
Boiler plate, cut, No. 1, St. L.	19.50 to 20.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	30.50 to 31.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago	19.25 to 20.25

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.32

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	25.75 to 26.75
Busheling, No. 1, Buffalo	26.00 to 27.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
City wrought, long, N. Y.	31.00 to 32.00
Forge flashings, small, Cleve.	24.50 to 25.50
Forge flashings, large, Cleve.	24.00 to 25.00
Forge No. 1, Eastern Pa.	22.50 to 23.50
Grate bars, Buffalo	20.00 to 21.00
Grate bars, Cleveland	20.00 to 21.00
Grate bars, N. J. points	20.00 to 20.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	49.50 to 50.00
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Chicago	36.00 to 37.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	40.00 to 40.50
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.50 to 18.50
Pipes and flues, Cleveland	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	32.00 to 33.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
R. R. wrgt. No. 1, Birming.	28.00 to 35.00
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	30.00

(Net Tons)

Angle bars, iron, Chicago	$37.00 to 37.50
Angle bars, steel, St. Louis	25.00 to 26.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	37.50 to 38.50
Busheling, No. 1, Chicago	25.00 to 26.00
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis	22.50 to 23.00
Busheling, No. 2, Chicago	16.50 to 17.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Cast borings, Chicago	17.00 to 17.50
Cut forge, Chicago	29.00 to 29.50
Iron axles, St. Louis	44.00 to 44.50
Iron axles, Chicago	47.00 to 48.00
Machine turnings, Chgo.	17.00 to 17.50
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	16.75 to 17.25
Pipes and flues, Chicago	22.00 to 23.00
Pipes and flues, St. Louis	21.50 to 22.00
Railroad wrgt., No. 1, Chgo.	31.25 to 32.25
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, Chgo.	29.00 to 29.50
Railroad wrgt., No. 2, St. L.	29.00 to 29.50

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$23.00 to 24.00
Axle turnings, Buffalo	26.00 to 27.00
Shafting, New York	35.00
Shafting, eastern Pa.	38.00 to 40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	46.00 to 47.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	30.50 to 31.00
Steel car axles, St. Louis	42.50 to 43.00
Steel car axles, Chicago	43.50 to 44.50

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	30.00 to 31.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	33.00 to 34.00
Car wheels, Chicago	32.00 to 33.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	26.50 to 27.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, Birmingham	24.00 to 26.00
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast No. 1, Cleveland	27.75 to 28.00
Cast, 1, heavy, N. J. points.	30.00
Cast, No. 1, eastern Pa.	31.00 to 33.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	20.50 to 21.00
Malleable railroad, Cleveland	27.00 to 27.50
Malleable railroad, Buffalo	31.00 to 32.00
Malleable railroad, Pittsburgh	28.00 to 29.00
Malleable railroad, east. Pa.	30.00 to 32.00

(Net Tons)

Cast, No. 1, Chicago	25.00 to 25.50
Cast, No. 1, Cincinnati	25.00 to 25.50
Cast, No. 1, St. Louis	21.50 to 22.00
Malleable railroad, Chicago	28.00 to 28.50
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	23.50 to 24.50

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$34.00 to 36.00
Reroll. rails, 5 ft. & ov., Chgo.	36.00 to 36.50
Reroll. rails, 5 ft. & ov., E. Pa.	37.00 to 40.00
Reroll. rails, 5 ft. & ov., St. L.	35.50 to 36.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, Chicago	36.00 to 37.00
Locomotive tires, St. Louis	32.50 to 33.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, January 10, 1918 *No. 2*

Car Congestion Stagnates Industry

Iron and Steel Plants Experience Worst Traffic Conditions in Their History and Much Production is Lost--Embargoes Tie Up Business on All Sides—Outlook is Not Promising

STAGNATION of shipping is having a paralyzing effect in all directions on the iron and steel industry. The climax of a combination of inadequate supplies of cars and motive power, of coal and other manufacturing supplies, has been reached during the past week. Conditions are pronounced to be the worst in the history of the industry. As a result, scores of mills and furnaces have been forced down and the loss of production has mounted far into the thousands of tons. The outlook for an immediate improvement is not promising, though strenuous efforts are being made to restore something like normal conditions. Many plants rapidly are filling their storage space and unless they are able to dispatch shipments, their speedy shutdown will be necessitated.

Embargoes Bar Business

Pittsburgh and its adjacent districts are laboring under a flood of embargoes which has shut off business communication with many parts of the country. One large plant had 1400 loaded cars within its yards awaiting to be moved. In the Connellsville coke region, 5000 loaded cars have been stalled on the tracks the past week. The Carnegie Steel Co. had 24 blast furnaces idle last week and 20 during the present week. The list of idle mills of this and other large producers in the Pittsburgh district has been equally serious. At one plant, only two of 17 mills were operating last week and this has been increased.

The extent of interruptions of blast furnace operations in recent weeks is shown by the December production statistics in pig iron. The output last month was the lowest since August, 1915. During the month, 23 furnaces were blown out and banked. The loss in production, compared with November, was 12 per cent. The December production was 2,886,553 tons, an average of 93,115 tons daily, against 3,198,597 tons in November, a daily average of 106,620 tons. Blast furnaces in Pennsylvania, Ohio and Illinois have been hit hardest, production in those states falling off 250,000 tons from November.

Revised Price Checks Sales

The declaration of the President that all contracts now taken for shipment subsequent to March 31 shall be subject to government prices in effect at the time of delivery has had the effect of checking forward sales in pig iron. Makers see no incentive to add to their bookings for extended delivery. New inquiry, however, remains brisk. Orders for government work are coming out in a heavier way and the largest so far to be placed calls for 36,000 tons of basic for shipment to an Erie, Pa., consumer. The iron is to go into navy castings.

Traffic problems have absorbed all attention of the industry during the past week. General business in finished lines has been relatively quiet. A 30-day extension has been granted by large interests on unspecified tonnage under contracts which were dated to be wound up Jan. 1.

Fixed Price Booklet Ready

A COMPLETE booklet containing all the official prices, differentials and extras fixed by the government on various iron and steel products has been prepared by THE IRON TRADE REVIEW and now is ready for distribution. Subscribers will be furnished with copies on application, without cost. The booklet represents the only complete collection of base prices, differentials and extras determined upon under federal supervision which yet has been arranged or published. All the price data from iron ore to carpet tacks has been grouped and correlated in accordance with the character of the product, and has been indexed alphabetically to allow quick reference. The complete story of price-fixing also is told. The booklet contains approximately 60 pages and is of a size for convenient handling.

The Iron Trade Review

EDITORIAL

Coal and Coke on Trial

MORE complaint as to their inability to buy supplies at the fixed government prices has been raised by consumers of coal and coke than of any other material of the iron and steel industry. This situation is in sharp contrast to that which generally prevails as to mill and furnace products, where buyers have been able to obtain tonnage at the agreed schedules without excessive trouble. Furthermore, the opportunities for obtaining steel at the government prices are improving steadily, subject to whether the material is to be used for an essential product, because order books gradually are being reduced or modified under priority regulation. In bars especially, consumers are able to obtain material with little delay.

A common explanation offered for the absence of coal and coke sales at the government prices is that production largely is taken up by shipments against contracts made before the market was fixed by the President. This is an explanation that scarcely explains numerous incidents which have come to light. Along this line, a letter to THE IRON TRADE REVIEW from an industrial company in the middle west is illuminating. An officer of the company writes:

"The government has fixed the price of Connellsville coke at $6 and $7 per ton and we have requisitioned on our regular concern for coke, receiving the reply they were unable to furnish any coke at this price, but could sell us coke for immediate delivery at $15 per ton. What we want to know is, does the government permit this to be done, and what recourse have we in such a case."

Attempts at profiteering such as this have brought much criticism upon the coal and coke producers. Many of the producers have endeavored honestly to co-operate with the government and to do what the latter has called upon them to do, to the extent that their bona fide obligations would permit. They nevertheless are sharing with their less honorable associates the incubus of discredit through their industry having appeared in an unfavorable light before so many people. The reputable coal and coke producers of the country owe it to themselves to join hands with the government to stamp out such reprehensible acts from which their industry is suffering. If they do not, the government is likely to lay heavy hands upon their business under the complete authority given it by the Lever act. As much was plainly stated by W. S. Blauvelt of the National fuel administration to the coke operators at a general meeting at Connellsville last week. Indictment and arrest of some coal dealers in the Pittsburgh district during the past week may be taken as a sign of the times.

Tools Present Vital War Problem

SERVICEABLE superstructures built on insecure foundations presage a diminished usefulness of the whole. More specifically, putting forth a splendid fighting front of men and money backed by patriotic enthusiasm, but inadequately supported by munitions and ships obviously decreases the effectiveness of these potentialities. Machine tools, for example, which are of vital importance in ship construction as well as in munition-making, need the fostering hand of the government quite as much as destroyer plant work. The country's capacity for making heavy tools has been limited, a tremendous demand has arisen and builders are falling steadily behind in deliveries. Many builders would enlarge their production capacities were they assured of a sufficient volume of orders; others would expand, but for the fact that they are staggering under the burden of overproduction with its attendant tied-up working capital. The latter find it difficult to secure financial backing from banks for business expansion. Handicapped in this way, the machine tool industry is having difficulty in meeting requirements. Governmental financial stimulus, it would seem, would transform into kinetic energy this almost incommensurable potential force.

Labor Faces Stern Duty

ON all sides the cry is raised that efficiency in conservation, production, transportation, distribution, etc., will win the war. All this when summed up, hinges upon the one brief statement that labor can, if it will, bring victory. After months of intensive training, our army will be numerically sufficient to work an appreciable influence in the test of arms. If such an elaborate organization is necessary to make soldiers that represent possibly 2 per cent of the population, of much greater necessity is the training or organization of the remaining 98 per cent, the larger portion of which is labor.

Since the war began, important strikes have occurred in 34 of the 48 states of this country, all of which have been an incalculable aid to the kaiser. In New York state, from Oct. 1, 1915, to June 30, 1916, nine months, 328 strikes were reported. These

involved 253,954 persons and represented an aggregate loss of 9,580,601 working days. Since the President's declaration of war, United States shipyards because of strikes and labor disputes have lost 536,992 working days, the equivalent of the labor of 20,000 men for a month. All the unsettling war reports do not come from across the ocean. It follows from the statistics of strikes and other disturbances that labor is not doing its full part in this crisis, since without its complete and whole-souled effort, the proper measure of support and co-operation will not be given the men at the front. Labor must realize that profiteering for wages must have no place in its bill of duty and that by interrupting production, it will not only be aiding the kaiser, but will be fighting its own sons and the sons of its friends, who have volunteered to lay down their lives if need be to bring permanent peace.

Finally, this is a war of labor, by labor, for labor and against labor and as soon as England's example of a truce between capital and labor for the duration of the war is followed here, the sooner will most effective results be obtained.

Difficulty in Fixing Nonessentials

DETERMINATION of what is a nonessential product promises to be one of the hardest tasks the government has undertaken in its war program. It is easy to think the other fellow's business is not essential, but that one's own cannot be dispensed with.

It seems like harsh treatment for the government to close up an industry which has been built up by patient endeavor and now represents the livelihood of its owner, stockholders, and employes. But another idea comes into the question. The billboards have carried the interrogation "Shall we be more tender with our dollars than our sons?" After all, is it more of a hardship for some to lose their business profits than for others to lose their lives or health or limbs? Men are giving up all they have, far more than financial considerations, to fight at the front.

Probably the problem will work itself out in a natural way by the gradual elimination of the really unessential industries through their inability to proceed as they have done in the past. Demands for the production of articles the need for which is imperative will absorb raw materials and labor until the latter will not be available to other non-war lines of industry. Under these circumstances the so-called nonessential activities may be weeded out without violence to the business structure.

It requires a high degree of patriotism for business to offer itself as a sacrifice, but not so much so as for the individual who goes to fight at the risk of forfeiting his life.

The Alaskan Coal Mining Industry

IN 1916 Alaska mines yielded a mineral output valued at $48,632,138. The output in 1915, greater than that of any previous year, was valued at $32,854,229, making the increase of 1916 almost $16,000,000, nearly 50 per cent. This enormous growth was due in great part to the large tonnage and high price of copper, yet nearly all other minerals were produced in greater quantities than in previous years.

An especial feature of the Alaskan mining industry was the increase in coal production. In 1915 it was 1400 tons, valued at $3300, while in 1916 the output jumped to 12,200 tons, valued at $55,000. While this output is, of course, exceedingly small, it is at least evidence of the stimulated interest which is being taken in this industry. Alaska has never been taken seriously as a coal producer due to the fact probably that in the early days men migrated there obsessed with the sole idea of gathering in sudden riches in gold. Strange to relate, it is the placer gold mining industry which is crying for coal at the present time.

A study of Alaskan coal output for the last 18 years reveals a curious series of increases and decreases. In 1899 the output was 1200 tons and this increased a trifle during each of the three succeeding years. In 1903 and 1904, however, it fell off, only to take a renewed spurt in 1905, which continued and finally culminated in a production of 10,139 tons in 1907. Then the output steadily declined to 1915. In fact no official production figures were published at all in 1914. Up to the year 1914 lignite had been used almost exclusively.

Economic reasons now seem to indicate that the coal mining industry in Alaska will finally come into its own. There are many regions known to contain large quantities of high grade anthracite and bituminous coals. Still more regions contain enormous quantities of lignite. Indications are that a considerable local market can be had easily, for coal imports exceeded 40,000 tons during each of the last three years.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 188

PIG IRON

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern).....$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)..... base plus 50c
2.75 to 3.25 silicon (No. 1X, No. 2 soft).....base plus $1.50
Over 3.25 silicon..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2+ foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern, Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern, furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia.	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Philadelphia	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.25c
Angle bars, Chicago, base	3.25c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pittsburgh	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh.	4.35
Barb wire, painted, Pittsburgh.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts. 8.00c
Sheet piling, base, Pittsburgh 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound.)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chic.	5.215c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chic.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pittsburgh.....$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	.30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, New York	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pittsburgh, carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh.	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 9, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 9, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh.....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2 Foundry pig iron, Chic.	33.00	33.00	33.00	30.00
Lake Superior Charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton.	33.00	33.00	33.00	30.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia.	34.25	34.00	34.00	30.50
Ferro mang., delivered.....	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh....	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts..	51.00	51.00	65.50	60.00
Open hearth billets, Pittsburgh.	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	2.975
Steel bars, Chicago.....	2.90	2.90	2.90	3.19
Iron bars, Philadelphia.....	3.685	3.685	4.935	3.159
Iron bars, Cleveland.....	3.64	3.64	4.50	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Jan. 9, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Iron bars, Chicago mill.....	3.50	3.50	4.50	3.00
Beams, Chicago	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh.....	3.25	3.25	3.25	3.575
Tank plates, Chicago.....	3.25	3.25	3.25	3.89
Tank plates, Philadelphia.....	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pittsburgh	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	7.875	4.125
Sheets, galv., No. 28, Pittsburgh	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh.....	3.50	3.50	3.875	3.00
Connellsville fur. coke.....	6.00	6.00	.....	7.25
Connellsville fdy. coke.....	7.00	7.00	.....	6.375
Heavy melting steel, Pittsburgh	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	30.00	28.75	26.10	21.50
Heavy melting steel, Chicago...	30.00	28.50	27.00	20.25
No. 1 wrought, eastern Pa.....	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago, net ton	31.00	31.50	31.90	23.75
Rerolling rails, Chicago.....	35.00	35.75	36.00	27.25
Car wheels, Chicago.....	29.00	29.50	25.90	19.75

(For Additional Prices See Page 188)

Furnace Crippling in Worst Stage

Shortage of Fuel Causes Great Number of Stacks to Bank and Immediate Improvement Not in Sight—Compulsory Revision of New Contracts to Fixed Prices at Delivery Checks Forward Selling

Pittsburgh, Jan. 8.—Perhaps the most serious shortage of fuel in the history of the industry is being experienced at present by blast furnace operators. As a result many furnaces are banked. There is no prospect of immediate improvement in the transportation situation and it is likely that the pig iron output for the current month will show a sharp decline. During the latter part of last week the Carnegie Steel Co. had 24 of its 59 furnaces inactive. Today it had 20 furnaces down, eight of them for relining and repairs and the others banked on account of a lack of coke. Some of them probably will be able to operate only temporarily because of the shortage of fuel. Operations of some independent interests reflect similar results. Difficulty is also being experienced by producers in making shipments on account of congestion and railroad embargoes, a great number of additional points being added to the list where freight cannot be shipped. Insistent demand has been made by some consumers for pig iron. There are practically no offerings. Furnaces are well committed for the first quarter and show a distinct disinclination to sell past that period, particularly because of irregular production and also on account of the uncertainty of prices after April 1. The tendency to cut off tonnages from consumers engaged in the manufacture of so-called nonessentials is growing and some pig iron makers have obligated themselves strictly to supply only those producing essential manufactures. One valley furnace interest has bought from another producer in the same district 5000 tons of bessemer iron at the regulation price of $36.30 and shipments are being made on this order. Some fair sized tonnages of resale bessemer and basic iron have been sold. Most of this was iron which was intended for export, deliveries of which had been held up. Small lots of foundry iron also have been sold for prompt delivery. A consumer in this district asked for 3000 tons of bessemer and 1000 tons of No. 2 foundry iron for second quarter.

New England at Standstill

Boston, Jan. 7.—Business in pig iron has been pretty much at a standstill since the beginning of the year. This is not because there has been no inquiry but because the iron is not available and the furnaces almost without exception are loathe to accept business until they know where they are at in the matter of supplies and also until they see the light with regard to contracts containing the government price clause. A contract subject to revision three months hence, as seen by local pig iron men, is a pretty one-sided proposition, for it merely amounts to a reservation for the user. As one man prominent in the trade says: "If I were a foundry owner, I should enter freely into contracts for iron with the contract containing the clause that I should not have to pay any more than what the government thinks is right." The obstacle to free contracting, however, is, the furnaces are sold up over the first half of this year and are not inclined to accept more business for the present, save in off iron. Some of this iron runs as low as 1.65 silicon, as high as 0.210 sulphur and some that could not be drilled. There is a fairly good movement of iron on contracts, with the

foundries rather anxious to get tonnage owed them. Shipments from most points have been a little better owing to an improvement in the car supply situation. In some sections, there is some anxiety to move iron on the high-priced contracts, but this is hardly common enough to occasion comment. New England foundries continue well off in the matter of coke supplies, but the steam coal situation is still badly strained in spite of efforts on the part of the fuel committee of the state. There are some foundries that must soon close down unless they get coal. Indeed, a few already have been forced to suspend.

Shipping Conditions Ascendent

Buffalo, Jan. 8.—The shipping situation rather than production is engaging the close attention of furnaces in this district at this time. From a commercial standpoint the negotiations throughout the week just closed were negligible, resulting in little more than some trading in off-grade iron on the part of one furnace. Another producer which has been having its troubles with the coke situation has retired from the market indefinitely. Shipments are so dilatory that the furnace will have to carry ahead much iron that was promised for delivery in the near future. Uncertainty as to the future has resulted in the interest deciding to refrain from quoting till it is in a position to guarantee deliveries. The shipping, serious enough, was rendered desperate with a New York Central embargo which became effective yesterday on all shipments to points east of Buffalo. This embargo hits many producers hard. Inquiry is good with producers being in a position to sell readily if they were able to ship. The inquiry is good for second and third quarter delivery, but at least one maker, approached for this delivery, declined to quote during the present unsettled condition of railroad affairs. The inquiry, Buffalo producers say, is unusual in that it is coming from all points. This indicates to furnace men the pressing need of most melters much of which they find impossible to secure within the boundaries of their own districts. Another heavy producer announces that it is sold up on practically all products for the year 1918. This is a producer which uses most of its pig iron in the manufacture of steel.

Selling is Checked

Chicago, Jan. 8.—Selling of pig iron in this market has come practically to a standstill, principally on account of the provision that deliveries after April 1 must be at whatever price the government has established for that period. Northern producers have been practically sold out for first half and all new business would be for last half or possibly second quarter. On this tonnage the provision for a revised price would apply. An important seller has not completed any contract since the announcement was made late in December and is holding up pending business until the form of the clause can be determined to fit conditions. Some southern sellers are said to be planning to add another clause reserving the right to cancel contracts if the announced maximum price should be below a profitable figure based on their costs. This adds to the uncertainty of the situation and increases the slowness of trading. A number of malleable users who neglected to buy when the market was active are now seeking tonnage, which is said to aggregate at least 20,000 tons at present. Some of these melters are in much need and are unable to obtain additional supply. Lake Superior charcoal producers have almost nothing to offer for first half delivery, but are willing to take further tonnage for second half under provision that the price shall be whatever the government has decided at the time of delivery. Consumers of this grade of iron are well covered until the middle of the year and are not now pressing for further contracts. Jackson county silveries now are being booked for last half delivery and bessemer ferrosilicon from 9 to 12 per cent is also available for last half. These contracts provide for a revision of price if a change is made from the present established level.

Try Out Last Half

Cincinnati, Jan. 7.—In the absence of iron to offer for prompt shipment sellers have tried out the last half market by offering some special grades that should be suitable for foundry uses. The effort to induce customers to book so far ahead has not been pressed and the tentative offers made for that delivery have not been met with any material response. Melters seem to think that no matter what price is named for shipment after March 31, there is no use to bind themselves with a contract that is subject to revision. They prefer to take chances on getting a supply of iron, as most of them can call on the government for assistance to fill contracts in hand. This condition is said to be general throughout the country, with most foundries depending on priority orders to get the iron due them. Although the furnaces are doing their utmost to rush iron to consumers transportation delays prove very vexing and in many cases are hard to overcome. The scarcity of basic iron is still a matter of serious comment. Although foundry iron is almost equally as hard to get, the foundry melters can use so many different mixtures that will absorb larger quantities of scrap that they are not as bad off as the steelmakers. Some Ohio silvery and bessemer ferrosilicon iron can be bought for last half shipment at the government's prices, subject to revision to conform to the schedule established after March 31.

New Demand Less Urgent

St. Louis, Jan. 7.—While still fairly keen, the demand for pig iron this week has been decidedly less urgent. Consumers with contracts are urging prompt and full deliveries, but less new business is being done than in several months. Consumption continues unchanged. One reason for the easing off in inquiries is the fact that producers who largely supply this point are sold up through the first half, and some have little to offer for third quarter. Reaffirmation of existing prices by the government has had the effect of holding down eagerness to purchase, users being satisfied no advantage can be gained by rushing into the market if no advance is likely. One of the East Side steel foundries was inquiring quietly for 3000 tons, and orders otherwise during the week aggregate something over 6000 tons of all grades. Virtually nothing was done in spot, sales being confined to a few scattering cars of off grades and a small tonnage of No. 2 southern released by a wiremaker. There has been less complaint on the score of railroad facilities by the local iron and steel trade. Contract material has been moving in quite promptly, and indications point to a still further improvement. Producers anticipate an output increase of from 5 to 20 per cent.

Basic Tonnage Allotted

Cleveland, Jan. 9.—An incentive to book for forward deliveries has been taken from pig iron sellers by the recent declaration of the President that contracts now made for delivery beyond March 31 must be subject to government price revisions. As a result, sales are few, although new inquiry is considerable and much tonnage recently put out still is pending. Producers have been studying the various angles produced by the new contract ruling. One of these refers

to the anticipation or deferment of shipments under contracts now being made. Accordingly, new clauses are being inserted in contracts covering this point. Large requirements for government work continue to come out. An order for 36,000 tons of basic covering shipment over a year in equal monthly installments beginning in March, for an Erie, Pa., consumer, has been distributed. This material is to cover navy castings. Lots of 1200 tons of foundry and 300 tons of high silicon malleable for government contracts at Bay City and Muskegon, Mich., also are out. War business in pig iron now is being distributed through the American Iron and Steel institute instead of directly by the steel director at Washington as in the past. A Canton steelmaker has been unable to satisfy a 20,000-ton basic requirement for second quarter.

East Stops Selling

Philadelphia, Jan. 7.—Business in pig iron has been brought to a standstill here as a result of the recent recommendation by the war industries board that all sales calling for delivery beyond April 1 be made subject to any change in the government price schedule at time of shipment. Owing to the fact that the furnaces in all cases are sold up to July 1, they are in no position, as a result of this recommendation, to make sales at definite figures, and since they consider any other method of doing business as undesirable, they are not booking anything. The exceptions to this rule are in a few trifling tonnages here and there which the furnaces manage to squeeze out for early shipment to regular customers. The only important sales of the week comprised tonnages on which negotiations practically had been completed by Dec. 31. These included some 8000 tons of high manganese basic for second half to a Trenton, N. J., melter, and 1400 tons of forward foundry for the Norfolk & Western railroad. Appreciating the uselessness of trying to buy under present circumstances, most consumers have left off inquiring. Copper-bearing low phosphorus iron is the only grade which now can be secured for nearby delivery. Among inquiries for this grade is one from a Pittsburgh steel foundry for 1000 tons for January and February. Eastern blast furnaces are running at a greatly reduced rate. Among furnaces which either are banked or which are greatly handicapped by the lack of coke are those of the E. & G. Brooke Co., the Alan Wood Iron & Steel Co., the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co. and others.

Coke Crush Unparalleled

Traffic Congestion at Worst Stage in History and Government Hastens to Take Sweeping Action—May Pro-rate Shipments

Pittsburgh, Jan. 8.—Sweeping action is expected to be taken soon by the government to relieve the coke situation in the Connellsville region which is extremely serious. Operators and consumers say that the traffic congestion there at present is the worst in the history of the industry. It was estimated last Thursday there were 5000 loaded cars or more on the Monongahela railroad, the Monongahela division of the Pennsylvania railroad and the Pittsburgh & Lake Erie, some of which had been standing on the tracks between the ovens and the Brownsville connection for four or five days. Great quantities of coke have been drawn from the ovens and piled on the ground. The trouble has been due principally to the shortage of railroad crews and the reduced efficiency of motive power caused by the severe weather. While the car supply has been low, this is not an important element in the situation inasmuch as it has been impossible to move the great numbers of cars that have been loaded. The situation became so acute that Warren S. Blauvelt of the fuel administration has given the matter his personal attention. Mr. Blauvelt addressed a meeting of about 200 coke operators last Thursday night at Uniontown, and has also been in Pittsburgh and taken up with blast furnace interests discussion pertaining to a solution of the problem. Mr. Blauvelt in urging coke operators to produce as much coke as possible and to dispose of it at the government prices, said that everything possible would be taken to relieve the congestion. One plan being considered calls for the elimination so far as possible of cross hauls and another for the pooling of shipments where this is feasible. Consideration is also being given to a plan whereby blast furnace operators will ascertain the amount of coke required by each furnace to produce a ton of iron. It is then proposed that shipments of coke be prorated according to the fuel consumption of each furnace. A committee of seven coke operators to distribute tonnages was appointed at the Uniontown meeting. Modern furnaces it has been pointed out require from 1600 to 2100 pounds of coke to make a ton of iron, while some of the older stacks consume as high as 3000 pounds. While the movement of coke from the Connellsville region is severely restricted, some fair sized tonnages have been shipped, particularly to the east. By-product coke production also has been reduced at plants which have relied upon river transportation to obtain coal. Fuel Administrator Garfield has issued an order continuing the coke prices of Sept. 24 in effect until further order. Production in the Connellsville region for the year 1917 up to Dec. 29, totaled 17,848,341 tons, according to the *Connellsville Courier,* and for the week ending Dec. 29, totaled 251,398 tons as compared with 291,374 tons for the preceding week.

Chicago Storm Serious

Chicago, Jan. 8.—Heavy snow falling Jan. 6 blockaded railroads in the Chicago district to a degree that practically stopped all receipts of coal. The immediate effect of this was to limit production of byproduct coke and temporary banking of blast furnaces has been resorted to by steelmakers, thus greatly limiting the production of pig iron. Steel mills have been in the position for some time of having practically no reserve of coal and are dependent upon daily receipts for their coke-making material.

Can't Get Quotations

St. Louis, Jan. 5.—Extreme difficulty is being experienced in getting the eastern ovens to quote for any future delivery and getting anything for immediate shipment is entirely out of the question. The general demand continues as urgent as ever. Best posted members of the trade say the railroad situation has not improved, but on the contrary is worse right now than it has been, even during the recent extreme weather.

Shortage Grows in South

Birmingham, Ala., Jan. 8.—Coal and coke production in the southern district continues to grow, but the shortage is becoming more acute. Even in the city of Birmingham, within sight of coal mines, there is such a shortage of coal that retail dealers cannot serve customers, and the public schools and municipal utility plants are about to be shut down. Miners are being urged not only to work full time during the week days, but on Sundays and overtime.

Embargoes Stifle Scrap

Inability of Traders to Ship to Many Points Brings Market to Standstill—New Recommendations Questioned

FOR COMPLETE SCRAP PRICES SEE PAGE 188

Buffalo, Jan. 8.—With a good demand for all grades of scrap, Buffalo dealers find it practically impossible to make shipments. On account of the fact that nothing can be brought in, dealers' stocks are reduced, and because of the fact that nothing can be sent out, no shipments are being made. An embargo was placed on points east by the New York Central yesterday. That means that no scrap has left Buffalo since Monday noon for any point east of Buffalo except Rochester and a couple of other nearby points. All priority orders have gone by the board in a situation apparently caused by congestion of cars at places nearer tidewater. Notwithstanding the car shortage some shipments to points east were being made up till today when the big embargo went into effect. What appears to be the advance-guard of a blizzard hit Buffalo Monday and presents a gloomy prospect to shippers who were beginning to look for relief after the spell of very cold weather.

Weather Blocks Business

Boston, Jan. 7.—Business in old material can be considered good when full allowance is made for the severest wintry weather this section has had in years and the inadequacy of transportation facilities. Actually, the volume of business is light, for in addition to these obstacles, the supply of scrap is not large. Manufacturers not being able to secure new machinery to replace the old, are slow to dispose of the latter, even though practically worn out. New England foundries are so busy that the fear exists that later there may be a marked scarcity of cast scrap; demand for this class of stock in consequence is pretty sharp. The market is very firm. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought No. 1 yard long, $29 to $30; horseshoes, $28 to $29; cotton ties, $20 to $21; No. 1 machinery, $33 to $33.50; No. 2 machinery, $28 to $29; stove plate. $19 to $20; car axles, iron or steel, $43 to $44; rerolling rails, $34 to $35; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $24 to $25; steel rails, $25 to $26; No. 1 railroad steel, $25 to $25.50; heavy melting steel, $24 to $25; axle turnings, $18 to $19; machine shop turnings, $12.50 to $15; cast borings, $17 to $17.50; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $30 to $32.

New Recommendations Puzzle

Philadelphia, Jan. 7.—Considerable uncertainty prevails here as to just what was meant by the extension, Dec. 27, of the $30, delivered, maximum price on No. 1 heavy melting steel to "all grades of iron and steel scrap to be melted, which normally sold at or under the price of No. 1 heavy melting steel scrap, including malleable cast of all kinds and cast iron scrap of all kinds, including iron car wheels." While all these grades in the past have brought about the same price as No. 1 heavy melting steel when sold to steel plants, it has been customary to charge considerably more to foundries. Therefore the general interpretation of the ruling is that it does not cover cast iron scrap for use by foundries. During the past week, No. 1 heavy cast scrap sold here to foundries at $33.50, delivered eastern Pennsylvania, malleable cast scrap at $32 or higher, and for old car wheels $35 was bid. In view of the uncertainty, however, as to whether or not a maximum price of $30 applies to these grades even when for foundry use, the market is regarded as nominal. Dealers have had very little scrap to sell, due to the severe weather, and the attendant inability to move shipments. The latter condition has led to a scarcity at consuming plants and the latter are eager to pick up all lots offered. This is particularly true in heavy melting steel. This grade now is firm at $30, delivered. Fairly large sales of borings and turnings for blast furnace use were made during the week at $18.50, delivered. Wrought scrap is active, but scarce.

Movement is Limited

Pittsburgh, Jan. 8.—While the demand for old material exceeds the supply, tonnages moving are limited on account of the railroad situation. Dealers in this district are not showing much interest in the market, saying that they cannot find sufficient tonnages to take care of requirements and that it would be almost impossible to make shipments even though material could be obtained. They also apparently have shown only mild interest in the prices recommended by the American Iron and Steel institute committee on additional grades. Scrap dealers have been allowed a commission of 3½ per cent on sales and this is said to be having a tendency to make some consumers deal directly with sources of supply.

Complain Over Recommendations

Cleveland, Jan. 8.—Considerable complaint has been raised by some local dealers and consumers of scrap over the recommendation of the American Iron and Steel institute that maximum price of $35, delivered, be quoted on iron mill material which normally sold at or under the price of No. 1 railroad wrought. It is pointed out that this valuation of such grades as yard scrap, busheling, track scrap, etc., is entirely out of line with what these classes have commanded in the market in the past. None of these grades have been selling above the price of heavy melting steel, or $30, delivered, and some of them customarily have been below that level. Practically nothing is astir in the way of new trading in the local market, traffic conditions having effectually shut off business.

Digesting New Schedules

Cincinnati, Jan. 7.—Dealers have not yet fully digested the new government scrap schedule. Many of these changes will advance the prices on different grades of scrap, but these changes have not yet been definitely made due to the absence of transactions. The railroad situation is curtailing business to such an extent that scrap is moving very slowly to any outside point. Inbound shipments also are held up.

Chicago Market Quiet

Chicago, Jan. 8.—Comparatively little trading is being done in the Chicago market, buyers apparently preferring to take only such material as they need for immediate use and with supplies unusually scarce this situation is comfortable for dealers. Recent announcement of prices for first quarter carrying a provision for revision on second quarter delivery has caused many buyers to avoid accumulating scrap at present prices for fear of a reduction on their finished products delivered during second quarter. Usual sources of supply are not yielding as much material as usual, and some grades are in great scarcity, while there is no surplus of any kind of scrap. The Illinois Central offers 2220 tons, the Chicago &

Northwestern 2100 tons, the Santa Fe 2050 and the Wabash 1400 tons.

Trading at Stalemate

St. Louis, Jan. 5.—The market for iron and steel scrap is almost at a standstill. The demand is not active and neither buyers nor sellers are in the least confident of their position. Dealers say leading consumers will not buy, even at the government figures, and there is a disposition in all quarters to sit quiet and await developments. Important melters declare they are well covered by contracts and are getting ample material to carry on operations, despite railroad congestion. On the other hand, reserve stocks are low in many instances. Tonnage in transit continues to move very slowly. Railroad offerings this week have been larger than for some time, but a considerable portion is bound to be absorbed by the Pittsburgh district, so that relatively little will find its way here. The belief is expressed that by the end of this month things will loosen up and work back to normal. Offerings by the railroads before the market this week were: Pennsylvania Lines West, 2225 tons; Wabash, 1200 tons; Illinois Central, 800 tons; Boston & Maine, 700 tons, and Mobile & Ohio, 200 tons.

Southern Market More Active

Birmingham, Ala., Jan. 8.—The iron and steel scrap market in the south is a little more active and quotations are firmer. Dealers are apprehensive in taking on any large contracts. The car situation shows but little improvement. Heavy melting steel still is considerably under the government-fixed level so far as southern consumers are concerned, the highest price so far being $24, delivered. Old material dealers are anxious for a change in the quotations to an f.o.b. seller's yard basis. Supply is a little more plentiful, though there is yet much country scrap to be brought in. Inquiries are being received in the south from other sections, but delivery troubles are holding back possible business.

A bronze tablet, containing the names of the office men who have enlisted or have been drafted into military or naval service, has been decorated with an American flag and hung in the hall of the Trumbull Steel Co.'s office at Warren, O. The tablet is made so that the lower end can be extended by adding the names of the office employes who may be drafted in the future.

Sheet Mills Face Idleness

Embargoes on Shipments in All Directions May Force Shutdowns as Storage Space is Being Choked

Youngstown, O., Jan. 9.—A majority of the Mahoning valley mills got under way this week after a 10-day cessation over the holidays for repairs only to be served with embargoes which threaten the closing down of many of their number. In some cases incoming shipments of material are restricted while in all cases shipments of finished product have been discontinued until further notice. The Pittsburgh & Lake Erie railroad has embargoed all shipments of raw and finished material in and out of Youngstwn, the New York Central railroad all shipments of raw and finished material east of Buffalo, the Erie railroad all shipments of raw and finished material east of Port Jarvis, N. Y., and the Pennsylvania and Baltimore & Ohio railroads have embargoed from all points all outgoing shipments of finished material and all incoming shipments of raw material except coking coal and blast furnace stock, including ore, coke and limestone. The embargoes apply to government as well as domestic shipments. All the sheet mills are in operation at present, but if the embargoes are not lifted in three or four days, every mill in the valley will be suspended, the time depending upon the storage space available at the various plants. Inquiry for blue annealed has fallen off considerably since Jan. 1. However, black and galvanized grades are in great demand and several contracts have been closed for delivery late this quarter. In fact, few valley mills have any grades of sheets to offer for immediate delivery, their output for the first half of this quarter having been contracted for some time ago. As a rule salesmanagers are not booking further than two months ahead in view of serving government demands. One maker in the valley has turned down in the past week several demands for black and galvanized aggregating from 4500 to 5000 tons because the prospective buyer needed the material sooner than the mills could make delivery. Most large sheetmaker has just completed shipment of a large French tonnage of black and galvanized. Another maker has booked about 400 tons of black sheets for the Emergency Fleet corporation.

Mill Operations Low

Pittsburgh, Jan. 8.—Lack of steel has greatly curtailed operations of sheet mills in this district. One prominent maker is maintaining a schedule of about 50 per cent of capacity. The average operations will not exceed 60 per cent and may be below that figure. The difficulty goes back to the shortage of coke which has restricted the output of pig iron. Producers of sheets have committed themselves fully for the first half on blue annealed and black sheets and on galvanized sheets for the first quarter. Construction work of a commercial character being light, roofers and builders in general who have supplies of galvanized sheets in stock in some cases are trying to dispose of the material. It is not unlikely that considerable demand will be made soon for galvanized sheets by the navy department in connection with portable houses to be built at navy yards.

Chicago Demand Heavy

Chicago, Jan. 8.—Inquiry for steel sheets of all grades is heavy, all consumers apparently being in need of additional tonnage. Inquiry for export is especially strong, but most sheetmakers are unable to take on this business. The leading independent sheetmaker here is out of the market except for small tonnages of blue annealed for delivery during second quarter.

Tin Plate Stored

To Limit of Warehouse Facilities Because Shipment is Blocked

Pittsburgh, Jan. 8.—It will be difficult if not impossible for the mills to supply tin plate unless priority shipments are given that product. Mills rapidly are reaching the point where it will be necessary to shut down at least part of their capacity for lack of storage room. One maker has approximately 1,000,000 boxes ready for shipment but is utterly unable to move the consignment on account of the transportation situation. This has affected mills to such an extent that they have either entirely or almost exhausted their storage room. The seriousness of the situation is increased by reason of the fact that great quantities of tin plate are stored at plants along the rivers in this and nearby districts and in the event of floods it will have to be reworked.

More Trouble to Get Bars

Mills Lose Much Production as Result of Transportation Troubles— Expiring Contracts Extended

Pittsburgh, Jan. 8.—Consumers of iron and steel bars have been making unsuccessful efforts to obtain tonnages for prompt delivery. Some makers of iron bars are fairly well committed for the first quarter or four months, while certain producers of steel bars are obligated for the entire year. The implement trade also is showing more interest, and while it has not closed new contracts involving large tonnages for first half delivery, in this district, these buyers have sounded out the market. Some makers of steel bars have taken first quarter contracts fairly freely, particularly for bessemer steel. Mills have difficulty in making shipments to many points because of traffic conditions and priority regulations also bar some deliveries. In consequence they have been able to catch up more or less rapidly on their accumulating bar orders. In consequence consumers have been in a position to place contracts on other business for quick delivery, especially with independent mills. One large producer is understood not to be selling, but to have left itself in a position to accept any new business that it may care to take. In some quarters it is believed a seller's market in steel bars will develop soon.

Contracts are Extended

Cleveland, Jan. 9.—A policy of extending for at least 30 days unspecified tonnages of contracts expiring Jan. 1, is being followed by some large producers. This is especially of importance in bars where under the readjustment of production forced by war conditions various manufacturing users have been unable to employ their full tonnage. The automobile industry is a case in point. Bar deliveries, which have been easier of late, again are being set back by the loss of production due to shipping conditions. Some of the largest bar producers in the Pittsburgh district have lost heavily in output during the past week and many mills have been idle. Government work is furnishing some important tonnages. An order for 2400 tons of tire steel for artillery carriages was allotted to a Pittsburgh maker. Local rivet makers who are furnishing large lots for government ship construction, have placed some heavy orders, including one for 6000 tons. Some inquiries for vanadium steel for ordnance work are current. Some makers continue to offer first quarter contracts especially in bessemer steel.

Spot Buying in West

Chicago, Jan. 8.—General conditions in the market for hard and soft steel and iron bars tend to make it a spot proposition. The possibilities of new price being named for delivery after April 1 prevents buying far into the future, both consumers and makers preferring to wait the outcome rather than commit themselves on an uncertainty. The leading interest continues its policy of accepting small lots from regular customers for delivery at convenience, but the total tonnage involved in this business is not large. Its principal effect is to give a more comfortable feeling to the consumer. Hard steel bars are in light demand with implement manufacturers about the only present buyers. Nothing is being done by concrete builders and bed manufacturers are not now in the market. Bar iron is being sold in small tonnages for delivery during first quarter, but there is light inquiry and neither the buyer nor seller desires to contract for second quarter.

Shafting Market is Quiet

Pittsburgh, Jan. 8.—Makers of cold-rolled shafting report that new requirements involve relatively small tonnages. A considerable portion of the buying is for government needs. Some makers have taken first quarter business more or less freely, however. The automobile trade is expected to come into the market soon. Producers are having difficulty in making shipments owing to railroad embargoes.

Nut and Bolt Output Cut

Pittsburgh, Jan. 8.—Operations of nut, bolt and rivet plants in this district have been interfered with during the past week by the severe weather. Some producers were compelled to close down entirely for a day or more and others had to restrict operations in certain departments. Contracts and new business call for capacity operations and these are being maintained where weather conditions permit. Makers report that they are able to get adequate supplies of steel bars at 2.90c, Pittsburgh, for government requirements, but strictly at contract prices where they are to apply on domestic requirements. Producers have bid freely on an inquiry recently put out by the Jeffersonville arsenal, Jeffersonville, Ind., for 40,000,000 bolts. This order is expected to be placed this week among several makers. Domestic consumers are showing an increased interest in the market and there is some export demand for rivets.

Government Buys Hoops

Pittsburgh, Jan. 8.—Fair demand exists for hoop steel and the government recently took 400 tons for shipment to France, while another order involves 500 tons. Business was taken at the government price of 3.50c, Pittsburgh. Makers of both hoops and bands have been able to take good care of contracts and appear to be more interested in taking on new commitments and in consequence there seems to have developed a buyer's market in this line.

Cotton Ties Market Closed

Pittsburgh, Jan. 8.—The season for cotton ties has closed and will not be formally opened for several months. The government price on hoop steel being 3.50c, Pittsburgh, it is estimated that the cotton tie market for 1918 will open at approximately $1.75 per bundle, Pittsburgh, comparing with the price of $2.12, the opening price for 1917.

Government Buying

In Railroad Equipment Causes Speculation—More Car Inquiry

New York, Jan. 6.—Considerable speculation prevails in the eastern car market as to the immediate effect of government control on the buying of railroad equipment. One rumor is that the government, in an effort to clear up the present congestion and to facilitate shipments in the future, will place orders shortly for 100,000 cars. Well informed interests, however, believe that this report is premature. They state that in their opinion the first efforts of the government in straightening out the traffic tangle will be along lines of using present equipment to the best advantage, and to continue to do so until it is found inadequate. Much can be accomplished, it is thought, by the government plan to transfer rolling stock to roads where the traffic is not so heavy.

Included in the private business of the past few days are 200 hoppers which the Republic Iron & Steel Co. let to the Pressed Steel Car Co. Among current inquiries are 1000 coal

and 3000 flats for the Illinois Central which is the revival of an inquiry put out several weeks ago. The Atlantic Coast line is considering 1000 box cars. The Shippers Car line wants 50 tank cars.

Due to the impossibility of securing assurances as to deliveries, foreign demand has been of little consequence for several months. In view of this situation, an inquiry now is out from the Chilean State railways for 1000 cars of miscellaneous type is unusual.

Car builders recently have been under great disadvantage in quoting on new business; due to difficulty in getting steel. It has been impossible in some cases even to secure steel for cars for the government. One leading builder, who inquired for 30,000 tons of plates, largely for government work, failed to secure a reservation since the mills had all the tonnage they could turn out in ship plates for the Emergency Fleet corporation. Pending inquiries include 1000 tons of tie plates for the Pennsylvania and a slightly smaller tonnage for the Philadelphia & Reading.

In the absence of the government's fixed price on rails, numerous small lots of rails, ranging, in some cases, up to 500 tons each, continue to be sold at prices ranging from $75 to $85, f.o.b. mill.

Defers Rail Purchase

Cleveland, Jan. 9.—The Toledo Railway & Light Co., which recently inquired for 1000 tons of rails, has decided not to buy at this time.

New Car Inquiry Out

Chicago, Jan. 8.—Some additional activity is being manifested for freight equipment, although this is not extensive. The Atlantic Coast Line is inquiring for 1000 box cars and the Baltimore & Ohio railroad for 1000 each of hopper, gondolas and flat cars. This road is in the market for 30,000 wheels. It is stated that about 10,000 cars contracted for the Russian government and now being held up may be diverted to the Italian government by the makers to whom the Russian order was given. It is understood practically all the steel for these cars has been delivered and with changes to suit the Italian specifications these cars can be turned out promptly. The Illinois Central has not yet closed for 1000 gondolas, for which it inquired several weeks ago.

Several Norwegian munition factories have combined under the name Norsk Spraengstofindustri, with a capital stock of $3,216,000.

Steel Buyers Discouraged

Find Great Difficulty in Getting Semifinished Material and Cease to Inquire—Production Loss Complicates

Pittsburgh, Jan. 8.—Demand for billets and sheet bars has declined. This appears to be due to the fact that buyers have found it impossible to cover requirements and in consequence have withdrawn from the market. At the same time it is understood that some brokers have tonnages of billets and sheet bars in stock, but they are unable to make shipments on account of the railroads situation, or are not in a position to take tonnages at the government prices. There is considerable complaint that the government has not encouraged legitimate and important steel brokers by affording them commissions on sales. A number of mills are supplying bessemer steel on contracts for billets and sheet bars and use open-hearth material to meet government requirements. Production of billets and sheet bars is estimated at about 70 per cent of capacity in the Pittsburgh and Youngstown districts. Considerable inquiry is out for billets rolled from discard steel. One broker has asked for 2000 tons per month of 2½-inch billets rolled from discard steel for the entire year. Another middleman wants 4000 tons of 4-inch billets rolled from discard steel. While it is known there is a fair volume of this high carbon steel on the market many mills are remelting it to make up for the shortage of scrap. A Canadian interest is offering about 10,000 tons of 4 x 4-inch steel billets for immediate shipment. Billets of 4 inches and larger sell at $48.50, Pittsburgh, and 2½-inch billets for high carbon grades are quoted at $52 or $1 extra up to 0.60 or $2 extra for steel analyzing higher in carbon. Makers of wire rods are receiving inquiries for both domestic and foreign shipment. Canada, France and Italy are included in the demand from abroad. These tonnages are not large. Some mills are out of the market for both soft and high carbon grades and none appears to be actively seeking business.

Strip Demand Improves

Pittsburgh, Jan. 8.—Improvement is reflected in the demand for cold-rolled strip steel. The automobile industry is not buying as heavily as under normal conditions, but is expected to become a more important factor soon. Business placed directly and indirectly by the government represents a large portion of the demand. Operations are estimated at about 70 per cent. Railroad embargoes make it impossible to ship to numerous points.

Offerings are Few

Cleveland, Jan. 9.—Because of the loss of production due to traffic conditions, makers of billets and sheet bars are obliged to offer this material even more sparingly than in the past. Virtually no sales are being made. Local buyers of slabs report they have had little difficulty to obtain adequate supplies from their regular sources of late. A Canton buyer has inquired for 1000 tons of rerolling billets.

Wire Production

Severely Cut by Coal and Traffic Conditions—Consumers Affected

Cleveland, Jan. 8.—A severe loss of production is represented by the present curtailment of operations forced on the American Steel & Wire Co. in this district by coal shortage. Practically all the mills and blast furnaces are down and only two of the finishing plants have been operating. Consumers, however, are not pressing wiremakers for deliveries as the manufacturing trade is suffering from the traffic conditions equally with the mills and jobbing buyers are doing little. Specifications for bolt wire are heavy, due to the large orders being filled by these manufacturers to the Emergency Fleet corporation.

Receives Nail Order

New York, Jan. 7.—The Jones & Laughlin Steel Co. has been allotted an order by the government for 10 carloads of nails to be used in the construction of buildings at the government proving ground at Baltimore.

Output Greatly Curtailed

Pittsburgh, Jan. 8.—The output of wire mills in this district has been greatly curtailed on account of transportation difficulties, the lack of fuel and of steel. All of the mills of one prominent maker in this district were closed down throughout last week, and it is not likely that they will be able to resume during the current week. Some mills have had to draw on capacities outside of this territory to take care of immediate requirements.

Big Shape Tonnage Awaited

Government Ship Contracts Will Call for Further Large Lots of Fabricated Material—Crane Steel Closed

Philadelphia, Jan. 7.—Although no definite word has gone forth, it now is not expected that further contracts for fabricated ship steel will be placed by the American International Shipbuilding Corp. before March. At that time it is expected that some 96,000 net tons of steel will be placed for the construction of 35 troop ships, each 8000 tons deadweight capacity. So far this company has placed steel for 85 vessels for the government. Richardson & Burgess have been awarded the general contract for extensions to buildings Nos. 105 and 112 at the Washington navy yard. With this exception, the structural market is devoid of developments.

Await Government Tonnage

Pittsburgh, Jan. 8.—Fabricators in this district report that no sizable tonnages are being placed by the government, although it is understood that it is about to close for large requirements, some of them in connection with railroad building. The domestic market is extremely quiet. Mills are doing well in making deliveries considering the seriousness of the transportation situation. Makers of structural material are well filled for the first half.

Crane Steel Placed

Cleveland, Jan. 9.—An order for 2600 tons of structural material for a large hammer-head crane to be built by the McMyler Interstate Co. for the navy department, has been allotted to a Pittsburgh maker. Other structural business in this territory is flat.

Shops Don't Want to Buy

Chicago, Jan. 8.—Fabricating shops are not anxious to contract for more structural shapes than they already have on mill books. So little building is coming out that shops are almost bare of business except work for the Emergency Fleet corporation. For this work the government furnishes the material and relieves the fabricators of making contracts. During the past 10 days government awards have been unusually small, but fabricating shops are busy on business already placed. General structural work in the west is almost absent.

CONTRACTS PLACED

Buildings for West Virginia Pulp & Paper Co., 1200 tons to American Bridge Co.

Pier No. 15, Brooklyn, 500 tons, to L. F. Shoemaker & Co.

Boiler house for Potomac Electric Power Co., Washington, 400 tons, to L. F. Shoemaker & Co.

CONTRACTS PENDING

Grand central viaduct, New York City, 300 to 400 tons, bids being taken.

Boiler house at Washington, for Potomac Electric Power Co., 400 tons, bids being taken.

Bridge for Lehigh Valley Railroad, 500 tons, bids being taken.

Chronic hospital, Brooklyn, 250 tons, bids being taken.

Bank building at Titusville, Pa., 200 tons, bids being taken.

Bridges and track scales for Pennsylvania railroad, 700 tons, bids being taken.

Pier No. 6, State barge canal, 350 tons, bids being taken.

Light Buying

Prevailed in Iron and Steel Pipe—Southern Plants Light

Pittsburgh, Jan. 8.—The market for iron and steel pipe is firm at the prices established by the government but the demand is comparatively slow, due to seasonal dullness. Most producers are catching up on deliveries and in case of butt-weld iron pipe prompt shipment can be made by some mills. Makers of butt-weld steel pipe are somewhat slower in making deliveries and one leading manufacturer is from 15 to 18 weeks behind. Others are from two to three months behind. Deliveries of lap-weld iron pipe are deferred from one month to six weeks. One maker of lap-weld steel pipe is more than a year behind on shipments. The principal demand for lap-weld pipe comes from the oil country interests. Government requirements have been taken care of in good shape and present demands are not heavy. The Philadelphia Co. has not yet placed orders for 20,000 tons of lap-weld steel pipe and 9000 tons of iron pipe inquired for in December.

Western Buying Light

Chicago, Jan. 8.—Bids will be opened Jan. 18 at Ann Arbor, Mich., on 200 to 250 tons. Madison, Wis., has awarded 200 tons to the Central Foundry Co. for universal pipe. Buying is much below normal this winter, as usually by this time contracts have been placed by cities for considerable pipe for their extensions during the coming summer. Routine business, usually bringing in a fair tonnage, is also much below normal.

Southern Plants Need Orders

Birmingham, Ala., Jan. 8.—There is need for business at the plants of the cast iron pipe companies in the south. Government business, being received spasmodically, is not of an extensive nature. No encouragement is held out for an immediate improvement in the pipe trade, though intimation is given that in the early spring some municipal work may be forced to a head. Machine shops and foundries of the south are working on full time and in many instances overtime.

Ferro Contracts

For Last Half Being Made—Demand Generally is Small

New York, Jan. 8.—Business in the principal ferroalloys is exceedingly dull and buyers appear disposed to wait for developments before commiting themselves any further ahead. Demand for ferromanganese consists of a few small tonnages which are wanted for prompt and nearby shipment. On ferromanganese the market continues firm at $250, delivered. Demand for spiegeleisen also is quiet and the market continues to be quoted at $60, furnace. On 50 per cent ferrosiiicon there is a good demand for spot and nearby carloads. Scarcity of this metal is responsible for a continued strong tone in prices, 50 per cent ferrosilicon continues to be quoted at $175, delivered, for prompt shipment and at $160 to $170 for contract.

Chicago Ferro Steady

Chicago, Jan. 8.—Contracts are being made by the local stack producing ferromanganese for last half and to a less degree for second quarter. The quotation remains steady at $250, Chicago furnace, which has been in effect for some time. Demand is steady and the supply from this source is not large.

Pittsburgh Market is Quiet

Pittsburgh, Jan. 8.—The market for ferroalloys is quiet. Only limited inquiry is out for 80 per cent ferromanganese, although producers are understood to be in a position to ship fair-sized tonnages promptly at $250, delivered. Makers as a general thing are comfortably booked for the next three or six months. The demand for spiegeleisen which was fairly active recently, appears to have fallen off. This alloy is quoted at $61.50, furnace, for prompt delivery. Consumers of 50 per cent ferrosilicon are

fairly well covered, some of them for the entire year. This metal is quotable at $175, delivered, for prompt shipment. Small sales have been made at $185 to $207. Producers of the lower grades of bessemer ferrosilicon have committed themselves for the first quarter or the first half and are not making any offerings in the open market.

Reserve Ore

For 1918 Delivery But Few Contracts Are Being Signed

Cleveland, Jan. 9.—Some consumers of Lake Superior ore are making reservations with sellers, but practically no contracts are being signed.

The impression is generally held that little ore for 1918 delivery will be contracted for prior to April 1, when the government will again determine its program of prices. The ore prices which were reaffirmed on Jan. 1 are those which were obtained for 1917 ore.

Ore sellers have always made their sales for a 12-month period. For that reason the President's announcement that contracts should not be made to cover more than the 3-month period between Jan. 1 and March 31, unless subject to revision after that date, has confused the situation.

Some Relief

Now Coming to Coal and Coke Districts—Commandeer Supplies

Pittsburgh, Jan. 9. (by wire.)—Reports from the Connellsville region today are to the effect that the severe car congestion there is being relieved. On the Pittsburgh & Lake Erie railroad coke shipments have been moving rather freely and improvement is shown on the other lines serving the districts. Hope is expressed that the bettered conditions will soon result in good supplies of coke being furnished blast furnaces and allow many of those which are now idle to resume operating.

The coal car congestion in the Pittsburgh district has been almost cleared away for the first time in more than one year. Mines are said to be receiving 100 per cent of their empty car requirements. The mines, however, have not been loading cars as rapidly as was expected because of various holidays which have interfered with the work. Supplies have been commandeered to insure continued operations at plants engaged on war contracts.

Plate Output is Reduced

Inability of Plants to Get Coal and Metal Causes Idleness of Mills—Much Tonnage is Rejected

Philadelphia, Jan. 7.—Business in the plate market here during the past week included additional orders for several thousand tons of plates for shipbuilding, which were placed by the Emergency Fleet corporation, and some 2500 tons of 2 x 12-foot plates, for use in repairing cars, which were placed by the Pennsylvania railroad. Big inquiries continue to come out from all kinds of domestic consumers but the mills are forced to turn them away. At least 25,000 tons thus were refused during the week. Output greatly has been curtailed by the lack of fuel. Plate mills not only are suffering from lack of steam and gas coal for their own use, but from lack of coke at blast furnaces from which they obtain the pig iron for their open-hearth furnaces. At the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co. at Coatesville, Pa., only one plate mill out of four is running and this is a small one. The plate mills of the Lukens Steel Co. at Coatesville are producing at only a fraction of their capacity. The government authorities have had the situation called to their attention repeatedly, but are unable to secure shipments of coal and coke in the necessary quantities.

Valley Mills Get Tonnage

Youngstown, O., Jan. 9.—It is estimated the government has placed orders for ship plates totaling between 30,000 and 35,000 tons among the valley mills during the past two months. Part of this tonnage was placed recently and will be used in the construction of submarines and the emergency merchant fleet. The plates for the emergency ships will be forwarded to one of the lake district where they will be fabricated into ships. At present, however, the plates are being stocked at the mills on account of the strict embargoes placed on all shipments of finished material out of this district. If the embargoes are not lifted or diversified soon, it is stated all mills in this territory will be completely paralyzed.

Government Taking Tonnages

Pittsburgh, Jan. 8.—Large plate tonnages are being taken by the government in connection with the shipbuilding program and it is believed that heavy requirements will be made soon for car and locomotive building now that the government has assumed control of the railroads of the country. The Russian debacle may result in many locomotives and cars building in America for that country being taken over for domestic use and it is reported part of this equipment may be exported to Italy. An interesting situation in the plate market is the offering by several mills of plates of certain sizes, not used by the government, at the regulation price of 3.25c, Pittsburgh. Some of the tonnages are understood to be bessemer steel. These offerings represent stocks which were accumulated when the high open market prices were prevailing. There is a dearth of car orders. Car makers report improvement in deliveries of plates, and appear to be receiving sufficient supplies to maintain operations as fully as labor conditions will permit.

Ship Steel Specified

Cleveland, Jan. 9.—The American Ship Building Co. has issued specifications to the different mills for a large tonnage covering its order for merchant ships recently taken. In excess of 10,000 tons was specified during the week. Most of this tonnage is for shipment within six months. Eastern plate mills have discontinued their offerings of either sheared or universals because of the lack of steel or because of government orders. It is reported that universal plates, however, can be had in other directions with less difficulty. Few variations from government prices now are noted. Local mills are quoting up to 4 cents from stock, but the tonnage is not important.

Manganese Ore Sales

New York, Jan. 8.—Prices on manganese ore recently have responded in marked fashion to the difficulties attendant upon secuirng vessels for bringing in the ore. Several sales of high grade foreign ore have been made at $1.30 per unit at tidewater and this figure now is the minimum. Sellers say that it would be easy to obtain even higher for immediate or fairly prompt delivery.

Operation of the Mexico, Santa Fe and Perry railway, an interurban electric road at Mexico, Mo., has been discontinued because of the fuel shortage. The road will be dismantled and all metal sold for scrap.

Recommend More Price Schedules

American Iron and Steel Institute General Steel Committee Announces Fixed Levels on Tool Steel and Iron Rolls—Further Differentials on Pig Iron Also Are Put Out for Adoption

ANOTHER group of price recommendations for iron and steel products under date of Jan. 7 has been announced by the committee on steel and steel products of the American Iron and Steel institute. The latest recommendations cover pig iron over 0.04 phosphorus and Virginia car wheel iron, iron rolls and tool steel. Chairman E. H. Gary's statement given in connection with the committee's announcement is as follows:

Referring to the statements of the chairman of the committee on steel and steel products of the American Iron and Steel institute dated Nov. 13, Nov. 20 and Dec. 22, 1917, recommending prices for certain steel products to be adopted as maximum prices, to take effect immediately, to apply to the requirements of the United States government, to the war requirements of the allies and for domestic consumption within the United States, the committee now makes similar recommendation to the iron and steel industry in respect of the prices and differentials below stated.

The recommendations so far made by the committee as to maximum prices, differentials, etc., cover the principal iron and steel products and the committee does not at present deem it necessary to make further specific recommendations.

In view of President Wilson's statement under date of Nov. 5, 1917, that the iron and steel manufacturers have agreed promptly to adjust the maximum prices of all iron and steel products other than those on which prices have been agreed upon, the committee now recommends to the iron and steel industry that the prices of all iron and steel products, maximum prices for which have not been agreed to with the war industries board or recommended by the committee, be promptly adjusted so as to be in line with the basis intermediate and finished products for which definite maximum prices have been established. The committee relies upon the patriotism and good faith of the iron and steel industry to accomplish this, and expressed the hope that all connected with the iron and steel industry will co-operate in the proper spirit to this end.

On Dec. 28, 1917, President Wilson authorized the following announcement:

"The President has approved the recommendation of the war industries board that the maximum prices heretofore fixed by the President upon the recommendation of the board upon ore, coke, pig iron, steel and steel products, subject to revision on Jan. 1, 1918, to be continued in effect until March 31, 1918. No new contracts calling for delivery of any of said commodities or articles on or after April 1, 1918, are to specify a price unless coupled with a clause making the price subject to revision by any authorized United States government agency, so that all deliveries after that date shall not exceed the maximum price then in force, although ordered or contracted for in the meantime. It is expected that all manufacturers and producers will observe the maximum prices now fixed."

The committee calls the especial attention of the industry to the above announcement, which applies to all prices, differentials and extras recommended by the committee.

Pig Iron Differentials

SPECIAL CAR WHEEL OR CYLINDER IRON

The price for Virginia or other special car wheel or cylinder irons containing over 1.00 per cent manganese may be made by adding to the base price per ton of $33, the following differentials for manganese:

Manganese	1.00 to 1.50	add $0.50
Manganese	1.50 to 2.00	add 1.50
Manganese	2.00 to 2.50	add 2.50
Manganese	2.50 to 3.00	add 3.50
Manganese	3.00 to 3.50	add 4.50
Manganese	3.50 to 4.00	add 5.50
Manganese	4.00 to 4.50	add 6.50
Manganese	4.50 to 5.00	add 7.50
Manganese	5.00 to 5.50	add 8.50
Manganese	5.50 to 6.00	add 9.50

IRON WITH PHOSPHORUS OVER 0.04

Add to base price per ton.

Phosphorus	Copper-free	Copper-bearing
0.04 maximum	$20.00	$17.00
0.045 maximum	17.50	15.00
0.05 maximum	15.00	13.00
0.055 maximum	12.50	11.00
0.06 maximum	10.00	9.00
0.065 maximum	6.50	6.50
0.070 maximum	5.50	5.50
0.075 maximum	5.00	5.00
0.075-0.09 maximum	*	*

*Use bessemer price.

Iron Rolls

Prices are for condensed grain (sand) and chilled iron rolls.

The following prices are subject to the usual customs of the trade, as regards terms, guarantees, adjustments, replacements, etc. The delivery point is f. o. b. makers' works, but the prices include an allowance for actual freight, in accordance with published freight rates, to the freight station of purchaser, provided same does not exceed 20 cents per 100 pounds. All freight in excess of 20 cents per 100 pounds to be paid by purchaser. The freight allowance does not include any additional charges at destination (for switching service, spotting of cars, drayage, cartage, transfer, ferry car service) or any other expense over and above that covered by the published freight rate applying to the regular delivery station.

PLAIN CHILLED ROLLS

Price per pound

Under 8-inch diameter	10.00c
8-inch diameter and under 10 inches	8.75c
10-inch diameter and under 13 inches	7.95c
13-inch diameter and under 21 inches	7.15c
21-inch diameter and under 24 inches	6.15c
24-inch diameter and under 33 inches under 91 inches long	5.70c
24-inch diameter and under 33 inches, 91 inches long and over	6.15c
33-inch diameter and under 35 inches	6.15c
35-inch diameter and under 39 inches	7.20c
39-inch diameter and under 43 inches	8.30c
43-inch diameter and under 45 inches	10.25c
Rail rolls, 20-inch diameter and over, with open chilled finishing pass on one or both ends	7.15c
Rail rolls, under 20-inch diameter with open chilled pass on one or both ends	7.45c

Plain rolls, part chilled, same price as chilled rolls of like diameter.

Plain chilled rolls requiring over 1½-inch chill, ¼c additional, and at purchaser's risk of breakage, regardless of excessive depth of chill.

Sand rolls, with but one or two plain chilled passes, not less than plain chilled rolls of like diameter.

All other rolls having enclosed chilled passes or grooves, not less than 1.7c per pound higher than plain chilled rolls of same diameter; chills for making same to be charged for at not over 10 per cent above cost, and when paid for may be delivered to customers on demand.

Gap rolls for shovel mills, ½c per pound additional.

SAND ROLLS
Price Per Pound

Under 10-inch diameter	7.95c
10-inch diameter and under 13 inches	7.15c
13-inch diameter and under 21 inches	5.90c
21-inch diameter and under 34 inches	5.50c
34-inch diameter and over	5.90c

IRON PINIONS
Price Per Pound

Under 10-inch diameter	8.35c
10-inch diameter and under 13 inches	7.55c
13-inch diameter and under 21 inches	6.35c
21-inch diameter and over	5.90c

BOXING OR CRATING

Two per cent of face of bill additional.

The above prices for rolls are subject to a discount of ¼c per pound where the purchaser sells and ships to the maker the broken and worn out scrap rolls and pinions produced in operation of its mills, not to exceed 70 per cent in weight of new rolls received, at not over $30 per ton of 2240 pounds in trade account, f. o. b. seller's mill. Any excess freight over $2.50 per ton, necessary to transport such scrap rolls and pinions to works of maker to be paid by the seller of the scrap rolls and pinions.

Tool Steel

All prices f. o. b. point of shipment and net without discount.

HIGH SPEED STEEL
(Base Prices Per Pound)

	Mill shipments	Shipments from makers' warehouse stocks
High speed steel	$2.00	$2.01
Tungsten finishing steel	.65	.66

EXTRAS

All dimensions inclusive. Intermediate sizes take the next higher extra.

BASE SIZES

Round, square and octagon 5/8-inch to 2 inches inclusive.

Flat 5/8-inch to 2 inches thick by 5/8-inch to 2 inches wide.

EXTRA SIZES
(Extras in Cents Per Pound)
Round, Square and Octagon

Size, inches	
1/16 to 1/2	2.0
1/16 to 3/4	3.5
1/16 to 1 1/2	6.0
1/4 to 5/8	8.5
2 1/16 to 2 1/2	2.0
2 5/8 to 3	2.5
3 1/16 to 3 1/2	3.0
3 5/8 to 4	3.5
4 1/16 to 4 1/2	4.0
4 5/8 to 5	4.5
5 1/16 to 5 1/2	5.0
5 5/8 to 6	5.5
6 1/16 to 6 1/2	6.0
6 5/8 to 7	6.5

Flat

Size, inches	
1/8 x 3/16	40.0
1/8 x 1/4	30.0
1/8 x 1/16	20.0
1/8 x 3/8 to 2	14.0
3/16 x 1/4 to 3	14.0
1/4 x 1/16 to 1/2	8.0
1/4 x 5/8 to 1	5.0
1/4 x 1 1/8 to 4	3.0
5/16 x 3/8 to 5/8	5.0
5/16 x 3/4 to 1	3.5
5/16 x 1 1/8 to 4 1/2	3.0
3/8 x 7/16 to 3/4	3.0
3/8 x 7/8 to 1 1/2	3.0
3/8 x 1 5/8 to 5	2.5
7/16 x 1/2 to 1	3.0
7/16 x 1 1/8 to 5 1/2	2.5
1/2 x 5/8 to 1	2.5
1/2 x 1 1/8 to 6	2.0
9/16 x 5/8 to 1	2.5
9/16 x 1 1/8 to 6	2.0
5/8 to 2 x 5/8 to 2	0.0
5/8 to 2 x 2 1/8 to 4	2.0
5/8 to 2 x 4 1/8 to 7	4.0
2 1/8 to 3 x 2 1/8 to 4	2.0
2 1/8 to 3 x 4 1/8 to 7	4.0

Intermediate sizes take the next higher extra.

Annealing, 2c per pound extra.

Bevels, same classification as flats, plus 10c per pound for shape.

Cutting to Specified Single and Multiple Lengths
(Cents Per Pound)

24 inches and over	1.0
18 to 23 15/16 inches	2.0
12 to 17 15/16 inches	3.0
6 to 11 15/16 inches	4.0

Less than six inches—special price.

Forged Discs
(Extras in Cents Per Pound)

Above 25 pounds	6
15 to 25 pounds	10
10 to 15 pounds	12
7½ to 10 pounds	14
5 to 7½ pounds	16
3 to 5 pounds	18
2 to 3 pounds	22
1 to 2 pounds	24
Annealing	2c per pound extra

Forged Die Blocks
(Extras in Cents Per Pound)

Above 25 pounds	4
15 to 25 pounds	6
10 to 15 pounds	10
7½ to 10 pounds	14
5 to 7½ pounds	16
3 to 5 pounds	18
2 to 3 pounds	22
1 to 2 pounds	24
Annealing	2c per pound extra

CARBON STEEL
Base price per pound

	Mill shipments	Shipments from makers' warehouse stocks
Non-shrinkable tool steel	$0.35	$0.36
Special tool steel	0.25	0.34
Extra tool steel	0.18	0.19
Regular tool steel	0.15	0.16

Prices are subject to established customs of trade, and to following extras:

All dimensions inclusive. Intermediate sizes take the next higher extra.

Unenumerated sizes at prices of the next larger on the list.

BASE SIZES
Extras in cents per pound
Round, Square and Octagon

5/8 to 2 inches	Base
2 1/8 to 3	1.0
3 1/8 to 4	1.5
4 1/8 to 5	2.0
5 1/8 to 6	2.5
6 1/8 to 7	3.0
7 1/8 to 8	3.5
1/16 to 1/2 inch	0.5
1/16 to 3/8	1.0
1/16 to 1 1/8	2.0
1/4 to 3/32	3.0
3/16	5.0
5/32	10.0
1/8	18.0

EXTRAS
EXTRA SIZES
Extras in cents per pound
Flat

5/8 to 2 inches thick x 1/16 to 2 inches wide	Base
1/8 x 3/16	20.0
1/8 x 1/4	15.0
1/8 to 1/16	8.0
1/8 x 3/8	4.0
1/8 x 1/16 to 1/2	3.0
1/8 x 1/16 to 7	2.0
1/8 x 7/8 to 8	3.0
1/16 x 1/4	5.0
1/16 x 1/16	4.0
1/16 x 3/8	3.0
1/16 x 7/16 to 5/8	2.0
1/16 x 1 1/8 to 2	1.5
1/16 x 2 1/8 to 7	1.0
1/16 x 7 1/8 to 8	2.0
1/4 x 1/16 to 3/8	2.0
1/4 x 7/16 to 5/8	1.5
1/4 x 1 1/8 to 2	1.5
1/4 x 2 1/8 to 7	1.0
1/4 x 7 1/8 to 8	2.0
5/16 x 3/8 to 5/8	1.5
5/16 x 1 1/8 to 8	1.0
3/8 x 7/16 to 8	1.0
7/16 x 1/2 to 8	1.0
1/2 x 1/16 to 8	1.0
1/16 x 2 1/8 to 8	1.0
1/16 to 2 x 5/8 to 2	0.0
5/8 to 2 x 2 1/8 to 7	1.0
5/8 to 1 3/4 x 7 1/8 to 8	1.0
1 7/8 to 2 x 7 1/8 to 8	1.5
2 1/8 to 3 x 2 1/8 to 5	1.0
2 1/8 to 3 x 5 1/8 to 8	1.5
3 1/8 to 4 x 3 1/8 to 6	1.5
3 1/8 to 4 x 6 1/8 to 8	2.0
4 1/8 to 5 x 4 1/8 to 7	2.0
4 1/8 to 5 x 7 1/8 to 8	2.5
5 1/8 to 6 x 5 1/8 to 8	2.5
6 1/8 to 7 x 6 1/8 to 7	3.0
6 1/8 to 8 x 7 1/8 to 8	3.5

Intermediate sizes take the next higher extra.

Annealed steel, 1c per pound extra.

Cutting to Specified Single and Multiple Lengths
(Cents Per Pound)

24 inches or over	½
18 to 24 inches	1
12 to 18 inches	1½
6 to 12 inches	2

Less than 6 inches special price. Over 18 feet special price.

Carnegie Men Banquet

Judge James H. Reed officiated as toastmaster at the twenty-first annual dinner Jan. 5 at the William Penn hotel, of operating officials of the Carnegie Steel Co. The affair took on a distinctly war-time aspect, the menu, musical program and subjects discussed being arranged accordingly. In opening the speaking program, Judge Reed gave a toast to the success of the United States and its allies in the world war. He also discussed problems arising in the steel industry as the result of the war and the methods employed in overcoming them. President Homer D. Williams discussed steel and its place in the conflict, and Traffic Manager Louis C. Biehler delivered an address on transportation and its help in the struggle. The importance of man power and the large part the courageous soldiers are playing in the war, was emphasized by Charles C. Dinkey, who spoke on "Man—The Human Equation in the War". Colonel Henry P. Bope, vice president and general manager of sales, responded to the toast "Our Country", and his patriotic remarks were loudly applauded. Chairman Elbert H. Gary and President James A. Farrell were unable to be present.

Thirty-five hundred men will be employed by the Holt Caterpillar Tractor Co., Peoria, Ill., manufacturing farm tractors.

Steel Output Has Slumped

Traffic Congestion and Shortage of Supplies is Curtailing Production at Iron and Steel Plants

Production of iron and steel is being curtailed sharply, owing to traffic congestion. Blast furnaces are hampered by inability to secure raw materials, while steel plants are having difficulty in securing sufficient rolling stock to handle incoming and outgoing shipments.

The congestion has grown more acute. Last week at one blast furnace plant, 1400 loaded cars were held up. In the Connellsville district, 5000 cars of coke were stalled. The Carnegie Steel Co. had 24 of its 59 stacks idle during the previous week and 20 last week. Some of the largest barmakers have been forced to practically shut down. As an illustration, one independent producer in the Pittsburgh district had only five of its 17 mills running last week and two the preceding week.

At Buffalo some finished steel plants are partially shut down, owing to an accumulation of material without shipping facilities to carry it away.

Few mills in the Mahoning valley are operating over 75 per cent of capacity. The shortage of coal and coke and traffic congestion are largely responsible for the slump in production, although one plant is crippled considerably on account of the shortage of labor. Only 60 per cent of the coke ovens of the Republic Iron & Steel Co. are operating. In the Cleveland district, the American Steel & Wire Co. seems to be the worst sufferer, with three furnaces banked. Only its 35-inch blooming mill and open-hearth furnaces at the Newburg steel works are operating.

In New York, the scarcity of fuel due to freight congestion has been holding 150 ships in port. This, it is thought, may seriously threaten the supply of materials to the allies. At the six Atlantic ports—Boston, New York, Newport News, Norfolk, Baltimore and Philadelphia—40,000 carloads of export freight is on wheels, in warehouses or stocked. This expressed in tons would aggregate about 2,000,000 and would require 200 10,000-ton ships to carry it away. Half of the export freight at Atlantic ports is at New York. In addition there are about 13,000 carloads of domestic freight.

New England Hard Hit

New England industries, especially those in Massachusetts and Connecticut engaged on government contracts, are seriously effected by the car and fuel shortage, and already a number have been obliged to shut down temporarily. The locality hit the hardest is Bridgeport, Conn., where six plants closed early in the new year. Those were the American & British Mfg. Co., Locomobile Co. of America, Bryant Electric Co., Siemon Hard Rubber Co., Spring-Perch Co., and the H. O. Canfield Rubber Co. Deliveries of fuel oil also have been stopped in Bridgeport, except to the government. As a result of the plants closing approximately 14,000 men were idle. The state fuel administrator was empowered by the government Jan. 1 to commandeer coal for the munitions factories, and in consequence none of the big plants found it necessary to shut down.

Supreme Effort

Necessary to Win War, Says Gary—Should Import Labor

Concentration of every ounce of energy, as well as the appropriation of every dollar of wealth and the application of every atom of skill are, in the opinion of Judge E. H. Gary, chairman of the United States Steel Corp., necessary to win the war. In an address delivered before the Commercial Club of Chicago at a dinner in the Blackstone hotel recently, while not minimizing the might of the enemy, he predicted certain victory. He said in part:

After referring to some of the horrors of war, he continued: "This picture of war conditions is not pleasant to look upon, but it is not exaggerated, and it stares us in the face. We have been slow and stupid or at least indifferent. We have not realized and do not yet realize the full extent of the dangers which threaten us, and in this respect there is little difference between the citizens of the various parts of the United States.

"Our country, as a whole, including the several branches of the government, does not yet appear to appreciate that in order to win in this war, it is necessary to appropriate every ounce of energy, every dollar of wealth and every atom of skill within reach, to offer every sacrifice, even of personal opinion or pride or desire for the advancement of the interests of individuals or political parties."

He then treated of the scarcity of labor, and recommended that labor be imported from the islands of the sea and from the orient. He said: "It is manifest that in order to render the assistance that is asked of us, we must have more men. We cannot produce the quantities or amounts demanded unless the number of men is materially increased."

McKinney Steel Co.

Will Take Over and Operate Corrigan-McKinney Interests

Organization of the McKinney Steel Co., Cleveland, as a successor of the Quinnesec Iron Mining Co. and Corrigan, McKinney & Co., Cleveland, has been completed. By this plan of reorganization, the titles of Corrigan, McKinney & Co. and the Quinnesec Iron Mining Co., have been wiped out. The Quinnesec Iron Mining Co. has been the owner of all the properties and Corrigan, McKinney & Co. have been acting as its agent. In the future the steel works, blast furnaces and iron mines will be owned and operated under the name of the McKinney Steel Co. Incorporation of the McKinney Steel Co. under an Ohio charter has been made. No change in the present officers of Corrigan, McKinney & Co., or the Quinnesec Iron Mining Co., has been made. Price McKinney, who has been the dominating force in the Corrigan-McKinney affairs for years, will continue as president, James W. Corrigan as vice president, and James E Ferris as secretary and treasurer.

Besides the extensive iron ore properties on the Superior ranges, the interests represented in the McKinney Steel Co. will be the River steel works, Cleveland; River blast furnaces, Cleveland; the Josephine blast furnaces, Josephine, Pa.; the Genesee blast furnaces, Charlotte, N. Y., and the Scottdale blast furnace, Scottdale, Pa.

Builder Buys Old Plant

Possession of the former plant of the Samuel C. Tatem Co., Cincinnati, has been acquired by the Oesterlein Machine Co., maker of milling machines and grinders, of that city. The transaction involves the transfer of a four-story, 60 x 266-foot building, a one-story, 103 x 300-foot structure and a power house. New equipment already has been purchased to supplement that of the newly acquired plant.

Causes of Blast-Furnace Breakouts

With Increasing Tonnage and Fast Driving, Breakouts Assume Serious Proportions, Sometimes Wrecking the Furnace, Occasionally Costing Lives, and Almost Always Causing Bad Messes, Delays and Inconvenience

BY F. H. WILLCOX

A BREAKOUT is the term employed to denote the conditions and results of the escape of gas and coke, or slag, or iron, from the bosh, tuyere breast, or hearth of a blast furnace. Breakouts may occur at any point below the fusion zone in the furnace, but the most frequent breakouts are of molten iron at a level below the surface of iron lying in the hearth, and are either through the hearth walls and jacket or into the hearth bottom and out under the hearth jacket.

If this runaway fluid iron comes in contact with water or wet material an explosion occurs which may wreck the furnace or cast-house equipment. Several furnaces have been put out of blast by such accidents, and in numerous instances men have been injured or killed by flames, flying metal, brickbats, and castings when these explosions take place. The hearth has received much attention, and heavier, stronger, and more expensive construction has been developed until the two types of hearth now standard rarely permit explosive breakouts.

Slag breakouts occur from the top of the hearth jacket and about the cinder notch up to the level of the tuyeres. They are seldom dangerous to life or limb, but may cause some damage to the brick lining and are a considerable nuisance and annoyance, because of the resulting delay for repairs and the time necessary to clean up the mess they cause.

The bosh of the blast furnace shown in Fig. 1 is an inverted truncated cone, so designed as to bring its top just below the zone of fusion, the limits of which depend on the grade of ore used and the temperature and volume of the blast; the bottom is arbitrarily fixed at 12 to 24 inches above the center line of the tuyeres.

The tuyere breast is comprised in that part of the hearth which extends from the bottom of the bosh to the top of the hearth jacket. The most energetic combustion of coke and the strongest inthrust of the blast are directly within this part of the furnace. The temperature at the nose of the tuyere may reach 3300 degrees Fahr., and may be as high for a considerable space adjacent, because the combustion of 750 pounds of coke cannot be instantaneous at the 12 or 16 small spaces in front of and above the tuyeres. As the nose of the tuyere is but 6 to 15 inches beyond the face of the brickwork the combustion temperature must reach nearly maximum intensity at the face of the brick. This temperature is sufficient to melt any but the best hearth brick and to soften the best brick so that it becomes plastic or will flow under compression.

To the effect of this high temperature must be added the effect of the blast. In an average furnace 40,000 cubic feet of air, expanded to 60,000 cubic feet at 1000 degrees Fahr., and at 15 pounds blast pressure is forced in each minute through twelve 7-inch tuyeres at a velocity of 310 feet per second. As the blast emerges from the nose of the tuyere with this high velocity it impinges on the mass of coke in the hearth. As this coke is held down by the weight of the furnace burden, the only way of escape open to the gaseous products of combustion is through the interstices between the pieces of coke. In spite of the great weight of the ore, limestone, and coke, the force of the blast makes the coke in front of the tuyeres and presumably that in the interior of the hearth above the tuyeres and along the walls dance briskly. On seeing this movement at the tuyeres one may imagine that the blast is thrusting the coke, which is still strong and harsh, against the hearth walls, and this is found to be the case on stopping the furnace. In some instances the hearth lining above, below and between the tuyeres has disappeared for a depth of 6 to 18 inches and may even be cut to so thin a shell that the furnace has to be blown out.

A few plants do not insert plates below the coolers, but bring the water-cooled hearth jacket up to the bottom of the cooler arch, thus relying on exterior cooling. Though the wall becomes much thinner before a cooling effect sufficient to arrest erosion is established, officials of these plants claim immunity from explosions of plates or breakouts at this point.

The objection to this construction is that the brickwork beneath the tuyere coolers becomes so thin that only an insecure foundation is left to support the coolers, and they may drop down or failure may develop beneath them. This is a valid objection, for the weakest place in a furnace equipped with cooling plates is immediately about the cinder-cooler opening, where at times the plates must be left out because of lack of room. Cinder breakouts occur at this point, between the top of the hearth jacket and cooler arches, not infrequently at some plants. There is, of course, the additional effect of increased erosion from the blast when the furnace is "blowing on the monkey" (flushing cinder when the blast blows through with the slag).

There is no adequate safeguard to prevent slag coming into the blowpipes which are made as heavy and with as thick walls as possible compatible with the necessity of taking them down and putting them up by hand almost daily. For this reason the pipe walls should not be thicker than 7/8 inch, which is sufficient to

Bosh Breakouts Seldom Occur

BLAST, gas and coke breakouts, usually known as bosh breakouts, are almost a thing of the past. Their elimination may be attributed as much to improvements in practice, smoother work on increasingly inferior ores, and less violent slips, as to strengthening of boshes. Although improvement in boshes is generally keeping pace with other furnace construction in increasing security, nevertheless, at many plants the bosh is not as strong, proportionately, as other parts of the furnace. With the present control over furnace operation, the bosh fails only at infrequent intervals. However, if plants with somewhat weak boshes should be subjected to periods of heavy driving for large production, with consequent severe slips, it may be that some boshes, although adequate for normal pressures and slips, would give away.

This article is an extract from a bulletin entitled "Blast-Furnace Breakouts, Explosions and Slips" by F. H. Willcox, bureau of mines, Washington, D. C.

withstand a severe attack, and are usually ½ inch thick. They are usually made of the best grade of bessemer iron, as a poor grade will bend and cut more easily. A few plants use blowpipes made of lapwelded steel pipes. Such pipes may be cheaper under local conditions, but are not as resistant to attack by slag and iron.

Thinning of Hearth Walls

One point should be kept in mind in regard to hearth breakouts, and that is—regardless of the thickness of hearth walls or the cooling intensity on the exterior, all furnaces become worn away on the inside in much the manner shown in Fig. 2, so that the wall becomes relatively thin and retains its form only by virtue of the cooling reinforcement of a metal jacket. This condition is found in furnaces blown out even after a short run.

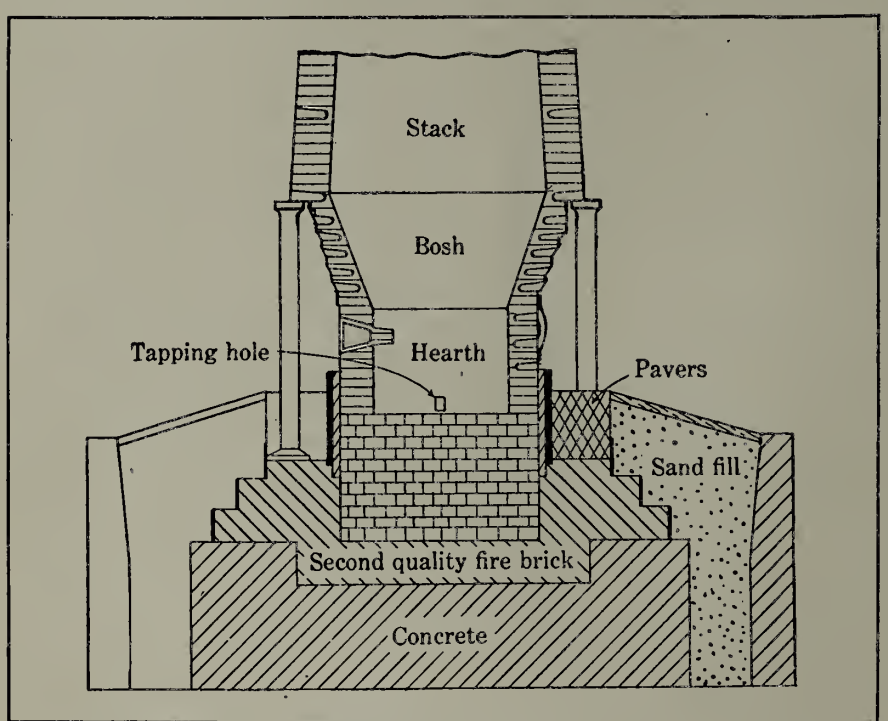


FIG. 1—SECTION OF HEARTH, BOSH AND FOUNDATION OF MODERN BLAST FURNACE

Added to this erosion is the attack of slag. While the composition of blast-furnace slag is frequently acid, that is, rich in silica and alumina, nevertheless, even when viscous with silica, it will combine with avidity with more silica. This is because slags of even pronounced acidity, as regards furnace requirements, are basic from a mineralogist's standpoint. Of greater significance, however, is the physical state of the slag and its effect on the facility with which the slag will attack brickwork. A thinly liquid slag will penetrate the interstices and joints of the brickwork more easily than will viscous aluminous or mucilaginous limy slags. Such slags tend to adhere to the walls and to freeze in cavities, whereas a fluid slag is more likely to drain from the walls at each cast and flush, and on rising it again attacks the exposed surface of the constantly enlarging cavities in the brickwork. All refractory materials tried are destroyed by the physical-chemical activities of heat, erosion and slag, and with a sharp slag and highly heated furnace, corrosion will bring about an unperceived destruction of hearth walls in a short run, the hearth walls sometimes losing 3 feet of thickness.

This action continues to the point where the chilling effect of the water-cooled hearth jacket is sufficient to prevent softening or slagging of the brick. After the destruction of the hearth wall has been arrested by the cooling jacket, the graphitic coating deposited over the brickwork aids greatly in preserving the remaining ring of brickwork, as the graphite is not affected by nonferruginous slag.

The Graphite Coating

The graphite coating is rarely homogeneous. On examination it is found to be composed of flakes, layers and stratifications, between which are veins of slag and iron. These layers are evidently built up as the furnace alternately scours and incrusts the wall with varying conditions of graphitic or white iron, limy or raw cinder, hot or cold working. Various analyses have been made of this material; three typical analyses are as follows:

Constituent	Per cent	Per cent	Per cent
Graphite	25.3	48.4	70.0
Iron	70.0	18.3	12.0
Silicon	1.9	0.1	3.0
Titanium	1.9	0.1	....
Slag	....	27.1	....

It is considered that loosely held brickwork, because of the possibility of cracks developing in it, gives the greatest danger of breakouts. When such a crack forms, the molten iron penetrates it instantly, and if not checked by the hearth jacket may come through. There may be 6 feet of fluid iron above the tapping hole and 2 feet of slag above the iron. The pressure per square inch of 1 foot of iron is 3 pounds, and 1 foot of slag, 1 pound, so that in this case the pressure is 20 pounds. If to this a blast pressure of 25 pounds be added, a total pressure of 45 pounds per square inch is exerted on the molten iron at the bottom of the hearth.

Sudden Breakouts

As a rule, breakouts through the hearth jacket occur suddenly. If cleavage cracks form slowly with the iron following them, the water on the hearth jacket or in the circulating coils becomes steamy several hours before the crack reaches the jacket, and, by cooling the jacket vigorously with a large volume of circulating water, the fluid iron may be chilled and the crack stopped. Undue thinning of the walls is similarly shown up and combated. However, if the crack opens suddenly, as is frequently the case, a jet of fluid iron is forced through the joint and penetrates without warning to the hearth jacket. Unless this invading molten mass is instantly solidified by the cooling effect of the hearth jacket it melts a hole in the jacket and the entire fluid contents of the hearth above this point are ejected with considerable velocity. The opening enlarges sometimes until it is large enough to put a barrel through.

Explosions of molten iron are due to the sudden and confined generation of steam when the molten iron comes in contact with moisture. A secondary cause may be the formation of hydrogen by the action of incandescent iron upon water, the hydrogen in turn exploding in contact with air. There are some peculiar features about the action of water on molten metal. For instance, molten iron may be run into water and be granulated or made into shot without any explosion, provided the water is deep and in large quantity. However, a blue hydrogen flame always appears upon the surface of the water. If iron in great excess

enters water, however, a violent explosion takes place.

Upon blowing a furnce out, the brickwork of the hearth bottom is seen to be replaced by a mass of pig iron, or a mixture of pig iron, slag and graphite, varying in depth from 4 feet to, in one instance, 26 feet below the tapping hole. Comparatively shallow depths are usually liquid, while deep pockets are usually solid or, unless drained, solidify after the furnace is blown out. These masses of material have long been known as "salamanders".

Action Beneath Tapping Hole

The penetration of this fluid mass into the foundations of the furnace gives rise to breakouts beneath the tapping hole. The cause is due to a variety of conditions. The erosive action of the blast may be eliminated, and also corrosion by slag, for except prior to the first cast and at infrequent intervals during the first part of the run, the hearth bottom is covered with liquid pig iron, which would prevent any slag coming in contact with the brickwork or gas circulating adjacent to it, except for brief periods immediately after casting. As the depth becomes greater, even this occasional contact is eliminated.

The other and most accepted explanation of the formation of salamanders is that the individual shapes comprising the hearth bottom are buoyed up by the weight of the supernatant iron, and being insecurely bound in, float up and dissolve in the slag. A cubic foot of brickwork weighs approximately 150 pounds, as compared with a corresponding weight of 450 pounds per cubic foot of pig iron. It is to be noted that it is not at all unusual for a furnace with a 16-foot hearth to make six casts per day of 100 tons each, and this presupposes a height of molten metal in the hearth of 2 to 4 feet, according to the extent of erosion and widening of hearth walls. With 2 feet of slag on top of the iron and 15 pounds blast pressure in the interior of the furnace the force exerted over the surface of an area 12 inches square would be equivalent to a hydrostatic pressure of 2800 foot-pounds. Unless every joint between the shapes making up the hearth bottom is absolutely flush and tight along all vertical and horizontal faces, the fluid iron under such high pressure will penetrate the joints.

When one or a group of these shapes has been isolated from the adjacent brick by a skin of fluid iron, the mass must, by reason of its lighter density, float up in the overlying molten iron.

The eating away of the hearth bottom is usually slow. In many cases furnace men report that after the furnace bottom has reached a depth of 4 to 6 feet below the tap hole, little further burrowing of the iron takes place, but that the furnace bottom works up and down, varying with the working of the furnace. When a furnace is working hot in the bottom and fast, the hearth deepens, and when it is working cold or slow, the hearth builds up. The latter condition should, in fact, promote building up, because the equilibrium between the heat supplied to the furnace bottom and the amount given off to the surroundings is changed in favor of the latter. If the hearth bottom is laid snugly and on heating up expands slightly so that it is tied in, this same heat equilibrium should arrest the downward growth of the salamander, both by retarding any slagging action and also by the decreased fluidity due to chilling of the iron at depth.

The cooling effect of the jacket extends only slightly into the brick on account of the low heat conductivity of the brickwork and does not hinder the molten iron from working back to where the cooling is effected. From this point a sudden crack or erosion of the wall will admit the iron to the jacket. This has happened so frequently that repeated experience has demonstrated that a simple rolled-steel jacket does not suffice to hold the iron in. A ½-inch jacket is often useless in this emergency, and a 1-inch jacket occasionally so. Although the jacket is covered with a film of water that cools it sufficiently under normal conditions, the mass of cold metal is not sufficient to freeze the fluid iron by dispersing its heat, and thus the advantage of the cooling water is not utilized. Practice shows that breakouts with this type of jacket are frequent. The breakout assumes more serious consequence because the jacket is surrounded by a ditch which contains a few inches to 2 or 3 feet of water. If only a small amount of this iron comes in contact with a large volume of water there is no explosion, but when the iron continues to escape in increasing quantities explosions usually occur. This danger has been so repeatedly demonstrated that most plants have eliminated the ditch and abandoned the idea of surface cooling.

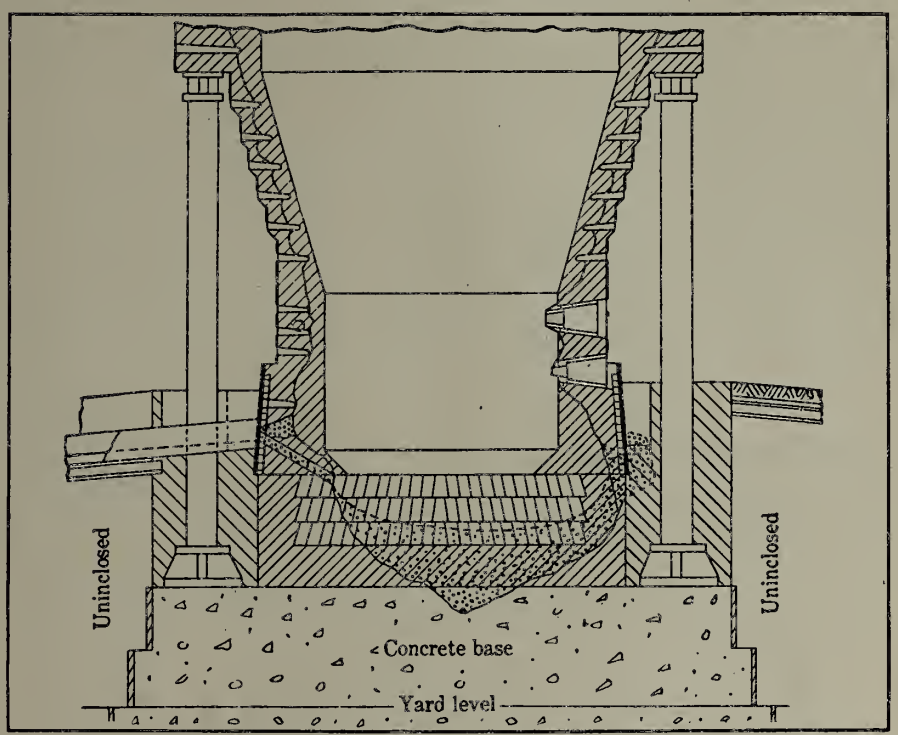


FIG. 2—DIAGRAM SHOWING HOW HEARTH WALLS ARE ATTACKED AND IRON REACHES THE FOUNDATIONS

Conductivity of Fire Brick

Fire brick of hearth and bosh quality has a heat conductivity of 1.32 (kilogram-calories per square meter per hour). The requirement is better met by a material having a high heat conductivity, and this demand is satisfied by iron or steel with a heat conductivity of 300. Also the plate must be thick enough so that in addition to its high heat conductivity and the quick dissipation of heat to cooling water it offers a large mass of cold material to absorb the heat and chill the fluid iron. This is the case with a 6-inch cast-iron jacket,

cooled by water circulating in pipes, or by a 4-inch cast-steel jacket with spray cooling. The cast-iron jacket with pipe cast in is sometimes designed with a corrugated surface and is cooled with a spray in addition to the circulating water in the pipes. This is probably the most intensive cooling possible.

To eliminate the danger of iron coming through the joints between water-cooled castings, one firm uses two rows behind a rolled-steel jacket, the joints being lapped. In order to eliminate the danger of losing the cooling effect of an entire section by intrusion of iron, the pipes may be bent and cast-in in U-shape, the feeds and discharges of several being connected in series so that if one is lost the others in the casting may still be kept in commission. To take care of water from temporary discharges of tuyeres, plates, and other cooling parts, there is left a shallow ditch 6 inches deep by 12 inches wide, but even this is sometimes eliminated. In some plants a circle of 6-inch pipe is laid about the hearth with funnels at each column, or there may be a circle drain pipe with funnels at columns laid in the brickwork about the jacket.

Attention to Water Supply

Several precautions and emergency measures may be taken to minimize the danger incident to breakouts. The bosh-cooling plates and also the plates about the tuyere breast should be flushed out regularly once a week with water under high pressure to prevent excessive accumulation of sediment. If this precaution is neglected failure of the plates is much more likely. In the lower part of the furnace, where the plates may come in contact with molten iron in the hearth, an explosion may result if the iron touches a plate insufficiently cooled because of water circulation being hindered by deposited mud.

The feed water for the cooling equipment should go through a double basket strainer with holes not larger than ¼ inch. These baskets should be changed and cleaned at the beginning of each shift, and in times of flood water when leaves, chips, and other debris may be drawn in at the pumps, the strainer should be inspected more frequently. In addition to provision for high-pressure water, there should be a steam line into the cast house to blow obstructions out of cooling pipes cast into the hearth-jacket segments or plates. Steam at 130 to 150 pounds pressure will frequently open a plugged or slowly dribbling pipe that does not respond to high-water pressure.

In the event of an obstinate hole or breakdown at the mixer or pig machine, delay in emptying the beds, or delay in spotting the ladles, care must be taken that the iron does not rise too high in the hearth. At some plants where the hearth walls are known to be weak, or the hearth bottom low, the blast is taken off just as soon as any delay develops without promise of immediate correction. Other plants keep on full wind for not more than 40 minutes after the regular casting time. If the delay still persists the blast is reduced from a pressure of 15 to 9 pounds and then to a pressure of 4 to 5 pounds. This low pressure is kept on not more than 20 to 30 minutes, as it may make the furnace stick; then the blast is taken off altogether and the furnace drafted back.

Hot Spots—A Source of Trouble

BUCKLING introduces an important operating difficulty because if the surface of the jacket is not perfectly smooth, the film of water essential for cooling and preserving of the brickwork will not cling to it. In a short time the small space not water-cooled becomes hot and then white-hot as the brick work or the conglomerate on the inside melts off. The jacket is quickly exposed to the attack of iron and slag which may melt an opening through it. This lets out a jet of incandescent coke, gas, slag, and iron globules which rapidly enlarges the opening and may result in a serious breakout. The formation of surface inequalities during operation is discouraging, for they make useless the care and money spent during construction to insure a perfectly smooth surface.

The furnace should be flushed more or less continually during such delays to keep the cinder away from the tuyeres. Care should be taken not to let the iron come over the cinder notch, as it may cause an explosion, and especially not to keep the wind on until the iron is above the cinder notch and cinder at the tuyeres, when the cinder cannot be flushed without danger of cutting the "monkey" and cinder coolers nor the wind be taken off without the blowpipes filling.

Stopping the hole at such times is difficult. Cinder is nearly always lying in the hole and the nose of the gun does not fill the hole, and instead of the clay being forced into and beyond the interior face of the wall and packing against the face it sometimes escapes back about the nose, extends only partly into the hole, and fails to fill it completely; cinder or molten iron may escape and come back in the gun as the plunger is drawn back, necessitating a delay, the hole chills up, and no more clay can be forced in. These results may occur even with holes of normal size if the gun is not placed squarely in the hole, is not properly loaded, or if the operator is unskilled or unfamiliar with the method of operating the throttle lever. If a hole is short or hard, care must be used in drilling into it on the next cast to avoid a breakout if the drill goes through the skull unexpectedly.

Care of Tapping Hole

With increasing production the bottom of the hole is made deeper and deeper as the hole is drilled, the angle of slope being increased until the desired capacity is reached. With higher blast and production the cutting effect is increased, until eventually as much as three handbarrow loads of clay are used to stop the hole. One barrowful, with the clay in the barrel of the gun, is more than enough to fill the hole, the two extra barrowfuls being used to insure that the walls and a substantial roof are built up. At this stage such excess clay, besides replacing the walls, tends to flatten out on the inside of the hearth wall and to thus form a key which locks the stopping clay in place within the hole and prevents it from being blown out by the internal pressure. The hole in a 36-inch hearth wall is frequently 5 feet long, but because of its slope does not project in as far as the length might indicate. It is desirable to keep the inner end of the hole away from the face of the hearth wall so as to protect the brickwork from the effects of the current of gas blowing down from the tuyeres and out the hole. This may be overdone, however, and the hole have so long a roof built up that there will be danger of the roof breaking through while the men are at the drill.

When the furnace is blown in the iron notch is rammed full of clay mixed with up to 33 per cent of coal or coke dust, the men working from the inside and outside of the furnace. The notch is sometimes left closed, but usually a 4-inch pipe is inserted in it when it is being clayed up. The pipe should project at least 6 inches inside of the brick lining, and clay be well packed about that part, so that the end will be well inside of any skull that chills on the walls. Holes are drilled in the outer end of the pipe, so that it may readily be withdrawn. Sometimes no pipe is put in, but the clay is packed about a tapered form 4 inches in diameter at one end.

6 inches at the other, and 6 feet long, which is withdrawn after the furnace is filled and ready to light. This is done to insure the hearth bottom being heated by the gas sweeping down through and out of the tapping hole, and also because on blowing in great difficulty is usually experienced in opening the tapping hole, if it is closed from the start, on account of the iron chilling against the cold walls, as frequently the first iron coming in contact with the hole seems to be cold and insufficiently carburized, so that it is tough.

A hole taking clay poorly, working short, or working high up, indicates the necessity of a very deep stopping, extreme caution in drilling, and, if the trouble persists, inserting over the tapping hole a longer tuyere or one with a smaller nose. At times building up about the inside face is aided by temporarily plugging the tuyere for 24 hours. The opening of the tuyere will be easier if a bar hole is pierced through the clay to prevent it from ironing over. If the hole is very short or the wall over the hole is thin, a cold blast on the face of the clay helps to hold it between casts.

The gun should be left in the hole with the steam on for several minutes after the blast is fully on and the hole stopped, in order that the plunger shall hold the clay in the barrel firmly against the plug of clay in the hole and prevent it from blowing out. The gun should not be removed from the hole until the clay has set solid on the inside, which may require 10 or more minutes; 20 minutes allows a minimum factor of safety, and many plants require 30 to 40 minutes.

Pickling With Nitre Cake

Scale Removed from Castings by Pickling in a Solution of Nitre Cake—A New Use for Waste Product

NITRE cake is a product in the manufacture of both nitric and sulphuric acids. Up to the year 1907 it was not considered as a by-product, but as a true waste product, and the chief problem in connection with it was the method of disposal. Most acid plants are located adjacent to streams, and the nitre cake was run into them. Even as late as 1912 some writers refer to it as a true waste product, and it has been an up-hill battle successfully to educate manufacturers both as to its merits and its uses.

Source of Nitre Cake

Nitre cake, such as the E. I. du Pont de Nemours Co., of Wilmington, Del., produces, is a fused salt containing approximately 78 per cent sodium bisulphate, 20 per cent normal sodium sulphate, a trace of ferrous sulphate, some silicious matter insoluble in water, and a small amount of moisture. Its acidity is equivalent to 32 per cent sulphuric acid, and in all its reactions it may be looked upon as containing this amount of available acid. The specific gravity of nitre cake is about two, varying wth the acid content, but in engineering practice we reckon the solid cake as weighing 126 pounds per cubic foot and piled in slabs 100 pounds per cubic foot. Nitre cake is readily soluble in warm or in hot water. The following amounts of nitre cake will dissolve in 100 parts of water at the temperature stated and achieve a saturated soluton in the time stated:

104	parts at	30° C.	in	105 minutes.
124	parts at	60° C.	in	45 minutes.
130	parts at	80° C	in	30 minutes.
160	parts at	100° C.	in	30 minutes.

At very low temperatures the acid sodium sulphate is broken up and the solution behaves like normal sodium sulphate dissolved in sulphuric acid. Attempts have been made to separate the normal sodium sulphate from sulphuric acid by this means, and temperatures as low as—23 degrees Cent. have been tried. However, it was found that the sulphuric acid would contain about 10 per cent sodium sulphate and the sodium sulphate about 9 per cent acid, and that the highest acidity obtainable is 29 per cent.

The chief industrial use of nitre cake at the present time is in the pickling of iron, steel, copper and brass. Pickling refers to the process of removing the oxide scale from the surface of metals, the scale having been formed during some heat-treating or rolling process. For pickling purposes, wooden tubs are used, in which the metal is immersed in solution. Pickling is accomplished in either agitated or quiescent solutions.

In the use of nitre cake for pickling, it is customary to make up in the tubs a solution containing ¾ to 1½ pounds of nitre cake to the gallon of water, which is equivalent to a 2 to 5-degree B. acid solution. Certain grades of steel, notably high-speed steels, require only ¾ to 1 pound of nitre cake per gallon, while others require more, in some cases exceeding the maximum mentioned. The solution is kept hot by means of steam coils, and if the solution is to be agitated, cleats are nailed to the bottom to prevent the detached scale from rising and fouling the pickling liquor.

Speed is essential in pickling(and the metal is taken from the tank as soon as the scale is removed. It is then washed in water and in a lime bath (the latter to neutralize the remaining traces of acid) and finally in water again. When the acid content of the pickling solution begins to weaken, the action in removing the scale is not so rapid. Additional nitre cake is then introduced until the bath becomes high in sodium sulphate and further additions of nitre cake fail to maintain the speed of the solution. At this point, part of the bath is siphoned off and a fresh solution of water and nitre cake is introduced. At the end of each run an entirely fresh bath is made.

In some foundries the castings come from the molds with particles of sand and scale firmly adhering to them. Neither sulphuric acid nor nitre cake will remove this sand entirely, and so sand blastng has to be resorted to. To sand-blast a casting requires a considerable length of time, say 20 to 30 minutes for each casting. If, however, the castings are pickled for from one to three minutes in a solution of nitre cake and then sand-blasted, the time required is less than half of that required for the sand-blasting process without preliminary pickling.

Advantages of Nitre Cake

Nitre cake has an advantage for pickling purposes because it removes the scale efficiently without attacking the metal materially. In the case of wire which has been stored out of doors for a long period of time, and consequently has accumulated a good deal of rust, it is found that after the wire is pickled in nitre cake it is nearer to gage than when pickled in sulphuric acid. This is explained by the fact that the sodium sulphate has a cushioning effect and protects the iron. Nitre cake will not pickle steel in which there has been a segregation of carbon due to improper manufacture. It removes the scale but leaves the carbon. It will therefore detect faulty steel stock.

Nitre cake is now widely used for pickling purposes; it has as much if not more speed in pickling than sulphuric acid; it can be handled easily and does not burn the workmen. The cost of pickling per ton of steel is moderate.

It is used to pickle gun barrels, bolts and all classes of ordnance and munitions, and in every pickling operation where sulphuric acid may be used. It is used in pickling copper and brass and gives good results.

From a paper read before the Philadelphia section of the American Chemical society. Mr. Rhodes is a chemical engineer with the E. I. du Pont de Nemours Co., Wilmington, Del.

Electricity Spurs the Development of



THE illustrations on this page show Westinghouse electrical equipment at the plant of the Central Steel Co., Massillon, O.: Fig. 1, manipulator drive; Fig. 2, accumulator pump drive; Fig. 3, motor-driven bloom shear; Figs. 4 and 5, controlling apparatus for blooming mill motor; Fig. 6, blooming mill showing table and screw-down mo-

Rolling Mill Equipment of All Kinds



tors; Fig. 7, 8000-*horsepower reversing blooming mill motor; Fig.* 8, *motor-driven air compressor; Fig.* 9, *soaking pit cover motor; Fig.* 10, *liquid slip regulator; Fig.* 11, *transformers; Fig.* 12, *first stand of* 24-*inch bar mills; Fig.* 13, 800-*horsepower motor driving bullhead rolls; Fig.* 14, 1500-*horsepower motor for two* 24-*inch stands of sheet bar mill.*

Iron and Steel Technology—1917

Enormous Outputs During the Past Year Have Been Effected Largely by Concentration of Energies as New Developments Have Been Neglected Unless They Promptly Led to Labor Conservation or Expanded Production

BY ROBERT J. ANDERSON

BROADLY considered, conditions in the past year have not been conducive to much technical progress in the iron and steel industry, and all of the advances were of an orderly nature. It is not difficult to recognize the reasons for these conditions. Since our entry into the war, our national resources have been speeded up rapidly in every line of industrial activity, and such a state of affairs is generally more or less inherently inimical to technical progress. The steel business has witnessed tremendous activity, and with output of paramount importance technical matters have in many cases been sidetracked. In some instances where new construction has been made to enlarge capacity even in the face of greatly increased costs, the returns upon the investment have been calculated to be immediate with small consideration being given to earnings after the war—whenever that may be. With these salient features of the year at hand, it is apparent that time has been the most important factor, and broadly speaking, standard practice has been rigidly adhered to.

Completes Furnace in 57 Days

Quick construction may be cited in the case of the blast furnace blown in on July 3, 1917, by the Cambria Steel Co., which was completed in 57 days from the foundation. Actual production in open-hearth plants has, in many places, exceeded estimated capacity, hearth enlargements as well as sundry minor changes being contributory factors.

War demands and the increase of domestic consumption have had a far-reaching effect on the world's markets, and steel works projects are being pushed in the warring and in the few remaining neutral countries. The by-product coke industry of Japan is advancing with great strides, while even in Spain, the increasing difficulties of obtaining steel materials such as castings, forgings and special steel have necessitated plans for increased production by that country to care for its home needs.

Notwithstanding the demands made for output, the exacting requirements of United States shell specifications and the high grade materials needed for munition work should have an important effect on the quality of steels produced. In this connection, it may be remarked that the United States high-explosive shell specifications are so rigid as to exclude the employment of much good shell material. With enormous production of shells demanded, it would appear that the ordnance department should relax on the chemical-analysis requirements and accept stock more according to physical value, which classification characterizes French practice. This would make for increased production and also allow the use of much steel at present ruled out by specification.

No shortage of ore has been experienced in the past year, nor is any curtailment of the supply imminent as existing mines can readily supply the increased demands, ignoring the possibilities of new discoveries. Labor shortage and transportation difficulties are about the only factors that can restrict an increased production. From the technical aspect, developments in washing and concentrating sandy ores have been encouraging, the success encountered assuring further progress in iron ore dressing. Magnetic separation of low-grade iron ores, such as those of the eastern Mesabi and the well-known bodies of New York and New Jersey, could, if sufficient of the best milling machinery were installed, result in four times the present output from such ores being recovered. Large-scale workings such as have been applied so effectively to the porphyry coppers could likewise increase the present production of eastern ores.

Ore Production

The ore-dressing developments in 1917 had most to do with mechanical problems relating to the treatment of lean ores, and the increase of extraction by magnetic methods. Developments in mining proper have been chiefly associated with increasing the efficiency of methods for removing mined ore from pits and in hoisting it from shafts. The tendency toward electrification of iron ore properties has continued. The fact is familiar to all that large supplies of ore are now available but that the high-grade ores of easy access are rapidly becoming depleted. Hence, improvements which will engage the attention of the operators in the future will be in the direction of beneficiation of low-grade ore, the discovery and exploitation of new mines, and the enlargement of magnetic-separating operations. Advances will continue as iron ore dressing is still in its infancy.

The furnaces have had hard driving in the year just closed on account of the increased demand for iron, and the new year should see no let-up. Construction has been noted more for rapidity than for departures in design. The main trend has been in the direction of improve-

Summary of Past Year

LOOKING over the past year it is evident that the huge efforts expended by industry to produce the enormous quotas of iron and steel—a part of America's share of the war burden—have made heavy inroads on the time that would ordinarily be devoted to technical projects or new ideas. Improvements or inventions which will result directly in labor-saving devices or reflect themselves in expanded output, have, however, been greatly encouraged. Again, the shortage of labor and the scarcity of skilled workers, together with the negro migration from the south, have had no small effect upon the technical developments.

The results obtained by the industry in general, considering these handicaps and the inadequacies of transportation and raw materials have been impressive. What under normal conditions would have been considered impossible, has been achieved. The gigantic efforts expended have been inspired largely by patriotic motives and the wonderful results accomplished are impressive in revealing the rapidity with which American citizens can meet a national emergency.

ments to appliances of a mechanical nature, and in the activity as regards by-products. Highly manganiferous slags from steelmaking operations are being added to blast furnace burdens in order to raise the manganese content of the pig iron; charging basic slags of this sort allows a definite advantage. Furnace by-products such as slag and potash have been attractive, the latter in particular, although such may not necessarily be the case at all plants because the alkali content of the ore and stone determines the value of the potash recovery. The potash content of manganiferous iron ores appears to be a considerable source of the valuable by-product. In the main, mechanical invention has been the most active interest as regards the stack itself, and new appliances or improvements on older ones are rapidly entering every phase of blast furnace operation, thereby diminishing the number of employes and making the work safer.

A comparatively small amount of new blowing equipment has been installed, existing blowing equipment generally being remodeled for greater blast pressures. The addition of plate valves which allow increased piston speeds has permitted some plants to put in an additional stack without adding more blowing units.

Hot Blast Stove Practice

Present tendencies in hot-blast stoves are toward the building of three stoves per furnace—an arrangement sufficiently elastic to prevent any probability of discontinuing operations through the crippling of one unit. The best information points to the economy and efficiency of arranging stoves so that there are as few units as possible but of large size. Changes in furnace lines and fuel have made for the employment of higher blast temperatures, and the greatly increased demand for gas for power purposes and boilers has required more economical stove operation. The insulation of stoves and hot-blast mains with insulating materials of diatomaceous earth received much attention in 1917, although practically a new subject three years ago. Insulation of stoves, mains and bustle pipe is a forward step, and worthwhile economies can be effected by proper attention to prevention of heat loss by this means. In general the development as to stoves has been along the lines of increased capacity and a reduction in the number per stack, coupled with more attention to the details of scientific operation.

The advances in the use of metallurgical fuels in the past year were continuations of well-grounded tendencies of heretofore, with interest in powdered coal active, and with the natural gas situation becoming constantly more acute. The great problem now confronting the industry is the fuel problem, and engineers have had to consider fuels from a broad viewpoint. By-product coke oven plants increased markedly in 1917, and it is estimated that the production from by-product ovens is over 50 per cent of the total output of the country. If the present construction of new units is entirely completed early in 1918, the oven capacity should approximate 30,000,000 tons for this year. Progress has been attended with advances in the recovery of benzol. In fact the development of benzol goes on record as one of the most remarkable in chemical industry in the past three years. Practically every by-product plant in the country is now equipped for benzol recovery.

Natural Gas in 1916 and 1917

THE consumption of natural gas was greatly increased in 1916 *and* 1917 *both in the home and for industrial purposes. In fact, at one period the demand entirely consumed the available supply which culminated in a general price advance and in some instances restrictive legislation For these reasons many plants were compelled to forego the use of this convenient fuel. In open-hearth furnaces it has been replaced to a large extent by coke oven gas and powdered coal. Crude oil, while a good fuel for open-hearth furnaces, is high in price*

The theory that there will be no outlet for benzol and toluol when the war is over is receiving more credence than is its due. Admittedly, the war requirements are taking many of these products for picric acid and trinitrotoluol, but when the production for war needs no longer is necessary the outlet for these products will be largely in the motor-fuel field. About 10,000,000 gallons of toluol are now produced per year, but there appears to be no substantial ground for fear of impossibility of disposing of this output when hostilities cease. The war has unquestionably accelerated the growth of the by-product coke industry, but when it is considered that a complete by-product plant now costs over twice as much as it did a few years ago, it is unreasonable to think that the large investments throughout the industry have been made for war profits alone. The development in the main has come because the by-product process is here to stay by virtue of being more efficient than the wasteful bee-hive oven, and because it constitutes better business.

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Progress in Fuels

The use of powdered coal received much attention in 1917, and the development of this infant branch of engineering is progressing rapidly. Pulverization of low-grade fuel, like highly gaseous lignite, offers a field for research; powdered lignite has been burned under boilers on the Pacific coast in the past year without difficulty, and reports of experiments now in progress will be of value. The application of clean producer gas to industrial heating furnaces is likewise receiving consideration, some heat-treating furnaces having in the past year switched from fuel oil to producer gas. Interest in waste-heat conservation and utilization is active, and many waste-heat boilers have been installed in connection with industrial heating operations, such as heating and melting furnaces. The steel industry has recognized the importance of the application of its waste heat to steam generation, and in the past three or four years about 100,000 rated boiler horsepower has been installed.

The shortage of magnesite prevented basic melting in some instances, and the fact that Austrian magnesite has been unavailable has presented serious difficulties in obtaining suitable refractories for brick for furnace linings. A process has been patented to make a synthetic material, termed "magnesio-ferrite", which is said to have the unusual properties of the Austrian magnesite. The process patented calls for making a similar material from natural iron-free

magnesite by adding mill scale or iron ore. Magnesite from Stevens county, Washington, is being produced as calcined magnesite and the so-called magnesio-ferrite. The ore from this point runs to 95 per cent $MgCO_3$, with silica, alumina, iron oxide and lime low, and is said to be obtainable in large quantities.

The study of silica refractories is continuing to receive a great deal of attention as indicated by the number of articles in the technical and scientific press; a study of this subject is being continued by the bureau of standards in co-operation with the American Refractories Manufacturers' association and the American Gas institute. The new refractory zircomia, zircomium oxide, has been tested under conditions of service and promises to be a valuable addition to the present limited list of suitable refractories. Insulating bricks and insulating materials have found increased application, and great strides were made in insulating engineering. Speaking generally, efforts have been put forth to increase the thermal efficiency and to provide greater uniformity of heat in high-temperature apparatus. Insulating bricks have been employed for the insulation of hot-metal cars and mixers with a reduction of external temperature of these vessels, and in the former allowing for a larger radius of haul without chilling. The use of these bricks on hot-blast mains and bustle pipes enables better blast temperatures to be secured. Likewise many hot blast stoves have been insulated with a resulting better thermal efficiency.

In abrasives, an anticipated shortage is at hand, the transportation difficulties having affected bauxite shipments from Arkansas, and the power shortage at Niagara is serious. The large quantities of grinding wheels required in the manufacture of munitions for the government's war plans may make these materials difficult to obtain.

The Electric Furnace

The high prices for fuel, together with the uncertainty of delivery in 1917, gave substantial impetus to the increased use of electric-melting furnaces in steel plants. In addition to melting furnaces, electric furnaces have been utilized for heat treating castings, shells and tool steel. The war has been helpful in bringing the electric furnace into favor because of the demand for special steels for tools and dies and for special alloy steels for aircraft construction. A tendency has started, due in some instances to advantageous power rates or for geographical reasons, to replace crucibles and converters with electric furnaces. In the main, however, the production of steel by the newer appliance has been confined to special steels because the control of chemical composition may be readily maintained on successive heats.

Simple Design is Big Feature

Strong and simple design is the advancing tendency in construction, and with the class of labor now available it is essential that the furnace and its auxiliary parts be practically fool-proof. The future construction of exceptionally large furnaces points to the stationary type. Reversed duplexing for electric furnaces in steel foundries has been mentioned in the past year, and while this is believed by some metallurgists to be an ideal arrangement, no instance in practice has come to the attention of the writer, nor does there seem to be any necessity for so operating. In reversed duplexing, cheap scrap would be melted on a basic bottom where refining could be performed, thereby eliminating the sulphur and phosphorus; the molten metal would be transferred to an acid furnace which had previously been working on a charge of metal, the charges united, and the final deoxidation would be performed under an acid slag. Assuming that acid steel is better than basic, the question is whether the added costs of handling the steel and the additional power required would not be so great as to offset the gain through the cheaper scrap charged into the basic furnace. However, it is practically useless to compare well made acid with well made basic electric-furnace steel.

No progress has been made either in the United States or in Canada in producing electric pig iron directly from ore. A new field, however, has arisen for the electric furnace with the war and the unprecedented conditions brought about by it, namely the production of pig iron from shell scrap and turnings. A number of furnaces in the United States and Canada are devoted to this work exclusively. The process is not new as it was attempted a few years ago, but under the then prevailing market conditions it was not commercially practicable. The process is simply one of melting scrap and adding carbon so that the resultant iron has about 3 per cent carbon. The formulas are naturally regulated by market conditions. An excellent quality of low phosphorus pig iron may be obtained—because of the low phosphorus and sulphur requirements on shell stock—at an operating cost which makes for substantial returns on the high price of low-phosphorus pig iron.

The manganese situation as regards ferromanganese was unsettled in 1917 and developments may be looked for in substitute deoxidizers, or in methods for better utilizing this vital alloy. Brazil has been the heaviest producer of manganese ore since hostilities closed other sources of supply for the United States, and the American steel industry would have been in a perilous condition if it had not been for that country.

For a deoxidizer substitute to be acceptable it should be able to remove oxygen from molten steel and at the same time the resultant oxides must be readily eliminated; further, any excess of deoxidizer cannot be detrimental to the metal. The adoption of any substitute will probably be a slow process because of the general antipathy toward new and unproved materials, so that the only other probabilities open are the conservation of ferromanganese by using it more efficiently and the development of methods for better extraction from the ores themselves. The production of elemental manganese by electrolysis of the ore in a bath of fused salts awaits solution. The bureau of mines has undertaken an important research along the lines of increasing the manganese supply. The premelting of ferromanganese in large open-hearth plants has gained ground, this operation being performed in electric melting furnaces with worth-while savings in manganese—as much as 33 per cent. Mining of manganese ores has been active since our entry into the war, but the total tonnage of high-grade ore mined amounts to less than 20 per cent of the present requirements of the steel industry.

With increasing open-hearth production, 50 per cent ferrosilicon has been an active alloy, and its consumption has greatly increased. Too, the 75 per cent alloy has been in greater demand. A steady growth is being witnessed in the use of the ferrotitanium alloys for the deoxidation of steel, and titanium alloys are likewise being employed to partly replace manganese. Titanium alloys have proved their value as is shown by their large consumption both at home and abroad.

Tungsten and Molybdenum

The main employment of tungsten in the form of ferrotungsten has been as usual in the manufacture of tungsten steel for high-speed tools. Interest in tungsten metallurgy has centered in the dressing of the ores, and few ore-dressing processes have

advanced as rapidly as those for treating this type, particularly in the Colorado district. More interest has been displayed in molybdenum and ferromolybdenum in the United States; in Canada, a number of companies are operating on the production of molybdenite concentrates which are smelted into ferromolybdenum, and this product is exported under the supervision of the imperial munitions board of Ottawa. Flotation has been utilized successfully in milling. Noteworthy developments are in progress in an eastern United States mill where the concentrating capacity is being enlarged. The market for ferromolybdenum in alloy steelmaking has not yet been developed in the United States to any great extent. About 33 per cent as much molybdenum as tungsten is required to confer the desired properties on steel for tools. Prices for the former are, however, higher. New electric furnace plants for the production of ferrotungsten were added in 1917, most of which were equipped with facilities for making ferromolybdenum.

Ferrochromium was in higher demand in 1917 than in the year previous, but no unusual technical developments are on record. The importance of ferrochromium as an additive material in steels used for motor cars, armor plate, armor-piercing projectiles, and high-speed tools has been greatly increased since the war started; and by the same token, the cessation of foreign supplies of chromiferous ores has accelerated production in North America. The aircraft production board made plans for the design of the standardized government airplane motor which will require large quantities of the alloy for chrome steel connecting rods, crankshafts and other parts. The issuance of a late order by the priority officer of the war industries board forbade the delivery of chrome steel for the manufacture of pleasure motor cars.

Continued interest has been exhibited in ferrouranium for making uranium steel, used at present in Germany for big guns, and in the United States for high-speed tools. In big gun linings it is claimed that uranium steel is better adapted to withstanding rapid fire. Small lots of this material are to be tried by the bureau of ordnance of the United States war department for use in guns.

Steel Production Processes

Munition making has caused minor departures of insufficient note to dwell upon at any length, and, in the main, standard practice has been closely adhered to in the steel production processes. The production of shells from cast steel ingots by direct casting has been adopted more widely. Ingots have been poured one-shell high. The advantages of casting the rough forms rather than employing the method of rolling billets, shearing them to length, and finally piercing the shells, are self-evident. As yet, cost appears to have been the most important factor which has delayed the more general adoption of so-called hot tops in ingot-casting practice in the United States, but it is unquestionably necessary to employ these devices if the maximum of sound steel is to be cast. Many of the defects found in steel today are due solely to the tonnage striven for and it should be possible to eliminate many of the mechanical and metallurgical defects without injuring output by making an appropriate study of the problems.

No Advance in Bessemer Process

In the bessemer process, no advance is noted in the year just brought to a close, nor is any marked departure looked for as the process has been developed about as far as it ever will be. The use of roll scale as an additive agent to vessel charges, while not new, received some attention. The use of roll scale in the converter will, in general, improve the quality of the steel and at the same time increase production with lowered costs, as has been proved by experience. While the duplex process was firmly established as a rational process in 1904, it has not been until late years that its true worth has been widely recognized in the industry. The large output possible with minimum capital investment as well as the fact that it is independent of the scrap market have strongly intrenched this method. Shell rejections have been fewer from duplex steel than from straight open-hearth steel. It appears as though most of the large plants will employ duplexing for most of their steel production in the near future. Triplexing, that is, steel refining by the use of the bessemer converter, open-hearth furnace and electric furnace, is making gains where special steel is to be made.

Rail failures of late continue to exhibit a decrease per 100 miles of track rolled, and the tendency continues toward heavier rails—one of the leading roads has ordered large tonnages of rails up to 130 pounds per yard. A late contribution to the rail-failure literature on transverse fissures goes to show that such fissures result from road conditions rather than from the methods of steel manufacture; railroad engineers, however, continue to call for better steel. It appears as though this subject must be further studied if it is to be disposed of for all time.

A large volume of manufactured products and new installations either completed or under contract have been the most noteworthy features in the application of electricity in steel mills. The sentiment in favor of the electric drive for reversing mills is indicated by the estimate that there are at least 21 sets of equipment either in operation or contracted for at this writing, where there were only two or three installations two years ago. Nor is the application confined to reversing blooming mills; included in the above are a billet mill and a 3-high structural mill.

The steel and cast iron foundry business enjoyed a successful year, unmarked by anything special other than the change in attitude of foundrymen toward the electric furnace as a melting medium. The electric furnace where employed in the foundry is utilized mainly for melting steel scrap for steel castings. There are only a few instances on record where malleable iron has been melted in an electric furnace. However, information on this subject may soon be available as a new plant under construction will shortly do such melting and on a large scale. Some plants have secured better results in the electric furnace than in the converter for small castings, and the operating costs of the two processes are dependent upon geographical location of a given plant and the power rates; the farther a plant is located from its source of low-phosphorus pig iron the greater the advantage in favor of the electric furnace due to the freight rate.

Laboratory Equipment

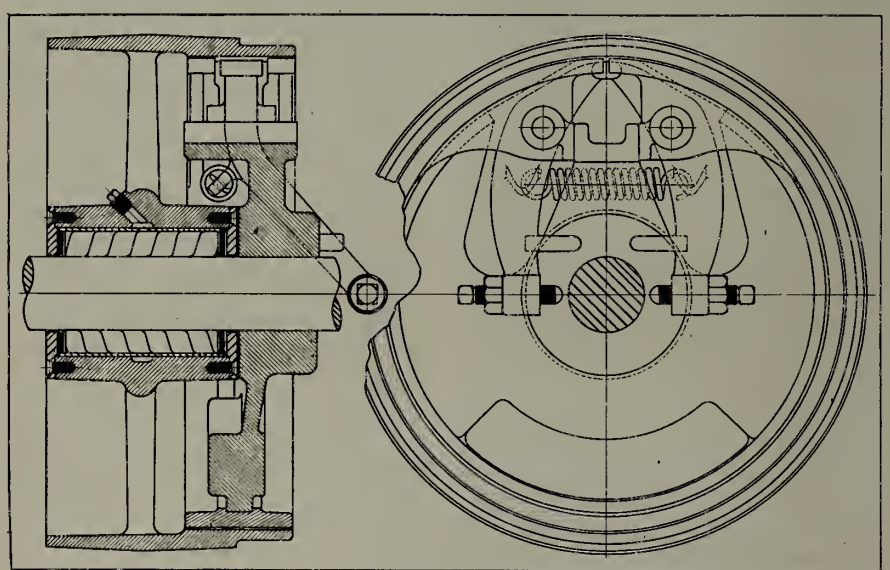
Since the war started, much iron has been in demand for making industrial chemical equipment such as retorts, dryers, sulphonation kettles, and the like; considerable technical progress in methods of manufacture aided by scientific laboratory control has been witnessed. High-silicon acid-resisting metal has also been in demand for chemical apparatus. The method of making cast iron shells in permanent iron molds has enjoyed much publicity. There is nothing new in the employment of such shells for warfare, and France is now making more than 1,000,000 cast iron shells daily casting, however, in sand. Germany, is is reported, is casting in

permanent molds. The present war has demonstrated their effectiveness against trenches because of their better fragmentation, and if our government uses these shells, foundrymen will have another problem to grapple with. Cast iron and steel briquettes have not had any wide use to date, nor has there been much progress in this direction, but they appear to have a definite future in foundry melting as their employment manifestly should result in economies.

Testing and Pyrometry

Metallography enjoyed a good year in 1917 to judge from the sales of equipment by the instrument makers and by the increasing interest manufacturers have displayed in this method of control. The movement is now going forward under its own impetus. Rational methods of scientific control by means of metallography have done much in recent years to establish sane procedure. An important forward step in testing methods for steel is the Burrows magnetic test. While possessing no great practical use at the present writing, the basic fact that there exists a definite relation between the mechanical and magnetic properties of steel has been established, and this means that the commercial testing of steel by the magnetic method is assuredly promised. Dr. Burrows' method of determining the properties of steel without testing to destruction should be extremely valuable.

Pyrometry has broadened its scope and usefulness in the steel industry, and the necessity of pyrometric control is by this time well understood. Future developments will be in the direction of the simplification of appliances, and along the lines of automatic temperature control. The recent work of Burgess on temperature measurements in open-hearth and casting practice has demonstrated that no unsurmountable difficulties are encountered in the measurement of furnace and ingot-teeming temperatures; the measurement temperatures of bessemer-converter charges does not appear practicable by pyrometry devices at present. The control of furnace and casting temperatures is desirable in many cases, because, as is well known, the properties of the finished steel are closely dependent upon these temperatures. Ordinary optical methods of pyrometry may be readily employed with a comparatively high degree of accuracy. Steel plants could undoubtedly improve their practice by employing pyrometric control of this nature, and be sure of better quality of product.



AUTOMATIC ROLLER BEARING FRICTION CLUTCH

Interest in the special steel has been centered in the wider use of these materials, and the metallurgical activity in this field has been in the direction of improvements in the qualities of the steels by heat treatment. Because of the advance in tungsten prices, a new permanent magnet steel (described about three years ago) containing chromium, has been tried as a substitute for the older tungsten steel. This steel, containing about 0.90 per cent carbon and 2 per cent chromium, is an acceptable substitute. The use of manganese steel for rock-crushing machinery and other special purposes requiring a steel of great ductility and great hardness has gone on apace, while a low-manganese steel of 1.25 per cent manganese content has found further use for rifle barrel stock. The value of low-manganese steel has not been widely appreciated nor has sufficient attention been directed toward their utilization for specific purposes.

Nickel steel has been used for many of the rifle barrels manufactured of late, and some machining difficulties have been experienced. Chromium-nickel steels have been going into motor car and airplane engine construction in increased quantity, while there appears to be a good future for nickel-chromium-vanadium steels in heat-treated castings; this steel has found increased application in light deck-plate armor and in gun shields. The vanadium steels, that is, the ternary carbon-vanadium steels, maintained their establishment for pneumatic tools such as chisels and rock drills, and as castings for locomotive frames. Copper-bearing steels have been used by the Germans in the present war for shells—certain ones fired were analyzed and found to contain 1.50 per cent copper.

Some further publicity has been given to the use of boron in steels, and recently the use of powdered ferroboron was recommended for case hardening; the results are reported to be similar to those obtained by case hardening with carbon. Many shops have practiced economies in high-speed steel in the past year by welding short tips of the alloy steel to carbon-steel shanks, while the so-called stellite has also been welded in a similar fashion.

An Automatic Friction Clutch

Several features are embodied in a new countershaft clutch recently brought out by the Accurate Machine Co., Cleveland. The new clutch has a large friction surface, an automatic self-tightening ring, and is fitted with a roller bearing. Essentially, the clutch consists of a pulley, friction ring and spider. The friction ring is driven and supported by the spider. Slots in the spider on each side of the driver allow sufficient space for the operation of the clutch fingers. The driver occupies the space between the two lugs cast at each side of the split on the friction ring, and bears on either lug. Both clutch fingers are supported on pins which are mounted in the lugs on the friction ring.

Operation of the clutch takes place as follows: As the thimble forces the fingers apart and the other ends of the fingers act against each other, the pins serve as fulcrums, thus enabling the friction ring to expand out against the friction surface of the pulley. It is said only a slight pressure is required to force the thimble

between the clutch fingers, and once that this is done, the tightening of the clutch takes place automatically.

Germans Use Chrome Steel for Magnets

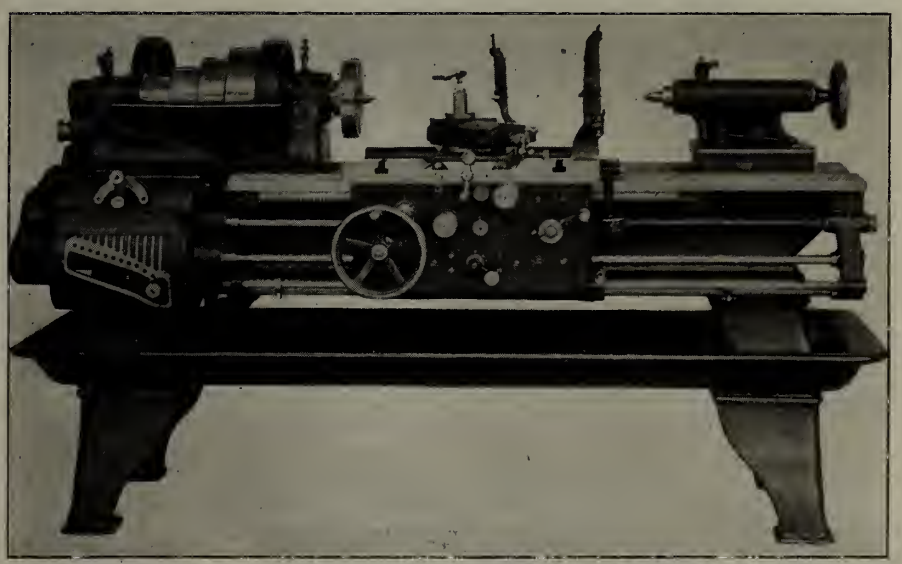
In the report of the German Imperial Physico-Technical institute for 1916, it is stated that 37 alloy steels with varying contents of carbon and chromium have been experimented upon, and a substitute for tungsten steel found for making magnets, all the available tungsten had been commandeered by the German government for war purposes. Though not so good as tungsten steels for the purpose, the report says that the chromium steel selected has given satisfactory results equal to those of the more common tungsten steels.

New Quick Change Tool Room Lathe

A new 16-inch quick-change toolroom lathe is being built by the Rockford Tool Co., Rockford, Ill. In designing the new lathe considerable effort was expended in reducing the number of controlling levers to a minimum. The headstock is heavily ribbed and securely clamped to the bed to prevent chatter. The bearings are of phosphor-bronze of generous proportions. End thrust is taken up on the rear bearing by large thrust ball bearings. Draw-in attachments and collets up to ⅞-inch in diameter may be used in the spindle. The tailstock is of the cutaway type and permits the use of the compound slide at right angles to the cross slide. For convenience in drilling, the tail spindle is graduated. The carriage is of liberal length, gibbed and scraped to a bearing. The cross thread gage stop has micrometer adjustment. A graduated chasing dial is furnished which enables the operator to chase all threads without stopping the lathe.

The apron is of double construction and all gears and studs are supported at each end, so that the possibility of cramping the bearings is reduced to a minimum. The gears are drop forged steel. Both longitudinal and power feeds are engaged by means of friction drives. A positive lock has been provided in order to obviate any possibility of the lead screw and feed rod being engaged at the same time. A feature which is believed to be of especial advantage in the production of a large number of duplicate parts is the automatic stop arranged so as to stop the carriage when traveling in either direction when feeding or screw cutting operations are being performed. Double the number of working speeds for the spindle may be obtained owing to an arrangement which permits both speeds of the countershaft to be utilized.

Special equipment includes a taper attachment, a relieving attachment and draw-in attachments and collets. The taper attachment has a top or adjusting slide which swivels its full length on the bottom slide. It is bolted to the latter at both ends. The slide is graduated on one end into inches per foot and degree; on the other end, it is graduated into thousandths of an inch up to three inches. Designed for the purpose of backing off or relieving teeth of hobs, cutters and similar tools, the relieving attachment is driven from the back gear through a quadrant clamped on the lathe bed. The tool-rest top slide is given a reciprocating movement by means of cams. Relieving and taper attachments may be used together.



TOOL ROOM LATHE ADAPTABLE TO MANY USES

The specifications of the lathe follow: Swing over bed, 16¾ inches; swing over carriage, 9⅞ inches; distance between centers, 32 inches; width of bed, 15 inches; length of carriage on bed, 24 inches; countershaft speeds, 150 to 205; threads per inch, 1½ to 80 (including 11½); feeds, 6 to 320 per inch.

Business and the Metric System

Better business, freer intercourse, and greater amity are expected to result from the adoption of the metric system universally among nations, according to a paper read by Justin W. McEachren before the American Metric association at Pittsburgh on Dec. 29. The platform of the association, as stated in this paper, advocates the international standardization of sizes, an international system of weights and measures, an international standard of currency and exchange, and international merchandising and banking methods.

The assertion is made that the adoption of the metric system is opposed by some by reason of the three factors, cost, confusion, and disturbance. Confusion and disturbance are stated to be worthy of note only as they directly affect cost. So cost is the factor dealt with at length in this paper.

A compromise measure to secure agreement between the opponents and the advocates of the metric system is proposed. The advocates of the metric system agree to sanction nothing that will disturb or confuse the work of engineers, designers, draftsmen, or skilled workmen. Present sizes and mechanical equipment are to be unchanged; all old standards and gages are to remain the same. In consideration of this agreement, the adoption of the international metric system by American industry is asked.

This agreement is expected to remove objection to the metric system on the ground of cost, as production will be in no way affected. It is believed that methods of sale, delivery and payment will be improved by this adoption, and the ultimate result hoped for is some world-wide system of weighing and measuring, a world-wide standard for paying and a world-wide method of remitting payment. Our own present currency system is proposed for use. The present wide acceptance of the American dollar seems to lend encouragement to the hope that it may at some time become the world's standard.

An Electric Furnace of New Type

A Description of an Electric Melting and Refining Furnace Recently Installed at the Midland Electric Steel Co., Terre Haute, Ind.—the Tilting Mechanism and Current Control Are Given Special Attention

AN ELECTRIC steel furnace, which has been used to manufacture basic carbon steel and low phosphorus pig iron, has been developed by the Booth-Hall Co., Chicago. The furnace is built for use on single, two and three-phase power lines. The single-phase furnace employs an auxiliary electrode, a main electrode, a conducting hearth and a cast-steel grid built under the hearth. The two-phase furnace has two main electrodes and two grids, while the three-phase type has three main electrodes and one grid. The furnace for single-phase operation is built only in the smaller sizes as a single-phase load of any considerable size cannot be handled by the average power house. Three-phase operation is employed only in the larger capacities where the increased number of electrodes tends to facilitate melting down and refining. The two-phase type of furnace has been designed for general use.

The furnace shown in the accompanying illustrations was recently placed in operation in the plant of the Midland Electric Steel Co., Terre Haute, Ind. It has a capacity of 3 to 5 net tons and is supplied by two single-phase transformers each of 600-kilovolt ampere capacity. They are connected to a 13,200-volt, 60-cycle, three-phase power line and deliver current to the furnace at 125 volts, secondary. A special switch is provided for cutting the voltage in half when refining or holding heats. The electrodes are automatically regulated and by proper manipulation of the electrode regulators and the voltage reduction switch, it is said to be possible to deliver any fraction of full power to the furnace. The furnace operates at about 90 per cent power factor, giving a power input at full load of from 1000 to 1100 kilowatts.

How Furnace Operates

Scrap steel ranging from machine shop turnings to heavy melting steel is used for charging the furnace. After charging, the auxiliary electrode and the two main electrodes are let down until they rest on the scrap. A pawl on the auxiliary electrode holder is now released which allows the electrode to rest of its own weight on the charge. The main electrodes are next drawn up and an arc created under each electrode. The arc is governed by the automatic electrode regulators which are designed to assure a uniform power input and a properly balanced load in the power lines. Heat generated by the two arcs from the main electrodes is conducted to the scrap, the auxiliary electrode acting as a common return. Since the auxiliary electrode rests on the scrap, no arc is formed under it.

When a pool of molten metal has been formed on the hearth sufficient to make it conductive of electricity, the current begins to flow through the hearth and out through the two steel grids imbedded beneath the hearth. This flow is recorded by the ammeters. The auxiliary electrode is then drawn up, out of contact with the scrap, and forms its own seal of the electrode opening in the roof of the furnace. The furnace then continues to operate two-phase with two independent circuits. On a cold bottom it is said that the auxiliary electrode is used for about 45 minutes; on a furnace which has been shut down over night, from 20 to 30 minutes, and on a hot furnace not more than 10 minutes.

As shown in Fig. 1, the furnace is spherical in shape with a saucer-shaped bottom. The roof is built of standard silica shapes which were used in place of specially designed brick, in order to save time on brick deliveries.

The furnace shell is made of ½-inch

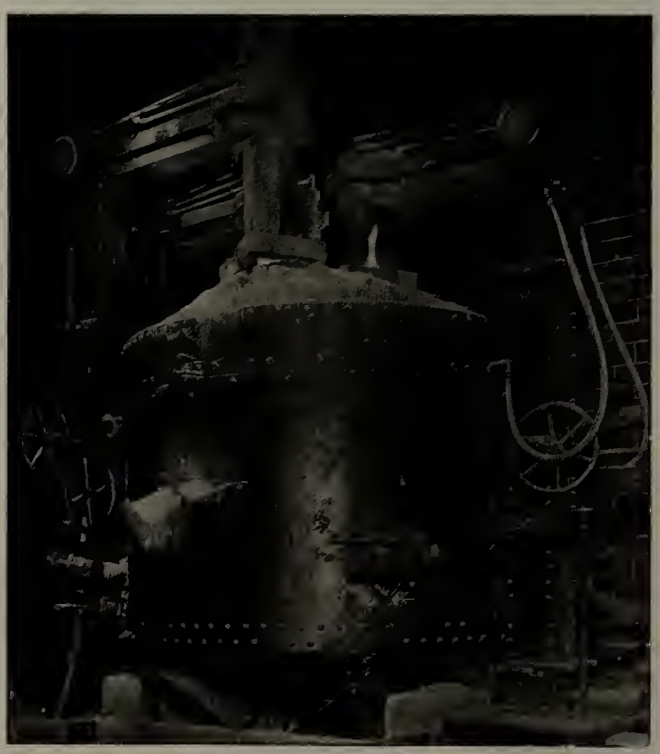


FIG. 1—FRONT VIEW OF THE FURNACE



FIG. 2—FURNACE SLIGHTLY TILTED FOR POURING

riveted steel plate. The main electrodes are on opposite sides of the furnace, while the auxiliary electrode is directly alongside one of the main electrodes, and toward the front of the furnace. The tilting mechanism is placed in the rear of the main furnace pit so that no tilting machinery is located directly underneath the furnace. The furnace slightly tilted for pouring is shown in Fig. 2.

The furnace may be lined either basic or acid, the one at Terre Haute being lined basic. The hearth is 24 inches thick and the grids are 18 inches below the top of the hearth. The hearth is composed chiefly of either magnesite or dolomite and is solidly sintered in, layer on layer. From the hearth up, the walls are brick. The first three rows which reach above the slag line are magnesite brick and the remainder silica brick. The door for charging and slagging is placed in the rear as shown in Fig. 3.

The electrode clamps used with this furnace consist of three segments, one of which is solidly bolted to the center, or main frame, while the other two are pivoted on outside frames, one on each side of the main frame. This allows the electrode to be clamped or released by turning a lever at the edge of the furnace. By pivoting two of the segments, a play is secured which tends to take up any inaccuracy in the diameter of the electrode. The clamps are 16 inches in length and give a long bearing on the electrode. This is designed to minimize the tendency for the electrode to crack or heat at this point. Each segment of the electrode clamp is thoroughly water cooled.

The furnace rocks either forward or backward upon 100-pound steel rails which are bolted to the concrete foundation piers. Three lugs are bolted to each rail, and extend over the rail and mesh with slots in the tread casting, which is bolted to the side of the furnace. The tilt is controlled by an A-frame which is cross braced and extends down into the main pit on each side of the furnace. The frame is connected under the furnace by a strut. To this strut is attached a second strut extending back into the furnace pit and furnished with a rack which engages the operating gears. The gears are actuated by a motor, the controller of which is placed at the front of the furnace platform. In an emergency the gears can be operated by hand.

The substation, as shown in Fig. 4, may be placed either directly back of the furnace or to one side. In the installation at the Midland plant, the substation is placed directly back of the furnace.

The switchboard for operating these furnaces is usually furnished with a watthour meter, or two voltmeters and two ammeters, one for each electrode. The Terre Haute installation is also furnished with an indicating wattmeter and power factor meter. The voltage reduction switch, developed for use with these furnaces, consists of six single-pole, double-throw knife switches mounted together and operated by one lever.

This furnace began to operate in December, although the Booth-Hall Co. was not formed until late in June, 1917. In the ensuing period, designs were perfected, the furnace built, installed and placed in operation. This type of furnace is built in the following sizes: 1500 to 2000 pounds, 3000 to 4000 pounds, 3 to 5 tons, 6 to 8 tons and 10 to 12 tons.

William K. Booth, the designer of the furnace, was identified for several years with the Snyder Electric Furnace Co. Julius R. Hall, who has been associated with Mr. Booth in developing the mechanical details, has occupied positions as designing engineer with the American Bridge Co., the Strauss Bascule Co., the Brown Hoisting Machinery Co. and the Snyder Electric Furnace Co.



FIG. 3—REAR VIEW SHOWING CHARGING DOOR



FIG. 4—A VIEW IN THE SUBSTATION

War Demands Drive Tool Builders

Shop Capacities Greatly Enlarged at Beginning of Year Prove Inadequate to Meet Specialized Demands Put Upon by Government for War Production—Commercial Orders Set Back—Prices Rise Steadily

NINETEEN hundred seventeen long will be remembered in the machine tool industry, for during this year the industry was placed under stress as never before. The government's hurried preparations for war created a demand for tools and still more tools. The necessity for manufacturing munitions of all kinds on a scale commensurate with the plans for placing America's millions in the field, opened up many new fields of enterprise requiring equipment. While industries were chosen for war work, the peace-time occupations of which best fitted them for this new work, the machinery requirements have been far beyond the capacity of builders. The making of ordnance, shells, airplane engines, trucks, mines and ammunition; the building of a vast fleet of cargo ships and all other mechanical equipment; the submarine destroyer program; the equipment of large railroad shops, arsenals and repair shops in France; the replacement requirements of steel producers and railroads; and numerous other sources of demand might be mentioned. All these have poured into the machine tool and crane markets in the past nine months.

The year 1916 and most of the year 1915 had been periods of capacity operations in the machine tool industry and the year 1917 was begun with a capacity to produce tools greater by far than ever before in the history of tool making in the United States. Even this enlarged capacity has been unable to cope with the unprecedented demand thrust upon it. The right of the government to preferred deliveries over all other orders was recognized from the first, and builders did all in their power to meet the increasing demands, but many conflicts soon began to arise between orders from the war, navy and other government departments, each of which considered its needs most important. Finally, the war industries board added a machine tool division to straighten out the tangle and supervise the filling of the government's needs. Special priority ratings were given machines needed for various purposes. Under a Class A priority, were placed machines needed for work on the submarine destroyers, for ordnance manufacture and airplane engine plants. Under class B rating, came machines needed for work on cargo ships; machines needed for less important uses were given lower ratings. Every effort has been made by builders and by the government, which has fully appreciated the situation, to put each machine turned out in the place where it was most needed. As the year closed, at least 90 per cent of the tools being manufactured were for direct use in connection with the war preparations.

War Doubles Prices

UNPRECEDENTED priee advances have characterized the machine tool market sinee the beginning of the war. Carried on by the impetus of heavy previous buying, the market during the major part of the past year eontinued its upward trend. With the fixation of priees on raw materials by the government, however, this advance was arrested. In the main, priees sinee the beginning of the war have advaneed as follows: Heavy planers, $2500 *to* $4400; *heavy lathes,* $1275 *to* $5650; *horizontal boring mills,* $1250 *to* $4250; *vertieal boring mills,* $3600 *to* $7200; *shapers,* $425 *to* $775; *milling maehines,* $825 *to* $1700, *and grinders,* $1250 *to* $2500.

When 1917 began, shapers were sold up five to six months, planers were scarce in all sizes, it being difficult to get any of these tools in less than six months. Universal grinders were scarce and sold up to May or June; autmatic tools of various kinds were sold up five or six months ahead; and plain and universal milling machines to July. There were plenty of single purpose lathes available, but the standard makes of lathes were pretty well sold up in all the small sizes. On other tools, however, the market was less booked ahead. Deliveries could be had in three to five months on 20-inch and larger lathes. Radial drills are sold ahead about two months. High speed drilling machines could be had for delivery in two or three months and upright drilling machines in less time.

But the special work of war has caused a shifting of demand for machine tools. Due to additional capacity constructed this year, night operations and concentration of builders on special types and sizes, deliveries of some tools have been cut down. Shapers and milling machines now are obtainable in three to four months. But the demands of ship builders and engine and motor manufacturers have pushed deliveries far in the future on heavy tools despite these expedients. Lathes over 24-inch, vertical and horizontal boring mills, 36-inch and up, have become exceedingly scarce. Some makers of these tools are out of the market for 1918. Deliveries on some makes of radial drills also have been pushed forward in some cases to six and eight months. The equipment of the new Fore River Shipbuilding Corp. destroyer plant absorbed the entire output of one radial drill manufacturer for five months. Small lathes, some makes of universal grinders and some upright drilling machines can be bought out of stock.

Prices advanced steadily all year until Oct. 1. At that time material prices were fixed by the government, which helped the situation somewhat. However, present quotations show a decided increase as compared with those of a year ago. Lathes have advanced about 30 to 35 per cent; planers, 50 per cent; shapers 35 to 40 per cent; radial drills, 35 per cent; boring mills, 40 to 45 per cent. These statements, of course, apply to the whole industry, prices and deliveries varying with different makers.

As time has been the essential element in machine tool purchases the past year, the market for used equipment has received considerable impetus. In many cases the prospective buyer has shown he preferred a second hand tool in good condition which could be shipped immediately to a new tool on which he would have to wait several months, even though the price of the used tool approximated that of the new tool. One case is cited where 15 24-inch engine lathes, after 16 years' continual service, sold for approximately $400 more than they cost new. In another case, a universal grinding machine, purchased for $900 in 1897, was sold a short time ago for $1700.

Canada Will Build Ships

Adopts Definite Plan for Government Construction—Plate Mills to be Built—Big Expenditures for Munitions Laid Out

TORONTO, Jan. 7.—Canada has adopted a definite plan for building ships under governmental control, according to C. C. Ballantyne, Canadian minister of marine. The government has decided to utilize the full capacity of Canadian shipyards in producing modern steel cargo steamers of the approved types. These vessels will sail under Canadian registry. The productive capacity of the shipyards of the dominion is estimated at from 275,000 to 300,000 tons annually. During the continuance of the war, and for some time afterward, the construction of steel ships for foreign registry will not be permitted. The naval construction branch of the marine department is working out the details of the program which calls for the construction of three types of vessels; one of approximately 3000 tons which may be built in shipyards situated on the Great Lakes, another of from 5000 to 7000 tons and a third with a deadweight capacity of from 8000 to 10,000 tons. Owing to the difficulty of obtaining plates and shapes, it is stated that negotiations are under way to establish mills for rolling this material in sufficient quantities to meet maximum requirements. The shipbuilding program will involve the expenditure of between $50,000,000 and $60,000,000 a year.

Mr. Ballantyne has made public the following details of the government policy:

1. The ships will be built and owned by the government. The policy inaugurated is one of government ownership of ocean transports.

2. The ships will be operated, partially at least, by the government, although some may be chartered by responsible parties.

3. No new shipyards will be established at present but the existing shipyards will be utilized to their fullest capacity. The main yards are the Vickers, Montreal, Que.; George Davies, Levis, Que.; Polson Iron Works, Toronto; Collingwood Shipbuilding Co., Collingwood, Ont.; Port Arthur Drydock & Shipbuilding Co., Port Arthur, Ont., and the yards on the Pacific coast.

4. Ships now under contract for the British government will be completed. These were let by the imperial munitions board. These ships will be finished early in the summer and after that time, Canada will undertake all construction. It is felt that if Canada provides the finances she should exercise control.

5. There will be an equitable distribution of labor between the various plants in order to secure the maximum efficiency.

6. Charles Duguid, the government's naval architect, will be the technical officer in charge of the work.

7. Rolling mills to make plates will be located in Canada. Heretofore all steel of this kind has come from the United States, but in order to meet this program, mills will be located in connection with the plants at Sydney and New Glasgow, N. S., and Hamilton and Sault Ste. Marie, Ont.

The munitions industry is to be continuously active during 1918. The imperial munitions board at Ottawa has laid out a program involving an outlay of $30,000,000 per month, which may be considerably increased. Of the present monthly outlay $25,000,000 by way of imperial credits are furnished by the Canadian government and $5,000,000 by the United States for material purchased there for the production of Canadian munitions. The present output mainly is 4.5-inch and 6-inch high explosive shells, and shrapnel, and it is understood that orders now on hand will keep the plants working to capacity for some months. Since the renewal of activity in shell manufacturing some of the establishments in Toronto, which had laid off their female employes, have taken on a number of women and girls, but at wages considerably lower than those formerly paid. Also they are showing more discrimination in only employing those who are strong enough for the work.

The annual financial statement of the Dominion Bridge Co. of Montreal for the year ending Oct. 31, shows a considerable falling off in profits, the net amount available for distribution amounting to $1,186,436, against $2,762,289 in 1916, a decrease of 57 per cent. This is partially accounted for by the deduction of the excess profits tax before the profits were brought forward, which was not done last year. Moreover, the returns from the successful completion of the Quebec Bridge contract are not included in the present report. President Phelps Johnson in his report says: "On the acceptance of the bridge by the Government a distribution of profits should be made, and your company will then receive about $1,500,000 as its share of the profits accumulated in the seven years the work has been in progress, and will also benefit by the return of a good portion of the cash capital invested in the work."

With regard to munition contracts, which were the main basis of the company's activities for the past two years, with disappointing results, President Johnson states that the prospects for remunerative business in this line not being encouraging, work has been looked for in other directions, and contracts for marine engines and boilers have been secured to the total value of about $1,170,000. Orders for ship plates and frames have also been secured, which will keep the structural departments of the Lachine and Toronto shops busy for seven months to come. President Johnson intimated that there was some doubt as to whether the present 10 per cent dividend rate would be maintained, owing to the general increase in the cost of labor and material involving larger cash investments, deferred payments for munition work, and anticipated new legislation as regards business profits taxation.

Canada's Mineral Output

The department of mines estimates the production of metals from Canadian ores in 1917 as follows: Gold, 17,000,000 ounces; silver, 23,500,000 ounces; copper, 113,000,000 pounds; nickel, 84,800,000 pounds; zinc, 31,000,000 pounds. The production of pig iron was about 1,186,000 short tons and steel ingots and direct steel castings, 1,735,000 short tons. The production of coal was about 14,100,000 short tons. The production of gold, silver, copper and coal was less than in 1916, while the production of nickel, lead, zinc, pig iron and steel was greater than in the previous twelve months. Higher prices received for silver, coal and other products considerably enhanced the total value of the mineral production. This is estimated to have been not less than $200,000,000, as compared with $177,201,534 for 1916.

Double tracking of the Birmingham Southern railway, it is thought will facilitate development of the Fairfield works of the Tennessee Coal, Iron & Railroad Co. A franchise has been granted by the city commission of Birmingham and products for the big steel works will be handled more easily when the project is completed.

Metals Respond to War Factors

United States as Belligerent Exercises Firm Control Over Production and Fixes Some Prices in Behalf of Itself and Its Allies—Hears Market is Unusual and Follows Irregular Course

ENTRANCE of the United States into the world war found a greater reflection in the nonferrous metal markets than has any other factor since the outbreak of hostilities almost three and one-half years ago. The United States government now has become the principal buyer of copper, lead, spelter, aluminum, antimony and other metals. But its entrance to the market has been attended by far different effects than followed the buying by the allied governments within the past three years. They bid against prosperous domestic manufacturers at a time when industrial activity was most keen, the resulting demand exceeded supplies and prices were forced to unprecedented levels. But the United States government has assumed firm control of the metal-producing industries. Where it found production apparently insufficient, it fixed prices and regulated deliveries. However, this has not been necessary except in a few cases, particularly copper, aluminum, and for a time lead. The readjustment of the nation's industries from a peace to a war basis has reduced to a great degree the consumption in ordinary commercial work and this condition has resulted in an extremely dull situation in most metals during the past nine months.

Copper Prices Are Fixed

The copper market opened the year 1917 at 28.75c, delivered, for carload lots, electrolytic. As the year progressed prices steadily advanced, until in March the price reached 36c. Dullness prevailed during the early months, largely due to the prolonged absence of the British government from the market, which had bought 440,000,000 pounds in September, 1916, covering its early 1917 requirements. When the United States entered the war, however, the British government awaited the former's plans. Finally it was announced the government would act as purchasing agent for itself and all the allies. Labor troubles began to develop at mines and smelters during the summer and production dropped sharply in July and August. The strikes were settled, with the help of the government, and in the autumn the production began to pick up. For a time it looked as though the supplies might be insufficient to meet all war demands. In October, after prolonged consideration the war industries board and a committee of leading copper producers entered into an agreement fixing a maximum price of 23.50c for all grades of copper. At the time of the report the market was about 27.50c. During October and November no new contracts were entered into by producers to commercial consumers, due to the scarcity of metal. But by December supplies had increased to a point where the war demands were taking only about 70 per cent of production, and deliveries were being made to nonessential consumers. Provision was made for the needs of the small consuming trade by the war industries board, through the granting of a 5 per cent commission to jobbers on less than carload lots. This brought the price on such lots to 24.67½c. As the year closed the copper market was on a fairly even keel at the fixed price.

The energies of the brass trade have been devoted almost entirely to war work. Consumption of brass for ornamental purposes has ceased, due to the falling off of building construction. Brass mill demand for spelter has become almost nil except where government requirements are concerned. The galvanizing trade, which suffered a severe setback two years ago, due to the high prices of spelter, is now not more than one-third of normal. Consumption of galvanized products now is retarded by the scarcity and high cost of steel. With the two main avenues of consumption thus affected, the spelter industry has not prospered this year. Production has steadily exceeded demand and large stocks have accumulated, aggregating over 46,000 tons on Oct. 1. They now probably are much heavier. Several large smelters closed down during the latter part of the year. By the close of December probably one-third of the country's smelting capacity was idle. The market for prime western smelter opened at 9.75c, St. Louis, at the beginning of January, 1917. In February and March demand improved and prices advanced to about 10.50c, St. Louis. Following the declaration of war, in April, demand dwindled and no really active buying followed during the year. The government's purchases of prime western were negligible, although it closed for some moderate lots of Grade A and Grade B spelter. For a time, supplies of spelter were bought for the government by the subcommittee on zinc of the council of national defense, but after the enactment of the Lever act this work was taken over by the navy department. The price of prime western for prompt shipment as the year closed was 7.50c, St. Louis. Despite the inactivity in spelter, sheet zinc continued in good demand all through the year at 19c, f. o. b. Illinois mill.

Tin Market Features

The tin market has been interesting, especially in the latter part of 1917. All supplies of Straits tin are exported from British possessions and are under the control of the London

Average Monthly Nonferrous Metal Prices in 1917

Prompt Wholesale Lots, Cents per Pound, New York Unless Otherwise Stipulated

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Copper, electrolytic	30.443	35.381	36.164	32.434	32.625	32.893	30.18	28.38	27.16	23.50	23.50	23.50
Copper, lake	29.738	34.833	35.562	32.738	32.159	32.05	62.39	62.739	61.674	61.814	74.443	23.50
Tin	44.158	51.458	54.59	55.972	63.50	62.111	10.90	10.641	9.026	6.93	6.162	88.25
*Lead	7.568	8.333	8.977	9.00	9.659	10.25	8.76	8.335	8.128	8.00	7.804	6.25
Spelter, St. Louis	9.8407	10.350	10.612	9.591	9.327	9.312	57.00	51.152	44.049	39.75	36.75	7.682
Aluminum	59.798	57.083	60.681	61.238	62.909	61.25	16.39	15.432	14.782	14.925	14.012	36.75
Antimony	16.528	29.791	31.715	35.452	25.579	19.862	29.47	27.391	27.232	23.50	23.50	14.875

*American Smelting & Refining Co.'s official asking price.

rubber and tin exports committee, which originally was created to prevent supplies from falling into enemy hands. When the United States went to war, American firms bought heavily in the London market and prices began to rise there and in the far east. But the London committee was very slow to grant permits. By October supplies in this country were scarce and by November an actual famine existed. In the meantime a subcommittee on tin had been appointed by the American Iron and Steel institute, to co-operate with the department of commerce in regulating distribution of tin arriving in this country. Later this committee was authorized by the government to take complete charge of this distribution. The market for Straits opened at 43c last January, advancing to about 63c by May and remaining at around that level until November, when it advanced to about 80c. In December no tin analyzing 99¾ per cent and higher could be obtained, although consumers were bidding above 90c, and inferior grades were just about as scarce and proportionately high. Some large consumers, through the tin subcommittee, were allotting part of their reserve stocks to small consumers working on government orders, at the price which these consumers had to pay in replacing their supplies by buying futures. Thus Banca tin was sold at 72c, when the same grade was being quoted 90c nominally in the open market. No Straits prices were quoted as the year closed.

Lead Booms, Then Declines

The lead market experienced a boom lasting over about seven months of the year, beginning last February. As the year opened the quotation in the outside market was 7.50c, New York, the American Smelting & Refining Co. quoting the same figure. By August the ouside market reached 12c, while the leading producer was quoting 11c, New York.

Producers did not know what the government's requirements would be and they laid aside large stocks. In July, August and September the government paid a fixed price of 8c, St. Louis. By October, however, the general market commenced to decline, so producers entered into an agreement with the war industries board to charge the government the average price for the succeeding month as quoted in the *Engineering and Mining Journal,* with a maximum of 8c in case the general market advanced to that level. This method was followed the rest of the year. The decline from the August high point was very sudden and was led by the principal producer, which dropped its price $100 a ton to 6c in less than two months, later advancing it to 6.25c, where it remained pegged during most of November and December. As the year closed the outside market was quoting 6.25c to 6.37½c, St. Louis, the leading producer 6.17½c, St. Louis.

The outside aluminum market saw a precipitous decline during the year, owing to the export embargo imposed by our government. Although the American producers' contract price for virgin aluminum was 37c for 1917-1918, the outside market opened the year at about 60c, New York. This level was maintained until July, when the market began to drop and it closed the year on a level with the Aluminum Co. of America's quotation of 37c. That producer is supplying the requirements of the government at 27.50c.

The antimony market experienced a turbulent year. At the opening Chinese and Japanese brands were quoted about 16.50c, duty paid, but with the break with Germany speculation was active. Prices rose to above 36c in April. Then, the trade was disappointed in its expectations of extensive government buying. Meanwhile, as shell contracts lapsed in Canada, this source of demand stopped. The market gradually quieted down and prices closed the year at 15c, duty paid, a decrease of over 100 per cent from the April price.

Obituaries

JOSEPH HOBSON, who died at his home in Hamilton, Ont., Dec. 19, aged 84, was an eminent engineer. He began his professional career with the constructing firm of Gzowski & Macpherson. In 1870 he succeeded Sir John Kennedy as chief engineer of the Great Western railway, later was appointed chief engineer of the Grand Trunk lines west of Toronto, and from 1896 to 1907 he was chief engineer of the Grand Trunk system. In 1907 he became consulting engineer. Among his notable engineering achievements were the construction of the international bridge between Buffalo and Fort Erie, the building of the tunnel under the St. Clair river near Sarnia, and the reconstruction of the Victoria bridge at Montreal over the St. Lawrence river. Robert Hobson, Hamilton, Ont., president of the Steel Co. of Canada, and J. Irvine Hobson, treasurer of the Canada Steamship Co., Montreal, are his two sons.

Leon J. Cohen, president of L. J. Cohen & Co., and Cohen-Schwartz Rail & Steel Co., St. Louis, died recently.

F. W. Kips, who for 10 years was auditor for the Interstate Iron & Steel Co., Chicago, died recently at his home in Pullman, Ill.

Henry Jacob Gearhart, purchasing agent or the Pressed Steel Car Co., died at his home in Pittsburgh, Dec. 28, aged 49, after being with that company since his graduation from the Philadelphia Medical school about 20 years ago.

George T. Robinson, who until 1897 was president of the Robinson-Rea Mfg. Co., one of the first steel foundries in the Pittsburgh district, died recently at his home in Pittsburgh at the age of 80. He was a member of the ninth Pennsylvania reserves during the Civil war.

J. Howard Murray, former owner of the old Trenton Vice & Tool works, Trenton, N. J., died at his home in that city recently, after a lingering illness. He was formerly associated with his son, General C. Edward Murray, in the Crescent Insulated Wire & Cable Co., Trenton, N. J.

Thomas Evans, formerly majority stockholder of the Lebanon Chain Works, Lebanon, Pa., and for a number of years its president, died recently at his home in that city, past 80 years of age, after failing in health rapidly for over a year. Commencing work in a rolling mill in St. Louis in 1850, he later moved to Portsmouth, O., where he learned the trade of roll turner. Later he returned to Cincinnati, the scene of his schooldays, to work at his trade, and in 1859 built the first rolling mill to be erected in Alabama, in Shelby, Ala. After a journey to the north subsequent to the John Brown raid he returned to the south as superintendent of the Ettawa Iron Works, Ettwa, Ga., where he remained until the war of 1861 sent him north again. In August of 1861 he produced rolls and machinery for the government at the plant of the Swift Iron & Steel Works, Newport, Ky., and during that winter was placed in charge of the entire plant. His rise from that time on was rapid. It was largely through his efforts that the Lebanon Chain Works achieved success.

Reward Faithful Service

Industrial Plants Distribute Bonuses and Other Substantial Forms of Appreciation of Employes' Loyalty—Insurance Grows in Favor

MANY employers took advantage of the opportunity offered at the year end to distribute rewards for faithful service and regular attendance. As usual in a large number of cases, these took the form of bonuses, but that the group life insurance idea rapidly is spreading in the industrial world is evidenced by the many announcements made of the presentation of policies to employes as Christmas presents. Some, however, gave both and these include the Crane Co., Bridgeport, Conn., and the Driver-Harris Co., Harrison, N. J. The former company gave each of its 3000 employes 10 per cent of his yearly earnings in addition to the regular monthly bonus of 10 per cent. This annual bonus aggregated $246,000. To all employed for more than three months and less than six years, $500 policies were given, the $1000 policies going to those employed longer than six years.

Each of the 250 employes of the Oesterlein Machine Co., Cincinnati, received insurance policies, those employed less than a year, $500 and those over a year, $1000, while 1500 employes of the Bullard Machine Tool Co., Bridgeport, Conn., were presented with accident and health policies, calling for the payment of $10 weekly for a period of 26 weeks, for any illness or accident sustained whether incidental to employment in the shop or not. These employes are already covered by life insurance policies of $500 each and accident policies to compensate for accidents in the shops.

An added feature of the group life insurance plan followed by the Lincoln Twist Drill Co., Taunton, Mass., is the "disability clause." Each employe in service three months was presented with a $300 policy. After six months' continuous service, the policy is increased to $500, in a year to $600 and each succeeding year $100 is added until a maximum of $1500 is reached. This plan is retroactive and the insurance applies in the event of death from any cause while employed by the Lincoln company. Provision is made whereby any employe, who from any cause, prior to his 60th birthday becomes wholly disabled and unable to earn his living, shall receive the amount due him according to the length of employment, with interest, payable annually in from 5 to 20 payments.

Policies in amounts from $250 to $1000, depending upon length of service were distributed by the Ball & Roller Bearing Co., Danbury, Conn., to their employes, while the Electric Controller & Mfg. Co., Cleveland, gave policies to its 330 men and women employes in amounts from $300 to $3000, representing six months salary of the recipient. These automatically increase until in four and a half years, the face of the policy represents one year's pay. This does not interfere with any bonuses paid nor with payments for accidents under the workmen's compensation law.

Bonuses Not Taxed

Since the treasury department has ruled that industrial bonuses may be deducted from gross income in arriving at net income for tax purposes, of intense interest to large numbers of employes are the several distributions recently made. Among the announcements reported, are the following: The Washington Iron Works, Seattle, distributed a $12,000 bonus; the American Chain Co., York, Pa., distributed $40,000 to 1500 employes in amounts of $70 to $300; the L. S. Starrett Co., Athol, Mass., distributed bonuses based on length of service in amounts representing from four to 10 per cent of the wages for six months ending Dec. 31, 1917; the Wyman-Gordon Co., Worcester, Mass., and Cleveland, gave $10 to each employe who had served one year or less and increased amounts for longer periods until those who have been affiliated with the company for 25 years, received 10 per cent of their year's wages; the Goulds Mfg. Co., Seneca Falls, N. Y., will pay its piece-work employes a 10 per cent bonus quarterly, contingent upon a stipulated amount of time being put in during the previous quarter; the Crocker-Wheeler Co., Ampere, N. J., manufacturer of electrical machinery, announces that during 1918, its employes receiving less than $2500 per year, will be presented with from 10 to 12 per cent of their earnings, according to length of service; The Traut & Hine Mfg. Co., New Britain, Conn., gave its employes a bonus of 10 per cent of their wages and salaries for the last four months of 1917; the Allis-Chalmers Mfg. Co., Milwaukee, will continue to give quarterly bonuses to its 8000 employes of 10 pe rcent during 1918, which aggregate $750,000 yearly; while the 200 employes of the Aluminum Goods Mfg. Co., Manitowoc, Wis., with branch plants in Newark, N. J., and Two Rivers, Wis., received a $10,000 bonus on 1917 wages.

As a reward for never being late or absent during the entire past year, The Cincinnati Planer Co., Cincinnati, presented eleven men with 5 per cent of their individual annual earnings in addition to the 5 per cent provided in the Christmas savings fund.

Puddlers Wages Soar

Since the commencement of the industrial activity attendant upon the war, wages of boilers or puddlers have advanced 160 per cent. The recent bi-monthly wage settlement between representatives of the Western Bar Iron association and the Amalgamated Association of Iron, Steel and Tin Workers brought an advance from $13.80 to $14.30 a ton, which will prevail for two months. This is $8.80 or 160 per cent above the base rate of $5.50 which is unprecented. Bar iron finishers are advanced about 5 per cent. The settlement was based on a 2.95c bar iron price compared with 2.85c two months previously.

Housing of Labor is Main Shipbuilding Problem

A request by Admiral Bowles, head of the construction department of the Emergency Fleet corporation, for authority to commandeer houses, car lines, ferry boats, summer resorts, etc., near shipyards to furnish employes with dwellings may represent the solution of the problem confronting the shipping board as to how labor may be retained. Raymond B. Stevens, vice chairman of the shipping board, testified before the senate committee that while he opposed conscription of labor, something should be done to secure an adequate supply of workmen for the shipbuilding program. He stated that United States shipyards have lost a total of 536,992 working days, equivalent to the work of 20,000 men for a month through strikes and labor disputes since April 6, when war was declared. Mr. Bowles told the committee that the production of ships easily could be increased 50 per cent if attention were paid to the housing problem which is the chief cause of unrest. The shipping board recently asked congress to appropriate $35,000,000 for houses for shipyard employes.

In Seattle, the war shipping committee of the chamber of commerce and the Commercial club has taken up the question of housing the 20,000 men to be sent by the government for shipyard work. Citizens are being urged to build the 5000 homes that will be needed. Committees have been appointed to procure vacant offices and loft space and to co-ordinate plans for constructing dormitories. Several industrial concerns have

formed separate corporations to build and rent houses to employes. But it remains for Elizabeth, N. J., to treat the problem in a municipal way. It recently formed the Economical Homes association because of the house famine being experienced due to increased industrial activity. Two and four-family houses are to be built by the association for the use of workmen. The Keasby & Mattison Co., Ambler, Pa., is building 200 six-room dwellings. It is stated that 3000 acres in Washington Park on the Delaware river below Gloucester may be used as the site for homes for workmen of the American International Shipbuilding Corp., Hog Island, near Philadelphia.

Open Labor Bureau

Because of increasing demands for labor in the Pittsburgh district, a branch of the state employment bureau has been opened in the South school building, Diamond and Ross streets, Pittsburgh. This branch bureau will be under the supervision of S. H. Thompson, with A. T. Kiel, formerly of the Mesta Machine Co., in charge of the skilled and semiskilled labor department. A. M. Koler has charge of the common labor department and the supplying of female labor receives the attention of Superintendent Thompson. He recently received an order for 1200 women operatives for munitions plants. The bureau filled more than 1600 positions in December.

Since the miners' new wage scale went into effect recently, more than 300 men have applied for employment at the Shamokin, Pa., colleries. Many workmen formerly employed in these colleries are expected to return because of the advance.

"On the Job" is Bugle Call to Industry

THAT industry carries an important responsibility for the successful prosecution of the war by keeping persistently and constantly on the job has been emphasized effectively by Henry M. Leland, president of the Liberty Motor Co., Detroit, and by Colonel W. H. Morgan, president of the Morgan Engineering Co., Alliance, O. They have issued stirring appeals to the loyalty, patriotism and Americanism of each employe in their respective plants. Each man in the shop is called upon to do his full duty and not to fail his comrades in the trenches. Only in this way, it is pointed out, can the war be won, and speedily. Some of the striking phases of the appeals of these employers to their men are given below.

By Henry M. Leland

We are at war. We, as a nation, are in a most desperate state of unpreparedness. The war cannot be won without the essential equipment of a modern successful army. Aeroplane engines are one of those essentials.

Every day's delay means 6000 lives of our noble boys, the patriots of our country and of our allies. It also means each day the loss of hundreds of millions of wealth, represented in equipment. Hence, every hour, every minute of unnecessary delay is a crime—real treason—toward those who are fronting the dangers and who are patiently enduring hardships for you and for each us.

We urge every person in our employ not to allow themselves to be satisfied unless each and every day they have done everything they can possibly do to win this war.

Our job, to help end the war, is to make motors for aeroplanes. We have really accomplished nothing until we are turning out motors in quantities. Have you done all you can today and will you do all you can each day to remove all obstacles to overcome all difficulties to get motors, to get the best possible motors, to get the largest possible number of motors? If you are helping with all the energy, all the skill, all the push with which God has endowed you, that is good, and everybody is and should be proud of you. If you are not doing all these things, you class up with the slackers and have no right to look the flag square in the face.

Six thousand men, on an average, dying every 24 hours, puts squarely up to each one the question, "Am I doing all I can?"

The United States of America expects every man to do his duty.

All patriots will.

By W. H. Morgan

With eleven-twelfths of the world at war, individual rights must give way for the benefit of national rights. What will become of us if we don't realize our duty soon, and do it?

Don't take too long to think. Act.

Don't sleep at your machine night or day. How can manly men do this?

Don't lose time, do more than your part.

Don't get peeved. War is on.

Don't forget the poor fellow in the field who might return home some day if you will only help to get him implements of war to defend himself not only for you but for your family.

Don't forget the war has just begun. For humanity's sake, realize it and help. You are working not only for our company, but for the country.

Don't be a slacker. Help every minute.

Don't leave a tool idle. Forget self for country and home. Men in the trenches work 24 hours a day, including holidays.

Don't require a foreman. You do the pushing. Nothing can win but individual effort. Let us do our part quickly without waiting for the have to.

Don't find fault if things are wrong without suggesting a remedy. We welcome suggestions.

Don't gossip with the other fellow and prevent him from doing his part.

Don't let this appeal fall flat. It means you, every one of you, men and women.

In the end, whether we are successful or a failure by doing all we can now, we will have the satisfaction of knowing we did our part. It is up to you and every true American. Your country asks your help. Come across.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JAMES McNAUGHTON has been elected president of the Eddystone Munitions Co., Philadelphia, and Captain Walter Wilhelm has been chosen vice president. Mr. McNaughton was recently appointed consulting vice president of the Baldwin Locomotive Works, Philadelphia, after serving as assistant to the president of the Eddystone Munitions Corp., Eddystone, Pa. Prior to his going to Eddystone, he was vice president of the American Locomotive Co., New York. Charles J. Schlacks, general manager of the Remington Arms Co., has been made chairman of the board of directors of the Eddystone Munitions Co., Philadelphia.

Thomas Nesmith Jr. has been appointed superintendent of the Market street plant of the United States Cartridge Co., Lowell, Mass.

J. Q. Finfrock has been appointed manager of the Remington Arms plant at Bridgeport, Conn., to succeed P. H. Phinney, resigned.

Alex. L. Feild and A. N. Detweiler have joined the engineering staff of the Powdered Coal Engineering & Equipment Co., Chicago.

L. W. Adams of Bethlehem, Pa., recently was appointed general superintendent of the Trenton, N. S., plant of the Nova Scotia Steel & Coal Co.

J. A. Massel is now in charge of the New York office at 826 Trinity building, 111 Broadway, of the O'Neil Iron Works, Buffalo.

Charles Spalding, who has had charge of the sales in the Detroit and Michigan districts for the Gisholt Machine Co., Madison, Wis., resigned Jan. 1.

W. A. Lownds, upon his resignation as assistant purchasing agent for the Fulton Iron Works, St. Louis, was appointed purchasing agent for the O'Neil Iron Works, Inc., Buffalo.

George Endicott formerly mechanical engineer for the Morgan Spring Co., Worcester, Mass., is now affiliated with the sales force of the Wickwire Steel Co., Buffalo.

William H. Chapman, formerly a chemist for the Norton Co., Worcester, Mass., who recently received a commission as first lieutenant in the aeronautic branch of the aviation corps of the United States army will leave soon for France.

N. M. Stineman, chief engineer of the La Salle Engineering Co.. Chicago, has received a captain's commission in the United States engineering corps.

J. W. Fall, formerly of the firm of Cavert, Fall & Miller, Nashville, Tenn., retired Jan. 1, and was succeeded by M. G. Lipscomb. The concern is now known as Cavert, Miller & Lipscomb, manufacturers agents.

Robert J. Anderson, chief chemist and metallurgist of the Cleveland Metal Products Co., Cleveland, has presented his resignation effective as of Feb. 1.

G. M. Lawther, formerly with the Pittsburgh Gage & Supply Co., and the Colonial Supply Co., Pittsburgh, has accepted a position in the Pittsburgh office of the Biddle Purchasing Co.

Edmund J. Cafferty, formerly affiliated with the New Departure Mfg. Co., Bristol, Conn., in its production department, has received a commission as first lieutenant after taking a course of training at Plattsburg camp.

Charles Philip Coleman has been promoted to the presidency of the Worthington Pump & Machinery Corp., Boston and Cambridge, Mass., having served as its vice president for some time.

F. H. Bird, who has been traveling engineer for the American Steel Foundries, Chicago, has been commissioned first lieutenant in the ordnance department of the United States army.

L. Herbert Ballou has accepted an important position with the Lewis Mfg. Co., Walpole, Mass., following his resignation as production manager of the Universal Winding Co., Providence, R. I.

Louis J. Voyer, who for several years was connected with the Philadelphia office of the American Sheet & Tin Plate Co., has resigned to accept the position of assistant general manager of sales with the Liberty Steel Co., Warren, O.

A. R. Vanderford, formerly affiliated with the Cumberland Foundry & Machine Co., Nashville, Tenn., has been appointed superintendent of the foundry operated by the Youngstown Sheet & Tube Co., Youngstown, O.

Arthur Baer has been made superintendent of the new blast furnace of the Mark Mfg. Co., Indiana Harbor. He was formerly assistant superintendent of blast furnaces at the south works of the Illinois Steel Co.

A. N. Martin's resignation as industrial agent for the Baltimore & Ohio railroad will take effect Jan. 1. He will then assume the position of general sales manager for the Fulflo Pump Co., Cincinnati, manufacturer of machine tools, grinding machines, etc.

Don H. Maring, formerly assistant manager of sales of the Connors-Weyman Steel Co., Birmingham, Ala., has for his present address "somewhere in France" since he was transferred overseas as captain in the ordnance department, U. S. army.

Bertrand C. Root, engineer for the MacKinnon Steel Co., Sherbrooke, Que., has made an inspection tour through Massachusetts locating sites for a chain of five munitions plants which Canadian shell manufacturers expect to erect in this country.

A. L. Browne, recent manager of the Bancroft Razor Co., Worcester, Mass., has been made chief production manager of the Worcester Pressed Steel Co., of that city. Mr. Browne was formerly systematizer for Manning, Maxwell & Moore, Inc., New York.

William Ganschow, of the William Ganschow Co., 1101 Washington boulevard, Chicago, gear cutters, was recently tendered a banquet by members of the West Park board, of which he is treasurer, at which he was presented with a diamond studded star.

Charles Hayden, of Hayden, Stone & Co., Boston bankers, has been elected a director of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, to take the place of J. Kearsley Mitchell of that city, who resigned to enter the government service.

Thomas Sadler, who has been assistant manager at the New Castle, Pa., plant of the American Sheet & Tin Plate Co. for many years has been transferred to the Shenango works, where he is assistant manager and general superintendent of the hot mills. J.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

Fankhouser has been transferred from the Gary, Ind., plant to succeed Mr. Sadler at the New Castle works.

George D. Kershaw, La Porte, Ind., has been appointed general works manager for the Standard Aeroplane Corp. of New Jersey. His headquarters will be Elizabeth, N. J. He was at one time vice president of the Advance-Rumely Co.

George A. Lautz, who has been president of the Niagara Machine Tool Works, Buffalo, for about 10 years and its general manager for 27, will retire in February. He will take a needed rest and has formulated no plans for the future.

D. Gleisen, a mechanical engineer and formerly assistant manager of the Hyatt Roller Bearing Co., Newark, N. J., in charge of bushings sales has been made manager of the industrial bearings division. He has been with the company for about six years.

Stanley P. Stewart, who has been assistant superintendent of the machinery division of the American International Shipbuilding Corp., Philadelphia, has been appointed superintendent. He was at one time mechanical engineer for the Stewart Boiler Works, Worcester, Mass.

J. C. Maben Jr., who has been associated with the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., for the past four years as vice president, has resigned. A successor to Waddill Catchings, who is to go with a banking firm in New York next month, is expected to be named soon.

O. B. Pullis who had charge of the Philadelphia office of the Blaw-Knox Co., Pittsburgh, up to the time it was closed recently, has been transferred to the company's office at San Francisco. Irving Burrows, the San Francisco representative has gone into the government's service.

Siegfried Roebling of John A. Roebling's Sons Co., Trenton, N. J., is now sergeant of Co. G. 113th infantry, located at Camp McClellan, Ala. Walter A. Morton is major in the 58th brigade at that camp, while A. Harry Reading is sergeant in Co. E 311th infantry at Camp Dix, N. J.

Raymond G. Hutchinson has been appointed superintendent of the Buffalo plant of the American Brass Co., which was formerly the Buffalo Copper & Brass Rolling Mill. Mr. Hutchinson has been division engineer of the American Brass Co., Waterbury, Conn., for some time.

Samuel N. McFedries, Milwaukee, has been commissioned a major to the ordnance engineers' corps. He has been assigned to duty in Washington for the present, but will have charge of the production of gun carriages and motor trucks in an eastern district.

Charles F. Glover, senior vice president of the American Hardware Corp., New Britain, Conn., has been elected first vice president to succeed C. F. Smith, resigned, who remains a director. Mr. Glover has been connected with the corporation and its predecessors for over 40 years.

Captain John F. Trumbull, New Haven, Conn., chief engineer of public utilities commission of Connecticut, has received a commission as major in the United States army. He has been assigned to the 25th engineer's division and is now at Camp Devens, Ayer, Mass., awaiting orders.

Thomas Alexander Forsyth, who in 51 years rose from the position of office boy to that of president and general manager of the Boston Belting Co., Boston, retired recently. He was tendered a farewell dinner by the old-time employes of the company who presented him with a large loving cup.

W. C. Swartley, sales manager, and John J. Regan, superintendent, the Tioga Steel & Iron Co., Philadelphia, resigned Jan. 1. They will go into business under the name of the Philadelphia Steel & Iron Co., with offices in the Commercial Trust building, Philadelphia, making a specialty of forgings.

C. L. Bachman, formerly manager of the Chicago office of the Combustion Engineering Corp., New York, has received a commission as first lieutenant of engineers. O. de Lorenzi, formerly affiliated with this company's force of testing engineers is now second lieutenant of engineers.

W. H. Crago, mining engineer, Duluth, Minn., formerly affiliated with the Oliver Mining Co., there, has resigned and will shortly leave for Belgian Congo, Central Africa, to have charge of exploration work for the Union Minera de Haut Katanga, the largest copper mining company in Africa.

Thomas Kaveny, president and general manager of the Herman Pneumatic Machine Co., Pittsburgh, spoke before the Philadelphia Foundrymen's association, Jan. 2, on "The Herman jar ram, roll-over pattern drawing molding machine." The subject of credit was taken up by Brown Snyder, vice president of the First National bank of Philadelphia.

C. M. Carmichael has accepted the position of assistant works manager of the Electro Metals Co., Welland, Ont., having resigned the superintendency of the steel plant of the British Forgings, Ltd., Toronto, Ont. He was formerly assistant works manager in charge of the electric furnace department of the Anniston Steel Co., Anniston, Ala.

Joseph T. Martin, who for 27 years has been connected with the Sparrows Point plant of the Bethlehem Steel Co., the last 19 of which he has served as general superintendent of construction in the marine department resigned recently. He has accepted the position of general manager of the Hog Island Ship yards at Philadelphia.

D. H. Botchford has been promoted to the position of general manager of the Columbia Steel Co., San Francisco, with his main office at Pittsburgh, Cal., to succeed C. M. Miall who recently resigned. A. M. Clark continues as manager of the company's Portland, Oreg., plant, in charge of northwestern territory.

Frederick H. Brooke, formerly a director of the E. & G. Brooke Iron Co., Birdsboro, Pa., who is a brother of Robert E. Brooke, that company's treasurer, has been appointed captain in the aviation signal service. George Brooke 3rd, another of that company's directors, is now first lieutenant of artillery and aide to General Foote.

J. C. Broadnax, formerly assistant superintendent of the steel plant of the British Forgings Co., Toronto, Ont., has been appointed superintendent of the electric furnace department at the Watertown arsenal, Watertown, Mass. Mr. Broadnax was at one time connected with the electric furnace department of the Anniston Steel Co., Anniston, Ala.

Iron and Steel Labor Draft Heavy

Industry Furnishes Largest Number and Percentage for Army With Two Exceptions —General Crowder in Annual Report Declares Shortage of Labor is Inevitable—Various Adjustments Are Suggested

WASHINGTON, Jan. 8.—More men were drawn from the iron and steel and allied manufacturing industries to produce America's new national army, both as to total and percentage, than from any other single industry or similarly grouped trades, with two exceptions, according to Provost Marshall General Crowder in his report to Secretary Baker on the first draft under the selective service law. The document brims with interesting statistical information compiled under the direction of C. F. Balch, statistician of the Chicago & Northwestern.

As classified by the report, the iron and steel and allied manufacturing industries supplied 49,553 of the 587,412 registered men. The registrants numbered 587,412 out of a population of 1,258,312 engaged in the industries. The number drawn is 3.94 per cent of the population, is slightly less than 5 per cent of the total certified for the army, but does not include the great number who volunteered into other branches of the service nor the hundreds who were given officers commissions.

Agriculture Furnishes Many

Agriculture and transportation are the two exceptions where the total number accepted for service was greater than in the iron and steel and allied industries. In agriculture the total was 205,731 out of 782,503 called. Here 2,439,246 of the 13,843,518 engaged in the industry were registered. The percentage of the number accepted of the entire male agricultural industrial population was only 1.48. In transportation the total accepted was 61,077 out of 233,453 called, 743,650 registered, and 2,831,066 employed. It is a percentage of 2.1 of the largest figure. Transportation, as grouped, includes railroads, waterways, street and electric lines, telephone and telegraph, express companies, transfer, hack, etc. As to percentage, forestry had three-tenths of one per cent more men taken than in the iron and steel group, but the total was only 7984. Here also public service, other than public service corporations, exceeded, the percentage being 4.46 but the total running up to only 23,606.

The iron and steel group as classified by General Crowder, has three divisions, one including blast furnaces, steel rolling mills, and military weapon factories; another including shipbuilding and boat building plants; and the third made up of farm implement, automobile, wagon and carriage factories; car and railroad shops, and other unclassified iron and steel industries.

Acceptance Percentage is High

In the first division, 22,068 men were taken of the 241,145 registered; 92,435 had been called for examination. The industrial population in this class was given as 373,701. The ratio of men accepted to men engaged in the trade is 5.90, the highest of any except the oil and gas well classification where one-tenth of one per cent noses out the steel industry. In the shipyard group the population was 62,071; registrants, 35,949; called, 11,910; accepted, 2628; and ratio, accepted to population, 4.23. In the third group the figures are, respectively, 822,540; 310,318; 102,860; 24,857; and 3.02.

Between the agricultural industry and the nonagricultural industries, the report makes many comparisons. Some are as follows: Of 782,503 agriculturalists called, 11.94 per cent claimed exemption. Of 2,300,446 non-agriculturalists called, only 2.06 per cent asked for discharge. The number of agricultural claims pending, 1088, is 202 more than those pending in the other industrial divisions. The agricultural appeals to the President numbered 17,218, nearly 30 per cent of the claims refused. The President has granted only 7.26 per cent, but 7021 are still pending. Non-agricultural appeals aggregate only 4719 or about 28 per cent of the claims denied. Here he has allowed 8.2 per cent with 1475 still pending.

The report indicates that the draft may have the effect of drafting labor, even suggests the possible need of conscription of labor for industrial requirements and emphasizes the necessity of regulating the wages of labor. The report says, in part, as follows:

"The draft itself is an instrument of compelling force in controlling and distributing labor supply throughout the United States. It is conceivable that our national necessities may require a direct draft of labor. Repugnant as this may seem to some of our ingrained peace-time ideas, there can be little doubt of the authority of the government to adopt such a measure. But there are measures short of this suggested in the draft regulations as they now stand, which give a powerful lever of control of labor supply that should be tried before we pass to the extreme of a direct industrial draft. Since this is so, the responsibilities of this office do not end with the prompt supply of levies for the army. The entire industrial field must be explored, provision of facile and effective methods must be perfected, and the selective service system must stand as a pervasive and supple control which shall serve its purpose so far as its powers make possible, in co-ordinating the man power of the nation and so fostering its industries in a nice and impartial balance which shall carry forward all varied endeavors, not singly or irregularly, but compacted in an even and synchronized march.

"While the selective system attempts to protect only those engaged in industries essential to the national interest it covers by the clearest terms all agriculture and all industries except those patently nonessential. It is designed to produce an immediately available class which shall protect all skilled labor appurtenant to agriculture and to all essential industry.

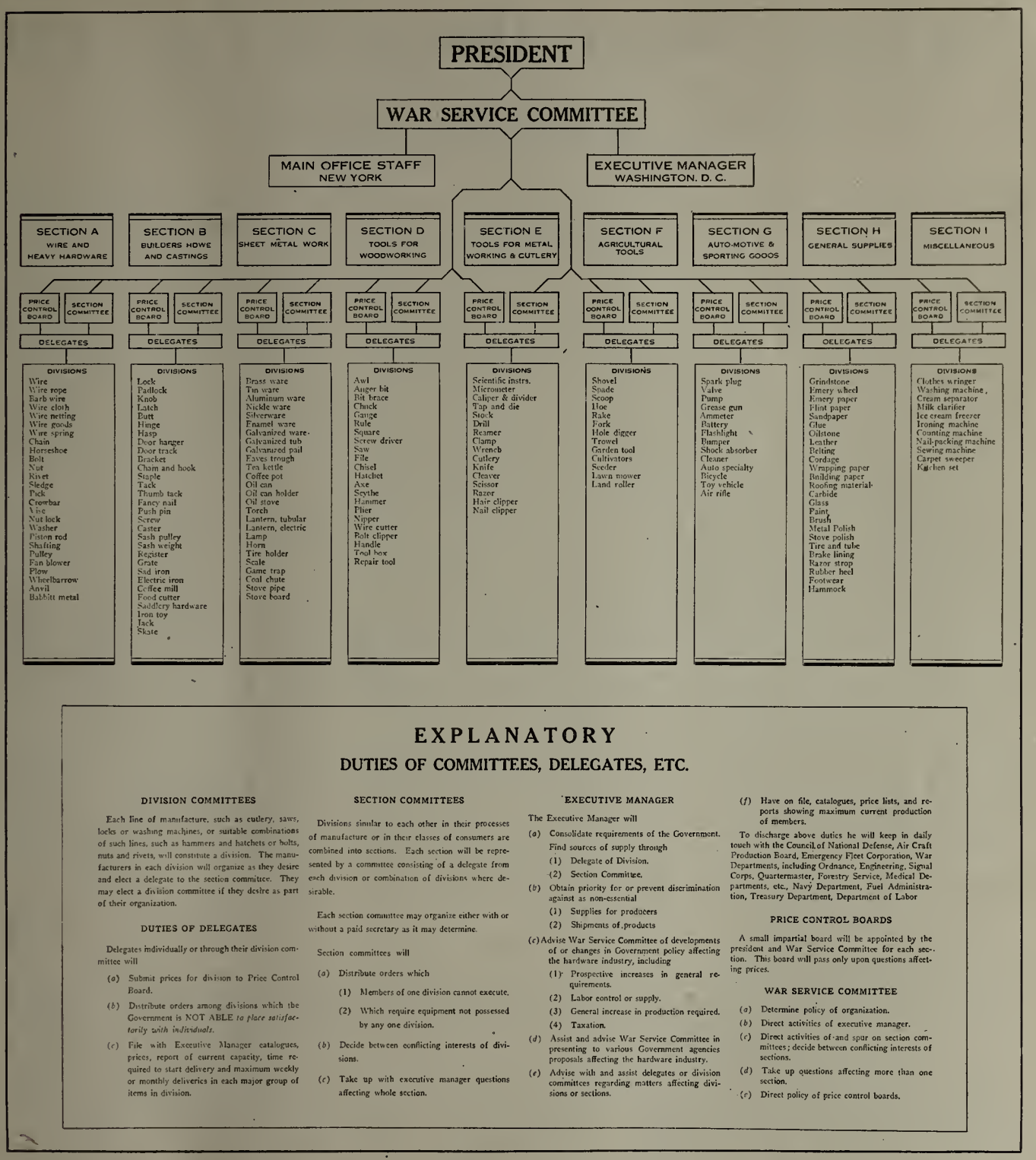
Eighty Per Cent Are Exempt

"The failure in direct deferment on account of engagement in nonessential industries may seem at first sight to depart from the resolution that the general industrial balance of the nation is not to be destroyed. The first impression fails to consider the effect of the dependency deferments and the fact already adverted to that fully 80 per cent of men in any particular industry, essential or nonessential, are removed entirely from the operation of the draft by being under or over draftable age or on account of dependency exemptions. The protection to nonessential industry, while not nearly so effective as that offered to essential industry, is sufficient to prevent destruction. This is as it should be. The added protection to essential industry will be a force to attract labor to such industry, but it will not be such a potent force as to destroy nonessential industry.

Great pressure has been exerted, first, to withdraw any exemption whatever from nonessential industry; second, to grant absolute exemption to all labor, skilled and unskilled, engaged in essential industry. The second if the milder course. The first is revolutionary. Either would be so potent as to coalesce labor supply about the favored industry.

"The second suggestion has been used

(*Concluded on page* 175)



EXPLANATORY

DUTIES OF COMMITTEES, DELEGATES, ETC.

DIVISION COMMITTEES

Each line of manufacture, such as cutlery, saws, locks or washing machines, or suitable combinations of such lines, such as hammers and hatchets or bolts, nuts and rivets, will constitute a division. The manufacturers in each division will organize as they desire and elect a delegate to the section committee. They may elect a division committee if they desire as part of their organization.

DUTIES OF DELEGATES

Delegates individually or through their division committee will

(*a*) Submit prices for division to Price Control Board.

(*b*) Distribute orders among divisions which the Government is NOT ABLE *to place satisfactorily with individuals.*

(*c*) File with Executive Manager catalogues, prices, report of current capacity, time required to start delivery and maximum weekly or monthly deliveries in each major group of items in division.

SECTION COMMITTEES

Divisions similar to each other in their processes of manufacture or in their classes of consumers are combined into sections. Each section will be represented by a committee consisting of a delegate from each division or combination of divisions where desirable.

Each section committee may organize either with or without a paid secretary as it may determine.

Section committees will

(*a*) Distribute orders which

(1) Members of one division cannot execute.

(2) Which require equipment not possessed by any one division.

(*b*) Decide between conflicting interests of divisions.

(*c*) Take up with executive manager questions affecting whole section.

EXECUTIVE MANAGER

The Executive Manager will

(*a*) Consolidate requirements of the Government. Find sources of supply through

(1) Delegate of Division.

(2) Section Committee.

(*b*) Obtain priority for or prevent discrimination against as non-essential

(1) Supplies for producers

(2) Shipments of products

(*c*) Advise War Service Committee of developments of or changes in Government policy affecting the hardware industry, including

(1) Prospective increases in general requirements.

(2) Labor control or supply.

(3) General increase in production required.

(4) Taxation.

(*d*) Assist and advise War Service Committee in presenting to various Government agencies proposals affecting the hardware industry.

(*e*) Advise with and assist delegates or division committees regarding matters affecting divisions or sections.

(*f*) Have on file, catalogues, price lists, and reports showing maximum current production of members.

To discharge above duties he will keep in daily touch with the Council of National Defense, Air Craft Production Board, Emergency Fleet Corporation, War Departments, including Ordnance, Engineering, Signal Corps, Quartermaster, Forestry Service, Medical Departments, etc., Navy Department, Fuel Administration, Treasury Department, Department of Labor

PRICE CONTROL BOARDS

A small impartial board will be appointed by the president and War Service Committee for each section. This board will pass only upon questions affecting prices.

WAR SERVICE COMMITTEE

(*a*) Determine policy of organization.

(*b*) Direct activities of executive manager.

(*c*) Direct activities of and spur on section committees; decide between conflicting interests of sections.

(*d*) Take up questions affecting more than one section.

(*e*) Direct policy of price control boards.

Hardware Makers Organize on War Basis

A WAR convention of all hardware manufacturers has been called by the executive council of the American Hardware Manufacturers' association, to be held Thursday, Jan. 17, at the Biltmore hotel, New York. The convention has for its object, primarily, the reorganization of hardware manufacturers so that prompt assistance may be given to the government; that manufacturers may be able to secure sufficient productive capacity at suitable prices; that the question of priorities on hardware may be determined, and that those industries in hardware essential to the continuance of the war may be named. The war service committee of the association has prepared a tentative diagram showing in detail the plan of an organization best fitted to meet war exigencies.

Officers of the association are as follows: President, Charles W. Ashbury, Enterprise Mfg. Co., Philadelphia; vice presidents, Frederick H. Payne, Greenfield Tap & Die Corp., Greenfield, Mass.; A. W. Stanley, Stanley Rule & Level Co., New Britain, Conn.; Frank Baackes, American Steel & Wire Co., Chicago; secretary-treasurer, F. D. Mitchell, Woolworth building, New York.

Pig Iron Output Drops 12 Per Cent

Production in December Shows Decline of 312,000 Tons From November—Steel Works Furnaces Badly Hit by Coke Shortage—Many Stacks Blown Out or Banked

PIG iron production in December dropped to the lowest point since August, 1915. Irregular blast furnace operations, resulting from the inability to secure coke, brought about a 12 per cent decrease in production last month in comparison with November.

The production of coke and anthracite pig iron in December was 2,886,553 tons, a loss of 312,044 tons from November. A clearer insight into the extent of the sharp drop in output

AVERAGE DAILY PRODUCTION.

	1917.	1916.	1915.	1914.	1913.
Jan.	101,930	102,319	51,323	60,624	89,929
Feb.	94,641	106,157	59,521	67,450	92,095
Mar.	105,026	107,343	66,009	75,534	89,123
Apr.	110,936	107,517	70,484	75,383	91,812
May	110,119	108,535	72,747	67,646	90,865
June	108,675	107,127	78,998	63,486	87,229
July	107,659	103,907	82,687	63,075	82,525
Aug.	104,483	103,156	89,510	64,403	81,839
Sept.	104,691	106,935	94,478	62,757	83,137
Oct.	106,332	113,167	100,656	57,007	81,933
Nov.	106,620	110,593	101,174	50,042	74,322
Dec.	93,115	102,715	103,278	48,236	63,746
Av'ge	104,542	106,610	81,022	62,934	83,980

is given by a comparison of the figures on average daily production during the last two months. In December the daily average was only 93,115 tons, a loss of 13,505 tons from the November average of 106,620 tons.

The total production of pig iron in 1917, excluding charcoal iron, was 38,157,897 tons, against 39,019,123 tons, in 1916, a decrease of 861,226 tons. Adding the output of the charcoal furnaces, the 1917 production of all classes of pig iron approximates 38,525,000, compared with an actual production in 1916 of 39,434,797 tons. As shown in the accompanying table, production during the second half of last year was on a par with the output in the first half.

The bulk of the decline during December occurred in Pennsylvania, Ohio and Illinois. The production in these three states fell off 250,000 tons out of the total of 312,044 tons for the country. The production of steelworks or nonmerchant furnaces in December was 2,046,173 tons, against 2,280,640 tons in November, a loss of 234,467 tons. The merchant furnaces produced 801,344 tons, compared with 874,339 tons in November, a loss of 72,995 tons. The nonmerchant furnaces showed a loss of 10,016 tons in average daily output, their record for December being 66,005 tons, against an average production of 76,021 tons in November. The average output of the merchant furnaces fell off 3295 tons, December's record being 25,850 tons, against 29,145 tons in November.

The number of active furnaces on Dec. 31 was 321, against 344 on the last day of November and 309 on Dec. 31, 1916. Six merchant furnaces were blown out during the month, and four were blown in, a net loss of two; while 23 steelworks furnaces were blown out and only two blown in, a net loss of 21.

In December, 22,598 tons of ferro were produced, a loss of 4690 tons, compared with the November figure of 27,288 tons. The spiegel production in December amounted to 16,438 tons, or 108 tons greater than the November total of 16,330 tons.

The following merchant furnaces were blown in during the month: One Hattie Ensley (new), Sloss-Sheffield Steel & Iron Co.; one Iroquois, Miami Metals Co., Dec. 14; Susquehanna No. 1, Rogers-Brown Iron Co., Dec. 10, and Globe, Globe Iron Co., Dec. 25. The following merchant furnaces were blown out: One Hattie Ensley, Sloss-Sheffield Steel & Iron Co.; Sheridan No. 2, Berkshire Iron Works; Lebanon B, Bethlehem Steel Co., Dec. 19; Marshall, Juniata Furnace & Foundry Co.; Lebanon Valley, Lebanon Blast Furnace Co.; and Robesonia, Robesonia Iron Co., Ltd., Dec. 31.

The following steelworks furnaces were blown in: One Hubbard, Youngstown Sheet & Tube Co., and one Eliza, Jones & Laughlin Steel Co. Those blown out were: Minnequa B, Colorado Fuel & Iron Co., Dec. 20; South Works No. 6, Joliet Nos. 1 and 2, and one Gary, Illinois Steel Co.; one South Chicago, Wisconsin Steel Co., Dec. 7; Bethlehem A, B and C, Bethlehem Steel Co.; one Lackawanna, Lackawanna Steel Co., Dec. 24; Emma, American Steel & Wire Co.; one Mingo, one Columbus, two Edgar Thomson and one Neville Island, Carnegie Steel Co.; one Lorain, National Tube Co.; one Cambria, Cambria Steel Co.; one Josephine, Corrigan, McKinney & Co., Dec. 16; one Atlantic, Republic Iron & Steel Co., Dec. 19; two Coatesville, Midvale Steel & Ordnance Co.; and one Top, Wheeling Steel & Iron Co.

Furnace No. 6 at the New South works and furnace No. 10 at the Gary works of the Illinois Steel Co., Chicago, were blown out on Dec. 14, for complete relining.

MONTHLY PRODUCTION.

	1917.	1916.	1915.
Jan.	3,159,839	3,171,878	1,591,024
Feb.	2,649,935	3,078,548	1,666,592
Mar.	3,255,813	3,327,630	2,046,280
Apr.	3,319,809	3,225,496	2,114,518
May	3,413,677	3,364,584	2,255,157
June	3,260,234	3,213,818	2,369,932
Total 1st half	19,059,307	19,381,954	12,043,503
July	3,337,442	3,221,127	2,563,311
Aug.	3,238,970	3,197,838	2,774,825
Sep.	3,140,742	3,208,041	2,834,342
Oct.	3,296,286	3,508,180	3,120,340
Nov.	3,198,597	3,317,805	3,035,235
Dec.	2,886,553	3,184,178	3,201,605
Total 2d half	19,098,590	19,637,169	17,529,658
Grand total	38,157,897	39,019,123	29,573,161

DECEMBER PIG IRON

States.	No. of stacks.	No. in blast last day of month. Dec.	Nov.	Total tonnage made. Merchant.	Non-Merchant.	Totals— Dec.	Nov.
Pennsylvania	160	122	134	210,001	935,130	1,145,131	1,261,755
Ohio	79	61	63	169,705	420,141	589,846	689,430
Alabama	47	32	32	140,411	99,194	239,605	247,089
Virginia	21	15	15	40,034	.....	40,034	47,353
New York	27	21	21	74,046	104,226	178,272	188,818
New Jersey	6	5	5	18,785	.....	18,785	27,319
Illinois	24	17	20	41,695	185,710	227,405	277,297
Colorado	6	3	4				
Indiana	14	13	14	24,328	255,527	279,855	278,130
Maryland	4	1	4				
Wisconsin	6	4	4				
Kentucky	7	5	5				
West Virginia	4	3	4	47,678	22,157	69,835	75,036
Tennessee	17	10	10				
Washington	1	1	1				
Georgia	2	1	1				
Texas	3	0	0				
Minnesota	3	3	3	34,661	24,088	58,749	62,752
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						16,438	16,330
Ferro—All states....						22,598	27,288
Total	435	321	344	801,344	2,046,173	2,886,553	3,198,597

Start First Mill

Of Extensive Bar Plant of Carnegie Steel Co. at McDonald

The first unit, an 8-inch guide mill, of the new McDonald plant of the Carnegie Steel Co., at Youngstown, O., began regular operations Jan. 3. It is a miscellaneous mill and its capacity is dependent upon the material it produces. It is equipped to roll rounds and squares up to ⅝ inch, concrete bars and flats up to 1½ inches wide, No. 12 gage up to 7/16 inch thick, and also special sections. The mill has been running experimentally for some time, rolling material used in connection with the construction of the plant, where four mills now are being installed, the three in addition to the 8-inch mill being a 10-inch guide mill and two 8-inch hoop mills. It is expected to put the 10-inch mill in operation on regular turns in about two months and the two hoop mills in operation about the first of May.

The mills will be driven by electric power supplied by the gas-electric engines at the Ohio works of the Carnegie Steel Co., Youngstown, O. The current is conveyed five miles to the McDonald plant by high-tension lines supported by 80 steel towers, and is delivered at 44,000 volts. It is distributed at 6600 volts to the mill motors. The plant will be supplied with slabs, billets, etc., by the Ohio works, the material being shipped intermill over the Youngstown & Northern railroad, a subsidiary of the Steel corporation. Furnaces using powdered coal for ignition have been installed for reheating the steel previous to rolling into bars. The mills are supplied with water from the Mahoning river. An extensive screening system has been built on the bank of the river and after the water passes through the screens, it is distributed to the various departments by electric turbines which have a daily capacity of 25,000,000 gallons. An udergground concrete tunnel, 1400 feet long, 12 feet high and 16 feet wide, leads from the plant entrance to the mills and affords the employes an access to their department without crossing any railroad's tracks. The tunnel is used for conveying castings.

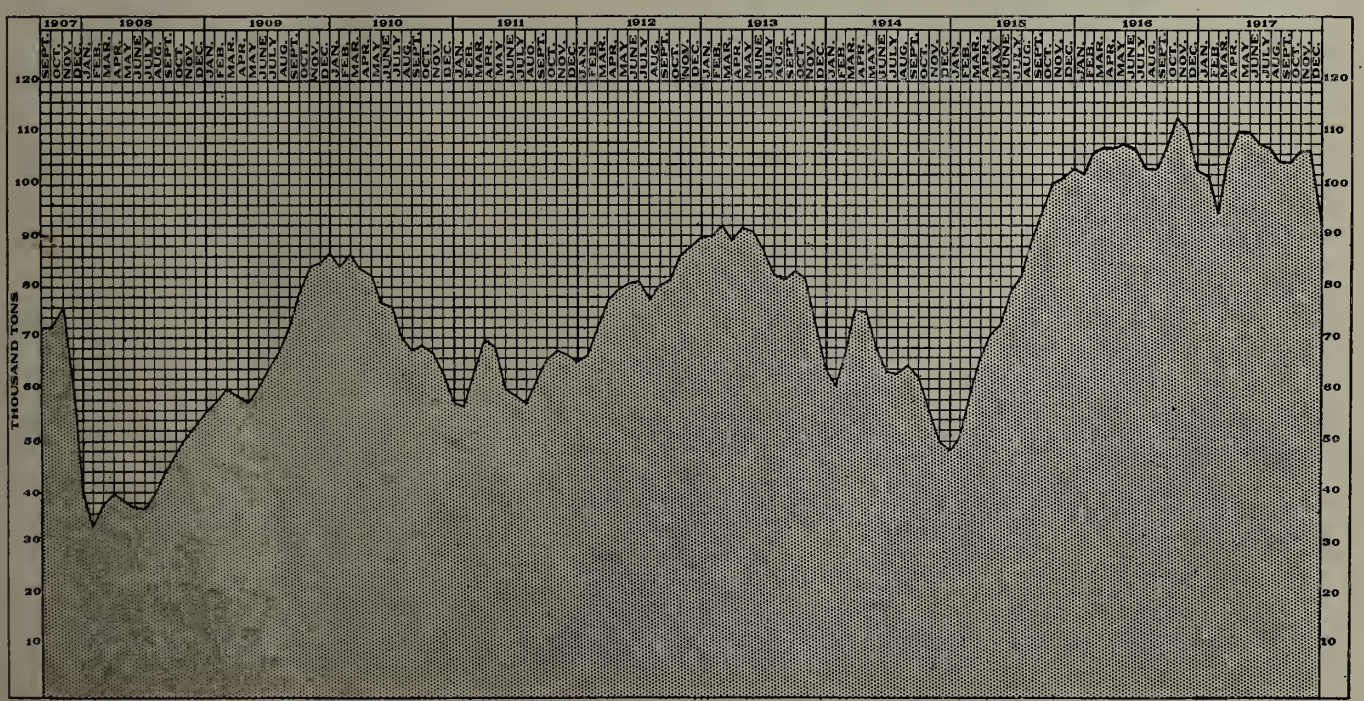
Heavy Draft on Industry

(*Concluded from page* 172)

specifically for the benefit of shipbuilding. The creation of a merchant marine is conceived by this office to be (next to the unhampered raising of our army) the most vitally necessary step in the prosecution of the war. As soon as it was made to appear that there was not sufficient labor to carry this project forward there was inserted in the new regulations a provision granting absolute immunity from draft to laborers engaged in the building and fitting of ships under the supervision of the navy or the Emergency Fleet corporation. The effect was electrical, and there is every indication that it will prove to be continuously effective. There is no longer any labor shortage in that industry.

"But the danger of such a step was instantly demonstrated. Munition factories at once demanded the same protection. The time has not yet come for this. If it were accorded to munition factories, agriculture would present a claim equally substantial, and the result would be such an inroad into class 1 as to abate it, to drive us into classes II and III in all other industries, and thus to break down the entire value and effect of the classification system. We can not take such a step now. When the classification is complete we shall know to the uttermost ounce just what concessions the army can make to the other paramount industries of the nation. Until that time no further concessions may be made.

"But this must be recognized: Even after all such concessions have been made the labor supply will be insufficient for the demands of even necessary industries. Man-power adjustments must be made on every hand, and they can no longer be made at the expense of the army. What are termed nonessential industries must not be destroyed; and if this nation can not continue under the relatively slight burden upon its man power, then it will stand established as the incompetent among the civilized nations of the world. Such a result is unthinkable. The problem must be faced and solved. This office will go as far as is humanly possible, but with its limited power it can not offer a complete solution. Women must take the place of men wherever that is possible. Waste of effort must be abolished. And finally, aside from manipulation of the effect of the draft, more subtle and equally powerful methods must be evolved, labor must be regulated, and the disproportionate prices now prevalent for the inducement of labor to abnormal areas must be controlled by administrative regulation which shall more effectively control the supply of labor appurtenant to every war-time industry. In no other manner can this very clearly defined and really simple problem be approached."



AVERAGE DAILY PRODUCTION OF COKE AND ANTHRACITE PIG IRON

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Proposes Entire Recasting of War Tax

COMPLETE remodeling of the income and war profits sections of the war revenue act of 1917 is proposed in a bill introduced by Senator Smoot, Utah, last week. Mr. Smoot is a Republican member of the senate finance committee and has voiced the sentiment of many business men in sharply criticizing the present act. He now proposes to recast these taxes in a way to make them understandable to the average citizen and to remove the injustices and discriminations which he declares the present act to contain. The proposed amendment to the excess profits section wipes out the mooted questions of invested capital, watered stock and bonded indebtedness and with a few modifications revises the basic theory of profits comparison on which the senate bill was founded before it went into conference last September. Mr. Smoot designates his amendment as "war profits tax" instead of "war excess profits tax" as designated in the present act.

Five Years in Pre-War Period

War profits are ascertained by deducting the pre-war profits from the net income of the trade or business for the taxable year. The bill takes as the pre-war period the years 1909, 1910, 1911, 1912 and 1913, excluding the two calendar years in which the net income of the trade or business was respectively the greatest and the least. The pre-war profits are the average annual amount of the net income of the trade or business during the pre-war period, plus 8 per cent of the new capital actually paid into the trade or business since Dec. 31, 1913, and minus 8 per cent of the amount of capital similarly withdrawn.

The bill proposes a tax to be paid for each taxable year on the incomes of every corporation, partnership or individual, engaged in trade or business, equal to the following percentages of the war profits of such trade or business:

"Ten per cent of the amount of such war profits not in excess of 10 per cent of the pre-war profits of such trade or business, (determined as hereinafter provided.)

"Twelve and one-half per cent of the amount by which such war profits exceed 10 per cent of such pre-war profits and do not exceed 20 per cent thereof.

"Fifteen per cent of the amount by which such war profits exceed 20 per cent of such pre-war profits and do not exceed 30 per cent thereof.

"Twenty per cent of the amount by which such war profits exceed 30 per cent of such pre-war profits and do not exceed 40 per cent thereof.

"Twenty-five per cent of the amount by which such war profits exceed 40 per cent of such pre-war profits and do not exceed 50 per cent thereof.

"Thirty per cent of the amount by which such war profits exceed 50 per cent of such pre-war profits and do not exceed 60 per cent thereof.

"Forty per cent of the amount by which such war profits exceed 60 per cent of such pre-war profits and do not exceed 70 per cent thereof.

"Fifty per cent of the amount by which such war profits exceed 70 per cent of such pre-war profits and do not exceed 80 per cent thereof.

"Sixty per cent of the amount by which such war profits exceed 80 per cent of such pre-war profits and do not exceed 90 per cent thereof.

"Seventy per cent of the amount by which such war profits exceed 90 per cent of such pre-war profits and do not exceed 100 per cent thereof.

"Eighty per cent of the amount by which such war profits exceed 100 per cent of such pre-war profits.

The amendment places the normal income tax at 2 per cent, as under the old law, but consolidates the surtax. The tax on corporation incomes is made 8 per cent above $2000, estimated to raise $715,000,000, or $180,000,000 more than the present act. The tax on war profits is estimated to raise $1,351,050,000 revenue annually. The bill proposes to levy a tax of 2 per cent on entire net individual incomes and an additional tax graded from 1 per cent on net incomes in excess of $5000, but not in excess of $7500, up to 63 per cent on the amount which the net income exceeds $2,000,000. So also with the tax on corporations. The bill proposes, first, a tax of 8 per cent on the net income received by the corporation and in addition a tax of 10 per cent on the amount remaining undistributed six months after the end of each calendar and fiscal year of the total net income of every corporation and stock company. Corporations having a net income of less than $2000 are exempt from the 8 per cent income tax. The amendment would do away with the 8 per cent tax on salaries and other income received for services. Senator Smoot, in a statement on the floor said: "The only excuse I have heard for not amending existing revenue acts is that the blank returns already have been prepared by the treasury department and should be delivered to persons interested within the next 30 days, as under existing laws the returns must be made by March 1. My amendment provides in section 300 that the commissioner of internal revenue, with the approval of the secretary of treasury, shall by regulation allow an extension of time, not to exceed 11 days for the filing of returns for and the payment of income and war profits taxes for the taxable year 1917. If the amendment is adopted any time during the month of January or February, it will not be too late, with a reasonable extension of time, to have the blanks prepared and sent to the interested persons. I see no reason why this amendment should not pass both houses of congress within the next 30 days.

Council Commences Trade Acceptance Campaign

Distribution of literature in its educational campaign has been started by the American Trade Acceptance council, from its recently established headquarters, room 466, Woolworth building, New York. Three great organizations are represented in the council, which was formed as a result of recommendations made at the meeting of the Investment Bankers' association last September in Atlantic City. These are the Investment Bankers' association, the United States chamber of commerce and the National association of Credit Men. Each named a committee of three and these formed the Trade Acceptance council, with Lewis E. Pierson as chairman. Several comprehensive publications already are in print and

others are being prepared, explaining the functions of the trade acceptance.

In a letter to Chairman Pierson of the council, Governor Harding of the federal reserve board states: "The board has learned with much interest and satisfaction of the formation of your joint committee with the object of promoting the use of the trade acceptance in the settlement of obligations arising out of commercial transactions. As you know, the federal reserve board and the federal reserve banks have consistently encouraged the development of the liquid trade acceptance as defined in the board's regulations, both by a campaign of education and by establishing a preferential rate in favor of this kind of paper. By enlarging the field for the sale of such paper, there will be promoted the establishment of a general discount market which is universally recognized as an important elements in the improvement of the American banking conditions."

D. C. Wills, federal reserve agent for the Cleveland district, in an address before the Association of Cleveland Credit Men at the Hotel Statler recently, stated that the large steel companies are in the forefront in the campaign to obtain a widespread use of the trade acceptance in business in place of the "frozen" book account, and added that general adoption of the new scientific medium of credit was one of the important details of winning the war.

Get Steel at 92

Employes of the United States Steel Corp. are to have the privilege of subscribing for its common stock during the current month at $92 a share. Judge E. H. Gary, chairman of the corporation, announced that 50,000 shares would be offered and these may be bought on payments. Last year's subscriptions aggregated in excess of 67,000 shares at a price of $107. In 1915 the price was $85.

Sees End to Extensions of Plants from Profits

James A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown, O., entertains an optimistic view for the next year in all essential lines of industry. He recently forecasted that business would be brisk throughout 1918, according to present indications. He said: "The demand for war materials, railroad supplies and for many general necessities will be such that only maximum operations will enable output to equal consumptive requirements. Profits, especially in the iron and steel business, undoubtedly reached their peak in 1917. Manufacturing costs have not receded, but, in fact, have been going forward to new maxima from time to time, so that with prices cut, the result is smaller gross earnings. In the iron and steel industry, it will not longer be possible to build plant extensions from earnings as in the past, and new capital from the sale of stock or other securities will be required for such projects."

Financial Crop Ends

The Toledo Pipe Threading Machine Co., Toledo, O., has decreased its capital from $750,000 to $50,000.

* * *

The foundry and iron works of the William T. Remppis Co., Reading, Pa., has been purchased from the trustees in bankruptcy by Ferdinand Thun for $33,000.

* * *

On Jan. 24, stockholders of the Grasselli Chemical Co., Cleveland, will vote on increasing its capitalization from $20,000,000 to $50,000,000. Of this amount $10,000,000 will be in preferred and $30,000,000 in common.

* * *

To comply with Ohio statutes governing foreign corporations doing business in the state, the Sharon Steel Hoop Co., Sharon, Pa., with a plant at Youngstown, O., has set aside $1,318,382 of its $10,000,000 capital for Ohio business.

* * *

Stockholders of the General Electric Co. held a meeting in New York city recently and voted to increase the capital stock to $20,000,000. If official estimates of the management are verified the fiscal year ending Dec. 31 will show a profit of $27,000,000 fully $8,000,000 in excess of the gain for 1916.

* * *

With 200,000 tons of flue dust in its stock pile at Youngstown, O., the American Sintering Co. will double its capacity there to reduce 800 tons daily. This will involve the expenditure of over $100,000. At its Hubbard, O., plant, 600 tons is the average daily capacity. The two plants will produce daily about 1000 tons of sinter of 60 per cent metallic iron.

* * *

The Atlantic Engine & Shipbuilding Co., New York and Boston, has acquired the plant of the Colonial Paper Co., Portsmouth, N. H., which has been closed for several years. It is announced that 10 steel merchant vessels for the government use will be constructed in it.

* * *

A special meeting of the stockholders of the Penn-Seaboard Steel Corp. will be held at New York, Jan. 16, to vote on the authorization of the issuance of $2,000,000 first mortgage 6 per cent 5-year serial gold bonds, dated Dec. 1, 1917. Another issuance and sale of 40,000 shares of the corporation's unissued capital stock by the board of directors will also be voted upon.

Non-War Supplies

Of Toluol Expected to be Released—Benzol Active and Weaker

New York, Jan. 5.—Present indications are that consumers of toluol for commercial purposes will be accorded permission by the government to buy at least a portion of their usual requirements. Although no official action has been taken, plans are being worked out along this line. Under the proposed arrangement, makers of essential products will receive preference. Up to the present time, however, no toluol yet has been released for anything excepting urgent government work. The navy department so far has replied to all applications for releases that the situation has not been so modified as to allow the distribution of toluol except for government purposes.

Despite further heavy sales of benzol, the large quantities of this product offered reflect clearly that production has overtaken consumption. The market is weak and now may be quoted at 35 to 40 cents per gallon, both for spot and contract depending on quantity. In some cases even lower was done on comparatively large accumulations which have been dumped on the market. Sales during the week involve many hundreds of thousands of gallons and further large transactions are pending. The government recently has placed large orders for benzol which are to be made into picric acid here. This does not mean an increase in picric acid output, however, since the contracts placed are merely extensions of expired commitments with the French government.

Solvent naphtha reflects the best tone in months. Demand both for crude and refined has improved.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.52
Per 100 Pounds at Seaboard	
Sulhate of ammonia (nominal)	$4.90 to 5.00

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Seizes Lathes For Destroyer Work

Government Commandeers 50-Foot Lathes to Push Destroyer Program to Its Utmost—Navy Department's Requirements of 60 Locomotive Cranes for 1918 Are Filled—Many Crane Inquiries Are Current

WITH the coming of the new year, the rapid unfolding of the government's vast war-preparation program is making its effect felt more perceptibly in the machine tool market. Lathe seizures for destroyer work feature this week. Indications of the earnestness with which the nation is entering into these preparations are found in the lettings of huge contracts for airplane parts, truck parts, fuses, shells, guns, gun mounts, cranes and other equipment. Machine tools, as a barometer of war orders, indicate that the east has lost some of its initial impetus and that the central west is on the ascendancy as a power in the making of munitions. The awarding of huge contracts is being felt in many branches of industry. The Morgan Engineering Co., Alliance, O., as an illustration, was awarded a contract for gun mounts and a few days later commenced work on a plant which will add approximately 500,000 square feet of floor space to its present works. A list was issued for about 275 tools, few of which have been secured up to the present time. War orders have brought out several inquiries for tools. Included are the following: From the Studebaker Corp., Detroit, for 50 machine tools; from the Cambria Steel Co., Johnstown, Pa., for miscelianeous equipment; from the E. W. Bliss Co., Brooklyn, N. Y., from the General Electric Co., Schenectady, N. Y., for about $300,000 worth of tools; from Victor R. Browning & Co., Mansfield, O., for new equipment, and from G. C. Hodgson & Co., Dayton, O., for automatic screw machines.

In the crane market, the placing of contracts for 60 locomotive cranes by the navy department was by far the most important feature of the week. Inquiries are current from the Air Nitrates Co., New York, for 14 electric traveling cranes and from the Federal Shipbuilding Co., New York, for 11 electric traveling cranes. Whittlesey & Whittlesey, New York, are active in securing equipment for the Southern Shipbuilding Co., Charleston, S. C.

ACTIVITY in the machine tool market continues lively although there are fewer long lists of tools being issued. Dealers generally secure a good volume of business even during the normally dull holiday season. In the past week the feature of the market has been the widespread commandeering of large lathes, having a 50-foot bed and longer. These lathes are wanted in connection with expediting the destroyer program; some of the delivery dates on these vessels having been advanced. Gossip in the market has it that the large submarines now being launched by the Germans have lessened the value of the submarine chasers and necessitated the presence of more destroyers. It takes comparatively little time to construct the hulls of the destroyers and it is almost as easy to obtain engines for destroyers as for chasers. But the hitch came in turning the long propeller shafts for the destroyers, this work requiring the big lathes.

Navy Department Covers for 1918 Crane Needs

THE bureau of yards and docks, navy department, Washington, has covered on 60 locomotive cranes, its estimated requirements for 1918. These cranes were apportioned among various builders, and range in capacity as follows: Forty-six, 15 to 20 tons; six, 20 to 30 tons; and eight, 5 tons. Among recent inquiries to be issued is that of the Air Nitrates Co., New York, involving 14 electric cranes. Specifications call for seven 5-ton, four 20-ton and four special transfer cranes. The Pennsylvania railroad also is understood to be in the market for two locomotive cranes. This is a revival of part of an inquiry made a few weeks ago. At present considerable attention is being directed to the requirements of Whittlesey & Whittlesey, New York, who are to purchase the equipment needed for the Southern Shipbuilding Co., Charleston, S. C. Negotiations continue on the 11 electric traveling cranes inquired for by the Federal Shipbuilding Co. This company recently placed four 10-ton cranes with the Milwaukee Electric Crane Co., four 20-ton cranes with the Erie Crane Co., and two 35-ton cranes with the Northern Engineering Works. The American International Shipbuilding Corp. has also awarded two 10-ton electric cranes to the Northern Engineering Works.

General Electric Co. Renews Inquiry

The General Electric Co. has revived its inquiry for about $300,000 worth of tools for its Lynn, Mass., plant, this list having appeared in the market several times previously. The American Can Co. has closed for about 50 lathes for its Edgewater, N. J., plant. The Davis-Bournonville Co., Jersey City, N. J., has been buying additional equipment. The E. W. Bliss Co., Brooklyn, N. Y., has been negotiating for tools for its new plant addition and probably will inquire formally in the near future. Export inquiry for machines has been active, a number of tools have been sold for export to France within the past week. The government has sent letters to machine tool dealers asking for a detailed report of all tools they are holding for export.

Boring Mills in Great Demand

TWO features characterize the Chicago market for machine tools. One is the equipment demand by plants turning out shells, and the other is the demand for boring mills from companies holding contracts for steel truck wheels. Both these features result from government contracts which are being placed in this territory to a much larger degree than formerly. One buyer, who is adding to his equipment in order to be able to handle a large contract for shells, recently bought

Achievement

IT TAKES CONFIDENCE of the staunchest type to launch a new business such as we launched a little more than two years ago, involving as it did the expenditure of hundreds of thousands of dollars in plant and equipment.

But we had confidence in the ideal which we had created and that confidence is reflected in our achievement—in every glowing furnace—in every ton of AGATHON steel they daily produce and best of all in the enthusiastic satisfaction of our customers.

AGATHON Steels will serve your purpose best.

The CENTRAL STEEL Co.
MASSILLON, OHIO

BRANCH OFFICES:

DETROIT OFFICE: 326-27-28 Ford Building.
F. Walter Guibert, District Representative.

CLEVELAND OFFICE: Hickox Building.
The Hamill-Hickox Company, District Representatives.

CHICAGO OFFICE:
1370 Peoples Gas Building, 122 So. Michigan Blvd.
C. H. Beach, District Sales Manager.

PHILADELPHIA OFFICE: 603 Widener Building.
Frank Wallace, District Sales Manager.

J. E. DOCKENDORFF & CO.
20 Broad Street, New York.
General Export Agents.



one hundred 24-inch lathes and is combing the market for 50 more. This is an example of only one of the many inquiries seeking to obtain additional lathes. One dealer has inquiries now for more than 50 boring mills ranging in size from 36 to 42 inches, all of which are to be used in finishing cast steel truck wheels. At present builders of this class of equipment can give February delivery, but this delivery promises to be deferred shortly. The arsenal at Rock Island recently placed an order for about 30 lathes. This, it is thought, will complete the purchasing of equipment required for work now under way there. Additional shops are to be built shortly for manufacturing gun recoil mechanism, however, and these will require much additional machinery. The ordnance companies recently organized in Wisconsin are not now in the market and the general buyer is inactive. Occasionally tools are commandeered by the government for special use. The Universal Engineering Co., Chicago, will build a machine shop at Maywood, Ill. A tractor plant is to be built at Peoria, Ill., by a company now being organized in Chicago.

New Year Releases Numerous Inquiries

CLEVELAND machine tool dealers report that an unusually large volume of business has been released since the beginning of the new year. Government needs, as during the latter part of last year, continue to claim the lion's share of attention. Dealers report that inquiries from the government in many cases are being sent direct to builders instead of through the usual channels. One builder is said to have been asked by federal officials for best delivery dates on 75 boring mills. The Cambria Steel Co., Johnstown, Pa., has been unsuccessful up to the present time in filling its equipment needs. The Studebaker Corp., Detroit, lately inquired for approximately 50 machine tools, of which about 40 are planers. A contract for 200 mounts for 5-inch guns has been awarded to Victor R. Browning & Co., Mansfield, O., and that company has sent out inquiries for new tools. Dodge Bros., Detroit, are buying planers and other tools wherever such tools are available. G. C. Hodgson & Co., Dayton, O., require several automatic screw machines. Engine lathes, of 16, 18 and 20-inch swing, are desired by the Pollak Steel Co., Cincinnati. The Cleveland City Forge & Iron Co., Cleveland, has inquired for a 42-inch gap lathe, several milling machines and a 24-inch shaper. The American Cast Iron Pipe Co., Birmingham, Ala., is in the market for a large planer. A hydraulic press is required by the Timken-Detroit Axle Co., Detroit. Best delivery dates and prices are asked by the Bailey-Burrus Mfg. Co., Atlanta, Ga., on one bull dozer for installation in its new forging department.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

PORTLAND, ME.—The General Shoe Machinery Co. has been incorporated to make machinery, appliances, etc., and to operate a foundry and machine shop with $200,000 capital. George T. Spear, Elmer Perry and others are interested.

PORTLAND, ME.—The Portland Development Co. has been incorporated to do a mining, quarrying, mechanical and manufacturing business with $2,000,000 capital. Lee D. Hodgkins, Frank B. Fish and Carroll S. Chaplin are the incorporators.

PORTLAND, ME. — The East Deering Foundry Co. has been incorporated with $10,000 capital. George R. Thomas, Charles E. Noyes, Joseph G. Noyes and Albert F. Thomas are interested.

PORTLAND, ME. — The International Truck Co. of Maine, has been incorporated with a capital of $10,000. The incorporators are Philip S. Brooks, Halbert P. Gardner and Irving E. Vernon. The company will deal in machinery and motor trucks.

BOSTON.—Plans are being drawn by Paul Strauss, engineer, 136 Ashmont street, Worcester, Mass., for a 2-story, 22 x 372-foot addition to the factory of C. L. Berger & Sons, 37 Williams street, Roxbury, Boston.

BOSTON.—The American Shipbuilding & Transportation Co. has been incorporated with $150,000 capital by Ralph T. Jackson, Newton, Mass.; Milton H. Reynolds, Revere, Mass., and Frederick W. Doring, Cambridge, Mass.

BOSTON.—Bids close Jan. 17 for the construction of a steel caisson 138 feet long, 53 feet deep and 27 feet wide to close the entrance to the masonry dry dock under construction by the state on the Commonwealth's flats, South Boston, Mass.

BOSTON.—The plant of W. W. Bevan & Co., Sears street, damaged by fire with a loss of $125,000.

HOLYOKE, MASS.—The MacKinnon Steel Co., Sherbrooke, Quebec, Can., contemplates erecting a plant here for the manufacture of shell forgings, for which the company has undertaken a large government contract. Bertwell C. Roote, Sherbrooke, is in charge.

SALEM, MASS. — The Wayland Tanning Machinery Co. will build a brick, 1-story, 40 x 150-foot factory building at Boston and Proctor streets.

SALEM, MASS. — The Wayland Tanning Machinery Co., Wayland, Mass., has had plans prepared for a 1-story brick factory building, 40 x 150 feet, to be erected on a site it has recently purchased at the corner of Boston and Proctor streets.

SPRINGFIELD, MASS.—The E. S. Stacy Machine Co. has been incorporated with $60,000 capital by Harry W. Stacy, Frank E. Stacy and M. R. Stacy, Frank E. Stacy is treasurer.

SPRINGFIELD, MASS. — The Fleming Foundry Co. has let the contract for a brick, 2-story, 51 x 56-foot addition to its iron foundry at 164 Birnie avenue.

SPRINGFIELD, MASS. — Contracts have been awarded for a $50,000 addition to the plant of the Springfield Aircraft Co. F. T.

WINCHESTER, MASS.—The Whitney Machine Co. has been incorporated with $100,000 capital by A. E. Whitney, R. F. Whitney and W. C. Goddard.

PROVIDENCE, R. I.—The Gorham Mfg. Co. has let the contract for a brick, mill construction, 1-story, 62 x 149-foot addition to its plant on Eddy street.

BRISTOL, CONN.—The Bristol Brass Co. has broken ground for a reclaiming plant on Broad street. This step follows government regulation of the supply of metal the company receives.

GILDERSLEEVE, CONN.—The Jarvis Co. will build a 40 x 130-foot factory to replace that recently damaged by fire.

HARTFORD, CONN.—Peter A. Frasse & Co., Inc., have awarded contract for a 1-story plant addition to be erected at 47 Boulevard street.

STAMFORD, CONN. — The John Davenport Foundry Co. is having plans drawn for a $90,000 shop, which will be two stories high and 90 x 300 feet. M. C. Rosenbaum, 74 Broadway, New York, is president.



DELAWARE RIVER STEEL COMPANY

MANUFACTURERS OF PIG IRON

CHESTER, PENNSYLVANIA

One hundred words introducing

Mr. Sheldon

OF AREA, ILLINOIS

To Pig Iron Consumers:

He is a salesman, a super salesman in fact. He no longer sells but teaches the Art, in his school for salesmen. His course is "The Science of Business Building". It is well to know his methods. We do. He says: "Salesmanship is the power to persuade people to purchase product at a profit". And as to service: "The power to serve, to the end of satisfaction and profit to the buyer and seller; this is the ultimate end of business". You always get service and satisfaction in "Delaware Iron". We tell it in one hundred words. Count them.

DELAWARE RIVER STEEL COMPANY



Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Pioneer Iron Works, 39 Union street, is preparing plans for a machine shop. The structure will be one and two stories high, 40 x 80 feet in size. An expenditure of $12,000 is contemplated.

BROOKLYN, N. Y.—L. Motchan, Inc., has been chartered to manufacture brass goods with $10,000 capital. The incorporators are A. Motchan, H. Goldstein and R. Rudich, 259 Vernon avenue.

BUFFALO.—The Linde Air Products Co., Forty-second Street building, New York, will build a 1-story 100 x 100-foot plant to cost $25,000 and has appointed T. W. Goodrich, Forty-second Street building, New York, engineer in charge of construction.

IRONDEQUOIT, N. Y.—The department of public works contemplates the erection of a 1-story, 40 x 80-foot power house. R. H. Pierce, city hall, Rochester, N. Y., is commissioner in charge.

NEW YORK.—The Fabricated Steel Products Corp. has been incorporated with $150,000 capital. The incorporators include H. Lindemann, W. E. I. Lambrecht and W. Arnold, 322 Tenth avenue.

NEW YORK.—The Puritan Steel Co., Inc., has been chartered and will engage in the manufacture of iron and steel products. The company is capitalized at $50,000 and its incorporators include A. T. Teichberg, H. Brasch and W. J. Miller, 60 Wall street.

WATERTOWN, N. Y.—The water board has had plans prepared by the S. M. Greene Co., 293 Bridge street, Springfield, Mass., for a power plant to cost $300,000.

BRADFORD, PA.—The pattern shop of E. R. Caldwell & Co., Hilton street, has been damaged by fire with a loss estimated at $100,000. The company has been engaged in making war materials.

FOLSOM, PA.—The Light Railway Equipment Co., Chester, Pa., has purchased a 3-acre site on which it proposes to erect a new plant.

OIL CITY, PA.—The Independent Tack Co., Fostoria, O., contemplates removing its plant to this city.

AN office has been opened at 39-41 Cortlandt street, New York, by the Nagle Corliss Engine works. Frank W. Richardson has been placed in charge. Recently the company opened an office in the Bourse building, Philadelphia.

Redfield & Fisher Inc., advertising, announce that hereafter all their business will be handled at 105 West Fortieth street, New York.

A brokerage business for dealing in metals has been organized by John P. Bech and Troels Fode, under the name of Bech & Fode. An office has been opened in the Woodworth building, New York.

The American International Shipbuilding Corp. has opened an office in the Union Arcade building, Pittsburgh. John A. Fouse is in charge.

The P. F. Schofield's Co., Macon, Ga., now represents the Asbestos Protected Metal Co. in Georgia.

Announcement has been made by the Hammond-Byrd Iron Co., Chicago, of the removal of its office from 1216 to 1328 Peoples Gas building.

Hamilton & Hansell, builders of Rennerfelt electric furnaces, have removed to larger offices in the Park Row building, New York.

The Roe-Stephens Mfg. Co., Detroit, will change its name to the Scott Valve Mfg. Co. of Michigan.

The Goldschmidt Thermit Co., New York, has opened an office and storeroom at 1427-1429 Western avenue Pittsburgh. H. D. Kelley is in charge.

Formal announcement has been made by the Biggs-Waterson Co., Cleveland, of the removal of its offices from 721 Guardian building to 1235-1237 West Ninth street.

The Dry Milling Engineering Co., 202 Boston building, Denver, has been appointed western agent for the Raymond Bros. Impact Pulverizer Co., Chicago.

The Neidow & Payson Co., Chicago, has been appointed sales agent for the American Pneumatic Chuck Co., also of Chicago, which was organized a short time ago.

BUFFALO.—The Barcalo Mfg. Co. is having plans drawn by Kidd & Hopkins, Franklin street, for a 1-story 40 x 100-foot factory addition to cost $6000, to its plant at 225 Louisiana avenue.

BUFFALO.—A permit has been granted to the Sizer Forge Co., 244 Larkin street, to build a steel and concrete machine shop to cost $55,000.

BUFFALO.—A charter of incorporation has been granted to Deck Bros., who will operate a foundry and machine shop with $35,000 capital. The incorporators are B. L. Lempenau, A. G. Bartholomew and A. S. Perrers.

BUFFALO.—Fire has caused $5000 damage to the corrugated iron department of the Pierce-Arrow Motor Co., 1695 Elmwood avenue. Considerable machinery will have to be replaced.

BUFFALO.—The A. R. Williams Machinery & Supply Corp. has been incorporated with $60,000 capital. The incorporators include T. A. Hollindrake, W. H. Young and T. D. Reid.

CITY ISLAND, N. Y.—The Kyle & Purdy Shipbuilding Co. will build a 3-story, 60 x 180-foot building on Fordham street. Robert Kaplan, Fordham street, is architect and engineer.

NEW YORK. — H. Sinclair Roberts, Inc., has been organized to manufacture hardware specialties and ornamental ironwork. The company is capitalized at $10,000 and its incorporators include H. S. Roberts, G. H. Burlis and C. Carow, 1192 Union street, Brooklyn, N. Y.

NEW YORK.—The Louis Weber Building Co., 171 Madison avenue, has received the general contract for the erection of a $15,000 transformer station and warehouse for the New York Edison Co.

NEW YORK.—The Electric Welding Co. of America has been chartered with $1,000,000 capital. W. Schenstrom, J. Kjekstad and E. Schwartz, 415 Knickerbocker avenue, Brooklyn, N. Y., are the incorporators.

ROCHESTER, N. Y.—The Eastman Kodak Co. contemplates the erection of a 5-story, 150 x 400-foot factory building to cost $500,000. George Eastman, 343 State street, is president and purchasing agent of the company.

SYRACUSE, N. Y.—The Church & Dwight Co., 27 Cedar street, New York, has awarded the contract to Dawson Bros. for the construction of a $100,000 warehouse in this city. The building will be two stories high and 93 x 240 feet.

PHILADELPHIA.—S. A. Ashman & Son Co., East Tioga street, manufacturer of iron and steel forgings, will build an addition to its plant.

PHILADELPHIA. — The Acme Gear Co. has been incorporated with a nominal capital of $5000 and will manufacture gears, pinions, etc. Harry C. Cole is interested.

PHILADELPHIA.—Plans are being drawn by Stearns, Woodnut & Schmehl, engineers, 21 South Fifteenth street, for a 3-story, 50 x 225-foot factory to be built by a firm whose name is withheld. The cost of the structure is estimated at $30,000.

PHILADELPHIA.—The Millbourne Mills is having plans drawn by F. B. Davis for a boiler house, 33 x 40 feet, to be erected at Sixty-third and Market streets.

PITCAIRN, PA.—The repair and machine shops of the Pennsylvania railroad have been damaged by fire with a loss estimated at $35,000.

PITTSBURGH.—The Benner Tool Co. has been incorporated with $5000 capital by R. T. Russell.

SCRANTON, PA. — The National Carbon Co. plans to rebuild its plant recently damaged by fire.

YORK, PA.—The York Mfg. Co. plans

OHIO STEELS

If your work is such that you must have steel castings

TRUE TO PATTERN
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and you would be interested in procuring castings with which you would have a

MINIMUM MACHINE SHOP LOSS,
give us a trial.

Our Springfield Plant is the best equipped and most modern in the country for the production of steel castings up to 250 pounds.

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Springfield, Ohio Lima, Ohio Bucyrus, Ohio



Service PLUS HH Quality

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the construction of a 1-story, 50 x 60-foot addition to its foundry.

YORK, PA. — The Standard Refractories Co., manufacturer of fire brick, has purchased three tracts of land on which it proposes to erect a large plant.

BLOOMSBURY, N. J.—E. H. Wenzelberger, Easton, Pa., is drawing plans for a 2-story, 74 x 85-foot addition to the paper mill of the Warren Mfg. Co.

CAMDEN, N. J.—The contract for a $10,000 galvanizing plant, 1-story high and 50 x 130 feet in size, has been awarded to the J. S. Rodgers Co., Moorestown, N. J., by the New York Shipbuilding Corp.

DUNELLEN, N. J.—The Crescent Color & Chemical Works contemplates the erection of a $10,000 addition to its factory, to be two stories high and 70 x 80 feet in size.

IRVINGTON, N. J. — The Reliable Tool Co. has been incorporated with $125,000 capital. The incorporators are C. Katzan, V. Katzan and L. Pischkittell, Newark, N. J.

JERSEY CITY, N. J.—The G. W. Bradley Axe & Tool Mfg. Co. has been granted a charter with a capital of $10,000. The incorporators are C. W. Bradley, Westport, Conn.; H. A. Daniel, Newburgh, N. Y., and others.

JERSEY CITY, N. J.—The General Welding Co. has been chartered with $10,000 capital to manufacture construction equipment. C. I. Rees, Lindhurst, N. J., and William B. Walsh are incorporators.

LINDEN, N. J.—The Trans-Atlantic Chemical Corp., 80 Wall street, New York, has awarded the contract for two new factory buildings.

MAHWAH, N. J.—The American Brake Shoe & Foundry Co. will build a 1 and 2-story plant addition, for which contract has been awarded to the W. L. Platt Construction Co., United Bank building, Paterson, N. J.

NEWARK, N. J.—The Bronze Art Fixture Co. has been chartered with $25,000 capital to manufacture gas fixtures. The incorporators include William D. Donovan, Russell Fleming and Matthew Bird.

RAHWAY, N. J.—The Atlas Welding Co., 146 Irving street, has been incorporated with a capital of $50,000 to manufacture acetylene welding and cutting apparatus. Among the incorporators are Walter W. Todenwarth, John Grouss and Clarence E. Pryor, Elizabeth, N. J.

Activities in the Central States

AMERY, WIS.—The Minnesota Masterlock Co. has been incorporated with $10,000 capital by F. E. Yates, I. G. Ogden, and W. T. Kennedy.

ANTIGO, WIS.—R. P. and J. T. Brown have incorporated the Electric Farm & Lighting Co. with a capital stock of $25,000. The company specializes in light and power plants for farms and other places isolated from ordinary sources of current.

APPLETON, WIS. — The Racine Motor Truck Co. is having plans prepared for a 1-story brick and steel factory building, 75 x 300 feet, to cost about $30,000. The structure will have wood block floors and will be equipped for assembling motor trucks and machining parts. A. Arthur Guilbert, Racine, Wis., is architect and engineer. Ira L. Miller, Sherman house, Appleton, is president and general manager of the company.

CHIPPEWA FALLS, WIS. — The Multi Color Printing & Machine Co., Rex building, will build a plant.

EAU CLAIRE, WIS.—Girnan & Sons Co. is having plans prepared for a 2-story machine shop, L-shaped, 45 x 150 and 45 x 75 feet, to cost about $25,000. Bids will be taken some time in January.

EAU CLAIRE, WIS. — Plans are being made by the Northwestern Motor Co. for the erection of a complete new manufacturing plant for the production of gasoline-powered railroad equipment. Kim Rosholt is president of the company. Contracts probably will not be awarded until next spring, but plans will be prepared at once.

EAU CLAIRE, WIS.—The United States Gear Shift Co., organized with a capital of $1,500,000 to manufacture a hydraulic gear-shifting device, has awarded the general contract for the erection of a 4-story manufacturing plant, 65 x 85 feet, to R. D. Rickman. The plant will contain a brass and aluminum foundry, machine shop, assembling shop, warehouse and office, and will cost about $50,000. L. A. Larson is vice president and chief engineer of the company.

MADISON, WIS.—A building permit has been issued to the Southern Wisconsin Foundry Co. to erect a new foundry and machine shop to replace the plant which was damaged by fire several weeks ago. The building will cost about $20,000 and will be erected by J. H. Findorff, Madison.

MILWAUKEE.—The Simplex Machinery & Tool Co. has been organized with $75,000 capital. The incorporators include Paul D. Durant, H. F. Friedrich and R. E. Pfeil.

MILWAUKEE.—The Modern Steel Treating Co. has been incorporated with $5000 capital to operate a new heat treating process by Adam J. Eimermann, G. Walter and others.

MILWAUKEE.—The Sommers & Sons Co., recently incorporated to manufacture tanks, will occupy the plant of the General Construction Co., Galena and Thirtieth streets, which will be remodeled and equipped.

MILWAUKEE.—Swift & Co., Chicago, have awarded a contract to Theo. Stark & Co., Cedar Rapids, Iowa, for erection of a 4-story concrete and brick addition to its Milwaukee refrigerating plant. The structure will be 50 x 60 feet and located at Second and Fowler streets.

MILWAUKEE.—To handle a large contract for furnishing reinforced concrete poles for the municipal street lighting system, the Universal Concrete Products Co., 208 South LaSalle street, Chicago, will erect a brick and frame shop, 80 x 486 feet, on Port Washington road here. J. E. Moody is chief engineer.

MILWAUKEE.—The building at 199 Oregon street, occupied by the Kieckhafer Mfg. Co., tool and die-maker, and the Chas. Jurack Pattern Works, has been damaged by fire with a loss of $5000.

OSHKOSH, WIS.—The Wisconsin Duplex Automobile Co., Clintonville, Wis., a $500,000 corporation, will establish a new plant and offices here. Plans will be prepared at once and the company hopes to be able to start manufacturing trucks by April 1.

RACINE, WIS.—The Thor Machine Works has been incorporated with $20,000 capital by K. H. Studt, Andrew Astrey and K. F. Jacobson.

RACINE, WIS.—A. A. Guilbert, architect, will close bids Jan. 2 for the erection of a brick and concrete warehouse, 60 x 104 feet, 4 stories and basement, for the J. I. Case Plow Works. The estimated cost is $50,000.

SHEBOYGAN, WIS.—The Badger State Tanning Co. will build a power house on South Water street. Juul & Sixta, 805 North Eighth street, are architects.

STEVENS POINT, WIS. — The Central City Iron Works, specializing in railroad malleable and gray iron castings, has been purchased by the Trenam Tractor Co., Milwaukee, a South Dakota corporation organized several months ago with $400,000 capital. The new owners of the foundry intend to continue the manufacture of castings. Some new equipment will be installed. F. M. Schuler is secretary and treasurer of the Trenam company.

DETROIT.—The Chevrolet Motor Co., 1244 Woodward avenue, plans to build a new factory and an addition to cost $100,000 and $300,000 respectively.

DETROIT.—The Detroit Range Boiler Co. has awarded the contract for a 1-story factory to be 75 x 173 feet in size, to W. N. Miller, 1303 Kresge building.

DETROIT. — Smith, Hinchman & Grylls, architects, 710 Washington Arcade, have prepared plans for a 5-story warehouse to be erected by Hudson & Symington.

GRAND RAPIDS, MICH. — The Safety Crank Co. has been organized to manufacture automobile cranks. G. H. Dickerson, DeForest W. Hamilton and Henry Reichel are interested.

GRAND RAPIDS, MICH.—The Haskelite Mfg. Co., Ludington, Mich., will remove its plant to this city. The company is capitalized at $1,000,000.

MARQUETTE, MICH. — The plant built for the Rainier Motor Car Co. and never occupied, will be opened by the General Motors Co. under the management of George H. Hannum.

TRAVERS CITY, MICH.—The Boardman River Light & Power Co. is planning a power plant and dam to cost $200,000. The Fargo Engineering Co., Jackson, Mich., is engineer.

CHARLESTON, ILL.—The city plans to reconstruct its waterworks plant including the addition of a 2,000,000-gallon pump, boilers and low and high lift pumps at a cost of $13,000. J. A. Tremble is city engineer.

CHICAGO.—C. Quinlan, 124 South Green street, will build a 4-story factory for the manufacture of metal specialties, at a cost of $30,000.

CHICAGO.—The American Cutlery Co., 764 Mather street, has been incorporated with $310,000 capital by Isaac Hirsch, Moses Hirsch, Lawrence H. Howell and Milton S. Hirsch.

CHICAGO.—The Duro Metal Products Co. has been incorporated with $5000 capital. Albert N. Powell and Alfred W. Bays, 109 North Dearborn street, are among the incorporated.

CHICAGO.—The Art Metal Radiator Co.



Revolving Crane Type Slab Chargers

Specialized machines have been one of the reasons for the great success of W-S-M equipment. Our Charging Machines are designed and built with a view to meeting local requirements—to utilize the available space most advantageously. Particular consideration is given to the general layout of the building, working conditions, service required, etc.

Let W-S-M engineers look over your plant when you are contemplating the installation of new steel making equipment of any kind. You will find they can save you money.

The Revolving Crane Type Slab Chargers pictured above were built by The W-S-M Company for the Youngstown Sheet and Tube Company, Youngstown, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

er Co., 175 West Jackson boulevard, has been incorporated with $5000 capital by Edward Schleicher, Irene J. Schleicher and Frederick A. Siebold Jr.

CHICAGO. — Plans are being drawn by Alex L. Levy, architect, 111 West Washington street, for a 75 x 125-foot factory to cost $50,000. The owner's name is not disclosed.

CICERO, ILL.—The Cicero Tool Works has been chartered with a capital stock of $25,000. John Janis is interested.

EAST ST. LOUIS, ILL.—The Excelsior Tool & Machine Co. will build an addition to its foundry, to include a large core oven, and will install a 10-ton and a 2-ton electric crane. T. F. Philippi is general manager.

EDWARDSVILLE, ILL. — The Liberty Steel Co., recently incorporated with $1,000,000 capital, will build a plant. S. F. Lloyd is president.

ELGIN, ILL.—Woodruff & Edwards are having plans drawn for the rebuilding of their foundry and machine shop, recently damaged by fire. The new structure will be 3-story, 100 x 140 feet, and will cost $80,000.

MATTOON, ILL. — The Foundry Metal Works will build a foundry building to cost $50,000. The Clark Meter Co. owns the concern.

MAYWOOD, ILL.—The Universal Engineering Co., 700 West Twenty-second street, Chicago, will build a 1-story machine shop here, costing $15,000.

PEKIN, ILL.—The Edwards Cylinder Co., recently incorporated, will build a factory. C. R. Edwards, Mackinaw, Ill., is president.

PEORIA, ILL.—Plans are being drawn by Reeves & Baillie, architects, 221 South Jefferson street, for a tractor plant containing 13 buildings, to cost $175,000 for a company being organized by H. A. Rosenthal, 122 South Michigan avenue, Chicago.

ROCKFORD, ILL. — The J. G. Redmond Millwork Co. has been incorporated with $15,000 to manufacture planing mill machinery.

ANDERSON, IND.—The Continental File Co., 230 Union building, is building a 1-story factory. G. A. Lambert is manager.

ELKHART, IND.—The Peck's Super Heat Co. has been incorporated with $10,000 capital to manufacture automobile appliances. Raymond G. Peck, Carl E. Mischler and H. J. Rife are interested.

NEW CASTLE, IND.—The Davis Foundry Co. has been incorporated with $40,000 capital by John G. Hey, Louis B. Patterson and William Davis.

SOUTH BEND, IND.—The Singer Mfg. Co., 2215 West Division street, will build a 1-story addition to its foundry, to cost $15,000.

TERRE HAUTE, IND. — The Midland Electric Steel Co. has been organized to make electric steel castings. The incorporators include J. B. Moos, Chicago, president; W. C. Ely, Terre Haute, now head of the Highland Iron & Steel Co., treasurer, and W. K. Booth, of the Booth-Hall Co., Chicago, general manager.

VINCENNES, IND. — The Baltimore & Ohio railroad is having plans prepared for a freight station to cost $100,000. H. A. Lane, Baltimore, is chief engineer.

BRYAN, O.—The Ohio Art Metal Co., Defiance, O., has purchased a tract on which it proposes to erect a 5-story factory building.

CANAL DOVER, O. — The Reeves Mfg. Co., Lloyd Reeves, manager, plans to make extensive coal mine developments. The company will install machinery and equipment to cost $100,000. George Arnold, New Philadelphia, O., is engineer.

CANTON, O.—The Republic Rubber Corp., recently organized, has had plans prepared for a new plant to cost $500,000.

CANTON, O.—The Canton Machine Shop Co. has been incorporated with a capital of $50,000. Frank L. Decorpos and Ralph Staley are interested.

CINCINNATI.—Plans are being prepared by Harry Hake, architect, for a 2-story brick addition to the factory of the Andrew Jergens Co., Spring Grove avenue, 100 x 200 feet.

CINCINNATI.—The Greaves Machine Tool Co. has been chartered with a capital of $100,000. William A. Greaves and William A. Greaves Jr. are interested.

CINCINNATI. — The Oesterlein Machine Co., 2850 Spring Grove avenue, has purchased the plant of the Samuel C. Tatum Co., Colerain avenue and Monmouth street which it will equip for the manufacture of machine tools.

CINCINNATI.—The Samuel C. Tatum Co., Colerain avenue and Monmouth streets, which has disposed of its plant to the Oesterlein Machine Co., is reported to have plans under consideration for the erection of a new plant.

CLEVELAND.—The plant of the Sterling Spring Co., 2148 Scranton road, has been damaged by fire with a loss estimated at $15,000.

Western and Intermountain Territory

MINNEAPOLIS. — The Federal Steel & Mfg. Co. will build a 1-story machine shop 100 x 400 feet and a foundry 100 x 125 feet in size. F. D. McClure, 1117 Metropolitan Life building, is president.

MINNEAPOLIS.—The Gas Traction Foundry Co. will build a foundry 195 x 297 feet in size, to cost $75,000. O. W. Potter, 1907 Fourth street, is general sales manager.

ROCHESTER, MINN. — Plans are being prepared for a bridge to contain two 150-foot spans. A. F. Wright is city clerk.

ST. PAUL.—The city is preparing plans for a viaduct one mile long to cost $500,000.

ST. PAUL.—The Convertible Tractor Corp., 1485 Marshall avenue, will build a 4-story addition 50 x 115 feet.

ST. PAUL.—The St. Paul Foundry Co. has received a government contract to furnish steel ship plates and other fittings, which renders necessary the installation of new equipment and the enlargement of its plant. C. M. Power is president of the company, which has its offices at Como avenue and Mackubin street.

BURLINGTON, IOWA.—The Northwestern Stamping Co., Osborn street, is receiving bids for the erection of a 100 x 150-foot plant.

BUTLER, MO.—The plant of the Butler Rolling Mills has been damaged by fire with a loss estimated at $100,000. Cannon Bros. are owners.

KANSAS CITY, MO. — The Henry Weis Mfg. Co. has been incorporated with $50,000 capital under a New Jersey charter to manufacture metal specialties by Henry Weis, Robert Vance and T. H. Ridge.

ST. LOUIS.—The Truck, Tractor & Mfg. Co. has been chartered with $25,000 capital to manufacture motor vehicles. The incorporators include Isidor M. Jacobs, Kansas City, Mo., and Norris B. Gregg Jr., St. Louis.

FOREMAN, ARK.—The Portland Cement Co. will build a cement manufacturing plant. The Fuller Engineering Co., 1336 South Michigan avenue, Chicago, is in charge of construction.

FORT SMITH, ARK.—The Rex Stove Co. has been incorporated with $100,000 capital by W. J. Henry, T. G. Dade, and W. J. Echols.

LITTLE ROCK, ARK. — The Arkansas Foundry Co. has leased a plant at the foot of East Sixth street which it will equip for the manufacture of railroad and mill castings.

LITTLE ROCK, ARK.—The Arkansas Motor Truck Co. has been incorporated to manufacture industrial vehicles. The capital is $10,000 and incorporators include S. N. Bolton, H. C. Wilson and J. O. Evatt.

BEAUMONT, TEX.—The Beaumont Iron Works will install additional machinery, including electric transformers.

FORT WORTH, TEX.—The Oil Machine & Mfg. Co., recently incorporated with $50,000 capital, will build a plant. J. W. Carter is manager.

ADA, OKLA.—The Ada Iron Works will build a foundry for the manufacture of gray iron and brass castings and is in the market for a melting furnace. William Gilbert is manager.

HOMINY, OKLA.—The city commissioners contemplate the erection of an electric lighting plant and system. Address the mayor.

CENTER, NEBR.—Bids will be received until Jan. 24 by George W. Draper, clerk of Knox county, for a bridge over Verdigris river, including one 180-foot high-truss steel span.

GERING, NEBR.—Bids will be received until Jan. 21 by V. B. Kirkham, clerk of Scottsbluff county, for two bridges each containing twelve 50-foot reinforced concrete arches with 16-foot roadway.

McCOOK, NEBR.—Bids will be received until Jan. 28 by Barney Hofer, clerk of Red Willow county, for a reinforced concrete bridge containing six 50-foot spans.

NORTH PLATTE, NEBR.—Bids will be received until Jan. 22 by A. S. Allen, clerk of Lincoln county, for a reinforced concrete bridge, containing ten 50-foot arches.

OMAHA, NEBR.—Andrew Murphy & Son will build a 3-story, 66 x 132-foot factory to cost $40,000. Plans are being drawn by John & Alan McDonald, architects, 905 Omaha National Bank building.

WEST POINT, NEBR.—Bids will be received until Jan. 23 by Rudolph Brazda, county clerk of Cummings county, for a 240-foot bridge.

BISMARCK, N. DAK.—The Dakota Sales Co. has been incorporated with $25,000 capital to manufacture grain cleaning machinery. C. Williams, C. C. Putnam, and H. L. Stegner are interested.

SHELLEY, IDAHO.—A municipal electric light plant is contemplated.

HANNA



M. A. HANNA & Co.

Sales Agents

Iron Ore
Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
"CHERRY VALLEY" "ZUG"

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Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

M·A HANNA & CO.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	22.00 to 22.50
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	25.00 to 26.00
Frogs, switches, guards, St. L.	29.00 to 29.50
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	27.00 to 29.00
Heavy melting steel, N. Y.	26.00 to 26.50
Heavy melting steel, St. L.	28.50 to 29.00
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	25.00 to 25.50
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh.	40.00
Low phos. steel, eastern Pa.	35.00 to 37.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	26.50 to 27.00
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	31.00 to 32.00
Steel rails, short, St. Louis.	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	16.50 to 17.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	19.50 to 20.00
Stove plate, Birmingham	19.50 to 21.50
Stove plate, Buffalo	22.00 to 23.00
Stove plate, eastern Pa.	22.00 to 23.00
Stove plate, Cleveland	19.00 to 20.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$21.00 to 22.00
Boiler plate, cut, No. 1, St. L.	21.00 to 21.50
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago	21.00 to 22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	25.75 to 26.75
Busheling, No. 1, Buffalo	26.00 to 27.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	35.00
Forge flashings, small, Cleve.	24.50 to 25.50
Forge flashings, large, Cleve.	24.00 to 25.00
Forge No. 1, Eastern Pa.	22.50 to 23.50
Grate bars, Buffalo	20.00 to 21.00
Grate bars, Cleveland	20.00 to 21.00
Grate bars, N. J. points	19.50 to 20.00
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	49.50 to 50.00
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	40.00 to 40.50
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Pipes and flues, Cleveland	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	35.00
R. R. wrgt. No. 1, Birming.	30.00 to 35.00
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	30.00

(Net Tons)

Angle bars, iron, Chicago	$37.00 to 37.50
Angle bars, steel, St. Louis.	26.50 to 27.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	37.50 to 38.50
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis.	24.50 to 25.00
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Cast borings, Chicago	17.00 to 17.50
Iron axles, St. Louis	44.00 to 44.50
Iron axles, Chicago	47.00 to 48.00
Machine turnings, Chgo.	17.00 to 17.50
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	16.75 to 17.25
Pipes and flues, Chicago	23.50 to 24.50
Pipes and flues, St. Louis	23.50 to 24.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, St. L.	29.00 to 29.50

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$23.00 to 24.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	34.00
Shafting, eastern Pa.	38.00 to 40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	46.00 to 47.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	50.00 to 55.00
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	30.50 to 31.00
Steel car axles, St. Louis	42.50 to 43.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	26.50 to 27.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, Birmingham	25.00 to 27.50
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast No. 1, Cleveland	27.75 to 28.00
Cast, 1, heavy, N. J. points.	30.00
Cast, No. 1, eastern Pa.	31.00 to 33.00
Cast No. 1 Chgo.	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	21.50 to 22.50
Malleable railroad, Cleveland	27.00 to 27.50
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00 to 32.00
Malleable railroad Chgo.	30.00
Malleable, agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	23.50 to 24.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	37.00 to 40.00
Reroll. rails, 5 ft. & ov., St. L.	35.50 to 36.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	47.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, January 17, 1918 No. 3

Struggle Hard to Restore Output

Iron and Steel Makers Making Slow Progress to Overcome Operating Situation of Unparalleled Severity—Iron Shortage More Menacing—Fabricators Repudiate Shape and Plate Contracts and Sharp Controversy Develops

SLOW progress is being made in repairing lines of iron and steel production shattered by two weeks of the worst operating conditions in the history of the industry. The past week's blizzard, sweeping over most of the principal industrial districts, has piled up the already appalling loss of tonnage previously resulting from the tangle of shipping at critical points. Sorely needed consignments of coal and coke are being pushed through the congestion of freight, but it will require some days even under favorable weather conditions, to bring output to a stable level. The Chicago district, which has been the center for recurrent storms of unusual severity, is hard-put to overcome the worst blockade since iron and steel making became a major industry in that territory. Scarcely a wheel has been turning at Gary, South Chicago, Indiana Harbor and Joliet. The Illinois Steel Co. has had 20 out of 28 blast furnaces out or banked, due to fuel shortage. Independent companies have suffered in equal measure. These conditions virtually have been duplicated at Cleveland, Pittsburgh and Youngstown. The Carnegie Steel Co. has reduced its idle furnace list from 20 to 16. Sheet mill output has dropped to a little more than 50 per cent. Many coke plants in the Connellsville region have been on a half-production basis.

Iron Shortage Is Menacing

The demoralizing situation for efficient and sustained blast furnace operations has brought the menace of pig iron shortage more sharply into view. The intermittent banking of furnaces has destroyed both tonnage and quality output and the yield of off-iron has been heavy. As an outgrowth of the conditions of the past two weeks, the statement is made on competent authority that virtually not a merchant company in the country, outside of the south, is likely to be able to show a profit for the month of January. The fact that the average billing price for many producers still is under the government-fixed prices, enters into this estimate. While the promulgated condition that new contracts are subject to price revision on deliveries subsequent to March 31, continues to chill the desire to sell for the future, notable exceptions have appeared. Certain Ohio and western Pennsylvania producers have taken on large bookings for the last half, largely from regular customers with war contracts. A northeastern Ohio steelmaker, who inquired for 50,000 to 60,000 tons of basic to Jan. 1, 1919, has made large purchases. A leading Youngstown steelmaker has bought iron to recoup losses from recent shutdowns. Inquiry of malleable users in the middle west has totaled many thousands and some good-sized orders have been closed. About 8000 tons of mixed grades for the 1918 requirements of the navy yards are pending.

Several plans to pool and distribute coke supplies have been put up to Washington. One of them contemplates the furnishing of fuel only to those stacks with the lowest consumption. If carried out, this would force the cessation of a considerable number of furnaces.

Finished Steel Buying Light

Fresh demand for finished steel, apart from government requirements, has remained so moderate that some of the smaller mills are becoming more concerned as to bookings. The increase of 484,612 tons in the Steel corporation's unfille orders in December is ascribed largely to reduced shipments enforced by recent shipping and operating difficulties. Only in exceptional cases are producers disposed to enter into formal contracts. The implement trade is being accommodated more freely in this way for first quarter. One large independent is understood to have entered the new year without a single outstanding contract. Extensions of tonnage not taken out on contracts expiring Jan. 1 continue to be made by important producers. In some cases these extensions have run to three months. A tense situation has developed in structural shapes and in a less degree in plates where numerous fabricators are refusing to accept tonnage placed before the fixing of prices, Sept. 24, even where specifications have been given. Litigation is threatened by some of the mills.

The Iron Trade Review

EDITORIAL

Woman Problem Demands Study

EACH day brings war's grim realities a little closer to the American people. With this clearer realization comes also a clearer visualization of the problems connected with this vast military undertaking. It is because of this that employers are becoming more and more interested in the study of woman's capabilities in the field of labor. Undoubtedly her field is going to be enlarged to a great extent. What woman is doing in the field of industrial labor, what are the problems of her employment and how the latter have been handled successfully are told in a sympathetic as well as in a practical way in a comprehensive article appearing in this issue. The number of women employed in industry is going to be greater than ever before, without doubt. They are going to be urged into occupations hitherto closed to them.

It is at this point that the danger lies. When war broke out in England patriotic fervor blinded the eyes of the people. Women were permitted to enter any occupation so long as they proved capable of standing up to the work from day to day. After the first flush of enthusiasm wore off, new aspects of the case appeared. Some work was too heavy for women, other work required long hours of standing which resulted in physical breakdowns in many cases. In addition to the detrimental effect upon women themselves, the children suffered. Mothers, working long hours could not properly take care of their children.

This country in facing this problem has Great Britain's example as a starting point. It does not have to begin at the beginning as she did. Therefore the lessons of Great Britain's mistakes should be taken to heart. There are certain types of work which woman eminently is well fitted to do. These consist of work requiring dexterity, lightness of touch and speed. There are certain other types which are physically harmful to women, that is, work requiring continuous standing and heavy lifting. In addition to the woman herself, she must be considered also as a home maker and a mother. If woman is forced to shirk these duties because the work in the shop and factory takes too much of her time and strength, the nation will pay for it by an increase in crime and vagrancy.

Before we put our women to work at any given job let us consider the two—woman and the job—from all possible aspects. Since the health and morality of future generations is concerned, it is imperative that an earnest effort be made to so adjust the labor between men and women that the least possible harm will be done.

The Turn of a Long Lane

FRUITS of the popular game of swatting the railroads which has been played freely by state and federal authorities in the country in recent years are to be found in the story of railroad expansion in 1917 now to be read in the annual statistics. According to the *Railway Age*, a condition came about in the year whereby the trackage of the country practically was reduced instead of enlarged. Only 979 miles of new track were built in the year. Against this, 451 miles actually were torn up, 491 miles were abandoned, and on 396 miles, permission to abandon was asked of state authorities by the owners. This meant a virtual net loss of 359 miles in the active trackage. In 1916, the new construction totaled 1098 miles; in 1915, 933 miles, and in 1914, 1532 miles. The record of the past 12 years has shown an almost unbroken decline. In 1905, 4388 miles were built and in 1906, 5623 miles.

These figures effectively portray the loss of faith of investors in railroad securities. No matter how hard pressed the carriers have been for extensions, soundly justified by increased business, and present conditions show many lines have been in this class, they have been unable to enlist the necessary capital except at prohibitive rates. The inevitable result has been that properties have been allowed to depreciate and extensions have languished. The restoration of credit which will result from the control of their affairs by the national government means that the railroads are to have a fair chance to redeem themselves. More than that, it means the substitution of a superseding railroad sovereignty, federal, for as many diverse and conflicting local authorities as there have been forms of state control.

Dilution of Labor Advocated

SKILLED workmen continually are being withdrawn from the industries to build the huge national army now in the formative stage. Where is the steady stream of workers to come from so essential to the production of the nation's munition and other war essentials? This question, particularly pertinent at the present time, has been formally recognized by the assembling, in Boston a short time ago, of representatives of ordnance makers,

trade school representatives and the New England committee on industrial training for war emergency. The importance of the question is shown in the case of two New England manufacturers who must increase their forces of 14,000 by approximately 35 per cent before April 1.

Proficient workers, it was brought out, are difficult to secure and the conference advocated the speeding-up of the munition industry by teaching women to do the work of men. Insofar as accuracy, freedom from accident and excellence of work are concerned, women, it was contended, are superior to men if their tasks are subdivided and supervised by skilled male their own. Munition requirements will increase directly as the duration of the war, but it is thought that the gradual falling off of nonessential industries will release women from industrial pursuits who, with training, will quickly become efficient in their new tasks.

War Stimulates New Grinding Practice

THE European war has brought about marked improvements in American manufacturing methods, among them being the adoption of wide-faced grinding wheels as used on precision grinding machines. These wheels are the result of exhaustive experimentation on the part of grinding wheel manufacturers and they have given especially good results in finish grinding the outer surface of shrapnel and high-explosive shells. With the use of the wide-faced wheel, longitudinal feeding is entirely eliminated, the wheel being fed directly to the work by means of the cross feed.

With a wheel of the correct grit and grade several hundred pieces often can be ground without redressing. Wheels with 10-inch face have been used successfully on both straight and contour work. In the latter case the face of the wheel is trued to exactly the shape the operator desires to produce. The radius on a shrapnel case serves as a good illustration of this practice. From the comparatively thin, small-diameter grinding wheels of yesterday to wheels of 24-inch diameter with a 10-inch face is a distinct departure. The grinding wheel manufacturer has not brought about the change alone, however; the co-operation received from the grinding machine builder was, of course, of vital importance. Large grinding wheels require heavy grinding machines and the grinding machine builder has kept pace with the times by designing the massive and substantial machines that have made the use of the wide-faced wheel a commercial possibility. Thus the war has served a useful purpose in helping to perfect efficient manufacturing methods that will prove of value in the years to come.

A Propaganda Not Made in Germany

ARRESTS do not stop treason, nor do jail sentences obliterate the slimy trail of the strike promoter. With the strike menace the greatest which today confronts our war and allied industries, a positive aggressive propaganda should be directed toward teaching the lessons of Americanism.

In the mines and in the large centers where war industries are being driven to capacity, the foreign labor element predominates. That great class which under normal conditions might peacefully pass through the "melting pot", now over the fierce fires of war and with the added fuel of exorbitant wages to be obtained, frequently "breaks out" and strikes result.

All strikes are not fomented among foreigners, nor, unfortunately, are all strike promoters enemy aliens. But the simple credulity of the foreigner is most easily imposed upon by the arguments of cupidity which form the stock in trade of the professional strike maker. Moreover, aliens have not the restraining influence of patriotism which *should* prevent disastrous strikes in war lines. It is to supply this latter influence that a propaganda of Americanism should be directed.

Some steps in this direction have been taken. Bureaus of Americanization exist in most of the large cities, and the lessons of citizenship are being presented to all who will accept them through schools, newspapers and industrial organizations. These outside efforts do not entirely counteract the effect of such Bolshevik arguments as "the rich man's war", and "Wilson is England's catspaw". A more aggressive propaganda is needed, and it must originate within the ranks of labor.

A step in this direction was taken by the Ohio union miners in their convention at Columbus last week. They adopted an amendment to their constitution which excludes from membership any foreigner who, after the legal residence of three years has not made an effort to become a citizen of the United States. Citizenship through coercion will not solve the problem, but the moral effect of a united labor sentiment towards Americanism and a propaganda directed from within will accomplish much. A man hesitates to destroy the house in which he lives.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 244

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern) ..... $33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern) ..... base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft) ..... base plus $1.50
Over 3.25 silicon ..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo.	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh,	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	.30
Iron, 3½ to 4½ inches, c. l.	.12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 16, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 16, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	30.00
Lake Superior charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	30.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia	34.25	34.00	34.00	30.50
Ferro mang., delivered.....	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh....	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts..	51.00	51.00	65.50	60.00
Open hearth billets, Pitts.....	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	2.975
Steel bars, Chicago.....	2.90	2.90	2.90	3.19
Iron bars, Philadelphia.....	3.685	3.685	4.935	3.159
Iron bars, Cleveland.....	3.64	3.64	4.50	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Jan. 16, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Iron bars, Chicago mill.....	3.50	4.50	4.50	2.85
Beams, Chicago.....	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.575
Tank plates, Chicago	3.25	3.25	3.25	3.89
Tank plates, Philadelphia ...	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pitts....	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	7.875	4.125
Sheets, gal., No. 28, Pitts... ..	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh.....	3.50	3.50	3.875	3.00
Connellsville fur. coke.....	6.00	6.00	.....	7.25
Connellsville fdy. coke.....	7.00	7.00	.....	6.375
Heavy melting steel, Pitts.....	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	30.00	28.75	26.10	21.50
Heavy melting steel, Chicago.	30.00	28.50	27.00	20.25
No. 1 wrought, eastern Pa....	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago.....	35.00	31.50	36.25	25.35
Rerolling rails, Chicago.....	35.00	35.75	36.00	27.25
Car wheels, Chicago.....	30.00	29.50	31.00	21.85

(For Additional Prices See Page 244)

Loss of Iron Production is Heavy

Furnaces on All Sides Forced to Bank by Fuel Shortage and Weather Conditions Are Resuming Gradually—Propose to Pool Coke to Most Efficient Plants—Some Sellers Book for Last Half

Pittsburgh, Jan. 15.—Production of pig iron has been greatly affected by the severe weather and congested traffic conditions. The actual output of iron, however, appears to be on a higher average than it was one week ago. This is not due to any marked improvement in the receipt of fuel, or in the railroad situation, but rather is attributed to the fact that some furnaces which were banked remained idle, pending an accumulation of coke and have resumed operations. The supply of fuel being received is extremely limited and unless improvement in this direction is made within the next few days, more banking will be necessitated. The Carnegie Steel Co., which had 20 furnaces down one week ago, now has reduced this number to 16, eight of which are out of blast for relining and repairs. Embargoes are restricting shipments of iron, which are being insisted upon by some consumers, although most of them realize the position of furnace operators and are not pressing them unduly for delivery. The shortage of gas and oil also has interfered with production. Some melters are borrowing iron from stacks of steel works for which they are making mill equipment. J. Leonard Replogle, director of steel supplies of the war industries board, is giving consideration to a plan to pool coke shipments so that fuel may be distributed to furnaces throughout the country with a view to insuring the greatest iron production possible. Admittedly there are many phases of this question which are difficult of solution and some suggestions which have been made probably will be discarded as being impractical. The idea of giving preference to furnaces which require the least amount of coke to make a ton of pig iron and closing down temporarily old furnaces, some of which consume 3000 pounds of coke in the manufacture of a ton of iron, is one proposal under way. There is also a plan by which the average operations of all furnaces will be calculated and coke supplied to them accordingly. Such questions as the location of the furnaces, transportation conditions, the elimination of cross-hauls in the coke regions and the supplying of coke from regions nearest the furnaces enter into the question. Some steelmakers self-contained on their iron supplies have been forced to buy steel-making metal to meet shortages. One of these is the Youngstown Sheet & Tube Co. Otherwise the market is inactive.

Price Uncertainty is Factor

Boston, Jan. 14.—Business in pig iron continues largely at a standstill in this territory, though there is no lack of inquiry and undoubtedly a large tonnage could be moved over if the metal were available, or the furnaces were content to go ahead and accept contracts containing the government clause relative to prices. In a few isolated cases, some business has been accepted subject to price revision, but as a general rule, the furnaces are very much disinclined to take the chances that the clause involves. If it was certain that the present basis would be affirmed after March 31, there would be more doing in forward business; it is the uncertainty about what the price is going to be that makes the iron makers indifferent about business. Meanwhile

the furnaces almost without exception are sold up to July 1, and about the only iron available for current needs is the stock that does not come within the ordinary specifications. There is a strong demand for such lots of iron as come on the market, for between the labor troubles, scarcity of coke, with the attendant banking of furnaces and the congestion of freight, there are many New England melters who have contracted for iron that they are not able to get. It is these users who are looking for spot iron to tide them over until such time as the material owing them gets in. There is no doubt that to secure supplies, these foundries gladly would pay a premium. Between the lack of iron and the pinch in the supply of steam coal, the situation is serious for the foundries in this section of the country.

15,000 Tons of Basic Sold

Philadelphia, Jan. 14.—The only important sale of pig iron in this district during the past week was one of 15,000 tons of basic for first half. Numerous other transactions embraced lots of off-iron principally which ranged from 1000 tons downward and did not form a large total. Inquiries which came out call for large tonnages of basic, standard low phosphorus, foundry and bessemer and the deliveries wanted extend throughout 1918. It is almost the universal custom for furnaces not to quote on these, due to the extent to which they already are sold ahead, and to the government recommendation that all contracts calling for delivery beyond April 1 be made subject to revision in the government price. Owing to inability to secure standard grades, many consumers are scouring the market for off-iron and are taking almost anything that is offered. Some of the off-iron sold during the past week was on the basis of "when and if produced".

Sell Last Half Freely

Cleveland, Jan. 15.—Heavy sales, though limited to a few interests, have followed the preceding week's dullness in pig iron, when the government's new declaration on contract prices beyond April 1 had the effect of sharply checking new business. Certain producers have opened their books freely to their regular trade, especially that portion engaged on government orders for the last half of 1918, and have closed a liberal tonnage. All these contracts have included the clause making the price after April 1 subject to the government price in effect at the time of delivery. Basic and malleable have predominated. A northeastern Ohio steelmaker who sought 20,000 tons of basic for second quarter and 30,000 to 40,000 tons for last half has purchased heavily, especially for shipment beyond July 1. This interest, however, has not yet filled its requirements. A Massillon, O., consumer has revived an inquiry for 15,000 tons of basic for first half. It develops that the 36,000 tons of basic of navy work closed for an Erie plant, as reported a week ago, was placed direct by the consumer with valley makers and not by government agency. The various navy yards are in the market for 8000 tons of low phosphorus, charcoal and Nos. 1, 2 and 3 foundry for all of 1918 and this business is expected to go largely to eastern furnaces. Malleable plants have come into the market freely for last half, in single cases for 8000 and 10,000 tons. About 10,000 tons have been placed, with 30,000 tons remaining open. Last half foundry inquiry also has been heavier. Alabama and Tennessee makers sold about 3500 tons for third and fourth quarters in this district during the past week. Production gradually is working back after last week's sweeping curtailment, when few stacks in this and surrounding districts escaped banking or slowing up.

Many Get Price Booklet

ANNOUNCEMENT of the compilation by THE IRON TRADE REVIEW of the first complete collection of official base prices, differentials and extras fixed on iron and steel products under government supervision, has brought forth a heavy demand from all quarters of the industry, showing the urgent need for such a booklet. The method of grouping the various schedules according to general product, the handy size, general style, indexing, etc., all facilitating quick reference, have elicited many compliments. Such an extensive call for the booklet has developed that it has been found necessary to put a nominal charge of 50 cents each to cover the cost of publication, where one or several extra copies are wanted. All subscribers will continue to be entitled on application to a single copy without charge, as long as the edition lasts.

Shipments Are Upset

Cincinnati, Jan. 14.—The storm has played havoc with shipments. Foundry iron enroute from the south has been located at nearby points across the Ohio river, but delays in getting it to melters on this side seem almost interminable. Shipments to Chicago territory from both the south and Virginia furnaces also are indefinitely delayed, while southern Ohio furnaces are unable to make any promises as to when the iron can be loaded, or when it will get to destination. About the only item of interest outside of shipping difficulties experienced, is the reported sale of several lots of Ohio silvery iron for last half shipment. Only one furnace had any iron to offer and this now has been cleaned up. For prompt shipment high silicon iron cannot be obtained. Virginia iron is entirely out of this market and sellers have none to offer for even the last half. The banking of many furnaces in all districts is becoming a more serious matter, if late reports can be relied upon.

No Business is Done

St. Louis, Jan. 12.—During the past week the pig iron business at this point has been as near to a complete standstill as at any period in recent years. Virtually nothing was done, so far as could be learned, for future delivery, and scarcity of offerings and the blizzard put a sharp period to spot transactions. Representatives here of all the leading producers report they have nothing to dispose of. Their principals are sold up well into the future, and the recent recommendation of the war industries board that deliveries after April shall be subject to federal revision, has further accented inertia. Meanwhile, however, consumption in this district continues unabated. The more important mills are well provided for with contract material and until the end of this week, shipments have been coming along in fairly satisfactory shape, allowing the maintaining of a working reserve. Inquiries during the week aggregated between 5000 and 6000 tons, including 1200 tons of No. 2 southern by a leading stove manufacturer who has booked a government order. The fuel situation here is probably better than in any other important iron and steel center of the country.

Southern Market Strong

Birmingham, Ala., Jan. 15.—Southern pig iron manufacturers are selling as it suits their fancy. Inquiries are coming in from every direction and the market is strong. The make for the first half of year practically has been sold, except as to certain grades and some off-grade iron. Contracts now being made for delivery during

the last half of the year carry the stipulation that prices are subject to revision by a government agency after April 1. Production in this section shows no improvement and there appears to be no chance for any material improvement in the near future. Furnace stocks again are dropping and the prospects are that before long the probable make will have to be depended on entirely. No improvement is to be noted in the railroad situation, though the indications are there will be relief before long. Passenger train service is being curtailed and every attention possible is being given to the freight business. Sales of large quantities of basic iron by southern makers for delivery through the entire year are heard of, though details are not announced.

Revision Clause Retards

Buffalo, Jan. 14.—The government order specifying that there may be a revision of prices, March 31, is having a deadening effect on the pig iron market. Furnaces are loath to take on orders for a definite delivery at an indefinite price. Until March 31 draws nearer the revision clause is going to have a retarding effect on business in this district. One firm announces that it has temporarily retired from the market on this account. Other furnaces are faced by operating difficulties and are marking time awaiting improvement of the traffic situation. Furnaces which were banked some weeks ago remain banked and others are operating uncertainly from day to day. The position of one interest which manufactures its own coke from its own coal is fair, but that of another which makes its own coke, but from outside coal is worse. Two other interests which must arrange to purchase coke from outside face serious difficulties. One of these interests is running at half capacity and is behind on shipments. Customers are lenient on specifications, realizing the difficulties the furnace man is up against. Another furnace is sticking to its policy of remaining out of the market until it is able to deliver. Iron shipped by this plant in November has not yet reached its destination. An aggregate of about 500 to 600 tons of iron was sold during the week. The inquiry is good, with requests for 2000 and 3000-ton lots pending. Considerable inquiry is out from New England.

The Youngstown Sheet & Tube Co. has established a branch office at Cleveland, with G. G. Stewart in charge.

Coke Still Critical Point

Blizzard Conditions Set Back Moderate Improvement Which Had Been Started—Car Supply at 30 Per Cent—Consider Pooling Plans

Pittsburgh, Jan. 15.—Traffic conditions in the Connellsville coke region continue to be extremely serious. The slight improvement in the movement of coke during the middle part of last week was brought to an abrupt end by the cold weather and blizzard which followed and all but completely demoralized conditions. Many loaded cars are standing on the sidings in the coke regions and cannot be moved because of lack of motive power and shortage of crews. The car supply is also at a low ebb and is 30 per cent today and will be 30 per cent tomorrow. Great quantities of coke are being drawn and dumped on the ground and some operators in order to eliminate this practice as much as possible are keeping fuel in the ovens as long as 96 hours and are alternating operations, placing them on a 50 per cent basis. Blast furnace interests are striving eagerly to get supplies since the weather has moderated somewhat and are succeeding to a small extent. The movement is greatly restricted, however, and unless it is much freer than at present, many more furnaces will have to be banked. Some of them are operating on the strength of accumulated stocks which were gathered while the furnaces were idle. It is considered likely that the fuel administration, which is handling the coke situation, soon will take drastic action looking to a partial solution, at least, of the problem. A plan to pool coke, giving preference to furnaces which require the least amount of fuel per ton of iron has been put up for consideration to the fuel administration and J. Leonard Replogle, director of steel supplies. Another proposal is that the average requirements of all furnaces shall be calculated and coke supplied each in accordance with this. According to the *Connellsville Courier*, production for the week ending Jan. 5 was 216,098 tons, as compared with 351,398 tons the preceding week. Coke brokers anxiously are awaiting the decision of the fuel administration as to whether or not they will be allowed a commission for selling fuel. The administration some time ago held that no commission would be allowed over the government prices. It is felt that any commission must come from the operators. The latter, however, as a general thing, are opposing the payment of commissions and this undoubtedly has curtailed sales of coke.

Shortages Very Serious

Cincinnati, Jan. 14.—The fuel proposition has become so serious that the furnaces and foundries in all districts are very much alarmed. The curtailment in the production of pig iron, due to the shortage of furnace coke, is now reaching a point where furnaces are getting desperate. The recent blizzard, followed by an even worse period has tied up the transportation lines to such an extent that nothing can be relied upon to get through to destination. The foundries have limited fuel supplies.

St. Louis Feels Pinch

St. Louis, Jan. 14.—For the first time since the beginning of the present general coke shortage, certain plants in this district are feeling the pinch of scarcity. While all are well covered into the first half, railroad congestion, due to the blizzard, has cut seriously into deliveries. Even local deliveries by truck to outlying plants have been hampered. Dealers report an increasing demand and recent advices indicate the situation to the west and southwest is critical. Enormous pressure has been brought to bear to get tonnages through to barren spots in Oklahoma, Arizona, Texas and New Mexico and even Kansas City is sounding the distress signal, but all to little effect. Dealers declare it is impossible to obtain a single car of foundry coke from eastern ovens for immediate shipment and almost as hard to get a quotation for any future delivery. A little fuel continues to filter in from southern producers, but this is snapped up immediately. A leading dealer today said he easily could place 50,000 tons before sundown.

Furnace Demands Being Met

Birmingham, Ala., Jan. 15.—Practically the same conditions as to coal and coke as have existed here for the past few weeks are still in force. The output is larger than ever before, but the shortage is more acute. Furnace coke is plentiful if the delivery is maintained. The least lagging is felt by iron makers. Coke production is above normal. No new contracts are being accepted. All government schedules of price are being lived up to rigidly.

Scrap Inquiry is Heavier

Consumers Seek Large Tonnage Especially in East But Supplies Not Available—Dealers' Commissions Are Being Paid

FOR COMPLETE SCRAP PRICES SEE PAGE 244

Philadelphia, Jan. 14.—Demand for practically all grades of iron and steel scrap is much more active here. Many inquiries running into hundreds, and in some cases thousands, of tons, have been placed before the dealers during the past week and the consumers are willing to pay the full commission of 3½ per cent. Very little scrap has been bought or sold, however, due to difficulties which the original collectors are having in loading, as a result of the severe weather. Shipments also are very difficult as a result of the railroad congestion. The Pennsylvania railroad during the past week distributed a large tonnage of various grades, most of which went direct to consumers at the maximum prices. Forge fire and bundled sheet scrap advanced sharply during the week and now are bringing around $27.50, delivered eastern Pennsylvania. Dealers have construed the American Iron and Steel institute's recent revised announcement of prices as applying the $30 maximum to cast scrap only when the latter is sold as a substitute for heavy melting steel. When sold to foundries, higher is asked. Hence No. 1 cast scrap is selling at $33 to $34, delivered, to foundries in this district.

Rerolling Rails Decline

Boston, Jan. 14.—There is still a very firm market in practically everything in the way of scrap. Rather too many rerolling rails for current wants have appeared and the price has slumped about $3 to $4 from recent levels. Otherwise, prices either have held at the levels of a week ago, or have moved upward. Horseshoes have been advanced $1, cotton ties $2, stove plate 50 cents to $1, wrought iron pipe $3, railroad steel 50 cents, axle turnings $2 and machine shop turnings $1 to $2. The railroad situation still is unfavorable and while there are plenty of chances for business, the actual turnover is very much restricted by the fact that dealers find it next to impossible to get stock either in or out. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought No. 1 yard long $29 to $30, horseshoes $29 to $30, cotton ties $22 to $23, stove plate $20 to $20.50, No. 1 machinery $33 to $33.50, No. 2 machinery $28 to $29, car axles, iron, $43 to $44, steel $43 to $44, rerolling rails $31, iron boiler plate $34 to $35, bundled barrel hoops $17.50 to $18, wrought iron pipe, new specifications, $27 to $28, steel rails $25 to $26, heavy melting steel $24 to $25, axle turnings $20 to $21, machine shop turnings $15 to $16, blast foundry turnings $14 to $14.50, cast borings $17 to $17.50, drop forge trimmings $21 to $22, cast iron car wheels, mill price, $30 to $32.

Sold on Commission Basis

Pittsburgh, Jan. 15.—Fair-sized tonnages of heavy melting steel, billet and bloom crops, No. 1 machinery cast and cast iron borings have been sold by dealers to consumers on a 3½ per cent commission basis. One sale involved 1000 tons of low phosphorus scrap. Users have shown no reluctance to pay this commission, being desirous of obtaining more scrap than can be supplied. The stocks of dealers either are low or entirely exhausted, and it is difficult and often impossible for them to obtain new supplies. When they are able to do so they are obliged to pay the government levels. This makes it necessary that dealers obtain a commission if they are to make any profit. The railroad situation has made it difficult to move scrap and additional embargoes, together with the increased trouble in obtaining permits, have formed a discouraging combination for the dealers. It now is necessary to obtain a permit from every road that handles old material, whereas up to recently it was necessary to obtain a permit only from the road that delivered the material to consumers. The market is firm and no sales under the prices set by the governmnt are known to have been made.

Demand Continues Strong

Buffalo, Jan. 15.—Scrap trading has been at a standstill during the week. There is plenty of demand, but the uncertainty of shipments is holding up the industry as it is holding up other developments. Few shipments have been delivered to consuming points and there is a decided shortage of scrap of all kinds. What little is being sold is bringing the maximum price under the government prices. All grades of scrap have been heavily inquired for, though the universality of the shipping situation has tended to curb this during the past few days. The stringency of the New York Central embargo on all points east was lifted somewhat during the week when the road offered to take shipments for Syracuse, but not east of that point, but storm conditions during the past few days have counteracted this development.

Busheling Has Jump

Cleveland, Jan. 15.—Short sales of No. 1 busheling have pushed the price up approximately $2, but outside of this the market is stagnant. Rail service is still only 15 to 20 per cent of normal, effectually putting a damper on shipments in and out. Dealers report no prospects of an appreciable betterment before spring, but once open weather comes to stay they expect prices to weaken and drop about $2 all around by midsummer. The American Iron and Steel institute's rulings on cast scrap and commissions which the American Board of Scrap Iron Dealers has put out have not aroused any favorable sentiment for government price-fixing. One dealer remarks that he believes he will get farther in the long run by minding his conscience and patriotism more than price schedules.

Chicago Market Inactive

Chicago, Jan. 15.—Unprecedented weather conditions preventing railroads from moving material is putting an effectual stop to scrap transactions. The market was slow before this happened, and with railroads unable to move material, consumers have no incentive to buy further. Most consumers are unable to operate their plants on account of lack of fuel, so they are not distressed by lack of scrap. On such items as a maximum price has been fixed by the government, commissions of 3½ per cent are being paid in most cases where quotations have reached the maximum. Current railroad lists do not offer much material, as would be expected under the conditions. The Northern Pacific offers 4400 tons, the Chicago & Eastern Illinois 500 tons, the Chicago, Milwaukee & St. Paul 950 tons, and the Chicago, St. Paul, Minneapolis & Omaha 610 tons.

Priority Orders Delayed

Cincinnati, Jan. 14.—All outside shipments are tied up and little business is being received from local melters, as even short hauls are almost impossible. Shipments made to the Pittsburgh district, on which priority orders were secured, are still enroute and have not much chance to reach destination this week. The

new prices have not yet been established, and until weather conditions permit of transactions being made, there is apt to be no change in the waiting attitude of local dealers.

Consumers Try to Buy

St. Louis, Jan. 12.—The market for iron and steel scrap continues quiet, with little business being consummated between mills and dealers direct. Owing to the fierce weather and railroad congestion, the tonnages of scrap in transit are hopelessly tied up and melters are beginning to feel the strain. On the whole, however, the aspect of things from the dealer's viewpoint is a bit more hopeful than last week. Consumers are trying to buy for absolute needs at government prices or less. Dealers have such small stocks on hand that they are not pressing sales, being satisfied to dispose of tonnages on track which must be moved. Consumption is abnormally heavy, and reserves are vanishing rapidly. The recommendation of the American Steel and Iron institute in advancing all rolling mill grades to the maximum price of No. 1 railroad wrought is causing great anxiety to the rolling mill people, as under this ruling No. 1 busheling, yard wrought pipes and flues and other inferior grades now may be sold at the maximum price of $35 per gross ton. The maximum price of $47.50 per gross ton on shafting, locomotive tires, arch bars and transoms, couplers and knuckles, iron and steel axles, is less important as in this district these materials have recently been selling close to this maximum. Offerings of all sorts continue light.

Prices Not Defined

Birmingham, Ala., Jan. 15.—The position of scrap iron and steel dealers in the south is more uncertain and consumers continue to buy from hand to mouth. Dealers report the market in this territory is off. Embargoes in the east prevent shipment in any quantity in that direction. Quotations now given are not clearly defined by actual business. Supplies are better, but complaint still is being made of the transportation service. Further explanation of the rules as to charges for shearing material, under 18 inches, has been received.

Exemption from import duty on motor cars and trucks into Mexico has been extended to June 18, according to telegram received by the government from the American consul general at Mexico City. Modifications have also been made in the export duties on iron, steel and wire.

Diverge Over Shell Steel

Government Agrees to Modify Manganese Specification at Mills' Urging But Other Chemical Requirements Cause Further Differences

Youngstown, O., Jan. 16.—Representatives of the United States ordnance department, shellmakers and munition steel manufacturers who were in conference here last week relative to the government's steel specifications and method of rolling failed to reach an agreement. A further meeting will be held in Baltimore next week. Producers of shell steel are understood to have contended that in order to meet the manganese specification they have experienced an actual loss in steel output of about 20 per cent. The government officials agreed to adjust this loss by lowering the manganese specifications only. This caused further differences over the carbon, sulphur and silicon specifications. Ordnance department officials showed a disposition to do whatever might be possible to adjust the difficulties but would not sanction any change in specifications at that time. All of the 1,500,000 tons of shell steel for the government referred to by THE IRON TRADE REVIEW Oct. 18 and subsequently has been placed. The last shipment is expected to be made by June. The shell steel orders placed in this district have not been completed at the rate expected. The cause is laid to irregular transportation and the coal situation. At present one producer has between 4000 and 5000 tons of shell steel stocked in his mill yard on account of the existing railroad embargoes. As soon as these are nullified, this tonnage will go forward to the fabricators. This is only one of the many delays with which the mills have to contend.

Much Production Lost

Pittsburgh, Jan. 15.—Production of billets and sheet bars has been reduced greatly on account of the shortage of pig iron. While there continues to be a demand, many consumers have withdrawn from the market because they realize it is impossible to obtain material. It is estimated that the output of billets and sheet bars in the Pittsburgh district does not exceed 75 per cent of the capacity. Some makers are supplying bessemer steel to domestic consumers in order to conserve open-hearth tonnages for the government. The reduced output of sheet bars has had an adverse effect on the production of sheets, and it is probable that the output of sheets for the first half of 1918 will fall considerably below requirements. The market for wire rods is quiet. Limited demand for tonnages is coming to the mills, some of it from this government and foreign countries. Some makers are out of the market, making no offerings of either soft or carbon tonnages.

Strip Demand is Light

Pittsburgh, Jan. 15.—Domestic demand for cold rolled strip steel is light while requirements placed by the government involve fair sized tonnages. Producers show a disinclination to take contracts for deliveries after April 1, when prices are subject to revision. It is believed that the automobile trade soon will become a greater factor in the market inasmuch as it has succeeded in using up part of its accumulated shipments and new business taken by it will involve good sized requirements.

Quiet Start

Made by Warehouse Trade in New England in New Year

Boston, Jan. 14.—Jobbers in steel and iron products have not been crowded with business during the past week and since the first week of the year also was a quiet one, it cannot be said that the year is starting off very briskly. Supplies are not coming forward from the mills freely, but there is exceptionally little complaint on this score, probably because wants are not so great but that they can be filled from what is available and is being received. There seems to be a fairly good demand from outside points from plants working on government orders, but in the metropolitan district of Boston, where the demands are chiefly for building supplies, business is very light. Building requirements are estimated at present to be only about 20 per cent of normal. The accuracy of this estimate is hardly to be disputed in view of the scarcity and high cost of building materials, the scarcity and high cost also of labor and the fact that the banks are cautious in the matter of loans for building construction, except for essential undertakings. Warehouse prices hold unchanged on the government basis.

More Bars to Farm Trade

Implement Manufacturers Place Further Contracts for First Quarter—Different Contracting Policies Are Being Pursued by Mills

Pittsburgh, Jan. 15.—Implement makers have begun to make contracts rather freely for steel bars for first half delivery. Mills closing this business find themselves able to take care of the requirements of these consumers. They are supplying them with much bessemer tonnage where formerly open-hearth steel was specified. Bessemer steel, it is said, can be used as satisfactorily as open-hearth steel in much of the implement manufacture. Another practice of the mills is to furnish steel bars for this trade from shell discard steel which is found to be well suited for the production of such parts as plow beams and points. Contracts for steel bars are made at the regulated level of 2.90c, Pittsburgh, although prices are subject to revision on deliveries after April 1. This has unquestionably restrained buying and at the same time has made producers more cautious about taking new business.

Government Largest Buyer

Chicago, Jan. 15.—With the exception of tonnages placed by the government for various purposes, the finished steel market is unusually quiet, although consumers appear somewhat more inclined to place contracts now than during the closing weeks of last year. Government tonnages continue to be placed in fairly large volume and are spread over almost the entire range of products. One effect of the price-fixing program and the recent announcement that material delivered after March 31 will be at the new price to be fixed previous to that date is to make buying practically on a spot basis as there is no incentive to contract for distant deliveries. Some buying of bar iron is being done but it is not an active market and tonnages are largely for immediate delivery, with nothing beyond first quarter. Users of concrete bars are not covering but some manufacturers are taking hard bars for first quarter delivery. Producers of rerolling bars are not willing to book business for second quarter until the price of rerolling rails is made certain.

Selling Prices Vary

Cleveland, Jan. 15.—Divers selling policies continues to be pursued by leading producers. The leading interest and one of the largest independents are making no new contracts. The latter has cleared its books of such obligations and new business is altogether in the form of orders with specifications attached. Two independent mills are willing to make first quarter contracts, particularly in bessemer steel, but with the exception of a few implement makers who have been taken care of, consumers are not anxious to close. Extensions of contracts expiring Jan. 1 continue to be granted by one large producer as previously reported and in some cases these have been set back three months. War business is active and sellers have little to do outside of this. One inquiry from a local consumer for military purposes calls for 1000 tons of bars.

Shafting Buying Small

Pittsburgh, Jan. 5.—The market for cold rolled shafting continues quiet, producers reporting that new business involves only small tonnages. Requirements being taken by the government make up a considerable portion of the business. Traffic conditions have interfered with shipments but it is hoped that there will be marked improvement in this direction soon when it is expected more buying will develop, especially on the part of automobile makers.

Small Hoop Lots Placed

Pittsburgh, Jan. 15.—Makers of hoops report that they are taking new business for hoops but that tonnages involved are small. Some of the demand comes from this and allied governments. Domestic buying is of a miscellaneous character. The market for bands continues quiet. Producers are well caught up on contracts and are in a position to take new business and to make good deliveries.

Joins Steel Committee

A. F. Huston, president of the Lukens Steel Co., Coatesville, Pa., has been added as a member on the committee of steel and steel products of the American Iron and Steel institute which has had in charge the fixing of base prices, differentials and extras on various iron and steel products in behalf of the industry. The other members of the committee are as follows: Chairman, E. H. Gary, chairman, United States Steel Corp., 71 Broadway, New York; vice chairman, J. A. Farrell, president, United States Steel Corp., 71 Broadway, New York; secretary, E. A. S. Clarke, president, Lackawanna Steel Co., 2 Rector street, New York; J. A. Burden, president, Burden Iron Co., Troy, N. Y.; H. G. Dalton, Pickands, Mather & Co., Cleveland; A. C. Dinkey, president, Midvale Steel & Ordnance Co., Philadelphia; E. G. Grace, president, Bethlehem Steel Corp., Bethlehem, Pa.; W. L. King, vice president, Jones & Laughlin Steel Co., Pittsburgh; C. H. Schwab, chairman, Bethlehem Steel Corp., 111 Broadway, New York; J. A. Topping, chairman, Republic Iron & Steel Co., 17 Battery place, New York; assistant secretary, H. H. Cook, American Iron and Steel institute, 61 Broadway, New York.

Mills Down

In Tin Plate Industry Because Storage Capacity is Filled

Pittsburgh, Jan. 15.—Their storage capacity having become exhausted, the 30 tin-plate mills of the Farrell, Pa., works of the American Sheet & Tin Plate Co. have been forced to suspend operations. Other mills will close down for a similar reason, unless quick relief is provided in the way of supplying adequate transportation facilities for the movement of tin plate. Great quantities have been stored, and the output of this product will be reduced greatly if the transportation situation is not worked out. Shipments of fair-sized tonnages to the west are being made, but those to the east, the most important consuming section, are extremely limited. The food administration at Washington is endeavoring to secure priority shipments for tin plate and now has the matter up with the car service commission and hopes to obtain the necessary order so that normal operations of tin mills can be resumed and shipments made without interference.

Gas Division Buys

Youngstown, O., Jan. 16.—Only western shipments of tinplate are being made by the mills in this district, the embargoes having curtailed the eastern movement. Lack of storage has greatly hindered the production of mills since the embargoes went into effect and orders for thousands of boxes of tinplate have been deferred. Inquiring for domestic purposes is heavy although the mills have little to offer under two months' delivery. It is thought the government is about to place large orders

with the mills here. Recent inquiries were made as to what condition the mills were in to handle government specifications. A reply to this inquiry brought an order for 2500 base boxes for the flame and gas division. This will be shipped to a Philadelphia fabricator.

Brisk Demand

For Manufacturers' Wire is Shown—Production is Greatly Curtailed

Pittsburgh, Jan. 15.—Demand being made upon wire mills is fairly brisk, that for manufacturers' wire being the most active. Deliveries of this grade can be made within 30 to 60 days. The transportation situation, lack of fuel and scarcity of steel has sharply curtailed the output of wire mills, some of which have had to suspend operations temporarily. The government continues to place contracts for wire and wire nails, although as a general thing the tonnages involved are not as heavy as those which were being placed up to recently. There is also some export demand for wire which is being furnished to the entente allies. A consumer in the middle west has placed an order for 1000 tons of galvanized wire at the government figure of 3.95c, Pittsburgh.

Production Still Low

Cleveland, Jan. 15.—Wire production in this district which has been cut low by the recent traffic congestion and blizzard conditions, still is exceedingly small. Only a few of the cold rolling mills of the American Steel & Wire Co. are in operation and steel works and blast furnaces remain practically inactive. Little new business is coming out. Wire nails are not active, as the jobbers are quiet. Fevering demand from the jobbing trade has continued good. Small boltmakers continue to take tonnage freely.

Cement Record Broken

Portland cement production in 1917 broke the previous high record made in 1913. Approximately 93,554,000 barrels were manufactured, an excess of 1,500,000 barrels over the 1913 production and more than 2,000,000 over 1916's output. The high record for shipments, however, remains in 1916, since 1917 shipments of 90,630,000 barrels fell below 1916 by 3,922,296 barrels. Stocks at mills increased 33.7 per cent, as compared with 1916, the figures being 11,180,000 barrels for 1917 and 8,360,478 barrels for 1916.

Sheet Output is Curtailed

Operations Now Being Carried on at About 50 Per Cent of Capacity—Eastern Shipments Are Barred

Pittsburgh, Jan. 15.—On account of the inability to obtain sufficient supplies of sheet bars and because of the congestion of traffic, operations of sheet mills are greatly curtailed. It is estimated that the schedule of sheet mills does not exceed 50 per cent of their capacity. During the middle of last week the average operations of all the sheet mills was 53 per cent and this schedule has been reduced since. For a short period, prior to the holidays, government buying of sheets was not as brisk as it was during the latter part of the summer and the early part of the fall, but since the turn in the new year the tonnage placed by the government has been practically as heavy as any time since the United States entered the war. Large tonnages have been placed during the past few days by the government. It is believed that the railroad situation will be worked out more or less satisfactorily in the not distant future and will enable the mills to greatly increase production. Inquiry from domestic consumers is light but the automobile industry has become more interested and is making increased demand for deliveries. Most of the tonnage taken on contract at high prices, before levels were regulated by the government, have been shipped, although it is understood that a fair sized portion remains on the books of the leading interest at its regular contract prices for the second half of last year.

Eastern Deliveries Blocked

Youngstown, O., Jan. 16.—Difficulty is being experienced by sheetmakers in this territory in making shipments of finished material. The embargoes still are in effect with no prospect of immediate lifting. Shipments to all eastern points have stopped and sales managers are diverting this tonnage to western warehouses where stocks had become depleted. Sales managers are taking this opportunity to bring warehouse stocks up to normal although eastern consumers are being put further in arrears. Foreign shipments also are held up pending the lifting of the embargoes. One valley producer who rolled French and Italian tonnages of black and galvanized sheets during the first three days the embargo existed and stocked them on the mill shipping platform, had to dispose of the tonnage elsewhere in order that outgoing tonnage would not be blocked. Inquiry for small tonnages of all grades is plentiful and among the bookings of one producer was a 750-ton order for galvanized sheets from the Emergency Fleet corporation. The corporation also placed smaller tonnages with other valley mills. Several orders for black sheets ranging from 75 to 300 tons for immediate delivery, were accepted by another producer from consumers not in the embargoed zones. The orders will be substituted on the rolling schedule for those affected by embargoes. In case the embargoes are lifted before the rolling is completed, the orders either will be cancelled or deferred. One valley mill is rolling a fairly large tonnage of black sheets for a large steel company in the Pittsburgh district, the latter supplying the sheet bars. So far production of sheets in this territory has not been curtailed to any great extent by the unsteady sheet bar mill operations. Nearly all sheet mills not self-contained have an ample supply of bars. However, the blast furnaces of one self-contained producer have been working so irregularly, due to the coke situation, that pig iron had to be bought on the outside to avert a shut-down of his sheet mills.

Tool Steel Active

Cleveland, Jan. 15. — Government regulation of tool steel prices has had no noticeable effect as yet, due to the fact that sellers in this district could not be busier. Many orders are being placed for chrome valve steel for airplanes and one order was taken recently for 500 tons of nickel chrome steel, similar to the material manufactured at the Krupps factory in Germany. The Halcomb Steel Co. reports that December production was abnormal, many orders being taken for special shell steel. Inquiries continue to pour in from all over the country, the majority of which are for stock material. The chief difficulty in filling these has been the railroad congestion, but this is gradually loosening under Director General McAdoo's efforts. The high price level maintained for several months prevailed up until the time government regulation took effect.

Repudiate Shape Tonnage

Fabricators Refuse to Take Out Steel Placed Before Sept. 24 Even Where Specified—Suits Are Threatened

Philadelphia, Jan. 14.—Many fabricators both in the east and the middle west are repudiating shape contracts which they made prior to Sept. 24 at the high prices which prevailed up to that time. To such an extent is such action developing that the mills in some cases seriously are considering the institution of suits to recover for such breaches. Thousands and thousands of tons are involved and the fabricators in question are among the most important in the country. In some cases the latter say they cannot take the steel because their shops are full of government work. Some fabricators say flatly they will not accept the steel because they are able to place their requirements elsewhere at the government 3c price. One leading shape maker comments on the situation as follows: "We are not saying so much about the fabricators who did not specify on their contracts, but we feel particularly incensed against those who did so specify and now are going back on their obligations. The latter class includes companies whose specifications we have made up and now are held from shipping, and companies which held us up as we were about to start rolling their material. As long as prices were advancing these consumers took every pound we could ship them, and their refusal to take what they have specified now that the market is lower is distinctly a breach of business faith. That there is no excuse for their attitude is proved by the fact that the specifications in most cases call for stock lengths rather than steel for any particular jobs. As opposed to the policy of these fabricators, we are holding all our contracts for raw materials as inviolable no matter what the price we agreed to pay."

Many structural shape mills, it develops, are being devoted to the rolling of shell rounds, since bar mill capacity is insufficient to fill the shell steel allotments of these makers. One large maker has provided his two shape mills with rolls for shell rounds and temporarily is producing practically no shapes. Numerous inquiries for shapes are coming from abroad. Several small tonnages for South America were sold during the past week at 3.50c, Pittsburgh, and higer and on an inquiry from Canada 4.50c was quoted. On some small lots of ship shapes 5c to 6c was quoted. Plain shapes continue to be offered by one mill for delivery in four to six weeks at 3c, Pittsburgh, but demand is limited.

Building Business Dead

Chicago, Jan. 15.—In the absence of building operations, which have been becoming less through recent months, demand for structural shapes is now practically at a minimum. Not an important tonnage was placed in the west during the past 10 days and practically nothing is pending. The government continues to place tonnages of shapes, plates and bars for shipbuilding purposes, which is giving fabricating shops some business.

CONTRACTS AWARDED

Girder bridges for the Pennsylvania railroad, 300 tons, to the McClintic-Marshall Co.

Boiler house for the American Smelting & Refining Co., Perth Amboy, N. J., 225 tons to independent.

Bridge for Virginian railroad, 300 tons, to the American Bridge Co.

New buildings for the Defiance Machine Works, Defiance, O., 500 tons, contract deferred.

CONTRACTS PENDING

Bridges for the Southern railway, 500 tons, to be built by the company.

East river pier, New York, 425 tons, I. Stander & Co., general contractors.

Loading pier, Perth Amboy, N. J., 500 tons, T. A. Gillespie & Co., taking bids.

Large Order

For Wrought Pipe Distributed at Pittsburgh—Foundries Need Business

Pittsburgh, Jan. 15.—The Philadelphia Co. has distributed approximately 13,000 tons of the 30,000 tons of iron and steel lap-weld pipe recently inquired for. Of the awards made, 7865 tons were for steel and 5017 tons for iron pipe. The remaining tonnages soon will be placed. The Mark Mfg. Co. received approximately 5465 tons of steel sizes, including 2125 tons of 6⅝-inch pipe, 1750 tons of 10-inch casing and 1590 tons of 4-inch pipe. The remaining steel tonnage, 2400 tons of 8-inch casing, went to the Wheeling Steel & Iron Co. The Reading Iron Co., Reading, Pa., was awarded approximately 3849 tons of iron sizes, including 425 tons of 5 3/16-inch casing; 2762 tons of 6⅝-inch casing, 212 tons of 3-inch tubing and 450 tons of 2-inch tubing. The A. M. Byers Co. received about 1168 tons of iron goods, including 212 tons of 3-inch tubing, 506 tons of 2-inch tubing, 150 tons of 2-inch pipe, 250 tons of 1½-inch pipe and 50 tons of merchant pipe. Fair demand for lap-weld steel and iron pipe is current, chiefly from oil country interests.

Market Continues Dull

Chicago, Jan. 15.—Practically nothing is being asked of cast-iron pipe makers and western cities have not yet begun to inquire for their 1918 requirements. One tonnage is pending at Bay City, Mich., and an inquiry for a considerable tonnage for use in California is expected to appear shortly.

Southern Market Dull

Birmingham, Ala., Jan. 15.—Cast iron pipe manufacturers in the south report business quiet and unless more orders are received soon, there probably will be some curtailment of operations. The melt is still quite large, but with the exception of a few specifications of a moderate total, there is not much new business in sight. Some orders have been filled for Cuba and inquiries are in hand from South America, but nothing in the way of export business has developed of late. Soil pipe plants are idle, with no business of any consequence in sight.

Little Ferro Sold

Pittsburgh, Jan. 15.—Small tonnages of ferromanganese for prompt shipment have been sold the past week at $250, delivered. Limited lots of 20 per cent spiegeleisen for nearby shipment have also been sold, most of the tonnage going at $60, furnace. Consumers of 50 per cent ferrosilicon appear to be well covered, some of them for the entire year, and the market for this alloy is quiet. It is now quoted at from $175 to $180, delivered, for prompt shipment. Some tonnages, however, involving extremely limited lots, have been sold at higher levels. Makers of the lower grades of bessemer ferrosilicon are well committed on contracts and are making no offerings.

Awards Big Gun Order

The contract for between 15,000 and 20,000 Browning guns awarded by the United States government to the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been sublet to its subsidiary, the New England

Westinghouse Co. The weapons will be made in its Massachusetts plants. The limit set for the number of guns is said to be merely nominal, and their manufacture will continue until the American army is fully supplied with these weapons. The company is authorized by the war department to continue on a small scale the manufacture of the Russian rifles, the half-filled contract for which the British government recently terminated, in order to insure the integrity of the plant, pending the readjustment necessary to taking up the new line. The manufacture of machine guns will be confined to the East Springfield and Chicopee, Mass., plants. Another plant in Chicopee will return to the manufacture of sporting rifles. This announcement sets at rest the report that the plants were likely to be taken over by the government.

Active Demand

For Light Rails Develops—Small Spikes are Wanted

Chicago, Jan. 15.—Light steel rails are in considerable demand with deliveries possible in about four to six months. The South Chicago mill is inactive on account of storm conditions, but some rails are being produced at the Milwaukee plant. The former plant is shut down on account of lack of power, resulting from fuel conditions. Some inquiry for 1919 delivery is being received for standard steel rails, mostly in small lots, but this business is not being booked. Frog and switch manufacturers are taking some small lots of heavy rails on which they can obtain deliveries through 1918.

Spike Shipments Urged

Pittsburgh, Jan. 15.—Producers of small spikes are being pressed for shipments on contracts but are from 30 to 60 days behind on deliveries and find it impossible to ship to many points on account of embargoes. Jobbers have been placing fair sized contracts for small spikes, the demand having increased somewhat since the American Iron and Steel institute established prices fixing one basis, 3.90c, Pittsburgh, and providing an extra of $1 per 100 pounds on lots of less than 200 kegs. The market for standard spikes is extremely quiet. Small tonnages of light rails are being bought but the market for standard rails is dull.

The Charles A. Strelinger Co., 43-51 East Larned street, Detroit, will hereafter serve as Michigan district sales agents for the Gisholt Machine Co.

Revoke Some Plate Orders

Eastern Fabricators to Some Extent Follow Same Tactics as in Shapes —Mill Output Forced Much Below Normal

Philadelphia, Jan. 14.—Further good-sized tonnages of plates for fabricated ship steel were distributed by the Emergency Fleet corporation during the past week. With this exception business accepted during the past week was of very slender proportions. Fabricators who are repudiating shape contracts placed prior to Sept. 24, also to some extent are repudiating plate contracts booked at the high price prevailing before that date. In some cases the fabricators involved are refusing to accept plates, cut to their specifications, setting forth either that they are fully occupied on government work, or that they can get plates elsewhere at the government price. Plate output here continues to suffer from scarcity of coal. The Lukens Steel Co., for instance, could produce fully 1200 tons more per week than at present if it had sufficient coal. The output of the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co., and of the Alan Wood Iron & Steel Co. also is much below normal for the same reason.

Little Open Tonnage Left

Buffalo, Jan. 14.—An inquiry is before the market for 1000 tons of tank plates for war purposes and 10,000 tons of bars and plates in connection with the government car-building program. On account of the fact that the government program calls for a much larger tonnage of plates than was first figured on, there will be less tonnage of the product available for commercial uses during the first half of 1918 than was anticipated.

Engineers to Meet

Iron and Steel Electrical Problems Form Topics

A joint meeting of the Pittsburgh section of the Association of Iron and Steel Electrical Engineers and the American Institute of Electrical Engineers will be held at the Hotel Chatam (old Hotel Lincoln), Penn avenue, Pittsburgh, on Saturday, Jan. 19. A paper will be presented on the "Generation, Distribution and Consumption of Power", by B. W. Gibson and B. A. Cornwel, of the Ohio works of the Carnegie Steel Co., Youngstown, O., for the Association of Iron and Steel Electrical Engineers. "Methods of Power Factor Correction" will be discussed by R. A. McCarty, power engineer, Westinghouse Electric & Mfg. Co., on behalf of the American Institute of Electrical Engineers.

The Philadelphia section of the Association of Iron and Steel Electrical Engineers will hold its next regular meeting on Feb. 2 when the subject of "Mill Type Transformers" will be discussed by H. G. Steele, of the Pittsburgh Transformer Co., Pittsburgh. The Cleveland district section of the association will hold its next meeting on Jan. 26, the subject to be announced later. The Pittsburgh section will hold a meeting on Feb. 16 at the Hotel Chatam when a paper on "Alternating Current and Direct Current Skip Hoists" will be read by Mr. Lindquist of the Otis Elevator Co.

More Ore

Available for Use in Furnaces Tributary to Lake Superior

Cleveland, Jan. 15.—The reserve supply of Lake Superior iron ore now available in furnace yards or on lower lake docks, is greater than at this time last year, despite decreased shipments on the lakes last year. An analysis of the blast furnace production record for 1917 shows that stacks running on Lake Superior ore consumed about 1,500,000 tons less ore than in 1916. Actual consumption was slightly less than 59,000,000 tons of ore. Heavier shipments were made to eastern stacks, but the 1917 total shipments of 62,500,000 tons were sufficient to build up the reserve supply by more than 2,000,000 tons.

The total shipments of iron ore from Lake Erie docks to furnaces between the opening and close of the 1917 season were 43,258,742 tons against 44,982,917 tons in the 1916 season. The 1916-17 winter shipments were 5,395,528 tons, giving a total movement in the year ended Dec. 1, 1917, of 48,654,270 tons against 50,549,863 tons in the previous 12 months.

Lake Erie docks at the close of the season held 10,326,349 tons against 10,167,760 tons on Dec. 1, 1916.

The ore trade is awaiting further action by the government in determining 1918 ore prices. Until a definite decision is announced, probably late in March, few contracts are expected to be made. Many consumers are placing reservations at this time.

War Board Reorganization Looms

Resignation of Chairman Willard of Industries Board and the Urgent Need of More Centralized Authority Believed Hastens Decisive Action—Retiring Chairman Says Output of Steel Will Not Be Adequate

WASHINGTON, Jan. 16.—Reorganization of the war industries board to centralize greater authority over the providing of essential war supplies, which has been pending for some days or the creation of a special bureau of munitions with a head responsible to the President apparently has been brought nearer by the resignation of Daniel S. Willard as chairman of the war board. Mr. Willard in explanation of his action, says he wishes to give his uninterrupted attention to the railroad problems. It is intimated, however, that the real cause was his unwillingness to act as a mere figurehead without authority.

The resignation was tendered to the President last night. It followed quickly Mr. Willard's appearance before the senate committee on military affairs where he as well as Barnard Baruch, chairman of the committee on metal supplies, declared in favor of the naming of one man responsible to the President to run the war industries board. This individual probably would be known as director of war industries with an organization similar to the food and fuel administrations. Neither favors the inauguration of a ministry of munitions or volunteer service but thinks that experts serving under such a director should be paid. A new cabinet office is not the thought of either, although both favor centralized authority as outlined.

Mr. Willard testified that the present board has no vested purchasing powers and is only voluntary. He said that the committees including the one on division of steel supply really have no authority. In reply to a question he said he thought J. Leonard Replogle, steel director, still is connected with the Wharton Steel Co., but that the latter had nothing to do with price agreements and only placed orders where they best could be filled.

Thinks Steel Output Inadequate

One of the striking points made in his testimony was that he thought the steel output will be inadequate to meet war requirements. He seemed reticent to give Rear Admiral McGowan much credit for navy's buying. He stated that the admiral's latest move to obtain competitive bidding might help the navy much more than the purchasing system that has been followed. He anticipated that the demand for war supplies will grow and recommended that surplus stocks should be laid by in reserve.

Mr. Willard said that section No. 3 of the food bill was responsible for the wrecking of the committee system of the war board and that if a director of industries is appointed, his committees should be approved by the President. In resigning, Mr. Willard recommended that John D. Ryan, president of the Anaconda Copper Co., who is at present engaged in important Red Cross work, be appointed his successor.

Affects Large Producers

Washington, Jan. 15.—The ammonia committee has sent out word that the ammonia and ammonia products covered by its proclamation requiring licenses for distribution are those produced in by-product coke plants, coal gas plants and nitrogen fixation plants only. As the administration says, "This excludes druggists, wholesalers and dealers handling only secondary products, and it excludes persons using the prime products solely as ingredients in the manufacture of products not subject to license."

Urge Kaiser's Ousting

Washington, Jan. 15.—How far business men and manufacturers of America will go in endorsing a plan promulgated yesterday by the chamber of commerce of the United States to influence German commercial interests to rid themselves of the kaiser and his government likely will depend largely upon independent interpretation of No. 3 of the 14 war aims the President stated last week, which is responsible for the chamber's move. The aim in question declares for "the removal, so far as possible, of all economic barriers and the establishment of an equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance".

Appeal has been made by the chamber to have 500,000 American business men vote on a resolution which calls upon German tradesmen to establish a responsible government if they would continue to do business with America. In view of the interpretation by some of No. 3 of the aims as a declaration for free trade after the war, business men and manufacturers, even though the appeal may be made on patriotic grounds, may decline to subscribe to the chamber's resolution.

Regulate Coal Supply to Non-War Industries

Washington, Jan. 15.—Inauguration by the fuel administration last week of a "coal budget plan" by which it expects to save 50,000,000 tons of coal in industries not engaged in producing war materials was followed immediately by an order expected to conserve at least 780,000 tons of the total. The order was to manufacturers of boxboard, paperboard, strawboard, binderboard, tagboard and other kinds of board made from waste paper and rags. It prohibits use of fuel of any sort from 7 a. m., Saturdays, to 7 a. m., Mondays, under penalties provided in the Lever bill.

The fuel administration is negotiating with 100 so-called nonessential industries and among those which have been in actual conference with officials and which are likely to be among the next curtailed are the brewery, glassware, artificial ice, paint and varnish, confectionary and wall paper trades. The brewing industry has agreed to curtail production for a saving of 700,000 tons of coal but no official order has yet been issued. The boxboard order was made after a similar voluntary agreement, the administration announced.

The "coal budget plan" is to keep the nonwar industries going as much as possible to furnish employment for as many of the 10,000,000 persons engaged as can be consistent with the curtailment and to utilize as far as justifiable the $13,000,000,000 invested in the various lines of business. The budget is to give an estimate of the total 1918 production of coal, the coal needed for actual war essentials, the amount left for nonwar work, the coal used by nonwar essentials in 1917 and the total to be curtailed

from nonwar industries during 1918.

It is planned to save coal through reduction of hours, reduction of lines manufactured, elimination of new lines or designs, more efficient management and transfer of product from nonwar to war. Voluntary agreements of each industry to limit its own use of coal are to be followed by formal orders of the administration to make the agreements legal and binding.

Worst Tie-Up

In History of Chicago Industry Experienced—Many Stacks Banked

Chicago, Jan. 15.—Two heavy snow falls within a week, the later accompanied by unusually high wind and below-zero temperature, caused the annulment of all train service on railroads entering Chicago from Friday night until Monday. The result of this was to cause all steelmaking plants to shut down Friday night. Operations cannot be resumed before tonight, and in many cases probably not until the end of the week. Workmen in various plants were loaned to railroads to help in digging out and other large crews were used in clearing tracks inside plant yards and getting snow away from roadways and switches. No such complete tie-up of transportation has been seen since steel manufacture has been an important industry in the Chicago district.

The important item has been fuel, which is entirely cut off by inability of railroads to move cars. In addition to this, blockades inside plant yards have prevented free movement of material from one point to another, adding to the situation.

The Illinois Steel Co. has 15 stacks banked in addition to the five which have been blown out on account of fuel shortage. This leaves only eight furnaces active and they are being run at a slow rate. The Milwaukee plant, which has one stack active and one blown out, is operating its rolling mill, but South Chicago, Gary and Joliet plants are entirely idle. The plant at Duluth is operating 100 per cent, as it is independent of outside coal supply.

The Inland Steel Co. at Indiana Harbor, was forced to cease activities Friday and does not expect to resume work before Tuesday night and possibly later. The three stacks at this plant have been banked. The bar mill of the Republic Iron & Steel Co. at East Chicago, Ind., is idle and most of its workers are assisting railroads in digging out. The same condition confronts almost all plants in this industrial district and it will be several days under present conditions before activity will be resumed in anything like the normal volume.

Valley Conditions Bad

Youngstown, O., Jan. 16.—Operating conditions in the Mahoning valley show little improvement over last week. Both coking and steam coal shipments are very irregular. The Carnegie Steel Co. has three of seven blast furnaces in blast; the Youngstown Sheet & Tube Co. have two furnaces banked while the remaining stacks are at times on slack blast; one of the Hazelton furnaces of the Republic Iron & Steel Co. which was banked last week has resumed. The Brown-Bonnell finishing mills of the latter company are in operation although the officials look for another suspension at any time.

Even War Orders Suffer

Pittsburgh, Jan. 16.—Existing railroad embargoes are not a respecter of even government orders of iron and steel products. At Pittsburgh shipments of large tonnages of plates consigned to government plants have been blocked. In the Mahoning valley thousands of tons of government material, including sheets, tin plate, pipe and shell steel are sidetracked. One producer has several thousand tons of shell steel alone stocked in his yard. For the past month the government officials have been acquainted by steel officials with the way railroads in the Youngstown territory have been handling war shipments. Plenty of promises have been forthcoming, but nothing has been done to forestall the tie-up that now exists in these vital necessities.

Rerolled Bar Makers Put Out Full Extra List

Makers of steel bars, angles and miscellaneous shapes rolled from standard rolls have issued schedules of extras conforming with recent announcements in this product made by the general committee of the American Iron and Steel institute. These extras apply to the base price of 3c per pound mill. Heretofore the makers of rail steel bars have not charged extras for size or twisting. The complete list of extras per 100 pounds is as follows:

Rounds, squares and flats, including deformed bars and twisted squares. Base plus regular steel bar extras.

ANGLES

	Base
1 x 1-inch and larger x ⅛-inch and heavier	10c
¼ x ¼-inch x ⅛-inch and heavier	10c
1 x 5/8-inch x ⅛-inch and heavier	15c
Scant of ⅛ to 7/64-inch	30c

The extra for angles scant of ⅛-inch is additional to the extra for size.

MISCELLANEOUS SECTIONS

Channeled flats and cultivator reams	Base
U bars, regular channels, harrow I bars, diamonds and triangulars	10c

TEES

1½ x 1½ x 3⅛-inch and larger	10c
1½ x 1½ x ⅛-inch and larger	30c
1 x 1 x 3/8-inch to 1¼ x 1¼ x 3/8-inch.	20c
1 x 1 x ⅛-inch to 1¼ x 1¼ x ⅛-inch.	40c

LESS THAN CARLOAD ORDERS

For less than carload lots, a minimum advance of 25 cents or a higher differential may be charged if local conditions justify.

QUANTITY DIFFERENTIALS

Quantities of less than 2000 pounds of a size, but more than 1000 pounds, 10c per 100 pounds.

Quantities of less than 1000 pounds of a size, 30c per 100 pounds.

CUTTING TO A LENGTH

For lengths 24 inches and longer no extra charge.

For lengths shorter than 24 inches extra subject to negotiations.

SPECIAL SECTIONS

Subject to negotiations.

Rapid Progress

Being Made on New Mills and Shipyard of Tennessee Company

Birmingham, Ala., Jan. 15.—Rapid progress is being made by the Tennessee Coal, Iron & Railroad Co., in the building of additional blooming, plate, shape and bar capacity at Fairfield, Ala., and by the Chickasaw Shipbuilding Co., subsidiary of the Tennessee company, on the new shipbuilding plant at Mobile on the Chicksabogue river. Large forces of men are woiking on the two plants and it is expected operations may be inaugurated by early fall. George Gordon Crawford, president of the two companies, during the past week made a personal inspection of both projects. An extensive tract of land embracing 13,500 acres has been acquired in Mobile so that sufficient ground is available for future development on a large scale. The building of the new shipyard is under the management of J. S. Coleman, an engineer of New Orleans, who has been made general superintendent of the plant. Ten ways are being installed and corresponding shop equipment is being provided. The plant will fabricate steel rolled at Fairfield. Two villages are being established, one for the white employes and the other for the colored. A large number of houses will be built. The villages will be thoroughly modern and sanitary and in accord with the latest ideas in community development.

While at Mobile President Crawford was a guest of honor at the annual dinner of the Mobile Chamber of Commerce.

Traffic Position

Of Steel Industry to be Reported Regularly—Mill Operations Low

New York, Jan. 16. (By wire.)—A committee of traffic managers of various steel companies has been appointed to advise A. H. Smith on traffic conditions in the steel industry, as suggested by the former to President J. A. Farrell of the Steel corporation.

The Steel corporation plants now are operating about 50 per cent of capacity at Pittsburgh and at 30 per cent at Chicago.

Moderate lots of rails have been made at $55, mill, for bessemer, and at $57 for open hearth. These prices to some extent indicate the current market. Good rail inquiries are current from Canadian roads.

Extension of contracts to various consumers being made by large steel producers is not general. Instead of booking new contracts, old ones are in some cases being held open for further specifications.

Huge Sum

Saved Government on Iron and Steel Products, Says Gifford

Washington, June 16.—Director Walter Gifford of the council of national defense also declared before the senate committee on military affairs for one-man control, though not necessarily through a cabinet officer. In summing up work of council and war board, he said adjustments of prices had saved for the government as follows: Iron and steel, $3,112,000,000, divided into pig iron, $1,640,000,000; shapes, $180,000,000; bars, $312,000,000; coke, $380,000,000; other steel products, $600,000,000. Copper savings reached $8,000,000; lead, $1,675,000; cement, $200,000; ship lumber, $2,800,000; cantonment lumber, $8,000,000; aircraft spruce, $2,850,000; shoes, $4,000,000; duck, $1,250,000, and alcohol, $2,250,000.

Cleveland Activity Low

Cleveland, Jan. 16.—Operating conditions in the Cleveland district show little improvement. Shipments of coal are far from being adequate and as a result many concerns have suspended operations. The company most affected is the American Steel & Wire Co. Only two of four blast furnaces at the Central works are blowing. The iron is being sent to the pig machine on account of the steel mills at Newburg having suspended. One cold roll strip mill at the Newburg plant and one at the Cuyahoga plant were the only units operating today.

Taking Many Bolts

Pittsburgh, Jan. 16. (By wire.)—The government has distributed all or a part of the 40,000,000 bolts for the Jeffersonville, Ind., arsenal, none of which went to Pittsburgh district makers. The government also has out an inquiry for 30,000,000 to 40,000,000 additional bolts.

Steel Orders Show First Gain in Months

Reflecting the first gain since last April, the report of the United States Steel Corp. as of Dec. 31 placed unfilled bookings at 9,381,718 tons. This is an increase of 5.44 per cent, or 484,612 tons over the amount reported for Nov. 30. Although freight congestion and hardships accompanying severe weather were big factors in cutting down shipments, it is thought that the growth of quietly placed government business undoubtedly contributed greatly to the gain shown in the Steel corporation's latest report. A comparative statement follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Jan. 15.—Copper again moved into the limelight in the metal markets last week, with reports from Washington that the war industries board had officially sanctioned the continuance of the present price of 23.50c for carloads until the close of the first quarter of 1918. These reports were branded as incorrect by the council of national defense, however, which stated that the matter had not yet been taken up directly. An announcement is expected in the trade this week. The 23.50c price has proved of general satisfaction both to producers and consumers in recent months. Copper producers at a meeting in New York a few days ago arrived at the conclusion that revision in either direction would be inadvisable at this time. It is thought, however, that the new agreement will contain the stipulation, as was the case in the steel agreement, that contracts booked for shipment on or after April 1 must be adjusted to meet any new price schedule determined. This stipulation is considered, in some quarters, a preliminary to government pooling of production and distribution of copper. It undoubtedly would have the effect of curtailing transactions to immediate requirements of consumers.

The tin market has remained barren of supplies the past week, with demand growing steadily more insistent. Americans own fully 3000 tons of tin in England, out of total stocks of less than 4000 tons there, while the British government is not permitting exports. In the future American importers and large consumers are expected to buy their supplies in Singapore, and some large buying has been done in that market. But it takes about three months to deliver from the far east and so little relief to the spot situation is expected from that quarter. Consumers and dealers have been scouring interior cities for small lots of tin, which have been selling at exorbitant prices. Small lots of Banca have changed hands at as high as 88c, while there are reports of as high as 99c being done. No supplies of Straits or Chinese 99 per cent are available. The situation steadily is growing more serious and some plants are already facing curtailment of operations.

The American Smelting & Refining Co. last Friday advanced its lead price to 6.75c, New York, 6.67½c, St. Louis. The outside market stiffened perceptibly, although the volume of business remains rather light. A good export inquiry has been in the market, but lack of bottoms is holding this business back. The outside lead market may be quoted as follows: Prompt, January and February shipment, 6.75c to 6.80c, St. Louis.

Since the first of the year galvanizers have shown a little more interest in their spelter requirements. On some days recently there has been almost an active inquiry for carloads. The geological survey issued preliminary figures for 1917, last week, showing production practically the same in 1917 as 1916, while stocks Dec. 31 slightly exceeded 50,000 tons. However, the statement had little market effect, as prices already are below cost, it is asserted. The market is about as follows: Prompt and January, 7.70c to 7.75c; February, 7.75c to 7.80c; March, 7.80c to 7.85c, St. Louis.

The antimony market has declined still further, with no demand of consequence, either from consumers or speculators. Spot may be obtained at about 14c to 14.12½c, duty paid, New York.

The outside aluminum market has gained strength, due to scarcity of supplies. Quotations are as follows: No. 1 virgin, 37.50c to 38.50c; No. 1 remelted, 36.50c to 37.50c; No. 12 alloy, 30c to 31c. The producer's contract price was advanced to 38c, effective Jan. 1.

Fill Your Draft Vacancies by Hiring

More Women for Your Plant



A Well-Paid, Highly-Specialized Type of Woman Factory Worker in a Cleveland Twist Drill Plant

The woman's invasion is upon us in earnest. Men are leaving mills and shops by the thousands to train for the world-wide fight for democracy. To fill their places, a great army of women for the first time is crossing the threshold of industry. That these women will fulfill their responsibilities all are agreed. But their coming brings problems, which executives charged with maintaining production must face.

BY MARGARET C. LYNCH

EACH day sees a fresh number of our young men leaving their chosen occupations to enter the great army which is to fight our battles overseas. This converts into a concrete proposition a question which up to now has been merely a hypothesis. The problem which in the past might have been phrased in these words, "If we send our young men to war, where are we going to get our workers?", has become, "Our young men are leaving! Where are more workers?"

We cannot leave their places vacant. To do so would be to court disaster. Thirty-nine months of war have conclusively demonstrated the vital necessity for a vigorous, active, thoroughly co-ordinated industrial organization behind the line. Production, we are all agreed, must not slacken; it must if anything be increased in volume.

How?

Who will fill up the benches and keep the machines in operation? Here as in Europe, there appears but one solution to the problem, and that is—woman. Work at the bench, the lathe or the drill press will be her part of the battle, and although it will be fought at home, its importance will be none the less vital.

This situation undoubtedly will have its unfortunate aspects. In the first place, under the spur of necessity, women will probably attempt work which is beyond their strength, and employers, used to dealing with men, will not be able to gage accurately the kind and amount of work that women should do. Also, many women will probably seek employment who have never had to work outside the home before.

The necessity for taking on unskilled labor at a time when speed is at a premium is unfortunate, but if the women of this country prove as ready to learn and as full of zeal as the English women have, their inexperience should not have a very serious effect on production.

What Can Women Do?

"What can women do?", the busy manufacturer is apt to ask at the outset. Fortunately, this question can be asked with considerable definiteness, for women are no new element in industry, even in America. They are employed effectively in operating light machine tools including shell turning lathes, drill presses, milling machines, shapers, etc. They are adept at inspecting, sorting and assembling operations. They are employed on punch presses, in stamping shops, for light forging and in armature winding departments.

During the month of July, 1917, the British Ministry of Munitions held an exhibition showing the work being done by women in England today. By means of photographs showing women engaged in various manufacturing operations, and through specimens of the finished products, this exhibit presented a comprehensive survey of the women's work in 14 different occupations. There were



BUSY AT A STRAIGHTENING MACHINE

internal combustion engines, including aircraft motors; motor trucks and accessories; steam engines; guns and component parts; small arms; gages, drills and cutters; metal aircraft fittings; aircraft woodwork; projectiles; optical instruments and glasswork. The exhibition covered practically the whole field of manufacturing and thus demonstrated that almost no arbitrary bounds can be set on "women's work." In some cases the women even set up their own machines. The work of the women shows thoroughness and a conscientious effort toward accuracy. In some factories where the workers consist entirely of women the output from the machines has far surpassed that for which they were originally designed.

The question now arises, under just what conditions should women work?

Fortunately we can draw on the experience of our English cousins across the sea, and so avoid many costly errors and experiments. The whole problem has been investigated throughly by the British Health of Munition Workers committee. The committee collected a mass of facts from which valuable principles have been deduced. A brief summary of these principles follows:

Women are more effective when working on an eight-hour schedule than when employed on longer shifts. Day work is also preferable for women, but if they are placed on night work, the eight-hour three-shift system is better than the longer two-shift practice. The use of the three shifts makes it possible for women either to be employed on continuous night work or to alternate day and night work Both systems have their advantages. The continuous system guarantees regularity of sleeping and eating hours. The alternate day and night work, however, gives every woman in the plant a chance to enjoy the more favored shifts.

The lunch hour should be liberal, with a few minutes for relaxation after the meal is finished. A rest period of 10 or 15 minutes in the middle of the afternoon is found advantageous, and

Women's Work in the Iron, Steel and Metal Industries

A survey of the field shows there are few shop operations women cannot perform satisfactorily. Their relative lack of strength is their principal limitation. Below is given a list of machines women are operating successfully, together with another list of apparatus which it is believed can best be handled by men.

Machines Operated Successfully by Women

Air Hoists
Arbor Presses
Balancing Tools
Bending Machines, Hydraulic
Blowpipes, Gas
Blueprint Machines
Bolt and Nut Machinery
Boring and Drilling Machines
Brazing Equipment
Broach Grinding Machines
Broaching Machines
Burnishing Machinery
Cartridge Machinery
Centering Machines
Chucking Machines
Cutting-off Machines
Cylinder Borers
Die Milling Machines
Drilling Machines
Elevators
Gages, Surface, Depth, Dial, Snap, Etc.
Galvanizing Machinery
Gear Cutting Machines
Grinding Machines, light
Hoists, Chain, Etc.
Jigs and Fixtures
Keyseaters
Knurling Tools
Lapping Machines, Power
Lathes, light
Looms, wire cloth
Milling Machines
Molding Machines, Core
Nipple Threading Machinery
Nut Tappers
Pattern Shop Tools and Machinery
Pipe Bending Tools
Planers
Polishing Machines
Presses, Shell Banding
Presses, Trimming
Profiling Machines
Punching and Shearing Machinery
Reamers
Relieving Machines
Rifle Barrel Machinery
Riveting Machines
Saws, Power Hack
Screw Driving Machines
Screw Machines, Automatic
Shapers
Sheet metal shears
Shell Making Machinery
Slotters
Spring Coiling and Forming Machinery
Swaging Machines
Tapping Machines
Testing and Inspecting Outfits
Thread Cutting Machinery
Thread Milling Machines
Thread Rolling Machines
Tinning Machines
Welding and Cutting, Oxy-Acetylene, light
Welding Machines, Electric, spot
Wire Working Machinery

Apparatus for Which Men Are Recommended

Annealing Ovens
Auto Trucks, Heavy
Bakers, Wire Coating
Barbed Wire Fence Machines
Benzol Recovery Plants
Blast Furnaces
Boiler Tube Machinery
Brickmaking Machinery
Briquetting Machinery
Bulldozers
Cableways and Tramways
Case Hardening Furnaces
Cement Machinery
Central Station Equipment
Centrifugal Coal Dryers
Charging Machines
Clay Machinery
Coal Mining Machinery
Coal and Ash Handling Machinery
Coke Ovens
Concrete Mixers
Cranes, Traveling
Cranes
Cupolas
Cutting Off Machines, heavy
Derricks
Digging and Excavating Machinery
Draw Benches, heavy
Dressers, grinding wheel
Engines, rolling mill
Flue Cutters and Flue Welders
Forging, heavy
Foundry Equipment, heavy
Furnaces, annealing and case hardening
Furnaces, electric steel
Furnaces, melting
Gas Producers
Grinding Machines, heavy
Hammers
Hammers, pneumatic
Heat Treating Apparatus
Hammers, steam
Hydraulic Machinery and Forging Presses
Lathes, car wheel
Lifting Magnets
Locomotives
Merchant Mill Equipment
Mining Machinery
Molding Machines
Open-Hearth Furnaces
Ore-Handling Machinery
Plate Rolls
Pipe Mill Machinery
Powdered Coal Equipment
Riveters, pneumatic
Rolling Mills
Sand Blast Equipment
Sand Conveying and Handling Machinery
Sheet-Mill Equipment
Steel Plant Construction
Steel Plate Construction
Structural Steel Work
Tire Welders and Benders
Tube Mill Machinery
Tumbling Mills
Wire Mill Machinery



WOMEN OPERATE HEAVY PUNCH PRESSES SUCCESSFULLY

if cocoa or coffee can be procured during this time the women go back to work much refreshed. This is especially true in any of the trades where there is danger from poisonous fumes, as a well-fed person is always better able to withstand the effects of these than an undernourished one.

As women generally react to their surroundings more readily than most men, the provision of pleasant places in which to eat and snatch a bit of rest will show results in output. It is also well to have a nurse or matron in charge of the rest room in case any of the women are taken ill. If an hour is allowed at noon this gives adequate time for lunch and for a few minutes rest before the afternoon's work is started, and this few minutes is very effective in bracing the women for extra effort in the afternoon.

People Like to be Clean

Every facility for personal cleanliness should be provided. The rooms maintained for this purpose should be so placed that the privacy of the occupants will be adequately cared for. Hot and cold water, fresh towels, plenty of soap, nail brushes, etc., add to the comfort and contentment of the workers and, therefore, to their efficiency. Particular care should be taken in this direction in plants where cartridges are made and fulminate of mercury handled, as well as in any other type of plant where poisonous materials are in use which might remain on the hands of the workers and prove dangerous through contact with food, etc.

As women, generally speaking, are not as strong as men, it has been found advisable to provide stools for them wherever possible. Also, it has been found that frequently machines which women have heretofore been unable to run because of injurious effects, can be made quite harmless by some slight alteration or by the addition of some simple appliance. To be sure that women are not injuring themselves by unsuitable work it is well to arrange for regular medical inspection, preferably by a woman physician.

In addition to doctor and nurse it has been found advisable in some places to include some women among the supervisors of female labor. Many plants, both in this country and in Europe, have a woman welfare worker on their staff.

It is attention to details which in the end is productive of the big results, and these are some of the details which the English manufacturers have found that it pays to study and work out.

The subject of wages has also received considerable attention in England, and the tendency is to pay the women on the same basis as the men have been paid for the same work. The slogan "equal pay for equal work," has been upheld by both men and women. Mixed motives probably actuate the male adherents of this principle. Some are undoubtedly sincerely desirous of seeing the women get a square deal, while others probably see as a result of lower wages a cheapening of production and a consequent lowering of the wages of male workers when they are ready to take up the reins again.

The British Munitions Supply committee has classified woman employes under two heads, women employed on woman's work and women employed on men's work. The committee has regulated the wages for both classes and for the latter the regulations have become law. Women on men's work must be paid the same piece rates as the men. They must be granted bonuses under the same conditions, and if employed on time schedule must be guaranteed £1 or $4.87 per week while learning and, therefore, unskilled.

Skill Promises Higher Wages

When a woman becomes a skilled worker, she must be paid on the same scale as the men. Claims have been made that in some cases employers have been guilty of so arranging the work that it is not identical with that done by the men. In such cases, because of some very minor difference in work a disproportionately large difference in wages has resulted. On the whole, however, one gathers that the women are receiving wages such as they never enjoyed before, in addition to very fair and considerate treatment in other ways.

Many English factories today have a preponderance of female help. Exhaustive investigations have been carried on to determine the type of work women are capable of doing, and to ascertain just what conditions are most suitable for securing the largest production while at the same time the health of the women is cared for.

In July, 1914, the number of occu-



A HIGHLY SKILLED DRILL PACKER

pied women in the United Kingdom was 5,020,000. In April, 1916, the number had risen to 5,490,000. This represents an increase in 21 months of war of 470,000, or about five times the normal peace-time increase. The metal industries show the greatest increase in the employment of females, with an advance of 88 per cent over the 1914 figures. The chemical group follows close behind with an increase of 84 per cent. The other industrial group show a relatively low rate of increase, the advance for all the "industrial" occupations being only 13.2 per cent. We have, therefore, a large number of women leaving the more strictly feminine occupations to take the place of male workers. As a result it was estimated that in April, 1916, there were 523,000 women in England directly replacing men, and at least 737,000 replacing men either directly or indirectly. In the United States the question of woman labor in the metal trades is beginning to present itself as a problem requiring our immediate attention. We are at the present time facing the same situation which our allies already have faced and partially solved. It appears that our method of solving the problem will be the same as theirs. It therefore behooves us to study their methods and those already in effect in this country.



WHERE DEFT FINGERS ARE REQUIRED—WOMEN TESTING DRILLS WITH MICROMETER CALIPERS

For years we have employed women in the core rooms of our foundries, and as the shadow of war becomes darker, more and more companies are replacing the men coremakers with women. It is said that women are being employed on light molding in some eastern foundries. This is unusual, however, and it has not yet been demonstrated whether or not women are capable of handling this work.

As the work in foundries frequently is too heavy for the average woman, the American Foundrymen's association has incorporated rules governing the employment of women in its official safety code. The code provides that no woman who is not in normal health shall be employed in any foundry, nor shall any woman be permitted to lift any object exceeding 25 pounds in weight, unless she uses mechanical means by which her physical effort is limited to exertion equivalent to that number of pounds.

It is in machine shops and metal working establishments of various kinds that women can be utilized to the best advantage. Here she is not confined to one kind of job, as our English neighbors have proved, but can find many outlets for her abilities. Here as everywhere she is hampered by her comparative lack of strength, but in work requiring skill, patience, delicacy of touch, or speed she can equal the male and in a great many cases prove his superior. To illustrate the work done by women in this country and the conditions under which they do it, it might be interesting to visit some of the various American plants who employ female workers and see for ourselves how it works.

The Cleveland Twist Drill Co., Cleveland, employs approximately 125 girls, and is very proud of them. Many of the girls have been with the company for from six to eight years. Most of them are not the type one would expect to find in a factory and one wonders how the Cleveland Twist Drill Co. manages to hold their services.

In the first place, the company selects its girls carefully. Girls that prove undesirable after employment are promptly discharged. Any girl who brings a friend to seek employment is required to stand sponsor for her. In this way the girls are safeguarded, as far as possible, against the entrance of new girls who might prove unpleasant associates.

In the second place, the girls do not come in contact with the men in the shop at all. The day begins at 7:00 a. m., 15 minutes after the men have gone to work, and ends at 4:40 p. m., 20 minutes before the men stop. The girls therefore have opportunity to be part way home before the men throng out from their own and neighboring shops. At noon the girls use their own lunch room, and it is very seldom that a girl is granted a pass to go outside the building at this time. She is therefore completely isolated as all the girls work together in one large bright room on the fifth floor of the building. The girls are employed exclusively in the inspection and packing departments. The work is light, requiring speed and dexterity rather than great physical strength. It is the type which is generally conceded to be woman's work in the factory. Four different operations are performed in the women's department. One group of girls is engaged in "laying straight" or sorting and arranging the drills. When this is accomplished the drills are sent on to another group who do hand burring. The drills are then sent to the inspection department where girls with calipers test them to 0.0005 inch. The rejected drills are either sent back, if the fault can be remedied. or discarded if it cannot be. The good ones go on to the packers. The packing, which is performed by a fourth group, is the final operation with the exception of checking. One girl does all the checking and she is responsible for all the drills that go out of the department.

The speed and accuracy displayed by an expert packer inspires wonder in the onlooker. The drills are placed in a neat pile on the table, from which the packer slides several so that they lie in a straight row in front of her.



Then, with a special tool, she separates out a certain number and almost with the same movement slides them into the envelope which she holds in her other hand. After the packages are checked and marked, they are ready for shipment.

The monotony attached to this kind of work is its chief drawback. Even this does not weigh very much with an expert, however, for her movements become so nearly automatic that she can carry on a conversation at the same time that her hands are flying at such speed that it is difficult to follow their movements. The only other disadvantage is that the drills are greasy and therefore the work is not so clean as office work. Compared with many other types of work, however, it is desirable.

The girls are paid on a piecework basis. A minimum wage also is set. When a girl's production runs 500 drills over the normal average on which wages are based, her pay is automatically raised by increments of one cent an hour. Each month the girls receive a 10 per cent bonus and at the end of the year all the employes are paid a "grand bonus," based on their year's wages. Last year this amounted to 33 1/3 per cent, and this year the company expects to equal or possibly better this record.

Although the day starts at 7:00 a. m.

Two Types of Workers

The illustrations on this page show two distinct types of women factory workers. The women in the illustration at the top of the page are filing burrs off small drills. Quickness, dexterity and intelligence are necessary qualifications for this class of work. At the bottom of the page women are shown operating heavy shop equipment. Women of the strong, foreign-born, peasant type are best adapted to work of this character. Strong backs, steady nerves and ability to stand up at the machine are among the requirements for this work.



and ends at 4:40 p. m., the girls do not work a full nine hours. At nine o'clock work stops for 15 minutes. Lunch comes at 11:30. The lunch period is 40 minutes, which gives a little time for rest after lunch is over. At 12:10 p. m. work is resumed, but at 2:45 another 15 minute rest period occurs. The work then goes on without break until closing time. This makes in all 8½ hours of work, pleasantly broken up by rest periods. It is not surprising that under such conditions the employes are unusually faithful and even after they are married they sometimes return to work.

How Women Do Heavy Work

A totally different type of work and a totally different type of worker are found within a stone's throw at the plant of the Cleveland Hardware Co. The output of the plant is largely small forgings. Here also women workers are not a new institution. For over 15 years they have been employed on what is, in many places, considered men's work. The attitude of the company is that if a woman has been accustomed to working long hours in the fields in Austria-Hungary she is not going to find eight hours at a punch press an exhausting job. It is, if anything, easier work than that to which she has been accustomed. It would be both cruel and foolish on the part of the employer to hire a girl who was not physically fit for this work. Therefore women of the strong peasant type are employed.

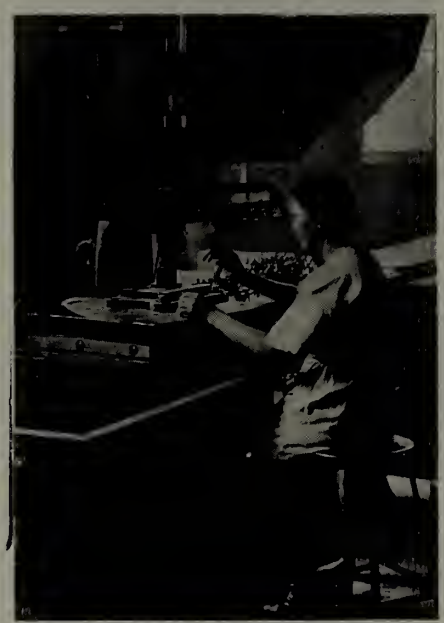
The hours of men and women are identical, each working an eight-hour day. The plant operates on the three-shift basis and women are employed on two of these. The eight-hour day has proved so successful from the standpoint of output that a longer day is not looked on with favor by the company. An effort is made to employ mature women for the shift running from 3:00 p. m. to 11:30 p. m. and, where possible, to hire women who have husbands working on the same shift. This obviates the going home alone at midnight difficulty.

Foreign Women Earn More

The women work on machines and also do inspecting. The company endeavors to choose its women carefully with reference to the type of work which they are to undertake. The women who do inspecting are more frequently Americans, but because the work is easier, the pay is less than that of the foreign women who operate machines. Punch presses, trimming presses, drilling, milling and reaming machines all are operated by female labor. About 200 women are employed in this work and they are found to be as skillful as men operators. This is explained by the theory that women possess more natural rhythm than men and they, therefore, adapt themselves more readily to the regular movement of machines. Safety guards are placed on all the machines and stools are provided so that the women may sit at their work if they desire.

The Cleveland Hardware Co. endeavors to make its employes as comfortable as possible. As the work is dirty a complete change of clothing is required for street wear. A locker is provided for each worker in which she can safely keep her street clothes during the day. Also the washing facilities are excellent.

The women can either bring their lunches or can buy them at the self-



LONG EXPERIENCE MAKES UNERRING FINGERS

serve lunch counter. Whether lunch is brought from home or is purchased in the cafeteria, the women get their coffee at the plant, for this is served by the company, with sugar and cream, for one cent a cup.

A general store is operated by the company right in the building. Here, one is given to understand, an employe can buy anything from a pin to a house and lot, and that the number of employes, both male and female, who put their savings in real estate is surprising. The company store is particularly convenient for the women, who can make their purchases without the trouble of going outside the plant, or without reference to the closing hours of the corner store.

The wages paid the hardware company's women employes are on a piecework basis and range, on the presses, from $2.50 to $3.00 a day. The pay is higher than the same women could make cleaning or washing by the day, which explains to a degree why the women prefer this work. In the case of the married women, the opportunity to work in the late afternoon and evening, and of having the morning and part of the afternoon in which to attend to housework makes the situation attractive.

In Other Industries

Many other concerns are experimenting with the employment of women. At the plant of the Atlas Bolt & Screw Co., Cleveland, women feed the automatic screw machines. The pay for this labor ranges from 16½ cents an hour, minimum, to from $3.50 to $3.75 per 9-hour day. If the employe stays for 15 days she is paid a 5 per cent bonus. If she stays for three months an extra 5 per cent bonus is paid on all earnings during that period.

Outside the door of the Cleveland Tack Works a "girls wanted" sign is displayed. One hundred girls are inspecting small parts and operating light drill presses in the plant of the Maxwell Motor Co., Detroit. The Dayton Engineering Co., Dayton, O., has established a school for women workers where they are taught light machine work, and are paid the guaranteed day rate while learning. In the handling of light machinery or small parts, this company finds that women are superior to men.

The Cutler-Hammer Mfg. Co., Milwaukee, recently employed 200 girls to ascertain how satisfactorily they would be able to replace men taken by the draft. The girls are employed principally in two departments; in one on light machine riveting in connection with lighting specialties, such as push-button sockets, push-button plates, etc., and also on light assembling operations. In the other department they finish and inspect small insulating parts. Although the work is still in an experimental stage, the company believes that the efficiency of the girls compares highly and possibly surpasses that of men workers, because of the greater suppleness of a girl's hand.

Women Munition Workers in America

In the summer of 1916, nearly 4000 women were engaged in the munitions plants at Bridgeport, Conn. The Lincoln Electric Co., Cleveland, is employing girls to wind armatures of motors. The Link-Belt Co., Indianapolis finds women are more skillful in assembling small links into chains and handling packing for heat treating purposes than men. The Chalmers Motor Car Co., Detroit, is using women as operators of light machine tools. The consensus of opinion seems to be the same, that on light work, the women



SHOP AND FACTORY WOMEN AT WORK AND AT REST

excel, and that up to the point where it becomes too heavy for them they are at least equal to the men.

The solution to the woman in industry question seems then to be, that given pleasant surroundings, reasonable hours, and good wages, women can be found to do practically all types of work performed in a factory, with the exception of that requiring very heavy lifting or continuous standing.

To make woman's labor effective the type of woman must be chosen carefully with reference to the kind of work for which she is destined; for machine and press work, women with strong backs and well developed muscles; for inspection, assembling, sorting, burring, or any other work of that type, women with supple hands and a quick and accurate eye.

Women have perhaps in the past performed as many types of work as they are capable of doing, for the employment of women in factories is not a new thing. However, she will now have a new incentive, and the scope of her labors, and the number of workers undoubtedly will become greater.

Wage Not Only Object

For the sake of both men and women, the wages for work identical to that performed by men should equal the wages of men. But a factor which will be of greater assistance in obtaining and holding female labor even than the matter of wages will be found in the little extra provisions made for the comfort and convenience of the worker. One girl who had been led away by the promise of war-time pay from a place she had held for some time, illustrated this by the remark she made on her return to her old place:

"Why Missis, no lockers—nails on wall! no lunch room! no nothing! I come back."

So she voluntarily returned to a place where more conservative wages were paid for the sake of the environment provided by the company. With suitable work, reasonable hours, fair wages and thoughtful provision for comfort, the result is willing workers to fill in the war-torn gaps.

When peace comes again a readjustment is inevitable. But it is an unfortunate fact that some of the men workers will not come back. Others, who will return, will not care to go back to their old jobs. Some will come back and need feminine support. In addition, a great many women will more than gladly retire from the factory when the return of a male supporter makes it possible. All these things will help in the great task of readjustment, which must be faced after the war.

Australian Steel Foundry Practice

BY A. M. HENDERSON

DURING the last six or seven years steel foundry practice in Australia has made great strides and at present several Australian foundries are producing steel castings which compare favorably with those made in England, Europe and the United States. Up to the present time only carbon steel has been used for castings and no systematic efforts had been made to produce alloys such as chrome and manganese steels. This apparent lack of progress is not a result of a scarcity of technical skill nor of lack of enterprise, but of a condition due to the many problems the steel foundries in Australia have encountered in developing their business, and in improving the quality of their product. This lack of development of the industry is partially explained by the total absence of any protective duty on chrome and manganese castings which are used for ore crushing and grinding purposes. Incidentally, it is for this purpose that 90 per cent of the chrome and manganese steel castings imported into Australia are used.

Lack of Standardization

To appreciate the reasons for the adoption of the steelmaking processes now used in Australia, it must be realized that every foundry has to adopt a process for producing steel which will give economical results under the prevailing conditions. In Australia the foundries have had to build up their business by satisfying customers that they could produce the required quality of material before they could obtain the security provided by prospects of future orders. The demand for steel castings calls for various grades of hardness and ductility and for castings varying in size from a few ounces to several tons. It will readily be seen under these conditions that the only processes suitable are those which may be operated intermittently, and are flexible in respect to the grade of steel produced. Standardization is a factor almost entirely absent from Australian steel foundries.

Because of the relative low cost of installation, the crucible process has been adopted very extensively in Australia. It was used there for over 20 years before the first side-blown converter was started. At present there are in Australia from 30 to 40 crucible steel foundries, 15 of which are regularly producing steel castings. There are seven side-blown converter plants in the country, two of which are government plants. One stock converter plant is already in operation and two or three others are being constructed. The electric furnace has had no influence whatever on Australian steelmaking methods. Its introduction has been of such recent date that the effect on foundry practice has not been noticeable.

The crucible furnaces used in Australia are built in batteries of from 2 to 10 holes, and are placed entirely below the floor level with the exception of the stack. Each hole is designed to melt two crucibles and, having an individual stack, may be worked independent of adjacent furnaces. Hard coke is used as a fuel, some 3000 to 4000 pounds being necessary to melt one ton of steel.

Details of Crucible Practice

The melting hole is lined with specially shaped fire brick which may easily be replaced. The furnace covers consist of fire brick and steel frames; these require constant renewing. The crucibles stand on fire brick blocks resting on the furnace fire bars which are approximately 1 inch square and are made of mild steel. In general, plumbago crucibles holding when new about 180 pounds of steel are used in these furnaces. As these crucibles deteriorate their capacity decreases to approximately 140 pounds; the average is 160 pounds for all heats. These crucibles last from five to eight heats depending upon the grade of steel being melted. In Australia as elsewhere the material melted in a crucible consists of boiler-plate punchings and other steel scrap and gray pig iron. The pig iron and as much as possible of the steel is packed into the cold crucibles. The remainder of the charge is added later on when the material in the crucible has melted down.

The furnaces are started with a wood fire. The crucibles are lowered into place by means of long tongs, suspended from an overhead lever. Covers are

A resume of a paper reprinted from the *Proceedings* of the Society of Chemical Industry of Victoria. The author is manager, Commonwealth Steel Co., Sydney, Australia.

placed on the tops of the pots and the furnaces are filled up with coke which is packed about the crucibles. Fresh coke is added at intervals and the remainder of the steel charge is added when the first packing of pig iron and scrap has melted. After the metal is melted, the firing is continued for some time to allow the metal to free itself of any dissolved gases which otherwise would tend to form blowholes in the castings. After firing for a sufficient length of time, the crucibles are lifted from the furnace and a small quantity of alumina ferric and ferromanganese is added. The crucibles are then transferred to a pouring tank and the small amount of slag is skimmed off. The metal is then poured into molds. The furnaces are allowed to burn out and after cooling are cleaned and prepared for the next day's melting.

A typical charge used for crucible steel is as follows: Pig iron, 20 pounds; scrap cast and runners, 40 pounds; scrap mild steel, 100 pounds. The composition of the steel produced by the crucible method depends largely upon the average composition of the charge. The metal, however, absorbs carbon from the crucible and the carbon content of the steel always increases from 0.2 to 0.6 per cent during the melting. It is difficult by the Australian process to obtain low carbon steel which approaches the commercial mild steel plate in softness and ductility. It is perhaps for this reason that the converter process is making such inroads upon the crucible founders' business in Australia.

For medium and hard steels which do not have to conform with standard specifications of strength and ductility the crucible process still has a large field of usefulness in Australia. It is interesting to note the manner in which several of the crucible founders developed their business. They were not technically trained men; knew nothing of chemistry, but came to Australia, worked in new materials, new sands, trained their own assistants, and for many years supplied all the engineers' requirements for steel castings.

Cost Considerations

Under Australian conditions over 50 per cent of the cost of producing castings is accounted for by the cost of the steel. In several well-organized foundries, however, the regular production of high-grade steel is no longer a hit or miss process, but a closely controlled metallurgical operation. In the Australian steel foundries using converters, every blow of steel is sampled and the carbon and silicon, together with the manganese content, are regularly determined. Phosphorus and sulphur are determined frequently but not on each blow. The most frequent cause of unsatisfactory steel castings in Australia is due to the difficulties experienced in obtaining regular and uniform supplies of material. This is particularly true in regard to molding sand. Soft converter steel castings are poured at a temperature of about 1600 degrees Cent. and at this temperature only highly refractory materials can be used for molds. The importance of this problem to the Australian foundrymen is indicated by the fact that fully 70 per cent of the defective steel castings are due to sand difficulties. The majority of steel foundries, especially the crucible foundries, do not seem to recognize this fact and are endeavoring to overcome what really are sand defects by altering their melting practice.

There is a divergence of opinion among steel founders over the question of bottom pouring and lip pouring. Bottom pouring is universal for casting ingots, but in this case a large number of similar ingots are being poured and there is no necessity to vary the rate of pouring. For steel castings, however, nearly every job should be poured at a different rate and hence the rate of pouring is of essential importance. For this purpose it is generally realized that better control of the pouring rate is obtained when pouring over a lip than when pouring through a hole in the bottom of the ladle. Furthermore, the metal in the bottom pouring has a considerable head behind it and leaves the ladle at a velocity which seriously cuts the sand runner provided in the molds. On the other hand, there is very little likelihood of any slag going into the mold with bottom pouring which may readily happen with lip pouring if skimming is not carefully done.

Practically all crucible steel castings and also converter steel castings containing over 0.4 per cent carbon are annealed. Converter steel castings having less than 0.4 per cent carbon may or may not be annealed according to the service which they are designed for. Coke-fired annealing stoves are customarily used in Australia. The castings are packed in the furnace and the side walls bricked up, or a removable top made in sections placed on the furnace. In only two of the foundries have pyrometers been installed to assist in governing the stove temperatures. So long as annealing ovens continue to be operated by guesswork, it is little wonder that castings fail to meet the standard specifications and the cause of failure has been a mystery.

Steel founding is no child's play, the daily crop of problems raised and difficulties to be overcome being considerably more than encountered in most manufacturing enterprises. Steelmaking today cannot be undertaken by men without technical training. Notwithstanding the many alluring prospects presented by those who are anxious to sell and install foolproof steelmaking processes, there are none which may be so classified and which do not require closest attention of a practical metallurgist in order to produce high grade castings.

Want Men for Service

The army and navy staff departments continue to demand men of engineering experience, especially in industrial lines. In calling attention to this, the United States Public Service Reserve, Washington, D. C., points out that a man of engineering experience has a rare combination of opportunities open to him, which are not open to the average patriotic American, as follows:

1. To serve the country in his most effective capacity.

2. To keep in touch with his own profession, with the result that his patriotic service will not have caused him to become rusty by the time peace returns.

3. To become a commissioned officer and receive much better pay than the average man who has wholly subordinated personal interests and now works for the national good.

4. To perform his service usually without leaving the United States.

Plant Begins Work

The new Victory plant of the Bethlehem Shipbuilding Corp., Ltd., Squantum, Mass., for the construction of torpedo boat destroyers, work on which has progressed rapidly, began actual shipbuilding operations this week. The completion of the plant construction will go forward with the work of the shipbuilders. It is announced that 6000 workmen will be employed at once in destroyer building.

The malleable iron plant of the American Radiator Co., Buffalo, has been equipped with annealing ovens provided with burners for the handling of powdered coal. With a good grade of Kentucky bituminous, averaging 12,500 B. t. u. test, the average consumption is said to have been one pound of coal to 3.5 pounds of castings in a preliminary test with damp brick furnace walls. The coal burners used are manufactured by the Powdered Coal Engineering & Equipment Co., Chicago.

Analysis of the Condenser Problem

The Advantages of the Different Types of Condensers Are Outlined—The Cost of Operation, Based on Thermal Efficiencies, Figures in the Choice of Equipment

BY D. D. PENDELTON

THE following discussion on the choice of condensers for steam plants is an abstract of a paper on "Modern Condenser Practice," which was presented before a recent meeting of the Engineers' Society of Western Pennsylvania. The author, D. D. Pendelton, is district sales manager, Wheeler Condenser Engineering Co. Carteret, N. J. As the type of condenser and the degree of perfection to which it operates determine largely the efficiency of a steam plant, the selection of the most suitable auxiliary equipment is one of prime importance to plant engineers.

For high duty work, 28-inch vacuum or better, the type of condenser to be selected should be thoroughly studied, taking into consideration the engineering, physical and commercial conditions. The question of water is of prime importance and should be studied as to: Quantity, kind, clean, dirty, acid, etc.; pumping head; source, natural or artificial; average temperature. With these points settled, the commercial vacuum which is practical to maintain may be determined, always bearing in mind that the average log of a properly designed, rated and operated surface condenser will show better vacuum than a jet machine and in turn better than a barometric machine, due principally to the conditions as to air leaks, and exhaust piping losses.

Surface Condensers

The surface machine also allows the condensate to be reclaimed as pure, distilled water for boiler feed, thus requiring only a moderate amount of make-up water to be treated in cases of unsuitable boiler feed supply. There is no limit to the size of surface equipments—they are now being made in sizes from 100 square feet up to 70,000 square feet.

The barometric condenser is limited in size by the expensive exhaust piping. The low level jet is also limited as to size. This is due to the removal or tail pump and air pump limitations and to the power necessary for driving the pumps. Units of 7500 to 10,000 kilowatts seem to be the practical limit for these pumps, although there have been installed in certain cases twin jets of 20,000 kilowatts capacity.

A 20,000 kilowatt turbine consuming 12½ pounds per kilowatt hour or a total of 250,000 of steam would require for surface work 31,250 gallons of water per minute at 15-degree difference, with 70-degree water and 28-inch vacuum, against a 10-foot head. This would require approximately 100 horsepower, the air and condensate pump of the hydraulic type requiring 140 horsepower additional or a total of 240 horsepower with one set of auxiliaries.

The jet at a 5-degree difference would require 20,000 gallons per minute against a 40-foot head if no booster pump were required, or approximately 400 horsepower. The air pump would require about 250 horsepower more, making a total of 650 horsepower.

After considering the local conditions, the choice of a condenser should be made upon the power requirements of operating cost, always considering the points mentioned in the preceding paragraphs. Assuming a case of 40,000 pounds of steam per hour, 28-inch vacuum with 70-degree water, the power requirements are as follows: Surface condensers at 15-degree difference would require 5000 gallons per minute. Since the discharge should be sealed, a working head of 10 feet should be ample, under ordinary circumstances, requiring a water horsepower of 12½. At an efficiency of 75 per cent on the centrifugal pump, a pumping horsepower of 16 2/3 would be required. Using the wet and dry system the air pump would require approximately six horsepower, the condensate pump about 2½ horsepower, making a total of approximately 25 horsepower. The low type jet owing to the low efficiency of the removal pump would require more power.

At a temperature difference of 5 degrees, however, less water, or 3100 gallons per minute would be required. A head of 36 feet being the discharge head from the condenser, plus friction would make approximately 27.9 water horsepower. The efficiency of the removal pump being about only 50 per cent, it would require a total of 55.8 horsepower. The air pump, however, would be approximately twice as large as for the surface condenser and would require 12 horsepower giving a total of 68 horsepower for the jet system. The barometric type would require the same amount of water, but the water must be lifted to the condenser head using the total static head plus suction and lift on the pump, less the suction effect of vacuum. This usually can be considered a net head of say 40 feet, making a total of 31 water horsepower; and at an efficiency of say 70 per cent on the supply pump, a total of 44½ horsepower would be required.

The same air pump would be used as in the case of the jet, requiring 12 horsepower, making a total of 56½ horsepower. The hydraulic or other types of air pumps and the steam jet would materially increase the air removal power requirements.

Summing the case up we have: Surface, 25 horsepower; barometric, 65½ horsepower—an increase over the surface of 126 per cent low type jet, 68 horsepower plus an increase over the surface of 172 per cent. The relative costs would be: One hundred per cent for the low type jet; 100 per cent for barometric, not including the exhaust piping; and about 200 per cent for surface equipment.

The rating of the surface of a condenser depends principally upon the amount of heat that can be dissipated by each square foot of surface. This being determined by the heat transfer per degree difference between the mean circulating water temperature and the temperature of the vacuum to be attempted.

Condenser Tubes

The tubes in surface condensers have been a source of much thought and experiment. The material used should be pure electrolytic copper, high grade spelter, having not over 0.07 per cent lead, 0.03 per cent iron and .05 per cent cadmium, and pure tin. No scrap should be used. The most common mixtures are: Pure copper, muntz metal (60 per cent copper, 40 per cent zinc); admiralty (70 per cent copper, 29 per cent zinc and 1 per cent tin). The standard tubes usually are No. 16 or 18 B. w. g. in thickness and ⅝ inch, ¾ or 1 inch outside diameter, depending upon conditions.

The quantity of water available and the temperature usually determine the vacuum which is practical to maintain. This quantity can be varied for the same vacuum by varying the assumed terminal temperature difference, which will directly vary the surface for any

given rate of heat transfer. A terminal temperature difference of 5, 10, 15, or 20 degrees can be used. A ratio of heat transfer from 300 to 500 may be employed. For standard commercial work, a terminal temperature difference of 15 degrees is usually conceded the best practice and a heat transfer of 300 to 350 is conceded the most conservative.

Water Velocities

Eminently good engineers have advocated water velocities for surface condensers as high as 10 feet per second, stating emphatically that 8 feet is conceded practical and standard. From tests of large condensers, a water velocity of 4.7 feet per second seems to be the average; for the purpose of discussion, say 5 feet. Now suppose that this velocity be increased to 8 or 10 feet; the power requirements for such conditions would be excessive. All talk of 8 to 10 feet per second seems to be absurd, in view of the fact that there are very few commercial and practical plants operating under such conditions.

Water quantities are usually figured at a 5-degree terminal difference as standard practice, although results have easily been maintained at the vacuum temperature or a 100-per cent water efficiency.

The removal or tail pump, as already stated, requires the larger amount of power—usually on river conditions the water has to be supplied to a cold well by a booster pump, drawn into the condenser by suction and expelled against the vacuum plus any friction and outside static head. The booster pump power has not been considered in the example of power requirements for the types already given.

Air Pump Requirements

The air pump is required to remove air coming in with the water as well as air entering through leaks in the exhaust or other piping and air entering with the steam. Here also the water quantities are figured as in the low type jet machines. The water supply can be more easily figured for it can be pumped directly to the barometric head without booster or auxiliary pumps. The air pump requirements are the same as in the low type jet.

After fixing the type of condenser to be used, the next step should be a study of the auxiliaries for equipment. These can be divided into two kinds: Motor driven and steam turbine or steam engine driven. It is very easy to analyze the power requirements of the motor-driven air, circulating and hotwell pumps for the electrical energy is taken directly from the switchboard. Steam turbine or engine drives, however, bring up the question of the return of heat to the feed water or heat balance and this so often complicates matters that we lose sight of the true power consumed. Roughly, 90 per cent of the steam of the auxiliaries will be returned as heat to the feed water provided there is enough water of a suitable temperature to absorb this heat. The amount of feed water available for absorbing this heat varies with the load on the main unit. The result is that at times of light load there is a grave danger of showing an excess of exhaust steam. This mitigates against the use of steam-driven auxiliaries to some extent and had led to the development of combined drives using turbines and motors.

In the case of steam jets, this device takes boiler steam, compresses the non-condensible vapors from the condenser and discharges the whole into a feed water heater working at atmospheric pressure. All of the heat except that lost in radiation and leakage is returned to the feed water and for that reason it would seem that the amount of steam required made little difference in the general economy of the whole plant. However, as pointed out previously, care must be taken to make certain that the available steam for heating the feed water is not excessive. One way of analyzing the steam consumption of such an apparatus as a steam jet air pump is as follows: Suppose the pump takes 3 per cent of the main turbine steam and that the main unit is rated at 5000 kilowatts or say 60,000 pounds of steam per hour, the steam jet, therefore, requires 1800 pounds of steam per hour. If this steam were expanding through the same range, that is from boiler pressure down, in the main turbine, it would produce about 150 kilowatts per hour. This then, in a sense, is the power consumption of the air pump and is to be compared with the power that some other type of pump would require for the same condition.

The efficiency of the booster pump for the low type jet and the supply pump for the barometric can be assumed as standard, consistent with good centrifugal pump design at a given head and quantity. However, the efficiency of the removal pump for the jet, owing to the slow entering water velocities in the impeller when pumping from a vacuum, is seldom over 50 per cent. The barometric, therefore, as far as power requirements are concerned is more efficient than the jet and less efficient than the surface. No condensate is reclaimed for boiler feed purposes in either case.

Where water supply is a serious problem some artificial method of cooling a given supply of circulating water is employed. This is done in several ways: Cooling towers of the natural draft enclosed type or of the natural draft open or rack type, forced draft, and combined forced and natural draft. In standard cooling tower practice it has been determined that with the air temperature at 75 degrees Fahr. and at 70 per cent relative humidity, the most economical vacuum is 27 inches, based on a 30-inch barometr, or a vacuum having a temperature of 115 degrees Fahr.

Practical Cooling Limits

Rating all condensers on a 5-degree difference—surface, jet or barometric—thus requiring the minimum amount of water, it will be necessary to cool the water from 110 degrees Fahr. Commercially, under the given air conditions, it has been found practical to cool to only 85 degrees Fahr. or sometimes to 80 degrees Fahr., giving a 25 or 30-degree cooling range, which with steam at 1000 B. t. u. per pound would require 25 and 33.3 pounds of water per pound of steam, respectively. The type of equipment to select would depend upon existing local conditions, such as space available and power consumption.

The natural draft open type of cooler requires more ground space and can be placed only where the vapors and driftage will do no harm to surrounding buildings or property. This type requires a pumping head of approximately 30 feet and no other power. The natural draft enclosed chimney type takes less ground space, the chimney or stack is usually about 75 feet high.

Area of the Cooling Pond

It is impossible to state generally the area of a pond necessary for a given quantity of water, but generally speaking, at a working pressure on the spray nozzles of 6 to 7 pounds, a pond of 3 square feet per gallon of water sprayed will have to be used. The area of a natural cooling pond is obviously very large as the heat dissipated per square foot depends upon the relative humidity, the temperature of the water and the velocity of the air currents. These are naturally, on account of varied conditions, very discordant.

In any water cooling device 90 per cent of the cooling effect is through evaporation and it is, therefore, vitally necessary that sufficient unsaturated air be given free access to the proper quantity of water. The air in all cases should go off the tower or pond in a saturated condition.

G. W. McClure Son & Co., Pittsburgh, have prepared plans for relining four hot blast stoves of the Wheeling Steel & Iron Co., Wheeling, W. Va. The stoves which are of the Crooke & Massick type will be changed over to the McClure type.

Heat Treatment of Heavy Forgings

Grain Growth is an All Important Factor in Heat Treatment of Steel—Small Forgings Require Painstaking Care—Engineers Should Co-operate With Metallurgists and Steel-Makers When Heavy Machine Parts Are Designed

BY SIR WILLIAM BEARDMORE

IN the heat treatment of large forgings there are no metallurgical principles involved which do not apply with equal force to the heat treatment of small forgings. Such differences as exist are entirely due to the limitations which large forgings impose on the practical conditions under which the heat treatment is carried out. For every class of forging it is desired that the material from which it is made should give the mechanical tests required by a suitable choice of composition, but in addition it

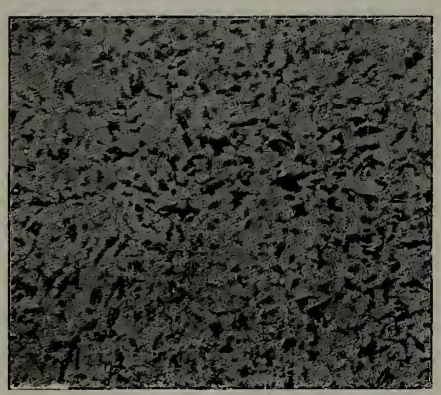


FIG. 1 — OUTSIDE SKIN OF 18-INCH OIL-HARDENED SHAFT—MAGNIFIED 100 DIAMETERS

is most necessary that the material should be in such a physical condition that brittleness and the chance of sudden failure should be reduced to an absolute minimum.

In carbon-steel forgings produced to meet a definite mechanical test specification the steel must possess the least crystalline growth or the smallest grain size, and the object of all heat treatment is to confer this condition on the forging before it leaves the steel works. It is well known that, at any chosen temperature, the time the material is kept at its heat and the time taken to cool down to normal temperature again have an all-important influence on the grain size. It is for this reason that in large forgings all the difficulties of heat treatment are magnified, and it is believed that a limit is ultimately reached in the size of the forging beyond which a plain carbon steel cannot be used with safety, and the use of an alloy steel becomes imperative.

The slowness with which heavy masses of steel cool results in large crystal grains at the center of the mass. To avoid this, recourse has to be made to oil-quenching to hasten the cooling and to diminish the size of the grain, while a subsequent reheating is generally necessary to remove the hardness introduced by the quenching operation. With small forging a simple annealing will put the material into the condition which will give satisfactory and safe results, but for large forgings some form of heat treatment is very necessary to produce the best results.

It is not sufficiently realized by engineers that in plain carbon steel the effect of oil-quenching is not uniform over the cross-section, but diminished as the center is approached. With very large forgings a stage is reached at which the quenching effect at the center is so small that it is insufficient to confer any benefit on the material, and it becomes impossible to guarantee the uniform results which are wanted. That this effect is a real one can be seen from the accompanying photomicrographs of a large oil-treated shaft and from the tests taken. This shaft tested was 18 inches in diameter and of the following composition: Carbon, 0.18; manganese, 0.65; silicon, 0.10; sulphur, 0.048, and phosphorous, 0.037 per cent. The shaft was heated to 1501 degrees Fahr. and held at that temperature for two hours and then cooled in oil. Tests were taken from the outside skin and center and gave the following results:

	Elastic Limit.	Ultimate Stress.	Elongation on 2 in.	Reduction of area.
	Tons per sq. in.	Tons per sq. in.	Per cent	Per cent.
Outside ...	17.5	33.1	27.0	53.1
Center	15.0	29.0	31.0	46.0

The structures of this shaft are given in the accompanying photomicrographs. Fig. 1 and Fig. 2 show the outside and inside structure, respectively. The tests taken from the center of the shaft have a lower tonnage than those from the outside, due to the fact that the quenching is not so effective. With a higher carbon steel it can be understood that the difference will be greater.

The effect of work is very important, and there is an intimate relation under practical conditions between the grain condition of a forging and the amount of work which has been put on it during forging. For the very best results the ratio of the cross-section of the ingot and the largest cross-section of the forging should have a minimum value, which should not be less than three. Preferably it should be as great as possible, but this cannot always be adhered to, since for large sizes it is limited by the maximum size of ingot with which the presses can deal and sometimes by the shape of the forging itself. For an ingot 83 inches in diameter the maximum size of the forging should not exceed 48

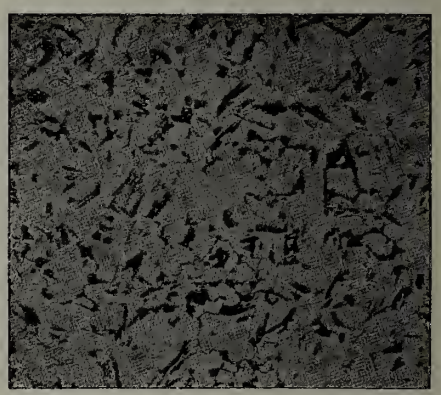


FIG. 2—INSIDE SKIN OF 18-INCH OIL-HARDENED SHAFT—MAGNIFIED 100 DIAMETERS

inches for the best practice. From a steelmaker's point of view larger forgings than this should be built up rather than manufactured in one piece. In this connection the cause of commercial efficiency would be better served if engineers in bringing out new designs in heavy steel construction, would consult the metallurgist and the steel manufacturer as to the best method of using their combined knowledge in the design and production of special requirements.

Though not strictly a forging, the following example illustrates very well what has been said above regarding the heat treatment of heavy forgings. An order was received which specified steel discs 55 inches in diameter and 11 inches thick with a mechanical test as follows:

Yield-point.	Ultimate stress.	Elongation (on ratio $\frac{\text{length}}{\text{diameter}} = 10$).
Tons per sq. in.	Tons per sq. in.	Per cent.
23	45	20

These discs were required to revolve at a high speed, and for magnetic rea-

A paper read before the Institution of Mechanical Engineers, London, Eng., March 16, 1917.

sons it was necessary to use a carbon-steel. The ingots were forged and then rolled to size from material of the following composition: Carbon, 0.53 to 0.54; silicon, 0.18; manganese, 0.50; sulphur, 0.029, and phosphorus, 0.040 per cent. These ingots were given a heat treatment after this operation, which consisted of heating to 1436 degrees Fahr. for 2 hours and cooling in oil, followed by heating to 1022 degrees Fahr. for 4 hours and cooling in air. Tests were taken from the center of the slab midway between the two surfaces, and results from this test are as follows:

CROSS TEST

Yield-Point	Ultimate Stress.	Elongation $\frac{\text{length}}{\text{diameter}} = 10$	Reduction of Area.
Tons per sq. in.	Tons per sq. in.	Per cent.	Per cent.
23.6	42.3	14.0	39.3

Fig. 3.	Yield-Point. Tons per sq. in.	Ultimate Stress. Tons per sq. in.	Elongation on 2 in. Per cent.	Reduction of Area. Per cent.
A ..	28.1	46.2	28.0	52.4
B ..	27.9	46.0	27.0	44.4
C ..	27.2	46.6	25.0	47.2
D ..	26.4	46.0	26.0	42.0
E ..	26.8	46.2	27.0	44.4

These results were the best that could be obtained, and were below the specified tests. There were two reasons for this failure. The carbon was too low and the thickness of the slabs too great to allow the oil-quenching sufficient time to be effective. Another ingot was therefore cast, from a higher carbon material, having an analysis as follows: Carbon, 0.62 to 0.63; silicon, 0.25; manganese, 0.70; sulphur, 0.023, and phosphorus, 0.024 per cent. This ingot was forged and rolled to 5½ inches thick to the size given in Fig. 3. In this way it was sought to avoid any unsoundness that might exist down the center line. At the same time the test specification was amended so that the elongation required was 22 per cent in 2 inches instead of

$$\frac{\text{length}}{\text{diameter}} = 10.$$

on a ratio

The plate was heated to 1625 degrees Fahr. and kept at this temperature for one hour and cooled in oil. It was then heated to 1400 degrees Fahr. and kept at this temperature one hour and cooled

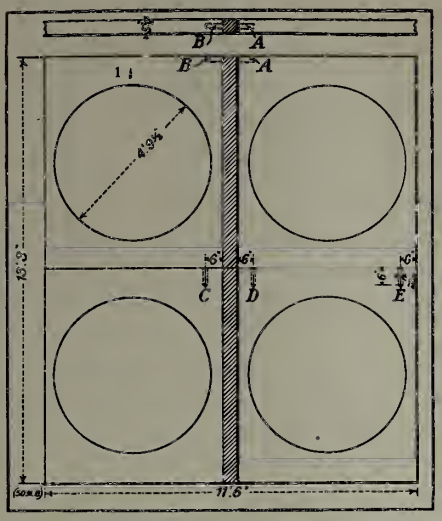


FIG. 3—FORGED AND ROLLED SLAB USED FOR TESTS

in oil. A third heating was then given the plate and the temperature was raised to 1184 degrees Fahr, and maintained for eight hours and the plate allowed to cool in air. The tests which were made on this plate are shown in the accompanying table, and refer to the corresponding letters in Fig. 3.

Work Is Important Factor

These results are satisfactory according to the test specification, and show the improvement effected by slight changes in the method of manufacture. The improvement due to rolling to a smaller thickness alone was also seen when first material containing 0.53 to 0.54 per cent carbon was rolled down from 11 to 5½ inches, and then retreated in the same manner, for it gave the tests as follows:

	Yield-point Tons per sq. in.	Ultimate stress Tons per sq. in.	Elongation (ratio length 10) Per cent.	Remarks In thick.
Length	26.3	44.9	15.8	5½
Cross ..	25.7	442.	16.5	5½
Cross ..	23.6	42.3	14.0	11

This result could have been still further improved by decreasing the thickness to 3 inches, but it shows how important the effect of work is on carbon steels, and how it may make just that difference between success and failure. For high-tensile material, that is, material over 40 tons strength, where the factor of safety is limited owing to the special conditions under which the material has to be employed, it will generally be safer to use an alloy steel, since for the same tonnage a very much tougher material can be developed. But for material whose tensile strength is below this figure there is not the same necessity, and excellent results can be obtained from oil-treated low-carbon steel.

Specifications of Rotor Spindle

Fig. 4 indicates the outline of a large rotor spindle which was made to the following test specifications: Yield point, 20 tons per square inch; ultimate stress, 36 tons per square inch; elongation on 2 inches, 24 per cent. It will be seen from the drawing that the largest diameter was 3 feet 8¼ inches, and the minimum diameter only 11⅛ inches, so that if such an ingot were used as would give the requisite amount of work for the largest section, the amount of time and money spent in forging down this ingot to 11 inches would be out of all proportion. In this case, as in many other cases, the best metallurgical conditions are incompatible with the best commercial conditions, and a compromise has to be effected. An ingot 60 inches in diameter was used of the follinw composition: Carbon, 0.38 per cent; manganese, 0.39 per cent; silicon, 0.21 per cent; sulphur, 0.029 per cent; phosphorus, 0.044 per cent. In the heat treatment of this job, and of jobs having similar shapes, when the forging is put into the furnace the time taken to heat up the heavy center section is much longer than the time taken to heat up the end sections. For instance, the end-pieces 11 inches in diameter could be heated up in about 4 hours, while the center would take about 20 hours to reach the same heat. Before the forging would be uniform the end-pieces would have been at their heat for 16 hours, and would have grown such a crystalline grain in consequence that any good effect of the oil treatment would have been annulled. To avoid this the ends were covered with asbestos sheets, leaving only the center exposed when the forging was charged into the furnace, and this sheeting was removed after 15½ hours in the furnace, so that the forging attained its heat uniformly as a whole,

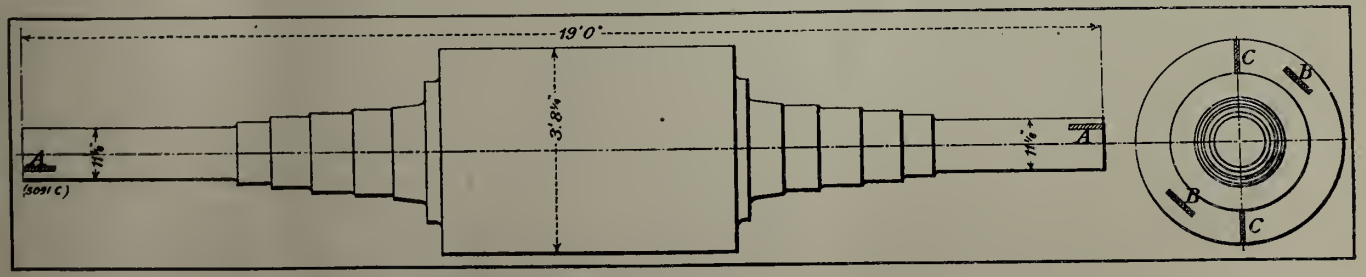


FIG. 4—DETAILS OF LARGE ROTOR SPINDLE USED IN TESTS

and the crystal grain in consequence was uniform throughout.

The test results are as follows:

Fig. 4.	Yield-Point. Tons per sq. in.	Ultimate stress. Tons per sq. in.	Elongation (on 2 in.). Per cent.
	22.6	38.8	27
A.....	22.6	38.8	27
	22.8	39.2	27
B.....	22.8	39.2	28
	22.4	38.8	28
C.....	22.4	38.8	30
	22.4	35.8	24

A refers to length tests taken one from each end of the forging, B. to tests taken circumferentially from a ring taken from the center part after treatment, and C to tests taken radially from the same ring. In both B and C tests two tests were taken from opposite diameters. This rotor was heated to 1472 degrees Fahr. for 2 hours, and cooled in oil. The center part attained its heat in 19 hours and 30 minutes, and the ends were uncovered after 15 hours 30 minutes, so that they attained their heat simultaneously with the center part. The rotor was then heated to 1022 degrees Fahr. in 11 hours and 30 minutes, and kept at that heat for 2 hours.

Troubles Caused by Distortion

A troublesome feature of large forgings which have been heat-treated is the distortion which takes place, due to internal stresses probably set up by the operation of quenching. On machining the forging, and especially on removing the outside surface, these stresses are partly relieved, and the forging distorts and takes up a new shape under the influence of the forces still left in the material, so that it loses straightness and generally adds to the time occupied in machining. It is advisable on this account to rough-machine the forging after treatment, and then to re-anneal it before the final treatment. Allowance for this re-annealing can be made on the first testing, and where the final machining is intricate and accurate it will be found to repay the cost.

Home Mines Yield Much Manganese Ore

DOMESTIC manganese ores which long have been relegated to the background by the more attractive high-percentage mineral imported from India and Brazil now have reached an important magnitude of production. With a view to determining the practical importance of the domestic output of manganese ores, the United States geological survey is collecting statistics of production every three months. The canvass for the quarter ending Oct. 1, 1917, is just completed and the statistics for both manganese and ferromanganese ores for the first nine months of 1917 are set forth in the accompanying table.

A large increase in the number of shippers and in the shipments of ore of each grade over those reported for the first six months of the year is shown. In 1916, only 26,997 tons of high-grade manganese ore was shipped by 55 operators but in the first nine months of the present year 70,225 tons was shipped by 88 operators and the reports received indicate that the shipments for the year will be about 122,275 tons. In September the production of high-grade ore was about 14,000 tons; in November it was nearly 17,000 tons.

Predicted Shipments for 1918

Inquiries made by the survey indicate that the shipments in 1918 will be between 175,000 and 200,000 tons. The 70,225 tons shipped in the first nine months of 1917 contained an average of 43.6 per cent manganese 2.8 per cent iron, and 13.7 per cent silica, and nearly all of it was used to make ferromanganese. Of manganese ores containing 15 to 40 per cent manganese, 380,169 tons were shipped in the first nine months of 1917 by 58 operators, against 176,130 tons shipped by 41 operators in the entire year of 1916. The ore contained an average of about 18.6 per cent manganese, 29.5 per cent iron, and 12.5 per cent silica. Most of it was used to make spiegeleisen.

The great increase in the shipments of high-grade ore from western states is noteworthy, particularly from Montana, Arizona, California, Utah and Nevada. The prices now offered are causing prospectors in these states to search closely for ores and many western mines are now shipping manganese ore that was left undisturbed in exploration years ago. The Philipsburg district, in Montana, shipped about 7000 tons a month of high-grade ore during the third quarter of 1917, and the Tombstone and Bisbee districts, in Arizona, are shipping large quantities of such ore. The rate of production of Virginia and Tennessee is increasing, but that of Arkansas and Georgia is not much larger than it was in 1916.

As recently as 1915 there was only a small market for ores containing less than 40 per cent manganese, so that the large increase in the shipment of low-grade ore in 1917 is very striking. The production of such ores now appears to be limited more by the market than by the capacity of the mines.

Recently attention has been directed to the Olympic region of Washington, where from time to time prospectors have penetrated the rugged central portions of the mountains and

Manganese Production for 1917

State	Ore containing 40 per cent of manganese or more Jan. 1 to Oct. 1: Number of shippers	Gross tons	U. S. G. S. estimate for year (gross tons)	Ore containing 15 to 40 per cent manganese Jan. 1 to Oct. 1: Number of shippers	Gross tons	U. S. G. S. estimate for year (gross tons)	Ore containing 5 to 15 per cent manganese Jan. 1 to Oct. 1: Number of shippers	Gross tons	U. S. G. S. estimate for year (gross tons)
Alabama	1	90	125	..	.....	.....	..	.....	.....
Arizona	9	8,196	12,000	10	14,781	22,000	1	9,429	14,000
Arkansas	5	5,236	6,600	6	6,810	8,500	2	888	1,000
California	22	6,592	11,000	4	500	575	..	.....	.....
Colorado	..	.....	.....	*	†73,666	†96,200	†	†	†
Georgia	7	850	3,500	8	10,271	14,000	3	749	1,100
Michigan	..	.....	.....	1	29,866	54,000	..	.....	.....
Minnesota	..	.....	.....	6	209,421	253,000	5	244,400	347,000
Montana	15	33,859	60,000	7	9,171	11,000	..	.....	.....
Nevada	1	875	2,500	1	125	125	†1	†86,576	†120,000
New Mexico	3	523	1,490	2	15,235	21,500	..	.....	.....
North Carolina	1	32	60	..	.....	.....	..	.....	.....
South Carolina	1	300	500	1	200	1,000	..	.....	.....
Tennessee	5	1,923	4,400	2	175	400	..	.....	.....
Texas	1	25	100	1	110	500	..	.....	.....
Utah	5	2,820	4,000	1	100	800	..	.....	.....
Virginia	12	8,904	16,000	8	9,738	13,000	2	516	600
Wisconsin	..	.....	.....	..	.....	.....	1	168,456	190,000
	88	70,225	122,275	‡58	†380,169	†496,600	†14	†424,438	†553,700

*Not ascertained.
†Ore from Colorado and Nevada used as flux not included in totals.
‡Not including number of shippers of ore from Leadville to Pueblo, Colo., for manufacture of spiegeleisen, nor number of shippers of Leadville ore used as flux.

have found here and there some valuable metals. Considerable native copper which generally carries manganese has been located.

An examination in part of the manganese-bearing rocks in this region was made in September, 1917, by J. T. Pardee of the geological survey. Manganese-bearing lodes were found in a belt, 2 or 3 miles wide, that lies on the south and east flanks of the Olympic mountains and extends from a point south of Lake Queniault to the head of the Dungeness river, a distance of 50 miles. In addition a few similar lodes were found about 75 miles farther northeast, on the opposite side of Puget sound, near Anacortes.

Some ore that contains 40 per cent or more of manganese is found, but the bulk of the deposits is of rather low grade. Analyses show that the general run of the ore contains 26 to 35 per cent of silica, 17 to 36 per cent of manganese and 8 to 15 per cent of iron. Some of the analyses show considerable lime also, and at places in the manganiferous belt thin beds of limestone, deep red with iron oxides, are associated with the greenstone.

At their outcrops most of the manganiferous bodies range from 2 to 10 feet in width and from 50 to several hundred feet in length but the few that have been developed pinch out within 40 to 50 feet of the surface. Close estimates of the quantity of ore available are difficult to make, but probably 50,000 to 100,000 tons of ore of composition similar to that shown by the analyses mentioned lie within a few feet of the surface.

During the field season of 1917 geologists of the United States geological survey and of the Virginia geological survey have been studying the relations of the manganese deposits to the rocks and surface features in the Shenandoah valley and have come to some definite conclusions which they believe will aid in the discovery of more of the ore which is so greatly needed in the iron industry due to the war limitation of imports. A report prepared by D. F. Hewett, G. W. Stose, F. J. Katz and H. D. Miser of the survey not only describes the rocks with which the manganese ore is associated and several well known types of manganese deposits in the Shenandoah valley, but gives a brief account of six promising tracts along the west front of the Blue Ridge. This report is now being printed. Conditions in the six Blue Ridge tracts appear favorable for the accumulation of ores of manganese and manganiferous iron, and the report recommends prospecting in them with a view to the discovery of workable deposits.

South American Production

Production of manganese in Brazil and India, the two great foreign sources of supply for the United States, continues to grow. This is graphically shown in a report by Consul General Alfred L. Moreau Gottschalk from Rio de Janeiro, Brazil, and by an almost steady increase of tonnage shipped over the Central railroad of Brazil from the mines to tidewater. This ore has been taken from a manganese field served by this railroad, along a 300-mile stretch of single-track line in the state of Minas Geraes. Only recently has the mineral been discovered in the northern state of Bahia, where development still is in its infancy. While the railroad upon which the North American market chiefly depends has been handicapped somewhat by lack of rolling stock, it has managed to open operations so as to show a gratifying monthly increase. In metric tons, the movement of manganese ore over its lines during the past four years, has been as follows:

Months	1914 Tons	1915 Tons	1916 Tons	1917 Tons
Jan.	26,468	26,735	36,025	39,843
Feb.	17,510	22,915	32,780	37,505
Mar.	20,510	24,587	31,441	40,700
Apr.	16,172	24,690	34,675	46,659
May	21,058	25,138	29,400	38,747
June	26,785	20,295	37,040	51,037
July	22,720	19,060	40,394	39,158
Aug.	14,960	21,100	40,639	58,758
Sep.	12,450	28,330	36,338	45,059
Oct.	21,075	30,370	40,099	60,188
Nov.	19,620	30,635	35,940	.....
Dec.	25,857	36,025	37,654	.....
Total ...	245,185	309,880	432,425	457,654

In Mysore, India, a better grade of ore is being produced owing to further exploitation and deeper mining. Kumsi and Shankargudda in the Shimoga district are the principal sources of supply and instead of running 30 per cent the ore now obtained is running 45 to 46 per cent manganese, which costs from 12 to 15 rupees per ton ($3.84 to $4.80) f.o.b. Marmagoa.

The Engineers of Tomorrow

BY J. A. L. WADDELL

THERE is an imminent matter of vital importance to the American nation concerning which very little, if anything, has been said in the newspapers. I refer to the depletion of the classes in technical schools, first, by widespread volunteering for the army and navy, and, second, by conscription. This subject received much attention at the recent Washington meeting of the Society for the Promotion of Engineering Education, an organization of 25 years' standing and composed of most of the leading American instructors in all lines of applied science, and also a few prominent practicing engineers. The meeting was addressed by such distinguished men as the secretary of war, the chief of engineers of the U. S. army, and the director of the bureau of standards. The five sessions held by the society on those two days were devoted almost exclusively to questions of public welfare, principally connected with the war.

As I attended all of the sessions from start to finish and took the deepest interest in the entire proceedings, I feel justified in making the following statements, and in claiming that they express the opinions of a number of the most profound thinkers of America.

First—The larger part of the civilized world will have to be reconstructed after the war, not excluding our own great railroad system, which undoubtedly will have deteriorated on account of over-use and lack of adequate upkeep.

Second—Such reconstruction is almost exclusively the work of engineers.

Third—The European technical men have been killed off by thousands during the past three years; and their slaughter will not cease until the war ends. Moreover, it is more than probable that many American engineers who serve in Europe will never return to our shores, and that a large number of those who do come back will be more or less incapacitated from active professional work.

Fourth—The technical schools of all the other warring countries than ours have practically been out of commission for three years, thus cutting down there, almost to zero, the supply of new men for the engineering profession.

Fifth—The call to arms in this country by both volunteering and conscription it is feared will soon have reduced to about one-half the attendance at the technical schools of the United States, *while instead of being halved it aught properly to be doubled.*

Sixth—In spite of the present paraly-

zation of many lines of engineering work, due to the cessation of large constructions and to the absolute lack of capital for important new projects of a peaceful character, the demand for young graduates of technical schools by the manufacturers of war supplies is so great that there is already a marked dearth of such assistance, which dearth will be more and more accentuated as the war progresses, and as the call for ships, guns, ammunition, aeroplanes, automobiles, and other war paraphernalia increases.

Seventh—Until the United States entered the war, it was almost certain that most of the reconstruction work of the world would be done by American engineers, and in any case they are sure to get a fair share of it; but it seems a shame that this country should miss such a golden opportunity as that which lies before it for securing the lion's share.

Eighth—The capacity of the old, experienced, and well-established American engineers for doing work is practically unlimited, *provided that there be no shortage of young, properly-educated assistants;* because most technical men of mature years have developed highly the faculty of management. On that account the average total annual amount of work engineered by such men in this country could readily be increased five fold, or, possibly even ten fold, without causing undue overstress either physical or mental; and, consequently, the great mass of the work of world-reconstruction could emanate from the United States and be handled abroad by American engineers.

Ninth—It is beyond question that, for the next 10 years or more, engineering is everywhere going to be the most lucrative of all the professions.

What Deduction is to be Drawn?

From these nine premises what is the most important deduction to be drawn? Evidently it is that, by some means or other, we must manage not only to prevent any falling off in the attendance at our technical schools both during and directly after the war, but also greatly to increase it. And how can this be done?

The answer to this question is not difficult. It is as follows:

First.—By urging more young men to go to college, and by persuading their parents that it is their duty to send the boys there for the ultimate good of both themselves and the country.

Second.—By inducing all sub-freshmen who have shown any special aptitude for mathematics, mechanics, or chemistry, to take the technical courses.

Third.—By discouraging the enlistment into the army and navy of all students in technical institutions, but, on the contrary, by encouraging them to remain and graduate, if possible. Of course, those who are drafted will have to serve; for it would, manifestly, be unfair to the rest of the youths of the country to excuse a man from going to the front simply because he is a technical student. Such drafted students, however, should generally be sent to the engineer corps, because their services in that branch of the army would probably be more effective than in any other, and because the training they would receive therein would be likely to serve them in good stead in after years when practicing in the engineering profession.

Fourth.—By granting government aid to those youths of evident special ability in technical lines who are unable to raise the money necessary for a course of instruction.

If these four steps be taken, the unique opportunity referred to will not be lost; and this country will then become the leader of the world in activity, effectiveness, and wealth.

An Appeal to Young Men

Let me, therefore, most earnestly implore all youths who are ready for college this fall, and who are not in any way unfitted for technical careers, to take up some branch of engineering or technology; and let me entreat the parents or guardians of such youths to exert their influence so as to induce the boys to choose that line of study for their life work. Remember: it is not only for the good of the country that I make this appeal, but also for the ultimate benefit of the young men themselves!

Some reader of this communication may remark that such an appeal would possess more force if it were to come from a national engineering society than when emanating from an individual engineer. Very true! But until quite lately there has been no engineering society which draws its membership from all lines of technical activity; and the one which is now being formed, viz., the American Academy of Engineers, has not yet received from congress the national charter for which it has applied. Were that association today fully organized and duly recognized by the government, it assuredly would make such an appeal as this and, in my opinion, that appeal would immediately be responded to by the nation, for the American people certainly are sensible enough to heed seriously any words of warning coming from a select body of the most practical men in the land.

The Belmont Iron Works, Philadelphia, has issued an attractive calendar for 1918, illustrating their product.

Mining Engineers Meeting

A tentative program has been announced for the annual meeting of the American Institute of Mining Engineers which will be held in New York, Feb. 18-21. A patriotic war smoker, which is scheduled for Monday night indicates the tone which the meeting will take. Technical sessions will be held twice a day during the meeting except Thursday. On Thursday the members will visit the physical laboratory at Princeton, N. J. This excursion will also give them the opportunity of observing officers of the United States aviation corps in action.

A study of war problems will naturally occupy a prominent place on the program. A new and particularly interesting feature of the meeting will be a technical session devoted to the subjects of personnel and welfare work, for which a number of excellent papers are in readiness. A paper of timely interest entitled "The Erosion of Guns" will be contributed by Prof. H. M. Howe. A "Hoover" dinner at the Hotel Biltmore, to be attended by the members, their guests and ladies, will take the place of the annual banquet.

Book Review

Kinematics of Machinery, by Arthur Warner Klein; cloth; 227 pages, 6 x 9 inches; published by the McGraw-Hill Book Co., and furnished by THE IRON TRADE REVIEW for $2.50 net.

"Kinematics of Machinery" is a text book covering the problems which have arisen in connection with recent developments of mechanisms and the consequent varying phases of their motions. An example of this is the comparatively recent growth of high-speed machinery and the many interesting questions to which it has given rise.

The volume in hand solves these problems by relatively simple graphical methods. These replace the usual complex analytical solutions with their approximations and consequent lack of clarity.

The main part of the text occupies itself with the equivalence, displacement, velocities and accelerations of mechanisms and gives the necessary preliminaries in the way of auxiliary construction and theorems with applications to many practical problems; here the velocities and accelerations are mainly treated by the method of centers. In Appendix B velocities and accelerations are found by the method of polygons. The subject is discussed in a thorough fashion so as to meet the demands of the most advanced practice.

For Increased Sintering Capacity

Larger Grate Surface, Positive Return, Sealed Pallet Boxes, and Decreased Friction Are Attained in an Improved Sintering Machine—A Development of the Dwight and Lloyd Design

AN IMPROVED Dwight & Lloyd sintering machine shown in the accompanying illustrations, was recently completed for the Carnegie Steel Co. at New Castle, Pa., for sintering blast furnace flue dust. This new machine has an active grate surface 42 inches wide and 57 feet 4 inches long, and its sintering capacity is said to be 2¼ times that of the present standard Dwight & Lloyd machines. It contains a number of improvements which are the result of experience gained by the American Ore Reclamation Co., New York, in the operation of the many standard Dwight & Lloyd sintering machines which have been installed in the last six years.

The standard Dwight & Lloyd machine heretofore used has an active grate surface 42 inches wide 25 feet 6 inches long and the lower strand of pallets rolls by gravity along an inclined track back to the driving sprocket wheels. The greater length of the new machine makes the use of a gravity return undesirable and the lower strand of pallets, therefore, is positively driven along the lower track by sprocket wheels at the discharge end, as shown in Fig. 2. The discharge and sprocket wheels are driven in synchronism with the driving and sprocket wheels, as shown in Fig. 1. This synchronous drive insures the return of the empty pallets to the driving sprocket wheels at the same rate of speed as that of the pallets on the upper strand.

On this new large machine, sliding friction between the pallets and the wind box tops is eliminated by carrying the weight of the loaded pallets on wheels running on rails. The pallet wheels are fitted with renewable steel bushings and have large oil spaces that carry a month's supply of grease. The sprocket wheel teeth drive against tooth surfaces cast in the frame of the pallet and not against the pallet wheels, thus allowing the pallet wheels properly to perform their function of rolling around the curved tracks at the drive end.

All of the gears and the sprocket wheel teeth on the new machine are steel castings. All gears and the shaft couplings are wholly enclosed in heavy sheet steel housings. The sprocket-wheel teeth are removable and are machined in jigs so that they are interchangeable and when worn may be replaced without tearing down the larger members of the drive. The driving pulley is fitted with a cast-iron break pin to prevent any accidental injuries to the driving mechanism.

An important feature of the new machine is the use of seal bars on the pallets which automatically maintain air-tight joints between the pallets and the tops of the wind boxes. These seal bars are made light and by their own weight bear on the finished surfaces of the wind box tops and also fit against the finished sides of the pallet slots where the bars hang.

The first one of the new machines was tested under full load conditions which were obtained by loading the upper strand of pallets with 20 tons of pig iron. In the tests it is stated the machine ran smoothly and the seal bars made a tight joint. The horsepower readings taken during the tests show that the various improvements have been effective in reducing the driving load. The fully loaded machine as set up for the test required 12¾ horsepower.

Based on the performance of the smaller machines now in service, the capacity of the new large machine will approximate the following amounts: Flue dust, from 300 to 350 tons sinter per day of 24 hours; pyrites cinder, from 375 to 450 tons sinter per day of 24 hours, and magnetic concentrates, from 450 to 550 tons sinter per day of 24 hours.



FIG. 1—GENERAL VIEW OF IMPROVED, EXTRA HEAVY SINTERING MACHINE

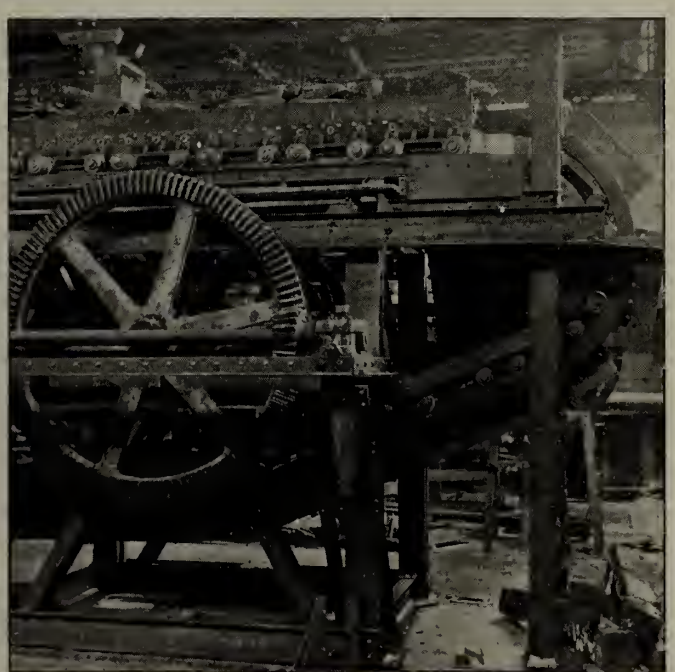


FIG. 2—SPROCKET WHEELS DRIVING THE LOWER STRAND OF PALLETS AT THE DISCHARGE END

How You May Sell to Uncle Sam

A Complete Official List of Purchasing Officers for the Government, Connected With the Business of War—Whom to See and Where to See Them in Washington

THE government and the man with something to sell are working toward the same end. Speed is their mutual aim. The chief problem is to get the man with something to sell in touch with the man who has the authority to buy. With the tremendous expansion of all governmental functions to handle the business of a huge war, within a few months' period has come great and inevitable confusion. New bureaus have been created, departments have been reorganized and greatly extended and the parcelling of duties and authority has proceeded throughout the various branches of the government on a comprehensive scale. Loss of much valuable time has resulted from the very bigness and newness of the war organization. Those who went to Washington to offer their plans, their services or their products, found difficulty in locating someone with whom they could negotiate.

To aid in obviating this difficulty, and to increase and facilitate negotiations THE IRON TRADE REVIEW presents herewith the official list of purchasing officers of the government's war machine and the products for which each has the authority to place orders.

Emergency Fleet Corporation

For Purchase of:	Persons to be Consulted
Boilers and machinery (other than electrical machinery).	A. L. Bell
Electrical apparatus and machinery	W. R. McCann
Anchor chain, wire rope, hemp rope, nautical instruments, miscellaneous equipment and supplies.....	J. P. Bourke
Raw and semi-finished material on which government expects to have prices fixed	G. R. Jasper
Lumber—southern pine and Oregon fir	F. K. Pawcett
Lumber—hardwoods	F. K. Paxton
Inspection:	**Persons to be Consulted**
(For material purchased by purchasing department only)	E. A. Rebbeka
Contracts and specifications.	T. D. Adams
Chief clerk	J. Birnie

War Department

OFFICE OF CHIEF OF ORDNANCE

Carriage Division

Lieutenant Colonel J. H. Rice, Room No. 139, State War and Navy Building.

Field Artillery Section

Lieutenant Colonel L. T. Hillman, 18th and E streets, N. W.
Field artillery material except guns and ammunition.

Seacoast Artillery Section

Major J. B. Dillard, 18th and E streets, N. W.
Seacoast material and railway materials and equipment, except guns and ammunition.

Machine Gun Section

Major E. McFarland, 1703 New York avenue.
Machine guns and automatic guns and equipment, except ammunition.

Motor Equipment Section

Major L. B. Moody, 1703 New York avenue.
All motor equipment for field artillery tractors, ammunition trucks, tanks, etc.

Anti-Aircraft Section

Major J. B. Rose, Eighteenth and E streets, New York.
All anti-aircraft mounts and equipment except motor equipment, guns and ammunition.

Equipment Division

Major J. R. Simpson, Hooe building, No. 1330 F street, N. W.

1.—Cotton and duck webbing.
2.—Cloth equipment made of cotton duck and webbing such as haversacks, pack carriers, cartridge belts, intrenching tool carriers, paulins, grain bags, feed bags, etc.
3.—Leather.
4.—Equipment made of leather, such as saddles, bridles, halters, bayonet scabbards, rifle scabbards, pistol holsters, belts, etc.
5.—Mess equipment, such as canteens, meat cans, bacon cans, knives, forks and spoons.
6.—Hardware, such as intrenching tools, picks, shovels, wire cutters, stencil outfits, marking outfits, etc. Also small hardware parts to be used in connection with cloth and leather equipment—such parts consist of snaps, hooks, buckles, eyelets, grommets, etc.
7.—Cleaning and preserving materials, such as sperm oil, neatsfoot oil, soap, sponges, ammonia, ammonium carbonate, etc.
8.—Steel helmets, including helmet linings and eye guards.
9.—Fencing equipment, including fencing plastrons, gloves, masks, wooden fencing masks, and wooden sabers.
10.–Periscopes.
11.–Woolen horse blankets.
12.–Horse covers.
13.–Instruments of precision, such as musketry rules.

Gun Division

Colonel Jay E. Hoffer, B street and Virginia avenue, N. W.

Artillery Ammunition Section

Lieutenant Colonel E. P. O'Hearn.
Artillery ammunition of all description from 3 to 16-inch in caliber.
Armor piercing projectiles.
Common steel shell.
Shrapnel.
All types of fuses.
Primers.
Fuse setters.
All accessories therefor, including paints, containers, packing boxes, etc.

Cannon Section

Major C. C. Jamison.
Cannon of all character from 3 inches to 16 inches (but this section *does not* handle small arms machine guns, carriages or mounts for cannon).
Forgings for cannon.
Breech mechanisms.
Firing mechanisms.

Explosives Section

Major J. H. Burns.
Smokeless powder for small arms and cannon.
Black powder.
High explosives of all kinds.
Raw material used in the manufacture of. Powder and explosives.

Trench Warfare Section

Captain E. J. W. Ragsdale.
Hand grenades.
Chemicals used for illuminating, incendiary and asphyxiating purposes.
Rifle grenades.
Aerial bombs.
Trench mortars.

Raw Materials

Major Douglas I. McKay, Hooe building.
Materials used in manufacture of ordnance material used by this division.
Steel, copper, spelter, lead, antimony, etc.

Division "T"

Colonel J. W. Joyce, Room 209 National Savings and Trust building, No. 719 Fifteenth street.
Supplies used in the manufacture of ammonia and acids, in purifying and compressing gases.

Small Arms Division

Colonel John T. Thompson, No. 1801 I street, N. W.
Small arms rifles,
Revolvers,
Scabbards,
Bayonets,
Small arms ammunition,
Targets,
Marksmen's insignia,
Automatic pistols,
Sabers,
Bolos,
Shot guns,
Target material.

The above mentioned articles are being purchased by the small arms division only in their completed state. The components entering into the manufacture of these several articles are being procured for the several contractors furnishing supplies to this department by the purchasing contractor of small arms ammunition manufacturers, No. 50 East Forty-second street, New York City.

A list of the components purchased by that bureau follows:

Steel (Not allotted by government).	Cotton waste.
Brass rod cleaners.	Chlorate of potash.
Rivet wire.	Lead sulphocyanide.
Screw bracket butt plate.	Antimony sulphide.
Butte plates.	Tri-nitrotolunen.
Cleaners bristles.	Manganese copper.
Cord.	Chip board.
Black walnut stocks.	Packing cases.
Thong case and caps.	Deadening pelt.
Thong cord and bristle brush.	Crucibles.
Emery and emery wheels.	Bandoleers.
Carborundum wheels.	Clips.
Bortz.	Coke.
Sling straps.	Newsboard.
Scabbards.	Solder
Drills.	Charcoal.
Screw drivers.	Screw hooks and thumb nuts.
Oil.	Varnish coating.
Lard.	Iron screws No. 13 2-inch.
Mineral.	Wire nails, 8 penny.
(Not alloted by government).	Shellac.
Sulphuric acid.	Soda ash.
	Rosanaline.
	Alcohol denatured.
	Terne plate.

PURCHASES FOR SIGNAL CORPS

Aircraft Division

Old Southern Railway building

Lieut. H. H. Emmons, Motors and parts.
H. L. Shepler, Planes.
L. S. Horner, Ordnance and instruments for signal corps.
Major C. R. Sligh, Woods, etc.
Captain H. D. Moore, general equipment.

Office of Quartermaster General

No purchases are made by officers on duty in the offices of the quartermaster general but authority for making purchases is given by the various divisions to the depot quartermasters, constructing quartermasters, department and other quartermasters at various military posts and stations to purchase materials and hire labor or enter into contracts for supplies as follows:

Supplies Division
(State, War, and Navy Building)

Brigadier General A. L. Smith, Q. M. Corps.
Lieut. Col. William E. Horton.
Fuel, forage, specifications for uniforms, etc.
Lieut. Col. George H. Penrose.
Miscellaneous supplies, such as typewriters, adding machines, printing outfits, stationary, office furniture, field ranges and field ovens.

Transportation Division

Colonel G. B. Drake, Q. M. Corps.
Colonel Drake is in charge of motor transportation — automobiles, motor trucks, motorcycles, bicycles, tractors, trailers, tires, oils and greases for same; also in charge of water transportation—supplies except subsistence, in connection with the transport and harbor boat service.
Major J. S. Pair.
Remount service—wagons and parts, horse drawn ambulances, carts, saddles, harness, harness parts, stable equipment.

Captain H. A. Hageman.
Transport repair shops—machinery and equipment for repair shops being organized for service abroad.
Major C. M. Curran.
Rail transportation—all kinds of railroad equipment, repair, etc., after installing.
Major J. W. Furlow.
Engineering features of motor transportation—in connection with testing of motor trucks with the view of standardization.

Cantonment Division
(15th and M streets)

Brigadier General I. W. Littell, Q. M. Corps.
Captain R. C. Marshall Jr.
This division has charge of construction of the national guard camps and national army cantonments and of the purchase and installing of material required to complete such camps and cantonments. A chart showing the division of that office is enclosed.

Construction and Repair Division
(15th and M streets)

Major C. C. Zollers, Q. M. Corps.
Supplies in charge of this division arc as follows:

Barracks, quarters, storehouses, etc.
Plumbing, heating and lighting in new buildings.
Fences.
Post bakery ovens.
Gymnasiums, bowling alleys, etc.
Shooting galleries and ranges.
Rentals, including recruiting stations and lodgings.
Permanent picket lines.
Flagstaffs.
Heavy furniture for officers' quarters.
Wall lockers.
Track and wagon scales.
Refrigerators.
Drafting and surveying instruments.
Power plants, including lighting, heating, refrigerating and pumping.
Laundries, crematories, etc.
Electric lighting systems.
Purchase of light.
Incandescent lamps.
Field laundries.
Installation of elevators.
Saw mills and saw mill equipment.
Steam cooking appliances.
Moving picture machines and equipment, including folding organs, chairs and tables.
Assembly tents for chaplains' equipment.
Wharves, sea walls and retaining walls.
Dredging.
Purchase of water.
Roads and walks.
Water-distributing systems.
Crematories, incinerators and odorless excavators.
Sewerage systems and purification plants.
Railroad rolling stock and equipment—first installation.
Drainage.
Cars and improvement of grounds.
Railway on reservations.
Time and fire-alarm systems.
Water systems.
Fire apparatus.

Cemeterial Branch

Captain H. R. Lemly.
Supplies in charge of this division are as follows: Coffins, metallic caskets, headstones.

Engineering Corps

Major Rose in charge of purchases, 1419 F street.
S. M. Pelton, No. 734 Fifteenth street.
Railway equipment and supplies.
Capt. S. D. Miller, 1419 F street.
Electric equipment.
Capt. O. M. Zimmerman, Winter building, U street.
Mechanical and miscellaneous.

Navy Department

Bureau of Ordnance

New Interior Building,
18 and F streets, N. W.,
(6th floor W. Wing).

Rear Admiral Ralph Earle, Chief of bureau, room A.
All matters of policy.
Commander T. A. Keraney, assistant, chief, room B.
Requisition for material for all yards and stations.
E. C. Bradt, Chief clerk, room C.
Office supplies.
Lieut. N. W. Pickering, room D.

Refractories

(Per 1000 f. o. b. works.)

FIRE CLAY BRICK.
(First Quality.)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK.
(Second Quality.)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK.
(Per Net Ton.)

9 x 4½ x 2½	$135.00 to 160.00

CHROME BRICK.
(Per Net Ton.)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK.
(Per Net Ton.)

55 per cent	$40.00 base
76 per cent	100.00 base

Guns and breech mechanism.
Lieut. L. S. Bye, room E.
Turret mounts, recoil springs.
Lieut. C. L. Caskey, room F.
Powder and fuses.
Commander T. V. Ogan, room G.
Torpedoes.
Lieut. Commander R. S. Holmes, room H.
Armor and projectiles.
Lieut. Commander W. T. Lightle, room I.
Supplies (ships).
Rear Admiral R. R. Ingersoll, room K.
Inventions.
Lieut. Commander W. E. VanQuken, room L.
Fire-control optical instruments, range-finders, binoculars.
Lieut. Commander S. C. Rowan, room M.
Mounts, (other than turret), and small arms.
Commander S. P. Fullinwider, room N.
Mines and mining, wire ropes.
Rear Admiral N. E. Mason, room O.
Member of Priority Board.
Commander F. H. Clark, room P.
Armor and projectile plant to be constructed at Charleston, W. Va.
Lieut. T. S. Wilkinson, room Q.
Experiments.
Commander A. L. Norton, room R.
General inspector.

Bureau of Supplies and Accounts
State, War and Navy Building.

Purchases all miscellaneous supplies and equipment for the Navy. Consult Paymaster Fisk.

Bureau of Yards and Docks
Navy Annex, New York Ave.

In charge of contracts for Navy construction.

Better Shipments

Being Made in Refractories Than in Many Other Lines

Shipments of refractories average about 70 per cent on contracts. The industry is doing better in this direction than many other lines of activity because it is on the preferred list. It is, however suffering by reason of embargoes which are holding it back on deliveries of a purely domestic character. Fair success is also being met with by refractories interests in obtaining coal as considerable improvement has developed recently. Some of the fuel is of an inferior quality, which is having an unfavorable effect on production.

The car shortage affecting a number of Ohio makers of fire brick has become so acute that it will force these plants to be shut down unless a decided improvement is immediately made. A representative maker whose normal requirements involve 10 cars daily, received only two cars during the period from Dec. 22 to Dec. 31; similarly during the period from Jan. 1 to Jan. 14 only two cars were received. In December 30 cars were received at the plant, 15 of which were delivered in two days. With a four-months' output of brick stacked at the plant and fully 200 cars required to fill existing orders, the seriousness of the situation is apparent. Priority orders have been unavailing in stimulating car movement. This case is representative of conditions in general among makers of fire brick.

Foundry Equipment Needed

Bids will be opened by the bureau of supplies and accounts, navy department, Washington, on Jan. 28, covering foundry equipment for delivery at Norfolk, Va. This equipment is embodied in schedule 2732½ and includes the following items: One motor-driven blower; one single grab bucket; 50 3-ton charging cars; 20 500-pound charging cars; four 4-ton transfer cars; miscellaneous foundry equipment; one lifting magnet; eight turntables; four track scales; lining and installing equipment.

The Adrian Steel Casting Co., Adrian, Mich., has ceased to make steel castings. Gray iron castings only will be produced until further notice.

Navy Will Restore Steel Bidding

Lower Quotations Sought by Bureau of Supplies and Accounts Particularly on Mill Material Not Definitely Fixed as to Price by Presidential Announcement —May Extend Even to List Under Maximum Agreement

WASHINGTON, Jan. 15.—Lower steel quotations on government orders through resumption of competitive bidding may come from a decision made last week by Rear Admiral Samuel McGowan, chief of the bureau of supplies and accounts, navy department, to purchase certain steel materials direct from the trade without allocating the order through J. Leonard Replogle, director of steel supply, of the war industries board. This decision is seen as a forerunner of lower quotations and is a new factor in the price adjustment program which now prohibits the making of new contracts for longer than the current quarter at present prices.

Prices May Go Down

All the prices announced by the President after representative steelmakers agreed the trade should abide by them, are maximum prices and, of course, do not prevent orders being taken at lower levels. How far this will be done depends entirely upon how far mill capacities are booked and, in the face of curtailed profits and heavy war taxes, upon the willingness of manufacturers to accept business at figures lower than those now in effect.

In view of Admiral McGowan's decision, it is evident that sworn government purchasing officers who, in the last analysis are responsible for their respective contracts, no matter by whom allocated, have determined they are not fully exercising their functions in merely accepting the President's prices. It is clear they feel they should place contracts at as low a figure as possible and may be expected to go as far as they can in this direction.

Not in Fixed List

"In sending these requests for bids to you, your attention is respectfully invited to the fact that the prices for the articles contained in the schedule mentioned above have not been fixed by the President and therefore the articles cannot be allocated by the director of steel supply," says Rear Admiral McGowan in his letter to steelmakers calling for bids on certain requirements for 1918 delivery. The material sought is of a character not contained in the President's three announcements fixing maximum prices.

To this end it is expected competitive bidding will be resorted to as far as practicable. This may extend even to the articles on which the President has announced prices, although Admiral McGowan's letter to manufacturers says, for that particular inquiry, that the tonnage sought is not one in which the President named the quotations. It is indicative, however, of what may come.

The intimation has been given here that the industry, while selling under agreed prices at profits considerably lower than formerly had been realized, will welcome the chance to put some life into an otherwise stagnated trade. This latter condition lately, is attributed chiefly to the imposing upon the manufacturers of the restriction as to length of contracts at present prices.

Pomerene Bill in Doubt

Senator Pomerene is still in hope of having his bill considered in congress in time to have the government control the industry before the end of the present quarter, but in view of the pending railroad bill, it is a matter of conjecture when the steel bill will be given committee attention as both measures are before the same group of senators. In the face of the new possibility of obtaining lower prices on individual contracts, depending upon the ability of the purchasing officers to develop such quotations, there is some doubt of immediate consideration of the Pomerene bill. It has been stated repeatedly that while the prices only are agreed ones, the government exercises such control of priority, commandeering power, etc., that the Pomerene bill is wholly unnecessary.

War Board May Pass Without Ministry

WASHINGTON, Jan. 15.—The navy department's bureau of supplies and accounts has broken away from the steel distribution system of the war industries board. This action, while not wholly abandoning the steel division, indicates less attention will be paid the civilian organization and that the efficiency of the navy's system may become the general plan of other government buying departments. First evidence of the real break came last week when the bureau, under direction of its chief, Rear Admiral Samuel McGowan, sent out letters to steel manufacturers inviting them to bid on certain steel requirements for 1918.

The decision of the bureau to go its own way in making steel purchases other than on those articles named in the three price announcements of the President and reaffirmed in the statement of Dec. 28, last, which also limited contracts at present prices to April 1, was reached after full legal consideration of the facts. This confirmed the point that, despite all price arrangements and supply advices of civilians, sworn government officers must make all purchases and be responsible for them.

The laws already on the books require that bids be invited on all orders, whether for steel or other commodities, except possibly in cases of real emergency when the judgment of the purchasing officers must guide them in the course which, despite the emergency, still comes under the strictest interpretation of responsibility. It was the emergency growing out of the war with Germany that created the old munitions board and later the war industries board which, while of assistance in some instances, developed into an unwieldy mass of red tape and established the division of steel supply. J. Leonard Replogle is director.

By eliminating negotiations with

the war industries board except for that steel on which the President actually announced the prices, the bureau of supplies and accounts goes back to the system of advertising and inviting bids on contracts. It is the system of publicity which has been built up by Admiral McGowan that sent the navy through the bevy of congressional inquiries without drawing the criticism similar to that heaped on the army which, in the main, relied on the war industries board for its supplies. The navy is going to stand on its own feet as far as possible.

With the President in open disfavor of a ministry of munitions and with the war department steeped in the mire of congressional probes, it is altogether likely that the department's ordnance and quartermaster's bureaus will be thoroughly reorganized along business lines and that many of Admiral McGowan's efficient and effective methods will be adopted. Secretary Baker is now engaged in some sort of revamping his department which more than likely will further eliminate and eventually abandon the war industries board.

May Reorganize War Board

This indicates that at a not far distant date the war board, recently recast with a series of divisions and directors in charge, each more or less assuming purchasing powers, will again be reorganized, but this time for purely advisory purposes. The army, the navy and the shipping board, the three big national consumers, demand the same general things but each in widely divergent ways. That one central board cannot meet these demands has been demonstrated and it will be only a matter of time until each department wakes up to its own full responsibility. As a naval officer recently said:

"The navy and the army are the two war arms of the government and each, in time, will get back to the system of supplying its own needs. There won't be any ministry of munitions and the war board will lose what semblance of power it may have and become merely a board of advisors. The navy has its own system. The army will develop one."

The steel articles on which the President approved the agreed prices are: Ore, coke, pig iron, steel bars, shapes, plates, blooms and billets, slabs, sheet bars, wire rods, shell bars, skelp, sheets, pipe, cold rolled steel, scrap, wire and tin plate. On all other articles the bureau of supplies and accounts will exercise its own pricefixing function, that of satisfying itself on prices obtained through direct bidding.

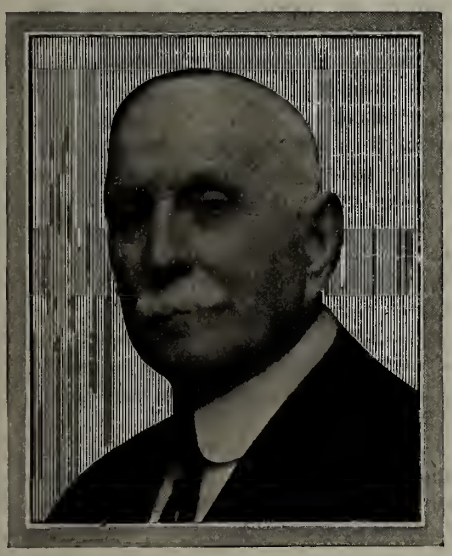
Must Obtain Licenses in Ammonium Sulphate

Washington, Jan. 15.—The legal department of the license division of the food administration has begun the licensing of "all persons, firms, corporations and associations engaged in the business of importing, manufacturing, storing or distributing ammonia, ammoniacal liquors or ammonium sulphate" under proclamation issued by the President, Jan. 3. License must be obtained by Jan. 21 if penalties provided in the food and fuel bill are not to be inflicted.

The decision of the President to control this industry is because of the shortage of ammonia and ammonia products for the government's chemical requirements in connection with the manufacture of munitions. Secretary Houston of the agricultural department has been put in charge of the industry with a special committee to assist in the administration.

Obituaries

CHRISTOPHER W. LEVALLEY, founder and chairman of the board of directors of the Chain Belt Co., Milwaukee, died suddenly of heart failure at his home in that city, Jan. 4. He would have been 83 years of age had he lived until April. Born at Manchester, Conn., in 1835, he moved to Hartford, Conn., 14 years later and served an apprenticeship in a machine shop. After serving in the civil war, he located in St. Paul, and was made superintendent of the St. Paul Harvester Co. At this time, Mr. Levalley saw the necessity of a positive drive for harvesting machinery and in 1891 he established the Chain Belt Co., in Milwaukee. It was his idea to drive a concrete mixer with a steel chain, using a cast semisteel drum. He was the company's president and general manager from 1891 until 1916, when he was elected chairman of the board of directors and this office was held by him until his death. He was interested also in the C. O. Bartlett & Snow Co., Cleveland, and in the Federal Malleable Co., Milwaukee. Many charitable institutions were recipients of his gifts and in 1917 he donated $100,000 to the Milwaukee foundation.



CHRISTOPHER W. LEVALLEY

Thomas R. Tobin, age 36, superintendent of the Warren Steel Casting Co., St. Louis, Mo., died recently of pneumonia.

Henry Belin Jr., president of the Wyoming Shovel Works, Wyoming, Pa., died at his home in that city, recently.

John Booth, who engaged in the wire and iron manufacturing business in Chicago from 1866 to 1909, died there Jan. 10 at the age of 84. He was born in Manchester, Eng., in 1833, and came to Chicago in 1856.

Albert Clark Case, at one time a partner of Andrew Carnegie in the Carnegie Steel Co., died at New York, Jan. 10, aged 66. He was president of the American Cotton Co. In his youth he became a telegrapher for the Pennsylvania railroad and in 1886 he served as auditor of the Baltimore & Ohio Telegraph Co. He subsequently acted as credit agent of the Carnegie company and became a partner in 1899.

Charles J. Klein, inventor of electric push button mechanisms, affiliated with the Cutler-Hammer Mfg. Co., Milwaukee, since 1908, died at his home in that city recently, following a stroke of apoplexy. He was born in New York City 55 years ago and became connected with the electrical industry in its early stages, having been affiliated with Edison in the installation of the first electric station in New York City.

Plan Nation-Wide Labor Exchange

Department of Labor Undertakes Comprehensive Union of Federal, State and Municipal Facilities to Recruit and Distribute Employes for Shipbuilding, Munition Making and Other Essential War Demands—Believes Supply Ample

TO MOBILIZE over 3,000,000 workers for agriculture, shipbuilding and munition plants is the task taken over by the United States employment service of the department of labor. This plan has the approval of President Wilson and he has requested the secretary of labor to undertake its administration. When the employment service was recently disassociated from the bureau of immigration, Secretary of Labor Wilson appointed John B. Densmore, of Montana, who was solicitor for the department of labor, national director. His assistants are Charles T. Clayton, of Maryland, and Robert Watson, of Massachusetts.

Tremendous expansion is contemplated for this movement and existing as well as projected federal, state and municipal employment offices will be utilized. These together with the labor supplying facilities of the various state councils of national defense will enable the federal employment service to cover the entire continent with a network of inter-related labor exchanges. Already more than 200 such exchanges are in operation and the immediate establishment of 50 more is projected. Workers will be recruited and transferred from one section to another as industrial demands dictate and it is hoped by the officers that not only the present demand will be supplied but a reserve created to meet the increasing demands of various war industries.

Five Divisions Planned

The employment service will be aided by its two auxiliary bodies, the United States public service reserve and the United States boy's working reserve. The following five divisions will handle the detail work: Information, farm service, women workers, reserves and investigation. The present available labor power of the United States is estimated at 29,650,000 men plus 8,875,000 women and 1,700,000 set aside for the national army. This has inspired Secretary of Labor Wilson to state his belief that there is an ample labor supply in the country both for the army and for industry, and that conscription will be unnecessary. He estimates that the first year of the war will demand only 3 per cent of the available working men since the problem to him is merely one of proper adjustment.

More Women Are Taking Up Industrial Work

If Lewis T. Bryant, commissioner of the New Jersey department of labor, has his way, the 10-hour workday for men will be changed to eight, since so many women are taking men's places in New Jersey industrial establishments. He made this suggestion to Governor Edge in his annual report recently. In Bloomfield, N. J., the International Arms & Fuse Co., Inc., is employing 25 girls on lathe work and the number will be increased. The force of female workers in the northwestern mills of the Carpenter Steel Works, Reading, Pa., performing laboring tasks will soon be increased from 20 to 150. Fifty other girls are employed in the office. For the first time in its history, the Draper Corp., Hopedale, Mass., manufacturer of looms, will employ 100 girls to tend light automatic machinery, while in Lorain, O., many factories contemplate the employment of large forces of women workers. The National Tube Co., it is reported, intends to employ many women, and in many other directions, female help is supplying the need created by the call of war for men. This need in England has been met by 1,421,000 women being employed since the war began, making the total women in industry 4,766,000. Of this number, 670,000 are working to produce munitions.

Three companies manufacturing ammunition in Massachusetts have notified the state free employment offices in Boston that they will require a large number of women in the near future and women have been put to work at lathes in the machine shop of the Erie railroad shops at Marion, O.

Employers of female help in Pennsylvania have had sent them by the Pennsylvania State Industrial board, a questionnaire, to ascertain what steps have been taken to place women in work formerly done by men. The survey will develop what medical examinations are given, what welfare work has been arranged, whether shorter hours are given to the women than were given the men, whether the women get the same wage as men for the same work, etc.

The labor and woman's committees of the Ohio national defense council have gone on record as opposing the substitution of women for men. A canvass is now being made to ascertain how many women are entering the industrial field and of the conditions under which they are working. S. P. Bush, president of the Buckeye Steel Castings Co., Columbus, O., asserted that he believed only a vital necessity such as might be brought to the nation's attention by the President, should lift the labor restrictions.

Mill Workers Advanced

Wages for sheet mill and tinplate operatives for the 2-month period commencing Jan. 1 advanced 4½ and 5 per cent respectively, as a result of the bimonthly settlement between the Amalgamated Association of Iron Steel and Tin Workers and the Western Sheet and Tinplate Manufacturers' association in Youngstown, O., recently. Sheet mill workers have been advanced 81 per cent since Jan. 1, 1917, while tinplate operatives have been advanced 87 per cent in that time. On the present basis of wages, rollers working steadily should be able to earn nearly $1000 a month.

Employers' Saving Large

A bulletin has been issued which gives a comprehensive survey of the workmen's compensation insurance field in the country. Statements contained in it of the Ohio industrial commission show that since the Ohio state insurance plan was adopted in July, 1911, $8,186,942.30 has been saved the employers of the state who are subscribers. That is the difference between the cost of the state plan and the sum those subscribers would have paid the liability companies had they purchased from them the insurance carried. For the year 1917, $5,000,000 was the minimum saving. The bulletin states further that if the Ohio plan was general throughout the country it is estimated that the annual saving to the employers of the nation would be $23,400,000.

Exports Drop Off Sharply

November Total Smallest Month in Outbound Iron and Steel Shipments Since July—Semifinished Total Large

EXPORTS of iron and steel products from the United States during the month of November showed a decided falling off from the large total recorded in October. Advance figures issued by the bureau of foreign and domestic commerce indicate that the movement in November amounted to only 473,459 tons, or approximately 85,000 tons less than the October total of 557,138 tons, and 80,670 tons less than November, 1916, when the shipments amounted to 554,219 tons. The November movement was the smallest since last July.

Pig iron exports showed an exceptional decline in November. Total shipments for that month were only 25,733 tons, compared with 47,200 tons for October and 106,781 tons for November, 1916. This is the smallest total reported since April, 1916. Many other products show a loss in tonnage, of which the most notable are steel rails, steel bars, scrap and structural iron and steel.

Exports of steel ingots, billets and blooms for November were 150,120 tons. While this total was not as large as that for October, 204,724 tons, it showed a decided increase over the November, 1916, total of 120,883 tons. Sheet and plate exports were at practically the same rate in November as in the preceding month, the figures being 64,425 tons and 65,761 tons, respectively.

IRON AND STEEL EXPORTS.
Gross Tons.

	November		Eleven months ending November	
	1917	1916	1917	1916
Scrap	7,081	19,559	149,423	197,905
Pig iron...	25,733	106,781	588,712	502,041
Steel billets, ingots and blooms ...	150,120	120,883	1,827,484	1,341,661
Wire rods.	19,062	12,552	161,213	144,966
Steel rails.	39,250	55,501	461,703	499,703
Steel bars..	30,344	57,819	547,884	711,152
Iron bars..	5,028	4,040	49,412	67,727
Struc. iron and steel...	19,179	27,735	262,401	264,946
Hoops, bands and scroll..	4,200	3,548	51,532	40,168
Sh'e and plates	64,425	45,382	764,555	465,359
Tin and terne plate...	21,176	15,816	209,280	209,157
Barbed wire.	27,977	23,528	177,491	403,054
All oth. wire.	20,698	18,955	184,369	249,653
Cut nails...	571	326	3,911	4,529
Wire nails.	10,053	11,247	98,081	139,158
All oth. nails incl. tacks..	1,441	1,768	17,668	11,050
Pipes and fittings ..	21,782	24,800	189,074	208,648
R. R. spikes, bolts, nuts, rivets and washers ...	4,827	3,449	47,862	49,461
Horseshoes..	503	409	7,732	7,660
Cast radiators	99	121	4,771	2,227
Total.....	473,549	554,219	5,804,558	5,520,225

For the 11-month period ending with November, however, 1917 exports of sheets and plates amounted to 764,555 tons, compared with 465,359 tons for the same period in 1916.

Exports of iron and steel products for the month of November were valued at $97,970,114. This is $16,226,629 less than the October figure of $114,196,743, but shows an increase over the November, 1916, valuation which amounted to $77,834,139. For the 11-month period ending with November, the 1917 figure was $1,123,603,635, compared with $728,451,202 for a similar period in 1916.

EXPORTS, GROSS TONS.

	Pig iron	Semi-finished material
1916		
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,928
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	152,901
1917		
Jan.	69,146	183,636
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120

Establish First Plant to Make Silicomanganese

Silicomanganese for the first time is being made in this country for the general market. The Pacific Electro Metals Co. has established a plant at Bay Point, San Francisco, and completed the installation of electrical furnaces capable of producing about 1000 tons of silicomanganese and ferromanganese per month. The plant was placed in operation about Jan. 1 and shipments on contracts already made will begin to go forward shortly. The output will be varied in accordance with demand. It now is considered that 78 to 82 per cent ferromanganese will constitute only a limited portion of the production, and that the greater part of the tonnage will be silicomanganese. The grade of silicomanganese to be produced initially will contain 20 to 25 per cent silicon, 50 to 55 per cent manganese, about 1 per cent carbon and the remainder iron. Later a higher grade will be made. In order to render itself immune from the scarcity of electrodes, the company has built its own plant for the making of electrodes, thus insuring continuous operation of its electric furnaces. The supply of ore controlled by the company is obtained from points in California and other western states, and is of a character specially suited to the economical production of silicomanganese. Up to the outbreak of the war, silicomanganese had been in regular use by a number of large steel companies in this country, but since the latter part of 1914 the French and British output has not been available. Since then occasional heats have been produced under special arrangement with certain electric furnace operators, but the Pacific Electro Metals Co. is the first organization to undertake the production of this metal permanently. Dana & Co., 111 Broadway, New York, are the sole sales agents of the Pacific Electro Metals Co.

1917 Ingots

Set at 42,200,000 Tons by Institute—December Shows Loss

Production of steel ingots in December slumped heavily. The records of the American Iron and Steel institute show that 29 companies which produced 3,166,257 gross tons of steel ingots in November turned out only 2,733,722 gross tons in December, a drop of 432,535 tons.

These companies in 1916 produced 88.14 per cent of the companies' total output of steel ingots. On the basis of reports from these companies for 1917, the institute estimates that the total steel ingot production in 1917 was 42,200,000. The severe decline in December brought about a 400,000-ton cut in the institute's estimates as produced during the fall had indicated the 1917 total would reach 52,600,000 tons.

The 29 companies produced 37,187,325 gross tons during 1917. Their average monthly output was 3,098,944 gross tons or 365,222 tons more than December output. The following table shows the production record as reported by the institute:

	Total First six months	Third Quarter July-Sept.	Total First nine months
Open-hearth	13,621,483	6,599,048	20,280,531
Bessemer	5,164,139	2,411,108	7,575,247
Other	55,198	24,435	79,633
Total.....	18,900,820	9,034,591	27,935,411

	Oct.	Nov.	Dec.	Total 12 months
Open-hearth	2,475,754	2,384,218	2,195,832	27,336,335
Bessemer	870,494	772,489	524,084	9,742,314
Other ..	5,687	9,550	13,806	108,676
Total..	3,351,935	3,166,257	2,733,722	37,187,325

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

LESLIE M. JOHNSTON, who has been secretary - treasurer and manager of the A. M. Byers Co., Pittsburgh, was recently appointed second vice president, a newly created position, with supervision over the A. M. Byers Co. of Ohio, of which S. K. Hine, Girard, O., is general manager. W. W. Williams, who was general sales manager has been made general manager; C. L. Jamison, who was assistant secretary and treasurer, is now secretary-treasurer, and T. L. Lewis, formerly assistant general sales manager, has been made general sales manager. E. M. Byers is president, and J. F. Byers is vice president of the company.

William C. Simcox has been made safety director of the General Fireproofing Co., Youngstown, O.

T. S. Disler has accepted a position with the Fort Pitt Steel Casting Co., McKeesport, Pa., as traffic manager.

F. Frith Pickslay of New York, has become sales manager of the Farrell-Cheek Steel Foundry Co., Sandusky, O.

A. A. Dawley now has charge of the branch office of the Union Supply Co., Chicago, opened up in the Call building, San Francisco.

G. W. Fowler has accepted a position in the sales department of the Detroit office of the New Departure Mfg. Co., Bristol, Conn.

Elmer H. Fish, employment manager of the Norton Co., Worcester, Mass., has been elected first vice president of the Employment Managers' association of that state.

L. H. Atkinson, of Atkinson & Utech, Inc., 111 Broadway, New York City, has just returned from a six weeks business trip in Italy and France.

W. H. Reaves has been placed in charge of the western sales office recently established by the P. & M. Co., Railway Exchange building, Chicago.

Charles A. Dana, president of the Spicer Mfg. Co., Plainsfield, N. J., has been elected partner in the New York stock exchange firm of William Morris Imbrie & Co.

George M. Moore spoke on "Glutrin" at the meeting of the Associated Foundry Foremen of New York and vicinity, held at the Hotel Chelsea, New York, Jan. 12.

George F. Fileshifter has been made superintendent of the Hoosier Cast-



LESLIE M. JOHNSTON

ings Co., Connersville, Ind. He was formerly employed by the American Foundry Co., Indianapolis.

R. A. Palmer, Pontiac, Mich., formerly the head of the Cartercar Co., has been made managing director of the Collier Motor Truck Co., Bellevue, O.

R. C. Stanley, general superintendent of the Bayonne, N. J., works of the International Nickel Co., has been elected first vice president to succeed E. F. Wood, who recently resigned.

W. P. Chinn, formerly general superintendent of the Mesaba range for Pickands, Mather & Co., Cleveland, has been appointed assistant general manager of all that company's iron mines under C. H. Munger.

C. D. Dyer Jr., formerly efficiency engineer with the By-Product Coke Corp., South Chicago, has accepted a position with the American and International Shipbuilding Co., Philadelphia.

George M. Verity, president American Rolling Mill Co., Middletown, O., since it was organized, has been appointed a member of the Ohio state war council by Governor James M. Cox.

R. T. Gladstone, formerly master mechanic for the Washington Steel & Ordnance Co., Washington, D. C., resigned recently to accept the position of general superintendent of the Steel Products Co., Huntington, W. Va.

Frank D. Chase, industrial engineer of Chicago, addressed the Chicago Foundrymen's club, at its annual meeting, Jan. 12, on "Efficient Foundries for Modern Foundrymen", and illustrated his lecture with stereopticon views.

Martin Oppenshaw, formerly advertising expert for several leading Wall street concerns, has accepted a position in charge of the advertising and publicity department recently opened by W. J. Crouch Co., Inc., 253 Broadway, New York, steel exporters.

William McLauchlan has retired from the firm of Pickands, Mather & Co., Cleveland, and his son Jay C. McLauchlan, who represented that company in Michigan territory for many years, has been admitted to the partnership.

Thomas P. Fredenburg, superintendent of the Almond Mfg. Co., South Ashburnham, Mass., maker of machinists' tools, is in a serious condition at Millers River hospital, Winchendon, Mass., from injuries sustained by being struck by a train.

G. E. Lewis, who for six years has been assistant purchasing agent for S. F. Bowser & Co., Ft. Wayne, Ind., resigned recently to accept a similar position with the tractor branch of the Moline Plow Works, Rock Island, Ill.

Frank Hitchcock, formerly postmaster general, has been elected temporary president of the Vulcan Steel Products Co., New York. A technical steel man will be selected later to whom Mr. Hitchcock will give place. This is a step in the reorganization of the concern which recently passed into control

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

of the syndicate headed by T. Coleman du Pont. Other companies owned are the Otrophon Steamship and Vulcan Trading.

J. H. Weller, formerly superintendent of the Whitney Mfg. Co., Hartford, Conn., manufacturer of chains, milling machines, etc., has accepted the position of production manager for the Templar Motors Corp., Cleveland.

E. H. Williams, who has been general superintendent of the McKeefrey Iron Co., Leetonia, O., has received a commission as major in the engineers, United States reserves. He has been ordered to active duty at Camp Lee, Petersburg, Va.

A. F. S. Blackwood, 1217 East High street, Springfield, O., has disposed of his interests in and has resigned from the Ohio Steel Foundry Co., which absorbed the Blackwood Steel Foundry Co. Mr. Blackwood was president of the latter company.

E. E. Keifer, who four years ago became affiliated with the Cambria Steel Co., Johnstown, Pa., has been transferred to Coatesville, Pa. He will serve in the capacity of chief draftsman at the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co.

George W. Perks succeeds A. P. Lohmann as chief engineer of the B. F. Goodrich Co., Akron, O. He was formerly general manager of the American Seeding Machine Co., Springfield, O. Mr. Lohman resigned to open an office as an advisory industrial engineer in Akron.

W. P. Scheurman, manager of the Hill Pump Co., Anderson, Ind., for the past three years, has disposed of his stock holdings to George B. Ayers, the concern's president. He resigned recently and will locate in Washington as a broker, representing the Hill Pump Co., in that city.

W. P. Allen, chief engineer of the Anniston Steel Co., and the Anniston Ordnance Co., Anniston, Ala., resigned recently and is now affiliated with the engineering force of the Tennessee Coal, Iron & Railroad Co. Mr. Allen was connected with the engineering department of the Alabama Power Co., Birmingham, for a number of years but went to Anniston when the electric furnace plant was installed about a year and a half ago.

Charles Spalding, who recently resigned as sales manager of the Gisholt Machine Co., Detroit, has accepted a similar position with the Amalgamated Machining Corp., Chicago, manufacturer of machinery for the automobile and tire manufacturing trade.

Robert Mackenzie has been promoted from the position of pattern shop foreman of the Swedish Crucible Steel Co., Detroit, to that of assistant general manager. The company contemplates the addition of an electric furnace to its crucible and converter equipment.

W. B. Fortune, who was prominently identified with the building of the Quebec bridge, has been retained by the American International Shipbuilding Corp. in connection with ship construction at its hog Island, Pa., plant. He is now in Philadelphia organizing his department.

Charles S. Humphrey, who for several years has been president of the Humphrey Pipe & Foundry Co., Bellefontaine, O., has disposed of his interest therein and is now equipping a brass and aluminum foundry and nickeling plant. It will operate as the Humphrey Bronze & Aluminum Co., from Feb. 1.

Frank W. Hall, formerly sales manager for the Sprague Electric works of the General Electric Co., 527-531 West Thirty-fourth steret, New York, has been appointed commercial manager, after an almost continuous connection of 22 years. D. C. Durland, formerly executive head of this company has resigned to accept the presidency of the Mitchell Motors Co., Inc.

Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Mfg. Co., has been appointed head of the production division of the ordnance bureau, in which capacity he will follow up, supervise and stimulate the production of all articles purchased. This is a further step in the reorganization of the ordnance bureau.

Col. William S. Pierce, who for the last five years has been commandant of the United States armory at Springfield, Mass., has been relieved of his duties and ordered to report at the ordnance office in Washington. He is considered an authority on ordnance work. Major G. H. Stewart, junior in command at the armory, has been named as acting commandant.

E. B. Sutton, who has had charge of the mine rescue station at Birmingham, Ala., for the United States bureau of mines, for four years, has resigned. Mr. Sutton has located in Elkins, W. Va., where he will engage in other business and his former assistant, W. T. Burgess, will have charge of the rescue station until a permanent appointment is made by Director Manning at Washington.

Dr. Ira N. Hollis, president of the Worcester Polytechnic institute, Worcester, Mass., and formerly head of the American society of Mechanical Engineers, announced on his recent return from Washington that he has no intention of devoting his time exclusively to any department of the government and the government does not intend to take over the institute to train engineers for the service, as had been proposed.

Robert Moran, Seattle, Wash., has been named state director of the United States public service reserve. He was founder of the Moran Bros. Shipbuilding Co., now the plant of the Seattle Construction & Dry Dock Co. It will be part of his duty to index all the skilled labor in the state of Washington for the purpose of supplying essential industries with lists of mechanics in an effort to carry out the government's plans for the prosecution of the war.

Russell T. Gray, recent secretary of the Shuman Advertising Co., Chicago, has established an office in the First National Bank building, Chicago, as an advertising engineer. He was at one time employed by the Haynes Automobile Co., in the capacity of advertising manager. Advertising service will be rendered a limited number of clients in the technical field. Technical advertising in trade papers and magazines, as well as all forms of engineering catalogs and direct-by-mail advertising will be handled.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Aim to Broaden Stock Dividend Ruling

MANAGEMENTS of many corporations have been watching with deep interest the developments indicating the government's attitude with regard to the taxing of stock dividends. Recently the United States Supreme Court handed down a decision in the case of Henry Towne, of the Yale & Towne Mfg. Co., against a tax collector, ordering the return to Mr. Towne of a sum of money which he had been levied as a tax on a stock dividend. Many people believed that the Supreme Court decision involved the general question as to whether stock dividends are income and therefore relieved them from taxation. Consequently some companies went ahead and formulated plans for the distribution of such dividends. But last week Commissioner of Internal Revenue Daniel C. Roper stated that he would decline to consider that the ruling applies to anything other than the income tax act of 1913, inasmuch as the income tax laws of 1916 and 1917 each contain specific provisions for the taxation of "stock dividends." While the decision of the supreme court speaks rather broadly of the reasons why stock dividends should not be considered income but merely capital adjustments, the treasury department takes the view that the 1913 act was the only issue involved in the case, and that consequently the ruling does not apply to the later acts.

That the revenue department appears to be splitting hairs in this matter, is the general feeling in the New York financial district. If the Supreme Court did not deal with the fundamental problem of taxing stock dividends in its recent decision, such question will have to be answered in later suits, for many corporations will not be content to let the status of the case rest with the opinion expressed by Mr. Roper.

"The court's decision is, in a sense, on a technical point," said Robert R. Reed, counsel of the Investment Bankers' association, "and does not reach the underlying question that will presumably have to be met in whatever legislation is attempted to tax the so-called accumulated earnings of corporations.

"Fundamentally the income earned by a company belongs to its stockholders during the period in which it is earned. They may not receive this income, but they can sell the right to it with their stock. If a stockholder sells his stock at an enhanced price the tax which he pays on a profit due to accumulated earnings is pro tanto the government's tax on those earnings.

"The price paid by the vendee is his capital and is invested in the accumulated earnings on which the vendor presumably pays the tax. If A bought 250 shares of stock in 1913 for $10,000 and sold them to B in 1917 for $50,000, A pays a tax on $40,000. If the company then declares a 100 per cent dividend, stock of cash, B receives back $25,000 of his capital in stock or cash. A tax upon it deprives him of his capital, not his income. It taxes him again on the profit made by A.

"The point is that the government already has received in fact a very large part of the tax which it aims to get by the taxation of stock dividends. The court has not yet had to deal with this fundamental problem. It has simply held what should hardly have needed an argument to prove, that to change a $100 bill for two $50 bills does not create income.

"A stock dividend, if anything, diminishes the legal rights of the stockholder as it deprives him of whatever possible power he might have had to enforce a cash distribution of the accumulated surplus. The government's intention to enforce the tax law of 1917 is necessarily subject to such legislation as may be enacted to meet the underlying problem."

Remits Taxes to Buyers

All steelmakers of late have been puzzled as to the method of disposing of the new war tax on freight rates. Up to a few days ago, the mills almost universally were charging the war tax to consumers in cases where the latter had bought their steel on a delivered basis, while the mills paid the war tax where the sale had been made on a Pittsburgh or mill basis. The independent makers, generally, still are adhering to this policy. The Steel Corporation, however, has decided that such a method is not equitable to the buyer. It therefore has decided not only to pay the war tax on freight charges for all goods sold on a delivered basis, but to send credits to all its customers against whom freight war tax charges had been made previous to this time.

Financial Crop Ends

The Bethlehem Steel Corp. has purchased the Bittinger lime stone quarries at Hanover, Pa., for $141,000. The quarries are to be equipped with modern machinery.

* * *

The Wharton Steel Co., purchased last year by J. Leonard Replogle and associates, is consolidating its floating debt and a $750,000 mortgage, through an issue of 2-year 6 per cent notes totaling $1,200,000. Of this, $1,000,000 has been placed and Chandler & Co., New York bankers, are offering about $200,000 of the notes at 94.

* * *

Almost unanimous approval was given in the vote taken at Beaumont, Texas, recently, to the proposition of issuing a $300,000 bond issue. This will provide funds to deepen the waterway from Beaumont to the sea two feet. Its present draft limit is 26 feet. This project is of importance to the Texas Steel Co., which contemplates building a steel plant at Beaumont.

* * *

The Impervious Metal Corp., 421 Wood street, Pittsburgh, has become the sole owner of the Alexapope Mfg. Co., Brooklyn, N. Y. Manufacture of baking japan and enamels will be continued and they will be sold under the trade name "Impervious" instead of "Alexapope", as heretofore. Charles E. Pope, who was practically sole owner of the Alexapope Mfg. Co. since its organization, is president of the Impervious Metal Corp.

* * *

Proceeds of the sale of $12,000,000 serial notes by the American Can Co.,

to the First National bank of New York, will be used principally to pay for tin plate. These will mature in equal installments in seven, eight, nine and ten months. The company is capitalized at $88,000,000, and last month wiped out accumulated dividends on its 7 per cent preferred stock. Five per cent bonds aggregating $11,872,500 remain outstanding.

* * *

Industrial securities which mature this year are considerably in excess of those which came due in 1916 and 1917. The total for 1918 is $184,070,753, nearly half of which is notes. Some of the largest of these are, the Winchester Repeating Arms Co., $16,000,000; the United Fruit Co., $10,000,000, and the International Harvester Co., $6,104,000. Among the important issues of bonds which mature in 1918 are, the United States Rubber Co., and subsidiaries, namely, the United States Rubber Co., $16,000,000; the General Rubber Co., $9,000,000, and Morgan & Wright debenture, $5,000,000. The total industrial securities of $184,070,753 top 1917 by $53,000,000 and 1916 by $99,500,000.

* * *

The following companies recently have increased their capital stock: Carrier Engineering Corp., Manhattan, N. Y., $250,000 to $300,000; Pratt Church Co., Frankfort, N. Y., $550,000 to $900,000; Twisted Wire & Steel Co., Manhattan, N. Y., $120,000 to $200,000; Donner Steel Co., Buffalo, $9,000,000 to $11,000,000; Halcomb Steel Co., Geddes, N. Y., $1,800,000 to $3,000,000; Christenson Machine Co., Racine, Wis., $5000 to $50,000; John Lauson Mfg. Co., New Holstein, Wis., manufacturer of gasoline engines and farm implements, $500,000 to $1,000,000; National Cast Iron Pipe & Foundry Co., Birmingham, Ala., $350,000 to $500,000; Boeing Air Plate Co., Seattle, $100,000 to $500,000; Royal Enameling & Mfg. Co., Chicago, $200,000 to $400,000; Benjamin Electric Mfg. Co., Chicago, $200,000 to $3,000,000; National Wire Wheel Works, Inc., Geneva, N. Y., $350,000 to $1,000,000; the Mechanical Mold & Machine Co., Akron, O., $10,000 to $150,000; the Hydraulic Pressed Steel Co., Cleveland, $5,700,000 to $7,200,000; the Detroit Range Boiler Co., Detroit, $120,000 to $210,000; the Empire Steel Products Co., Manhattan, $25,000 to $100,000; the Independent Stove Co., Owosso, Mich., $235,000 to $300,000; the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., $500,000 to $1,000,000; the Royal Enameling & Mfg. Co., Chicago, $200,000 to $400,000; the Cadillac Can Co., Detroit, $12,000 to $60,000; the Federal Nut, Bolt & Machine Co., Cleveland, $30,000 to $100,000; the Domestic Engineering Co., Dayton, $800,000 to $3,500,000; the Pennsylvania Crusher Co., Manhattan, $25,000 to $100,000; the Machine Appliance Co., Brooklyn, $12,000 to $50,000; the Steward Davit & Equipment Co., Manhattan, $22,500 to $82,500.

Few Miles

Added to Railroad Mileage in 1917—Domestic Car Orders Fall

Railroad building in 1917 almost paralleled the poor record of 1915, when but 933 miles were constructed. That year made the worst record since 1901, the year the *Railway Age* commenced to gather statistics. According to the data presented in the annual statistical number of the *Railway Age*, only 979 miles were built last year in the United States, while 10 years ago, in 1907, 5212 was the total new trackage. During last year, 451 miles were actually torn up, operation was abandoned on 491 miles more and the owners of 396 additional miles asked permission from state authorities to abandon it, a total of 1338 miles. Subtracting the mileage built from that figure, it leaves a net loss of 358 miles. Railroad building in 1916 aggregated 1098 miles as against 5623 miles in 1906 and the total mileage in 1915 was 933 compared with 4388 miles 10 years before. The figures for 1908, 1909, 1910, 1911, 1912, 1913 and 1914 are 3214, 3748, 4122, 3066, 2997, 3071 and 1532 miles, respectively.

About 50 per cent represents the falling off in freight cars ordered for domestic use in the United States and Canada in 1917 as compared with 1907. Only 79,367 were ordered in 1917 against 151,711 in 1907. In 1916, 165,324 were ordered as against 310,315 in 1906, and the figures for 1915 and 1905 are 109,792 and 341,315, respectively. In 1917, 19,024 freight cars were ordered for the United States government, while 64,667 represents the total number ordered for France, Russia and other European countries. This brings the 1917 total to 164,058, which includes the 30,500 Russian cars, orders for which are held in abeyance. The passenger cars ordered totaled 1167 in 1917, including 1124 for domestic use, this figure being the smallest since 1901. The smallest previous year was 1908 when 1319 were ordered. The largest year since 1901 was 1909, when 4514 was the total of passenger cars ordered.

Foreign orders also added greatly to locomotive orders. In 1915, 1916 and 1917 only 7207 were ordered for domestic use as against 15,389 ordered in 1905, 1906 and 1907, a decrease for the three-year period of 53.1 per cent. In addition to 2704 locomotives ordered in 1917 for domestic use in the United States and Canada, 2057 were ordered for the United States government with 2881 for England, France, Russia and other European countries. This brought the actual total for 1917 to 7642. This total includes the Russian order for 1500 locomotives now held in abeyance. Other years when domestic orders were small are 1908, 1914 and 1915, with 1182, 1265 and 1612, respectively, being the figures. The largest year was 1905, when 6265 locomotives for domestic use were ordered.

Await Licensing

Of Ammonium Sulphate Shipments Under Fovernment Direction—Benzol

New York, Jan. 12.—The licensing system which was applied to sulphate of ammonia by the recent proclamation by President Wilson, has not yet been definitely formulated. This system, which was necessitated by the government's need of sulphate of ammonia to make nitrate of ammonia for the manufacture of high explosives is expected, after it has been in effect a few weeks longer, to apply to every pound produced. Pending definite instructions, producers of this product still are relying on their own judgment in distributing the comparatively small amounts which are left after taking care of current government requisitions. Sulphate of ammonia still may be quoted nominally at $4.90 to $5 per 100 pounds at seaboard for spot shipment. No contracts are being taken.

Sales of benzol this week involved a number of contracts, including several large ones, but demand is not nearly as active as a few weeks ago. Although prices are unchanged, the tendency is toward weakness. Pure benzol is quoted at 35 to 40 cents per gallon, both for spot and contract. Current inquiry involves several good-sized quantities, but is smaller than usual.

Phenol continues strong at 53 to 54 cents per pound for spot. No contract phenol is to be had. Sales of solvent naphtha during the past week did not represent a large total. Although new inquiries are few, the market continues firm at 18 to 22 cents per gallon. All toluol in excess of that required for filling old contracts, continues to be shipped on government requisitions.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52

Per 100 Pounds at Seaboard

Sulhate of ammonia (nominal)	$4.90 to 5.00

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia.....nominal

Survey of Tool Industry Progresses

Machine Tool Section of War Industries Board Gathers Data Pertaining to Tool Industry—Government Commandeers More Tools for Destroyer Plant—Huge Machine Gun Contract Awarded to New England Company

CO-ORDINATION of the supply, production and sales subdivisions of the machine tool industry and the collection of data pertaining to these branches which was proposed a short time ago and lately undertaken by the machine tool section of the war industries board, is likely to result in greater production efficiency and a much more expeditious handling of orders. This data, after classification, will facilitate the making of plans with a degree of certainty hitherto impossible, and enable a gaging of the rapidity with which new projects may be completed, ready for operation. It may also afford a means of determining negligence, inefficiency and incompetence either in builder, dealer or politician, in the event of any further government investigations conducted along the lines of that lately concluded.

Although the current of war orders gradually is flowing westward and many manufacturers of products now regarded as nonessentials are diverting their facilities to the production of munition or war materials, the east still continues active in its demands for machine tools. A dearth of extremely large tool lists, however, is in evidence in that section. Lately inquiries from foreign sources have been received in increasing numbers, but owing to the government's new plan of seizing tools intended for neutral countries this class of inquiries is worthless so far as domestic builders and dealers are concerned. The recent placing of an order for 15,000 machine guns with an eastern manufacturer has as yet been unproductive of an inquiry for tools.

A fair volume of crane inquiries, well scattered, is current in the New York market. These, generally, are for electric traveling cranes. Contracts for two of the huge 350-ton cranes for the navy yards at Norfolk and Philadelphia have not been let, although the actual construction of the third crane, which is for the Brooklyn navy yard, has been started. Sales of punching and shearing machinery have been numerous.

Reports From Districts Show Mixed Conditions

MACHINE tool builders throughout Ohio are receiving communications from the government which indicate that the plan proposed some time ago of establishing a central purchasing bureau is rapidly taking form. Amplifying this statement a letter to a builder of planers may be cited. This builder was asked by the government to give data relative to prices, best delivery dates and other details on 565 planers, 450 to be 36 inches or larger. A number of other builders have also been requested to supply information of a like character. Machine tool prices still are tending upward. One dealer reports that prices on shearing machinery, lathes and automatic drilling machines have been increased. Cleveland machine tool dealers are experiencing no difficulties in securing new business, but are hampered considerably with the prevailing sluggish deliveries. The Chandler Motor Car Co., Cleveland, it is understood, is negotiating for government work. A government contract for motor truck trailers has been awarded the Grant Motor Car Corp., Cleveland, which recently acquired the Denneen Motor Co., maker of trucks, also of Cleveland. The Aluminum Castings Co., Cleveland, is in the market for the following equipment: One 16-inch x 6-foot lathe; one 18-inch x 6-foot lathe; one 20-inch x 8-foot lathe; one 3 or 4-foot radial drill; one 20-inch shaper; one milling machine, and one upright drilling machine. A supplementary tool list issued by the Ohmer Fare Register Co., Dayton, O., includes the following items: One heavy engine lathe, 36 to 60 inches swing; one 6 or 7-foot vertical boring mill; several planers, 42 inches or larger; and a number of gear cutters. A detailed list of the requirements of Victor R. Browning & Co., Mansfield, O., mention of which was previously made, follows: One 14-inch tool room lathe; two 16-inch engine lathes; one 18-inch engine lathe; four 24-inch engine lathes; three 20-inch engine lathes; one 60-inch engine lathe; three 42-inch vertical boring mills; one 60-inch vertical boring mill; two 72-inch vertical boring mills; one 120-inch vertical boring mill; 12 horizontal boring mills; one 20-inch shaper; two 24-inch shapers; one universal milling machine; one plain horizontal milling machine; two plain horizontal milling machines; one 20-inch slotter.

Government Collects Data for Central Purchasing Bureau

WHILE apparent quiet rules the Chicago machine tool market an occasional large inquiry keeps the market fairly active. Generally, buyers are not inquiring for much equipment and the holiday lull which usually lasts past inventory time still continues. However, the Standard Steel Car Co. is seeking more equipment for its plant at Hammond, Ind., where a heavy munition order is to be cared for and several manufacturers who have taken on shell contracts are looking for additional machinery. Dealers and buyers have found that priority orders possess comparatively little value at present on account of their number and constantly changing conditions. At present the priority board determines individual cases without regard to certificates. A new feature is coming to the front in the market for machinery as the need for machines and products formerly imported is becoming more pressing. Local manufacturers are changing the nature of their output to include devices formerly obtained from Europe, but now cut off by the



Might

The might inherent in a "mite" of AGATHON ALLOY Steel—that enables it to withstand successfully year after year, terrific strains and stresses hundreds, yes, *thousands* of times out of proportion to its size, is but a reflection of the METHODS used in producing it.

In other words, the might of Agathon Steels is the result of giant intellects and giant machinery working in perfect harmony.

Agathon Steels will serve your purpose best.

The Central Steel Company
Massillon, Ohio

Branch Offices

DETROIT OFFICE: 326-27-28 Ford Bldg.,
F. Walter Guibert, District Representative
CLEVELAND OFFICE: Hickox Building,
The Hamill-Hickox Company, District Representative.
CHICAGO OFFICE: 1370 People's Gas Bldg., 122 So Michigan Blvd., *C. H. Beach, Dist. Sales Mgr.*
PHILADELPHIA OFFICE: 603 Widener Building,
Frank Wallace, District Sales Manager.
J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents

Say you saw it in THE IRON TRADE REVIEW

war. Instances of such changes are becoming more common from time to time. The city of Quincy, Ill., will build an auxiliary pumping station. The William Glader Machine Works, Chicago, will build a three-story factory in connection with its present plant. The Wagner Electric Co., St. Louis, is building a plant for the manufacture of shells. The St. Louis Malleable Casting Co., St. Louis, has plans ready for a large plant including offices and factory buildings. The Detroit Shell Co., Detroit, has obtained a plant which it will proceed to equip for the manufacture of artillery shells. The city of Everett, Wash., is having plans prepared for a municipal hydro-electric plant to furnish power and light for the city.

Many Machine Tools Seized by Government

GOVERNMENT commandeering of machine tools is increasing. The Brooklyn navy yard has just seized a number of milling machines and other tools which had been held in New York warehouses for Scandinavian and Holland buyers. Various government plants continue to absorb machine tools, although there are fewer of the sensational lists which characterized the market a few months ago. Shipbuilders still are a prominent factor in the market, but the larger proportion of such buying seems to have been completed, although deliveries of much of this equipment are yet to be made.

The largest list to come to the attention of the New York market this week consists of 85 big lathes, 36-inch and over, for the destroyer plant of the Fore River Shipbuilding Corp. The Morse Dry Dock & Repair Co., Brooklyn, whose plant recently was damaged by fire, has been buying considerable machinery, having ordered an aggregate of 40,000 from one dealer. The Watson-Stillman Co., 50 Church street, New York, New York, which has a government contract for hydraulic jacks for 9.5 guns, and which is building a plant addition, has ordered about $40,000 worth of general machine shop equipment, including lathes, drills, planers, shapers, etc., and expects to place orders for about $60,000 more. The Meade-Morrison Co., Gloucester, Mass., which has a government munition contract, is doubling its plant capacity and will buy additional equipment, including hydraulic presses. The Watervliet arsenal, Watervliet, N. Y., which recently placed orders for about $500,000 worth of tools, mostly lathes, with a Cleveland company, is inquiring for a few additional tools, including radial drills and lathes. The Submarine Boat Corp., New York, has been in the machinery market almost constantly for miscellaneous requirements for the Newark bay shipyard. The Groton Iron Works, Groton, Conn., has bought pipe cutting and threading machinery and is in the market for additional tools. The General Electric Co. has not closed against the list of $300,000 worth of machine tools for its Lynn, Mass., plant, which it reissued recently. The New England Westinghouse Co., which has received a government contract for 15,000 or more Browning machine guns, has been watched with interest by sellers in the New York market, but as yet has issued no general inquiry.

Contract Let for World's Largest Crane

The demand for cranes continues to come out in fair volume. The American Shipbuilding Co. is understood to be figuring actively on several locomotive cranes and other miscellaneous equipment for its yard which now is under construction at Alexandria, Va. Some equipment was placed by the company early last fall. Additional cranes for the Brooklyn navy yard also are being figured upon at this time, the inquiry being for one 40-ton and two 10-ton electric cranes for the machine shop. The McMyler-Interstate Co. recently was awarded a contract for a 350-ton outfitting crane for the Brooklyn yard. This is the largest crane ever proposed and will cost approximately $800,000. Negotiations on two additional cranes of similar size are still pending for the government yards at Philadelphia and Norfolk. The inquiry of the Federal Shipbuilding Co. for 11 electric traveling cranes continues before the market. Two locomotive cranes for the Pennsylvania railroad also are pending. The inquiry of the J. G. White Engineering Co. for a 60-ton electric crane, which has been out for some time, has not been closed. The Morse Dry Dock & Repair Co., Brooklyn, has closed on a 10-ton electric traveling crane in connection with considerable miscellaneous equipment. The Braden Copper Co. also has purchased a 10-ton crane. Some sizable business is being placed by domestic consumers for punching and shearing equipment. Several inquiries also are in the market from Norway and Japan, but this business cannot be considered at this time, owing to prevailing embargoes. The requirements of the Foundation Co., which is building wooden ships at Newark Meadows, N. J., are unfilled.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

GROVETON, N. H.—The factory of the Odell Mfg. Co. has recently been damaged by fire with a loss of $100,000.

PORTSMOUTH, N. H.—The Atlantic Engine & Shipbuilding Co., New York, has purchased the plant formerly operated by the Colonial Paper Co., which it will equip for the building of steel vessels for the government.

ATHOL, MASS.—Fire damaged the plant of the Athol Mfg. Co., Jan. 4, to the extent of $10,000, and caused a shut down of two weeks.

BOSTON.—The Edgar Levinstein Co. has been incorporated to manufacture chemicals. The company has a capital of $250,000 and its incorporators are Edgar Levenstein, Harry R. Davies and others.

BOSTON.—The Northway Motors Corp. has been chartered to manufacture motor vehicles with $5,000,000 capital. Ralph H. Northway, Cincinnati; James H. Walker, Amesbury, Mass.; James F. Finneran and James F. Cavanaugh, Everett, Mass., are the incorporators.

CAMBRIDGE, MASS.—The terminal repair shop and roundhouse of the Boston & Maine railroad were damaged by fire Jan. 5 with a loss of $200,000.

FRAMINGHAM, MASS.—The R. H. Long Co. has been incorporated to manufacture

TALKS WITH ROLLING MILL JIM



Over the top of all good roll records is "HUBBARD". Why not have Hubbard over the top of your roll records and then yours will be good?

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings

Say you saw it in THE IRON TRADE REVIEW

machinery with $10,000,000 capital. Richard H. Long, Richard F. Long and George H. Farrar are the incorporators.

GLOUCESTER, MASS. — The Mead-Morrison Mfg. Co. will build an 84 x 240-foot annex to its munitions plant, which will be equipped with two 450-horsepower hydraulic presses.

GLOUCESTER, MASS.—An 84 x 240-foot addition will be erected at the plant of the Mead-Morrison Mfg. Co., south of the present works. Plans call for completion of the work in 30 days. It is understood that considerable new equipment will be installed, including two 450-horsepower hydraulic presses.

NORTH GRAFTON, MASS.—The factory of the Hi-Lo-Jack Co., maker of auto jacks, suffered a fire loss of $15,000 to its machinery recently.

NEW BEDFORD, MASS.—Plans are being prepared for a brick and steel frame, 1-story and basement, 98 x 126-foot power station to cost $300,000, for the Union Street Railway Co., on Middle street. The New England Structural Co., Boston, will furnish the steel work.

SOUTH BOSTON, MASS.—Contract has been let for a brick and steel, 1-story, 60 x 300-foot addition to the factory of the S. A. Woods Machine Co., Alger street.

SOUTH BOSTON, MASS.—The Gillette Safety Razor Co. will build a steel and concrete, fireproof, 7-story factory building to cost $800,000 adjoining its present plant. The new structure will increase the company's output 60 per cent.

WATERTOWN, MASS.—The Stone & Webster Engineering Corp., Boston office, has been awarded contract at $360,000 for erecting an addition to the plant for the manufacture of gun carriages at the United States arsenal.

WESTFIELD, MASS.—The Westfield Mfg. Co. has let the contract for a 1-story, 62 x 400-foot factory building.

WINCHESTER, MASS. — The Whitney Machine Co. has been incorporated with a capital of $100,000 to engage in the foundry and machinery manufacturing business. The incorporators are Arthur E. Whitney, Robert F. Whitney and Walter C. Goddard.

PAWTUCKET, R. I.—Plans are being drawn for an addition to the factory of the William H. Haskell Mfg. Co., maker of bolts, Main, Pine and Bayley streets.

PROVIDENCE, R. I.—The Bourn Rubber Co. has let the contract for a brick, 1-story, 100 x 162-foot manufacturing building on Waldo street, to be used as an addition to its wire department.

WOONSOCKET, R. I. — The Providence Knitting Co. will enlarge its plant by the erection of a 1-story addition, 40 x 50 feet, in size.

BRIDGEPORT, CONN.—The Modern Mfg. Co. will build a 1-story addition to its factory at 73 Third street.

BRIDGEPORT, CONN.—The General Machine & Mfg. Co. has been incorporated to make metal goods, machinery and tools, with $50,000 capital. Axel H. Nilson, David Hjorta, Mauritz Olson, Jacob Nilson and John M. S. Anderson are incorporators.

HARTFORD, CONN.—The Cushman-Church Co. has awarded to the Ellison Construction Co., 60 Prospect street, contract for a $20,000 factory addition, 1-story high, 90 x 110 feet. Ford, Buck & Sheldon are engineers.

MERIDEN, CONN.—The E. J. Doolittle Co. has been incorporated to manufacture metal products, etc., with $40,000 capital by E. J. Doolittle, LeRoy Holmes, O. S. Gillette and William E. Johnson.

NEW BRITAIN, CONN.—Landers, Frary & Clarke, manufacturers of hardware, have awarded the contract for a 3-story factory building, 56 x 155 feet, to the Torrington Building Co., Torrington, Conn.

NEW HAVEN, CONN.—The New York, New Haven & Hartford railway will build a 45 x 66-foot addition to its machine shop at Cedar Hill and will install new machinery for repairing locomotives.

NEW HAVEN, CONN.—The Marlin Arms Corp. has let the contract to Fred T. Ley & Co., Inc., Springfield, Mass., for a brick and steel, fireproof, 1-story factory on Dixwell avenue, to contain 40,000 square feet of floor space.

STAMFORD, CONN. — Additions to the plant of the John Davenport Foundry Co. are contemplated by a New York syndicate which recently took over the property and which is headed by George C. Rosenbaum. The principal building to be erected will be 50 x 200 feet with an ell, 50 x 192 feet. It will be two stories high, of reinforced concrete construction. It is understood that considerable additional equipment will be needed.

WATERBURY, CONN.—The Connecticut Brass & Mfg. Co., which recently bought the plant of the Piling Brass Co., plans to erect an additional story to one of the buildings.

WATERBURY, CONN.—The Scovill Mfg. Co., East Main street, has let the contract for a concrete, 5-story, 70 x 217-foot factory with a 20 x 73-foot ell, to cost $200,000. The company also will build a brick and steel, 3-story, 42 x 92-foot factory to cost $40,000 on the same street.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Sidel-Rattner Mfg. Co. has been incorporated with $12,000 capital to manufacture automobile accessories. R. Sidel, C. D. Brandt and C. Rattner, 18 Dunham place, are incorporators.

BROOKLYN, N. Y.—Meurer Bros. have been incorporated with a capital of $750,000 to manufacture steel barrels. The incorporators are C. H. Bolles Jr., A. and J. Meurer, 266 Lincoln place.

BROOKLYN, N. Y.—The Kasper & Koetzle Hardware Co. have been chartered to manufacture hardware with a capital of $50,000. The incorporators are F. Koetzle, C. and W. Kasper, 565 Bushwick avenue.

BROOKLYN, N. Y.—The High Efficient Motor Corp. has been incorporated with $200,000 capital to manufacture motors, engines and automobiles. The incorporators are M. Leventhal, W. Rabsilber and R. E. Weber, 1014 Bushwick avenue.

BUFFALO.—The Lumen Bearing Co. plans to erect a 1-story 25 x 40-foot addition to its brass foundry.

BUFFALO.—The General Drop Forge Co. has been incorporated with $10,000 capital. The incorporators include E. H. Letchworth, C. M. Baldy and W. M. Wilkins.

BUFFALO.—The Wm. H. Race & Sons Motor Co. has been organized with $25,000 capital. The incorporators are W. H., L. W. and W. H. Race Jr.

BUFFALO.—The plant of the Excelsior Steel Ball Co., Military road, has been damaged by a fire in the tempering department which caused a loss of about $6000.

BUFFALO.—The Curtiss Aeroplane & Motor Co. contemplates the construction of a 1-story factory building at 2000 Elmwood avenue.

GRASMERE, N. Y.—The Durkee Mfg. Co. has been chartered with a capital of $100,000 to manufacture compasses for airplane and marine service. The incorporators are W. H. and J. W. Durkee and F. A. Wurzbach, 381 East 165th street.

JAMESTOWN, N. Y.—The plant of the Curtiss Machine Co. has been damaged recently by fire, the loss amounting to about $50,000. The plant is a branch of the Curtiss Aeroplane & Motor Co., Buffalo.

LONG ISLAND CITY, L. I., N. Y.—The William F. Meyers Co. contemplates the erection of a $7000 addition to its plant. John N. Baker is architect.

NEW YORK.—The Wire Wheel Corp. of America, 831 Eleventh avenue, has purchased a site adjoining its present plant, upon which it plans to build an addition.

NEW YORK.—The Universal Sheet Metal Works has been incorporated with $100,000 capital. The incorporators include J. Lefkowitz, R. and R. Sadwith, 3202 Perry avenue.

NEW YORK. — J. Chatillon & Sons, 85 Cliff street, manufacturers of scales, have increased their capital stock from $200,000 to $300,000 to provide for the erection of a plant addition.

NEW YORK.—The Manville Mfg. Corp. has been chartered with a capital of $300,000 to manufacture fire extinguishers. Among the incorporators are R. Bennett Jr., R. Sherman and R. W. Evans, 144 Wall street.

NEW YORK.—The Russian Steel Export Co. has been organized with $200,000 capital. The incorporators include J. P. Beal, H. W. McAteer and C. R. McElhany, 233 Broadway.

NEW YORK.—A charter has been granted to Whittaker, Clark & Daniels, capitalized at $100,000. The company will engage in the manufacture of chemicals and metal polishes. Incorporators include W. B. Daniels, L. E., and S. H. Clark, 250 Front street.

NEW YORK.—A charter of incorporation has been granted to the Krisfo Tool & Chemical Corp., organized with $75,000 to engage in a boiler-making and machine shop business. C. Kriser, D. D. Walter and E. Sayer, 208 West 119th street, are interested.

OGDENSBURG, N. Y. — A $40,000 coal pocket will be erected by the George Hall Coal & Transportation Co. Adolph Suck, Hyde Park, Mass., is architect.

PORT IVORY, L. I., N. Y.—The erection of five factory buildings is being planned by the Proctor & Gamble Mfg. Co., Cincinnati. The Ferro Concrete Construction Co. will be the builder.



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BRANCH OFFICES

NEW YORK PHILADELPHIA CHICAGO

ROCHESTER, N. Y.—The Taylor Instrument Co., 95 Ames street, manufacturer of thermometers, has awarded the contract for a 3-story, 25 x 95-foot addition to its factory.

OIL CITY, PA.—The plant of the Oil City Foundry Co. has been damaged by fire. The cupola building is an entire loss, as is part of the main foundry.

OIL CITY, PA.—The Independent Tack Co., Harrisburg, Pa., will remove its factory to this city. S. G. Catchpole is president.

PITTSBURGH.—The hammer shop and 21-inch mill at the Park plant of the Crucible Steel Co. of America, was badly damaged by fire Jan. 1.

BEAVER FALLS, PA.—The G. H. Hamilton Mfg. Co., manufacturer of stoves, will erect a new factory, for which contract has been awarded.

BRADFORD, PA.—The pattern plant of E. R. Caldwell & Co., Hilton street, manufacturer of machines, has been severely damaged by fire with a loss estimated at $100,000.

GROVETON STATION, PA.—The Lewis Foundry & Machine Co. plans a 100-foot addition to its plant and has bought a 30-ton crane and other equipment. The company makes gray iron castings and rolling mill machinery.

HARRISBURG, PA.—The plant of the Harrisburg Pipe & Pipe Bending Co. has been damaged by fire with a loss of several hundred thousands of dollars. The company has been making 4-inch shells for the government.

LANSDOWNE, PA.—The York Steel Corp. has been organized with a nominal capital of $5000. Frank A. Moorhead is interested.

LATROBE, PA.—The Keystone Automobile & Machine Co., recently organized with a capital of $15,000, plans to build a factory. B. Ratner is in charge.

PHILADELPHIA.—Wirt & Knox, Sedgley avenue, manufacturers of brass specialties, plan to build an addition to their plant.

PHILADELPHIA.—The Lanston Monotype Machine Co., Twenty-fourth and Locust streets, will build a 1-story concrete plant addition to cost $20,000.

PHILADELPHIA.—The N. Z. Graves Co., 22-24 South Third street, will build a 2-story foundry and pattern shop at Chestnut and Thirtieth streets.

PHILADELPHIA.—The J. A. Clark Iron Foundry Co. has had plans prepared for an addition to its plant at Thirty-fifth street and Grays Ferry road.

PHILADELPHIA.—The Hudson-Peck Machine Products Co. has been granted a charter of incorporation. The company is capitalized at $60,000 and Raymond Hawley is interested.

PHILADELPHIA.—The Quaker City Motortruck Mfg. Co. has been chartered with $1,000,00 capital. The incorporators include Joseph D. Morelli, Charles L. Guerin and John Morelli.

NEWPORT NEWS, VA.—The Chesapeake & Ohio railroad has awarded the contract to Harwood & Morse for the erection of a $20,000 addition to its freight house.

PHILADELPHIA.—A permit has been granted to Charles H. Caspar, Thirty-first and Jefferson streets, for a 2-story reinforced concrete 33 x 47-foot shop addition to cost $18,000. Contract has been awarded to F. A. Poth & Sons.

PHILADELPHIA. — Sterns, Woodnut & Schmehl, engineers, will receive bids shortly for a $30,000 factory building. The structure will be three stories high and 50 x 225 feet. The original plans for this project have been revised.

PITTSBURGH.—The Miller-Owen Electric Co. plans to erect a 1-story, 40 x 200-foot warehouse, to cost $40,000. H. S. Kesuler, 3301 Penn avenue, is engineer.

READING, PA.—The Berks Engineering Co., Seventh and Chestnut streets, has increased its capital from $25,000 to $150,000 to provide for the erection of an addition to its machine shop.

SHARON, PA.—The Standard Car Construction Co., Columbia Bank building, Pittsburgh, has increased its capital from $1,000,000 to $2,000,000 and plans additions and improvements to its plant.

ALDENE, N. J. — The Marconi Wireless Co. will erect an addition to its plant to cost $50,000.

CLIFTON HEIGHTS, N. J.—Frank E. Hahn, architect, is in charge of installing new machinery and power equipment and making alterations to the municipal power plant.

NEWARK, N. J. — Fire recently caused a serious loss at the plant of Federal Shipbuilding Co., Kearney meadows.

EDGEWATER, N. J.—The American Can Co. is in the market for considerable new machinery and equipment for its proposed new plant.

DOVER, N. J.—Charles Butters, Oakland, Cal., has purchased a 10-acre plot along the Morristown & Erie railroad and will erect 21 iron and steel structures to be used as an aluminum bronze works. The plant will consist of a warehouse, 30 x 125 feet, a melting house, 50 x 125 feet, six grinding units, 10 x 60 feet, four boiler houses, a machine shop, etc.

JERSEY CITY, N. J.—The New York Revolving Portable Elevator Co., 346 Garfield avenue, has awarded the contract for the erection of a 1-story addition to its plant.

JERSEY CITY, N. J.—Twenty acres of land, fronting on Newark bay, have been purchased by Colgate & Co. for the erection of a large plant. Details of the project have not been divulged.

KINGSLAND, N. J.—The plant of the Canadian Car & Foundry Co., which was damaged by fire last February has been sold to a company manufacturing chemicals. The new owner expects to equip the factory for the manufacture of commercial chemicals. The property consists of 85 acres of land along the Hackensack meadows and the main line of the Delaware, Lackawanna & Western railroad.

LYDEN, N. J. — MacGovern & Co., 114 Liberty street, New York, are having plans revised for a 1-story, 100 x 203-foot machine shop. Fletcher-Thompson, Inc., Bridgeport, Conn., is engineer in charge.

NEWARK, N. J.—The trustees of Overbrook hospital will erect new filter beds at the electrolytic disposal plant, to cost $52,500.

NEWARK, N. J.—The Federal Real Estate Co. will build a machine shop at 41 Bryant avenue, to be 25 x 90 feet.

NEWARK, N. J.—J. Campbell & Co., Plum Point Lane, have had plans prepared for a 1-story, 25 x 80-foot machine shop.

NEWARK, N. J.—The A. Buermann Mfg. Co., 220 Jelliff avenue, will build a 1-story, 52 x 57-foot addition to its foundry. Cost is estimated at $7000.

NEWARK, N. J.—The Splitdorf Electrical Co., 98 Warren street, manufacturer of spark plugs, will build a 2-story addition to its plant.

NEWARK, N. J.—William E. Lehman, 738 Broad street, is interested in a machine shop to be built on New Jersey Railroad avenue. The build will be three stories high.

Activities in the Central States

BELOIT, WIS.—The capital stock of the Mattison Machine Works has been increased from $25,000 to $225,000 to provide for additions to its foundry and machine shop. The company manufactures woodworking machinery, shapers and lathes. C. W. Mattison is president and manager.

DE PERE, WIS.—The Western Steel & Mfg. Co. is preparing to build an addition to its plant and power house to cost $25,000.

EAU CLAIRE, WIS.—The Girnan & Sons Co., manufacturer of vehicles, will build a factory and machine shop 45 x 150 feet to cost $25,000.

FOND DU LAC, WIS.—The Damrow Bros. Mfg. Co., manufacturer of milk cans and other galvanized sheet metal specialties and stampings, owing to the shortage of sheet tin, will install a rolling mill to manufacture its own supply of sheets from the rough pig. Equipment will be ordered at once.

JANESVILLE, WIS.—Bids will be taken about Jan. 15 for the erection of a solid brick addition, 36 x 36 feet, to the pumping station, and a new scale room, 14 x 14 feet, to the boiler house of the Janesville municipal waterworks system.

KENOSHA, WIS.—The Kincannon Silent Transmission Co. has been incorporated with a nominal capital of $3200 by George C. Kincannon and J. J. Blaine.

MENASHA, WIS.—The Menasha Wire & Mfg. Co. is having plans prepared for a plant to cost $30,000.

MILWAUKEE.—H. F. Blakney, A. M. Berger and Maurice A. McCabe, have organized the Old Abe Mining Co., with a capital stock of $25,000, to develop lead and zinc properties in southwestern Wisconsin.

MILWAUKEE.—The Liberty Foundry Co., which recently awarded contracts for the erection of a gray iron shop to cost about $15,000, is taking bids on equipment and electric motors. W. J. Buckley, 852 Grant boulevard, treasurer of the company, is in charge.

MILWAUKEE.—The Van Dyke Knitting Co., Sixteenth avenue and South Pierce street, has awarded contracts for a 2-story factory addition, 90 x 165 feet, of brick, and concrete, mill construction, with an automatic sprinkler system, to cost about $40,000. Herman J. Esser, Camp building, is architect.

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Chicago, to prepare plans for a reinforced concrete, steel and brick warehouse building, six stories high, 62 x 150 feet. The estimated cost is about $100,000. Wm. J. E. Schaus is general manager.

MILWAUKEE.—Articles of incorporation have been filed by the United States Aero Propeller Co. The capital stock is $30,000. The incorporators are Fordyce H. Bottum, Frank L. McNamara and John H. Hurley, all members of the law firm of Bottum, Bottum, Hudnall & Lecher, Pabst building. A definite statement concerning the company's plans will be made later.

RICE LAKE, WIS.—The Rice Lake Advancement association has offered to the Wisconsin Aluminum Foundry Co., Manitowoc, Wis., to provide a free site, a suitable plant and further co-operation if it will reestablish its plant. The offer is under consideration.

RACINE, WIS.—The Hamilton & Beach Mfg. Co., small electric motors and motor-driven devices, will award contracts Jan. 10 for the erection of a 3-story factory addition, 80 x 150 feet in size. The improvement will cost about $75,000. Fred J. Osius is general manager.

RACINE, WIS.—The Belle City Malleable Iron Co., Racine, Wis., which sustained an estimated loss of between $75,000 and $100,000 by fire Jan. 5, is preparing to rebuild immediately. The main building was badly damaged, together with five freight cars loaded with materials. The building was 80 x 120 feet, 2 stories, brick, and was used as a pattern shop, core room, stockroom, shipping room, and superintendent's office, in addition to being the main machine shop. The plant was the largest of the kind in Racine. J. A. Chapman is president.

SOUTH MILWAUKEE, WIS.—The Caldwell Engineering Co., Jacksonville, Ill., has been engaged by the city to make a survey and prepare estimates on an additional pumping engine for the municipal waterworks system. J. F. Lorig is mayor.

WRIGHTSTOWN, WIS. — The Wisconsin state highway commission will take bids after Jan. 20 for the construction of a 75-foot steel and concrete bridge, with 20-foot roadway. M. W. Torkelsen, state bridge engineer, is completing plans.

WAUSAU, WIS.—Bids will be taken about March 1 by architects Swarthout & Spear for the erection of the first unit of a $250,000 industrial and vocational training institute in this city. It will be E-shaped, each unit being 90 x 200 feet. S. B. Tobey is superintendent.

BENTON HARBOR, MICH.—The Metal Specialties Co. has been incorporated with a capital of $87,000 to manufacture metal devices and machine parts. Incorporators include William R. Everett, A. R. Knight and Milton Hinkley.

DETROIT.—The A. Colton Co., 782 East Jefferson street, manufacturer of machinery, is building an addition.

DETROIT.—The Detroit Shell Co., recently incorporated with $2,000,000 capital, will occupy the plant of the Springfield Body Co., which it will equip for the manufacture of shells. J. Kelsey is president.

CHICAGO. — The William Glader Machine Works, 210 North Ann street, will build a 3-story factory 50 x 100 feet, to cost $20,000.

CHICAGO.—The Hughes Electric Heating Co. will build a 1-story, brick factory to cost $30,000.

CHICAGO. — The W. Gladden Machine Works will build a 3-story factory, 50 x 100 feet for which contract has been awarded.

CHICAGO.—The pattern warehouse of the Reedy Foundry Co., 4600 Iowa street, has been damaged by fire with $25,000 loss. The company has been making castings for submarine engines.

CHICAGO.—Rosenwald & Weil, J. E. Weil, president, 508 South Franklin street, will build a manufacturing plant covering 166,000 feet of ground, to include a power plant, machine shop and manufacturing buildings, cost is estimated at $200,000.

CLEARING, ILL. — The Standard Steel Castings Co., care Davidson & Weiss, architects, 53 West Jackson boulevard, Chicago, will build a 1-story addition 126 x 402 feet in size, to cost $100,000.

MONMOUTH, ILL.—The plant of the Boss Mfg. Co. has been damaged by fire. The company has leased the building formerly occupied by the Ogle Mfg. Co., which it will equip for its own use.

QUINCY, ILL.—An auxiliary high service pumping station, 1-story, 26 x 32 feet, to cost $100,000 will be built by the city. E. R. Chatten is city engineer.

ANDERSON, IND.—The Anderson Foundry & Machine Works is preparing plans for the erection of an addition 80 x 300 feet in size to double the capacity of its plant.

INDIANAPOLIS. — Articles of incorporation have been issued to the Ray N. Moore Mfg. Co. The company's capital is $50,000 and it will manufacture corn planters and machinery. Ray N. Moore, M. Moore and A. W. Caul, Ames, Iowa, are the incorporators.

PERU, IND.—The Model Gas Engine Co. plans to erect an addition to its plant. Cost is estimated at $50,000.

SOUTH BEND, IND.—The Studebaker Corp. has obtained a permit for the erection of a dry kiln, to cost $50,000, to be 112 x 244 feet of reinforced concrete and tile construction.

SOUTH BEND, IND.—A concrete reservoir will be erected at the north city pumping station, to cost $6700.

UNION CITY, IND.—The Tita Engineering Co. has been incorporated with a capital of $50,000 to manufacture automobile parts. Incorporators are L. Leroy Armstrong, W. Frank Roberts and Russel J. Tritt.

WABASH, IND.—The Service Motor Truck Co., which has taken a contract for the manufacture of Liberty trucks, announces plans for the construction of two additions, one building to be 75 x 200 feet, and the other 50 x 400 feet.

BELLEVUE, O.—The Collier Motor Truck Co. will build a 50 x 150-foot brick and steel addition to its plant. R. A. Palmer is general manager of the company.

CLEVELAND.—The Minerva Engine Co. has been chartered with $250,000 capital. Clifford S. Goby and Royal K. Johnson are interested.

CLEVELAND.—The plant of the Ackerman Wheel Co., which has been engaged on government contracts for tractor and airplane wheels, has been damaged severely by fire. Loss is estimated at $10,000.

CLEVELAND.—A charter of incorporation has been granted to the H. D. Wright Mfg. Co., capitalized at $25,000. The company will manufacture furnaces; its incorporators are William H. Marlatt and E. G. Rushford.

CLEVELAND.—The Welding Equipment & Supply Co. has been incorporated with $10,000 capital. The incorporators include R. J. Bishop, W. H. Martin, M. A. Gaxik and others.

CLEVELAND.—The Monarch Brass Co., Payne avenue and East Forty-fifth street, will build a brick factory to cost $50,000. Contract for construction has been awarded to Christian Schwartzenberg & Gaede, 1900 Euclid avenue.

COLUMBUS, O.—The machine shop of J. and W. J. Leukart has been severely damaged by fire.

DAYTON, O.—The Monarch Engineering Co. has been incorporated with $150,000 capital to manufacture tools. The incorporators are F. A. Wagner and F. W. Gruen.

DAYTON, O.—Work will be commenced shortly on a 300 x 500-foot factory to be built by the Dayton-Wright Aeroplane Co. The structure will be one and two stories high and will cost $200,000. H. L. Talbot, City National bank, is in charge.

DAYTON, O.—The Dayton-Ohio Production Co. has been incorporated under a New York charter to manufacture guns and ammunition with $25,000 capital. Incorporators include A. H. Glock, D. W. Morgan and E. K. Hanlon, 610 West 141st street, New York.

DAYTON, O.—The Dayton Automatic Products Co. has been organized with $250,000 capital and is considering a site for its proposed factory. G. C. Hodgson is the company's engineer in charge of construction, which will be rushed as much as possible as the company has undertaken a government contract.

GALION, O.—The roundhouse of the Big Four railway has been damaged by fire and will be rebuilt shortly.

HAMILTON, O.—The Iron City Foundry Co. has been incorporated with $50,000 capital. The incorporators include Albert D. Stuckey, C. E. Freeman, F. G. Traber and others.

HAMILTON, O.—F. Mueller, architect, will prepare plans shortly for a $100,000 factory to be erected by Brandon R. Milligan, Rentschler building.

LIMA, O.—The Lima Rivet & Forging Co., recently organized, has purchased a site and will erect a factory. W. L. Russell is in charge.

MEDINA, O.—The Medina Machine Co., which has recently received government contracts, plans to enlarge its plant.

MANSFIELD, O.—The American Clay Machinery Co., Bucyrus, O., has awarded to the Austin Co., 14320 Euclid avenue, Cleveland, contract for the erection of a plant here. R. C. Penfield is president of the company, which manufactures grinding machinery.

URBANA, O.—The Urbana Mfg. Co. has been incorporated with $50,000 capital to manufacture sheet metal specialties. The incorporators are Harry S. Easton, Frank C. Gaumer, Joseph C. Mackery and others.

TOLEDO, O.—The Acklin Stamping Co., 1645 Dorr street, has awarded the contract for an addition to its plant.

TOLEDO, O.—The Pronovost Torsion Spring Wheel Co. will erect a plant on a 60-acre site recently purchased between Dora and Bancroft streets. The company has offices at 828 Spitzer building.

ZANESVILLE, O.—The machine shop of the Baltimore & Ohio railroad has been damaged by fire with a loss of $15,000.

HUNTINGTON, W. VA.—A large addition will be built by the Huntington Steel Products Co.

PRINCETON, W. VA.—The Virginia railroad will construct a new machine and car repair plant. Raymond Depue, Terminal building, Norfolk, Va., is president.

YORKVILLE, W. VA.—The Wheeling Steel & Iron Co. has purchased 80 acres and will build a number of plant additions, including tin mill and steel plant extensions.



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W-S-M Continuous Heating Furnaces afford a great saving in time and labor which is frequently expended in charging the furnace.

The Heating Furnaces shown above are used for heating blooms, billets and ingots. The pieces are fed onto a platform in front of the furnace and are pushed through the fire chamber by hydraulically operated cylinders, the heated pieces being discharged upon a roller table, which carries them directly to the rolls.

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Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
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Up and Down the Pacific Coast

ABERDEEN, WASH.—Manager Ward, of the Grays Harbor Motor Ship Co., announces that a machine shop is to be constructed for installing engines in vessels for the government.

EDMONDS, WASH.—An ordinance has been passed granting to the Washington Coast Utilities a franchise to install and operate an electric lighting system.

EVERETT, WASH.—Plans are being prepared by Burns & McDonnell, engineers, Kansas City, Mo., for a municipal hydro-electric plant to cost $800,000. D. D. Merrill is mayor.

SEATTLE.—The Puget Sound Machinery Depot has obtained a permit to erect a $75,000 warehouse building at 3455 First avenue, south. Plans have also been completed for construction of a 180 x 269-foot boiler shop.

SEATTLE.—Plans for an addition to the plant of the Seattle Pattern & Model Works, Spokane street and Whatcom avenue, are being prepared by architect F. W. Grant, Mehlhorn building, and bids will be called for in about two weeks.

SEATTLE—Francis W. Grant, architect, Mehlhorn building, has been commissioned to prepare plans for the first unit of a group of buildings for the Smelters Steel Co., White building. The first unit will be a 2-story building 100 x 120 feet of frame and concrete construction and will cost about $80,000. Other buildings will be erected as needed.

SPOKANE, WASH.—The Northwest Harvester Co., 3036 Trent avenue, has obtained a permit to erect a $4000 brick pattern shop.

SPOKANE, WASH.—Chief engineer E. S. Clark of the Spokane & British Columbia railway is completing the survey for a proposed road to run from this city to Republic, where a junction will be made with a completed section of the road from British Columbia.

LA GRANDE, OREG.—The La Grande Iron Works will build a plant addition, 40 x 80 feet and will install new machinery for its foundry and iron works. D. J. Fitzgerald is in charge.

PORTLAND, OREG.—The plant of the Cutler Grading Machine Co., Hood River, Oreg., makers of apple sizing machinery, will be moved to this city.

PORTLAND, OREG.—Wilbur E. Coman, president and general manager, Northwestern Electric Co., announces that contract has been awarded by the company for the construction of an addition to its power plant which will increase its capacity 50 per cent. Cost is estimated at $1,500,000.

PRINEVILLE, OREG.—The voters have approved the proposal to build and equip a railroad from the city to the main line by authorizing a bond issue of $100,000.

FRESNO, CAL. — The Pacific & Gulf Electric Co. contemplates additions and extensions to its plant. Cost is estimated at $400,000.

MARTINEZ, CAL.—An election will be held Jan. 22 on issuing $200,000 in bonds to build a waterworks system. Olmstead & Gilelen, Los Angeles, are engineers.

MODESTO, CAL.—The Sierra & San Francisco Power Co. plans additions and improvements to its power plant to cost $25,000.

New Business in Eastern Canada

BRANTFORD, ONT. — The city council has authorized the expenditure of $100,000 for extensions to the waterworks plant and system and proposes to commence at once on the erection of a pumping station. T. Harry Jones is engineer.

COPPER CLIFF, ONT. — The Dominion Bridge Co., Dominion station, Lachine, Que., has been awarded the structural steel contract and the Allis-Chalmers Co., Milwaukee, the converter contract in connection with the extensions planned by the Canadian Copper Co.

DESERONTO, ONT. — The Dominion Match Co. will build an addition to its plant and install machinery to cost $50,000.

DUNDAS, ONT.—The John Bertram & Sons Co., Ltd., has let a contract to the Secord Co. for an addition to its machine shop, 70 x 300 feet, to cost about $150,000.

HILLSDALE, ONT.—Fitzgerald Bros. are in the market for a portable steam engine.

HAMILTON, ONT.—The Rae Machine Tool Works, Ltd., has been incorporated, to manufacture machinery, castings, implements and tools with $45,000 capital stock. The directors are Willis B. Sturrup, John S. Duggan, Craig McKay and others, Toronto, Ont.

LISTOWEL, ONT.—The Malcolm Andrew Furniture Co. will build an addition to its factory and install machinery to cost $7500.

LINDSAY.—The Allen & Hanbury Co., 54 Gerrard street east, Toronto, Ont., will build a plant at Lindsay to cost $100,000 and has let the general contract to Irwin Thompson, 326 Seaton street, Toronto.

PORT COLBORNE, ONT.—A. E. Augustine, Box 116, is in the market for a 15-horsepower electric motor with starter.

OJIBWAY, ONT.—Plans for a municipal water works system have been approved by the Ontario health department.

OWEN SOUND, ONT.—The Union Cement Co. will install machinery in the old Sun building for the manufacture of cement. The new plant will have a daily capacity of 2500 barrels. The company will purchase second hand equipment for the plant.

RENFREW, ONT.—The city council will purchase a pump for the waterworks plant. J. R. Stewart is engineer.

PORT ARTHUR, ONT.—The plant of the Port Arthur Shipbuilding Co. has been damaged by fire with a loss of $15,000.

TORONTO, ONT. — The Swift Canadian Co., St. Clair avenue, is in the market for a locomotive type boiler.

TORONTO, ONT.—The Bond Engineering Works, foot of Cherry street, has awarded contracts for the erection of an addition to its foundry to cost $8500.

TORONTO, ONT.—The Cluff Ammunition Co., 28 Atlantic avenue, will build an addition to its plant to cost $12,000.

TORONTO, ONT.—J. A. Johnston, 171 King street, east is in the market for a portable steam engine.

TORONTO, ONT.—The Swift-Canadian Co. will erect an addition to its cooler plant on St. Clair avenue at a cost of $20,000.

TORONTO, ONT.—The Toronto Hardware Mfg. Co., Ltd., has been incorporated to carry on the business of manufacturer, iron founder and machinist with $400,000 capital stock. Archibald W. Langmuir, William A. J. Case, William M. Smith and others are interested.

WALKERVILLE, ONT. — The Dominion Stamping Co., Ltd., has awarded the contract for a forge shop and is in the market for machinery, including drop hammers. The new building and equipment will cost about $16,000.

WALKERVILLE, ONT. — The Beaver Truck & Tractors Co., Ltd., has been incorporated to manufacture motor trucks, farm tractors, fire apparatus and vehicles with $500,000 capital stock. Edward P. Brownell, Toronto; Charles J. Stodgell and Henry P. Crocker, Walkerville, are interested.

WINDSOR, ONT.—The plant of the Studebaker Auto Co. has been damaged by fire with a loss of $75,000, Dec. 30.

LACHINE, QUE.—The plant of the Rapid Tool & Machine Co. has been damaged by fire with a loss of $55,000. The plant will be rebuilt.

MONTREAL, QUE. — The Canadian Co-operative Marine Corp. has been chartered to build and operate ships with $1,000,000 capital stock. Waldo W. Skinner, George G. Hyde, Ronald C. Grant and others are interested.

UPPER BEDFORD, QUE.—The Torrington Co., Ltd., has been incorporated to manufacture needles, sewing machines and machinery with $150,000 capital stock. Walter R. L. Shanks, Francis G. Bush, George R. Drennan and others, Montreal, Que., are incorporators.

HANNA



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"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

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Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.
Old Bed, crude 55 iron.... 10.50c to 11.00c
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Steel bars, Cleveland.....	4.035c
Steel bars, Detroit.....	4.085c
Steel bars, Philadelphia.....	4.10c
Steel bars, New York.....	4.095c
Steel bars, St. Louis.....	4.17c
Steel bars, Cincinnati.....	4.085c
Steel bars, St. Paul.....	4.22c
Steel bars, Buffalo.....	4.05c
Iron bars, Buffalo.....	4.65c
Iron bars, Chicago.....	4.10c
Iron bars, Cleveland.....	3.985c
Iron bars, Detroit.....	4.75c
Iron bars, St. Louis.....	4.17c
Iron bars, Cincinnati.....	4.085c
Iron bars, Philadelphia.....	4.50c
Iron bars, New York.....	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis.....	4.27c
Shapes, St. Paul.....	4.32c
Shapes, New York.....	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis.....	4.52c
Plates, St. Paul.....	4.57c
Plates, New York.....	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi..	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo...	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo..	6.45c
No. 28 black sheets, Cleve..	6.35c
No. 28 black sheets, Cinci..	5.45c
No. 28 black, Detroit.....	6.435c
No. 28 black sheets, St. L..	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo...	7.70c
No. 28 galv. sheets, Cleve...	7.60c
No. 28 galv. sheets, Cinci...	6.635c
No. 28 galvanized, Detroit...	7.685c
No. 28 galv. sheets, St. L..	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh..	$22.00 to 23.00
Bundled sheets, Cleveland...	24.50 to 25.25
Bundled sheets, Buffalo.....	19.00 to 20.00
City wrought, short, N. Y..	25.00 to 26.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts...	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo..	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci..	27.00 to 27.50
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y..	26.00 to 26.50
Heavy melting steel, St. L..	29.00 to 29.25
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	27.50 to 28.50
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo.....	40.00
Low phos. steel, Pittsburgh.	40.00
Low phos. steel, eastern Pa..	40.00
Shoveling steel, Chicago.....	30.00
Shoveling steel, St. Louis....	27.50 to 28.00
Steel rails, short, Chicago...	34.00 to 34.50
Steel rails, short, Cleveland..	31.00 to 32.00
Steel rails, short, St. Louis.	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati.....	16.50 to 17.00
Stove plate, St. Louis.....	20.50 to 21.00
Stove plate, N. J. points...	19.50 to 20.00
Stove plate, Birmingham....	19.50 to 21.50
Stove plate, Buffalo.....	22.00 to 23.00
Stove plate, eastern Pa.....	23.50 to 24.50
Stove plate, Cleveland.....	19.00 to 20.00
Stove plate, Pittsburgh.....	20.00 to 21.00
Cast iron borings.....	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$21.00 to 22.00
Boiler plate, cut, No. 1, St. L.	23.50 to 24.00
Bundled sheets, Cincinnati..	17.00 to 17.50
Knuckles, coup., Chicago....	34.00 to 34.50
Knuckles, coup., St. Louis..	31.50 to 32.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago.....	21.00 to 22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.....	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul.....	4.54

Buffalo to:

Albany, N. Y.....	$1.26
New England (rail).....	3.10
New York and Brooklyn (rail)..	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark..	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul.....	5.85
New York (r. and w.).....	6.00
Philadelphia (r. and w.).....	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul.....	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul.....	4.54

Duluth, Minn., to:

Minneapolis-St. Paul.....	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul..	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail).....	75 cents
Pacific coast (tin plate)....	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland.	29.00 to 30.00
Busheling, No. 1, Buffalo...	26.00 to 27.00
Busheling, No. 2, Buffalo...	17.00 to 18.00
Busheling, No. 1, Pittsburgh.	21.00 to 22.00
Cast borings, New York....	16.50 to 17.00
Cast borings, eastern Pa....	19.00 to 20.00
Cast borings, Cleveland.....	20.00
Cast borings, Buffalo.....	19.00 to 20.00
Cast borings, Pittsburgh.....	20.00
Cast borings, Birmingham...	13.00 to 15.00
City wrought, long, N. Y...	31.00 to 32.00
Cut forge, Chicago.....	35.00
Forge flashings, small, Cleve.	25.50 to 26.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, Eastern Pa....	24.00 to 25.00
Grate bars, Buffalo.....	20.00 to 21.00
Grate bars, Cleveland.....	20.00 to 21.00
Grate bars, N. J. points....	19.50 to 20.00
Iron axles, Pittsburgh.....	42.00 to 44.00
Iron axles, Cincinnati.....	42.00 to 42.50
Iron axles, Cleveland.....	47.50
Iron axles, eastern Pa.....	47.50
Iron axles, Chicago.....	47.50
Iron axles, Buffalo.....	45.00 to 47.00
Iron rails, Chicago.....	38.00 to 39.00
Iron rails, Buffalo.....	37.00 to 38.00
Iron rails, Cincinnati.....	32.50 to 33.00
Iron rails, St. Louis.....	34.00 to 35.00
Iron rails, Cleveland.....	35.00
Machine turnings, Cleve.....	20.00
Machine turnings, Buffalo...	18.00 to 18.50
Machine turnings, N. Y....	16.00 to 16.50
Machine turnings, Pitts.....	20.00
Machine turnings, east. Pa..	18.50 to 19.50
Machine turnings, Birming..	17.00 to 18.00
Pipes and flues, Cleveland..	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo..	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	35.00
R. R. wrgt. No. 1, Birming.	28.00 to 32.00
Wrought pipe, Buffalo.....	26.00 to 27.00
Wrought pipe, eastern Pa...	30.00 to 32.00
Wrought pipe, New York...	30.00

(Net Tons)

Angle bars, iron, Chicago...	$37.00 to 37.50
Angle bars, steel, St. Louis..	29.00 to 29.50
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	37.50 to 38.50
Busheling, No. 1, Chicago...	26.00 to 27.00
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis.	26.00 to 26.50
Busheling, No. 2, Chicago...	17.50 to 18.50
Cast borings, Cincinnati.....	13.00 to 13.50
Cast borings, St. Louis.....	16.00 to 16.50
Cast borings, Chicago.....	17.00 to 17.50
Iron axles, St. Louis.....	45.00 to 45.50
Iron axles, Chicago.....	47.00 to 48.00
Machine turnings, Chgo.....	17.00 to 17.50
Machine turnings, Cinci.....	13.00 to 13.50
Machine turnings, St. L....	16.75 to 17.25
Pipes and flues, Chicago.....	23.50 to 24.50
Pipes and flues, St. Louis...	23.50 to 24.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland....$24.00 to 25.00	
Axle turnings, Buffalo.....	26.50 to 27.00
Shafting, New York	34.00
Shafting, eastern Pa.....	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York..	46.00
Steel car axles, Buffalo.....	45.00 to 47.00
Steel car axles, Cleveland....	45.00
Steel car axles, Pittsburgh..	40.00 to 42.00
Steel car axles, eastern Pa..	47.50
Steel car axles, Chgo.....	47.50

(Net Tons)

Shafting, St. Louis.....	32.00 to 32.50
Steel car axles, St. Louis...	42.50 to 43.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts....	$30.00
Car wheels, (steel), Pitts...	33.00 to 35.00
Car wheels, eastern Pa.....	33.00 to 35.00
Car wheels, Buffalo.....	30.00
Car wheels, Chicago.....	30.00
Car wheels, St. Louis.....	29.50 to 30.00
Car wheels, Birmingham....	25.00 to 30.00
Car wheels, Cleveland.....	30.00
Tram car wheels, Birming...	21.00 to 25.00
Cast, No. 1, Birmingham....	25.00 to 27.50
Cast, 1, machy., N. J. points	30.00
Cast No. 1, Cleveland.....	30.00
Cast, 1, heavy, N. J. points.	30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo.....	30.00
Cast, No. 1, Pittsburgh.....	28.00 to 29.00
Malleable railroad, Cincinnati	21.50 to 22.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo...	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa..	30.00 to 32.00
Malleable railroad Chgo.....	30.00
Malleable, agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati.....	26.00 to 26.50
Cast, No. 1, St. Louis.....	24.50 to 25.00
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	23.50 to 24.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.50 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.....	47.50

(Net Tons)

Boiler punchings, Chicago...	31.50 to 32.00
Locomotive tires, St. Louis..	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, January 24, 1918 No. 4

Industry Awaits Promised Relief

Survey of Conditions in All Districts Shows Little Evidence of Quick Improvement in Strangling Traffic Congestion, Due to Coal Conservation Effort—Production Makes Better Showing Through Liberal Exemptions

FOUR days of mandatory stagnation of industry have yet to prove their concrete benefits to iron and steel plants. Such improvement, to be of consequence, can come only from a sustained relief from the traffic blockades which have been strangling the industry for a number of weeks. Reports from all districts, barring St. Louis, where conditions have not been acute, fail to show that the fuel conservation campaign has brought about a foundation for permanent betterment. The activities of the industry have been widely affected by the enforced shutdowns. Production has remained only fractional. On the whole, however, especially in initial iron and steel operations, which have been exempted, the output probably has been larger the past week than during the several weeks preceding, when inadequate transportation had demoralized the whole industry.

Reduced Melt Helps Stacks

The position of merchant makers of pig iron has been improved somewhat because the shutting down of the plants of hundreds of consumers has brought some relaxation to the tense demand for deliveries. Some arrearages have been met. The maximum benefits from the cessation of melt, however, have not been realized, because coke shortages have continued to prevent normal furnace production. Except for further active selling for last half by certain producers along the lakes the week's new business has not been heavy, but more makers are disposed to negotiate. One maker sold 40,000 tons, embracing numerous individual lots. Heavy inquiries of basic remain unsatisfied in various districts.

Faith is expressed in coke circles that the fuel conservation campaign will work an appreciable improvement in the Connellsville coke region. Operations of the ovens during the week have been very erratic, owing to the irregular placing of cars. The car supply is estimated to have been about 45 per cent. The plan to pool shipments has been adopted and details are being perfected. Nothing has come from the reported intention of the fuel administration to commandeer a large amount of coke in behalf of two large steel works, the protest from eastern merchant operators apparently having been effective.

More Willing to Sell

Manifestations of more liberality in selling policies are being given by producers in finished lines. This undoubtedly is related closely to the fact that live tonnage, disregarding government business, gradually is being worked away. Bars probably reflect this changing attitude of the mills more than any other product. Implement manufacturers have made further first quarter and first half purchases. Sales of pleasure automobiles, especially of the medium-priced types, have been heavier than expected and that industry now is slated for 50 per cent operations. This is somewhat better than appeared likely from previous indications. Cancellations by fabricators of shape and plate tonnages placed with eastern mills before the regime of government prices have been duplicated in steel bars. The fabricators as well as nut, bolt and rivet makers have taken such action. In shapes, however, the shops have indicated a willingness to take their tonnage but the situation is complicated because the mills have been turned to shell steel rolling. Some platemakers have shown in instances a disposition to mark down some of the extremely high-priced tonnage under contract to encourage specifications.

No Contracts for Ore

The reservations of lake ore for the new season now reach a heavy tonnage, but there have been no contracts. Nor is there likely to be until about April 1, when the question of whether the usual 12-month term will be followed is expected to be reviewed finally by the government. The operators are having difficulty in planning their winter mining activities because of the uncertainty over their sales tonnage. Operations have not been affected by the coal order. As a result of the restricted operations of the furnaces, it is estimated that the consumption of lake ore during the winter months will be probably 2,500,000 tons below that of a like period a year ago.

The Iron Trade Review

EDITORIAL

Transportation Outranks All

A CLEARER visualization of what war means and requires in individual as well as collective sacrifice is held by the nation at large after the swift developments of the past week. The country has been put to the test in a severe and far-reaching manner which it had no reason to anticipate, through the abrupt throwing of the brakes upon industry by the momentous order of the fuel administration. It was a natural reaction from the shock of so sudden and radical an undertaking that a storm of protest should have swept immediately through the country. It is as equally characteristic and in keeping with the concepts of true Americanism, that the country, having expressed its impulsive opinion over the cause, necessity, and selection of such an unprecedented proceeding, should have lent its energies without stint, if not wholesouledly, to the things asked of it; and now is concerning itself more with the efficacy of the plan rather than with its defects.

It is certain that these reasons which brought forth the summary order to industry and general business to forego their normal everyday activities, in order to conserve both coal and cars, were grave and compelling. As much is made clear if not specific by the statement of the fuel administrator as to the paralysis of shipping along the Atlantic seaboard where hundreds of loaded ships have been tied up awaiting bunker coal and freight tonnage has been overflowing piers, warehouses and railroad yards, with each passing day making the confusion more desperate and hopeless as to ordinary measures of relief. There is a strong suspicion that the situation had reached a point far more serious than generally understood. When the mind is allowed to dwell upon the fact so repeatedly and vigorously emphasized before the country that ships are the biggest single factor in the winning of the war, and ships mean the bridging of the resources of America with the battle line in Europe, the critical importance of keeping the only-too-few bottoms in constant motion is driven home. Our bare obligations to our allies, if not the furtherance of our war plans abroad, call for an uninterrupted stream of those essential supplies for which they look to us on our word.

Since shipping is so vital in the present struggle it is not difficult to picture the fatal lengths to which its retardation and stagnation might be allowed to extend. If the causes underlying the present astonishing demand upon the business life of the country are shaped by the question whether or not the movement of the ships is to be kept at top speed, only the most energetic and vigorous means promising correction within the briefest time could be countenanced. It matters not how and why conditions have come to this emergency. These are questions for which the fixing of responsibility may be left to future time. Action, swift and decisive, is the only factor that counts. The country must reserve its decision whether the present course of action is the wisest and most effective until all the facts are known and the proposed remedy has had its full trial.

Industry has one, and only one, big duty at present. That is to win the war. The objective of all output is the European battlefield. It may be shown that production which exceeds the facilities to transfer it to the point of application, is valueless and virtually obstructive to the best results. An intolerable condition of operations lately has prevailed in the iron and steel industry. It were far better from the standpoint of efficiency and from actual production to have abandoned a crippled activity for a complete temporary suspension, if by so doing the industry could have assured itself of the opportunity of free and unrestrained movement. Any way the coal problem is viewed it becomes one of transportation. Until the blockaded cars and the ships are freed and kept nimble, production figures may not be accepted at face value.

Comprehensive Distribution Necessary

WHETHER his figures will bear close scrutiny and are free from bias, a recent announcement by Secretary Wilson of the federal department of labor is of interest. Commenting on the apparent shortage of labor and the proposition to allow importation of oriental workers to fill the gap, he states that the government will take 1,500,000 workers for war purposes. He states there are 35,000,000 workers in the United States and that the number required for war work, 1,500,000, is less than the normal number of unemployed.

This showing would indicate that the problem is more a readjusment than a shortage and the situation should work itself out readily with time. It would indicate that while there is a real shortage in some lines there should be a surplus in others from which the former can draw its needed supply. If this is

the case intelligently applied classification should remedy the situation and should utilize all available labor to the best advantage.

It is a fact, that needs only a little observation to establish its truth, that labor at present is in a state of migratory unrest. Some industries are paying unusually high wages. All workers have a natural desire to participate in the advantages others enjoy. False or exaggerated reports of labor shortage in some industries are responsible for much of the unrest among workers. This has the effect of demoralizing effort and of seriously reducing production.

Systematic planning and far-sighted regulation are needed to remedy this situation and no more important task confronts the government. If there is sufficient labor it should be distributed to serve all needs according to a comprehensive and integrated program.

War Halts Commercial Growth

REVERSALS of policy have been frequent in the iron and steel market since the war unsettled established conditions and gave new aspects to the situation. For many years as the steel industry expanded efforts of makers have been directed to enlarging the uses of metals in place of other materials to broaden their fields and create new demand for their output. Much thought has been given to this aspect of the business and the use of steel in many forms has been created to the exclusion of other materials, wood, paper and nonferrous metals.

At present, with demand for steel and iron in excess of production, it has been necessary to curtail their use in such lines where other materials could be substituted. Instead of seeking to broaden their field, makers of steel and iron have been forced into an opposite attitude and are seeking to restrict it to channels where no other material will serve.

Railroads have bought cars built of wood where nothing but steel was used in recent years; cans and boxes of wood and paper have been substituted as containers for tin plate for products where they would suffice; and reinforced concrete has been resorted to freely where fabricated steel structurals would have been used under normal conditions. The list might be extended but these examples will suffice.

After the stress of war is over and business gets back to a basis where production catches up with demand, the steelmaker will be back at his former position and will resume his campaign to encourage the use of metal where now he discourages it.

Great Britian Finds Herself

TWO years of government control of Great Britain's iron and steel industry have been marked by sweeping modifications of pre-war conditions. In that period state regulation of the works has been rendered practically complete. In fact, the subservience and co-ordination of the facilities of individual manufacturers to the national good as dictated by the war, have been much more absolute than under the system so far advanced in this country. What the two years have meant to Great Britain from the standpoint of national profit and also the economic importance of these evolutionary changes are told in an analytical and expert way in the highly complete article in this issue by the British correspondent of THE IRON TRADE REVIEW.

It is shown it was not until government control intervened that the industry entered upon the era of great expansion and of economic betterment which still is in full swing. For two years the doctrine of "business as usual" was a retarding influence. Individual policies were followed. The taking over of the conduct of the industry by the government in November, 1915, quickly brought about several policies of national scope and vision. The results accomplished are impressive. Starting with a production of 7,500,000 tons annually before the war the British output of steel rapidly is approaching the 12,000,000-ton mark; and if the war lasts this capacity may be raised to 14,000,000 tons, it is stated officially. More complete and efficient working of the native iron ore deposits has been brought about. Shortages of pig iron have been made up by the more extended and skillful substitution of scrap. Many works have been rebuilt, enlarged and greatly modernized. Prices have been effectually regulated and distribution has been directed along the lines of greatest necessity. The labor situation has been handled with a minimum of friction.

This war will leave the British iron and steel industry in a position of greatly enhanced advantage and strength for the future conquests of peace. Likewise it will have greatly improved the national economic position. Will this conflict have the same effect for the United States? A survey with profit may be made of what Great Britain has done. While the conditions facing the two countries at the outset of the war have been dissimilar in many ways, Great Britain's performance contains much of value to the United States.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 296

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern) ..... $33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern) ..... base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft) ..... base plus $1.50
Over 3.25 silicon ..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh,	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts 8.00c
Sheet piling, base, Pitts. 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts. $7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l. 30
Iron, 3½ to 4½ inches, c. l. 12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 23, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 23, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	30.00
Lake Superior charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	30.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia	34.25	34.00	34.00	30.50
Ferro mang., delivered.....	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh....	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts..	51.00	51.00	65.50	60.00
Open hearth billets, Pitts.....	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	2.975
Steel bars, Chicago.....	2.90	2.90	2.90	3.19
Iron bars, Philadelphia.....	3.685	3.685	4.935	3.159
Iron bars, Cleveland.....	3.64	3.64	4.50	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Jan. 23, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Iron bars, Chicago mill.....	3.50	4.50	4.50	2.85
Beams, Chicago.....	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.575
Tank plates, Chicago	3.25	3.25	3.25	3.89
Tank plates, Philadelphia ...	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pitts....	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	7.875	4.125
Sheets, gal., No. 28, Pitts... ..	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh.....	3.50	3.50	3.875	3.00
Connellsville fur. coke.....	6.00	6.00	6.00	7.25
Connellsville fdy. coke.....	7.00	7.00	7.00	6.375
Heavy melting steel, Pitts.....	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	30.00	28.75	26.10	21.50
Heavy melting steel, Chicago.	30.00	28.50	27.00	20.25
No. 1 wrought, eastern Pa....	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago.....	35.00	31.50	36.25	25.35
Rerolling rails, Chicago.....	35.00	35.75	36.00	27.25
Car wheels, Chicago.....	30.00	29.50	31.00	21.85

(For Additional Prices See Page 296)

Last Half Sales of Iron Growing

Producers More Willing to Negotiate But Study Contigencies Arising From Mandatory Price Revision Clause in Contracts—Shutdown of Many Consuming Plants Eases Tension of Demand But Furnaces Lose Full Effect

Cleveland, Jan. 22.—Certain producers in this district continue to sell freely for last half to regular customers, but they are unable to supply over 50 per cent of the demands. Usually inquiries are being scaled to about one-half their original amount. The bookings of one important interest in the week totaled approximately 40,000 tons, making an aggregate of 70,000 to 80,000 tons taken within two weeks. All this business is subject to government price revision. Perhaps one-third of the contracts closed have been for malleable, for which there is a large and insistent inquiry. Some sales of this grade have reached 5000 tons individually. Basic remains exceedingly scarce especially for first half. Two northern Ohio consumers continue to scour the market for 15,000 to 20,000 tons each for second quarter, and one of them also is seeking 20,000 tons for last half. Of the 8000 tons of mixed grades asked for the navy department, the low phosphorus has been placed with eastern furnaces and the remaining lots of foundry and charcoal are being placed in various directions. New government inquiries include 800 tons of malleable for first quarter for a western consumer and 1000 tons of high phosphorus foundry for Italy. The position of iron producers, in view of the tense demand, has been improved by the enforced closing of many consuming plants during the past five days. The furnaces, however, have not realized the full benefit of this reduced melt because they have been unable to maintain normal operations.

Revision Clause Employed

New York, Jan. 22.—Foundry iron for second half has been sold during the past week embodying a clause which provides for revision on deliveries after March 31 in accordance with the government price. Business so far done involved only a few thousand tons. This method of selling has not become popular and is unlikely to. In almost all cases, the furnaces prefer to wait rather than sell at anything but a definite price. New inquiries are numerous and consumers are scouring the market more thoroughly than in normal times. A Buffalo consumer who never before bought in this district has inquired here for 1000 tons of foundry. Current inquiry includes some 5000 tons of malleable and at least 25,000 tons of foundry, all for first quarter and first half, and a great deal of tonnage for second half. The largest single requirement is that of a Bridgeport consumer who wants 7000 tons of high and medium silicon for first quarter. Consumers generally realize that iron practically is unobtainable and in very few cases are making insistent efforts to obtain it. Blast furnaces were exempted from the closing order of the federal fuel administrator. All of them, therefore, continued to operate as before. Scarcity of coke, instead of being relieved, has become more acute lately, with the result that none of the eastern furnaces have more than a very scant supply and a good many occasionally are forced to bank temporarily. Some furnaces have lost all the way from one to three months' production through the lack of coke and the effect will be to keep many furnaces out of the market for a

much longer period than expected. Eastern blast furnaces generally are curtailing as much as possible the production of high silicon iron owing to the higher cost. Makers state that after they have completed present high silicon contracts they will make only ordinary grades ranging from 1.75 to 2.75 per cent. As a result, it is expected that foundries will have to depend to a growing extent on 50 per cent ferrosilicon and silveries.

Shutdown Eases Urgency

Boston, Jan. 21.—The Garfield fuel order having closed down a good many New England foundries, a fresh factor of dullness has been introduced into the local pig iron market. To a considerable extent, the shutdown eases off the urgency of the demand from plants, which although covered on iron by contract, were unable because of weather conditions or railroad congestion to secure what was due them, and consequently sought any free iron that cropped out from time to time. The plants engaged on purely government work have not been obliged to heed the Garfield order, although in the confusion which resulted from the lack of notice many did not open Friday morning, and then had something of a scramble rounding up their employes when they learned of their exemption. On the whole, it must be said that the foundries that come within the scope of the order have obeyed the mandate quite gracefully. The loudest complaint about the whole matter has been the very short notice given. The shutdown has not been wholly unwelcome, for it must be admitted that lately there are plants working on nonessentials which have not found new business any too brisk. New building operations, save for war purposes, have been on a rather restricted scale and stove concerns have felt not only the lack of new dwelling construction, but also of the usual amount of household purchases. There have been offers to place orders for delivery up to April 1, and it is believed there will be quite a little business done when the time comes for reopening plants.

Bookings Are Better

Buffalo, Jan. 22.—Somewhat better bookings in pig iron have been reported for the week just ended than for the past few weeks, but the scarcity of metal still continues in the face of a heavy demand. Just at present there is very little iron obtainable before July 1, with the exception of small lots of offgrades which are sold to old customers who must have something. As far as new business is concerned, at least one Buffalo furnace is declining to entertain any proposals, since its prospects are that iron promised for midsummer may not be delivered until considerably later. In fact, it is the opinion of one well-informed furnaceman that some plants which figured on being sold up to July 1, will, in reality, be sold up until Sept. 1, because of intermittent operations. Furnace production is being materially interfered with by the failure to obtain regular shipments of coke and in most cases the fuel is of such low grade as to make an inferior product. There has been a slight departure from the position of the week before when Buffalo furnaces declined to quote for last half because of the possibility of the figures being revised March 31. Some of them are now showing a disposition to take on such business and some tonnages actually are being booked. These, generally speaking, contain the proviso that the prices will be subject to government revision. The idea is entertained in some quarters that prices will be revised upward. One producer told a representative of THE IRON TRADE REVIEW that it would be only simple justice to the merchant pig iron producer for the government to fix a higher price than $33. He gave it as his opinion that a scrutiny of the balances of northern merchant furnaces for a considerable period largely would show "red ink". The inquiry during the past week has been good. The Canadian furnace at Port Colborne has experienced good inquiries and has taken some business. Uncertainty as to supplies of coke has held its offerings to first half exclusively.

Consumption Greatly Curtailed

Cincinnati, Jan. 21.—The five-day shutdown period has applied to all foundries in this vicinity as none has received release orders the same as sent the machine tool builders. Some foundries were already idle on account of a shortage of coke. Shipments of iron are very poor. Iron that was enroute before the receipt of the fuel administrator's recent order, is lost and few new shipments can be sent forward. Iron merchants predict that the reconsigning of iron will soon be a thing of the past. In fact, the practice has already practically been discontinued. This will affect shipments from the south more than from any other producing district. Inquiries for foundry iron are quite numerous, most of which are for shipment in the last half, although some iron is wanted for nearby delivery. Sellers are not now disposed to sell beyond April 1, even when the iron is to be had. They realize fully that the iron shortage is acute and that the future demand will be large enough to take care of all the iron that can be produced. No sales of consequence are reported, although a few cars of southern and Virginia are disposed of now and then.

Chicago Inquiry Active

Chicago, Jan. 22.—Inquiry for all grades of pig iron is growing more active and has attained practically the dimensions of a general buying movement. Only last half business can be booked by most makers and first half tonnage is practically unobtainable. Some delay is being met in concluding transactions as sellers are waiting until a form of contract is decided on to cover a change in prices by the end of first quarter, as provided in government regulations. For this reason, tonnages are being booked informally and tentatively, to be made binding when the form of contract is decided on. Good demand is being met for silvery iron but this is difficult to buy even for last half, as makers appear to have covered a large part of their production. Lake Superior charcoal is in demand and considerable tonnages are being covered for last half delivery.

Coal Order Stops Business

St. Louis, Jan. 19.—The Garfield five-day order fell like a mallet stroke on pig iron activities in this district, giving the coup de grace to what the blizzard and other disabilities had left. Dealers unanimously report "nothing doing" and most of them are not looking for a return to even relatively normal conditions for some days to come. So far as could be learned sales during the week, either for prompt shipment or future delivery, were virtually nil. The order to close down industries, according to best opinion here, will create no easing of pig iron demand and it will be just as hard to secure tonnages as heretofore, save that railroad facilities may be better for the breathing spell.

Second Half Selling Active

Philadelphia, Jan. 22.—Second half selling of pig iron which heretofore has been exceptional became active during the past week. Fully 15,000 tons mostly foundry with some malleable were sold here. All this tonnage is subject to price revision. Sales for earlier delivery involved principally small lots of off-grades, high manganese, high silicon and similar qualities. Many inquiries are current, some running into thousands of tons, mostly for second half foun-

dry. The Penn Seaboard Steel Corp. wants nearly 30,000 tons of basic mostly for second quarter. The Stanley G. Flagg Mfg. Co. wants 3500 tons of malleable, basic and foundry, for first quarter. The coke scarcity has been relieved at some furnaces; at others it still is acute. One New York furnace making standard low phosphorus is out and another on the same grade is on half schedule on account of coke conditions. Even more critical situation, however, has been averted by the indefinite postponement of the government order diverting 100,000 tons of coke to the Midvale Steel & Ordnance Co. and to the Bethlehem Steel Corp. Following the announcement of this order, eastern furnaces whose supply was involved, sent a committee to Washington, pointing out how other government requirements would suffer.

Furnaces' Output Still Restricted

Pittsburgh, Jan. 23.—Operations of blast furnaces in the valleys and the Pittsburgh district continue to be restricted on account of a shortage of coke, but inasmuch as there is a freer movement of fuel and furnaces are expecting supplies at once the production of pig iron promises to show an appreciable increase. The Carnegie Steel Co. has only 36 of its 59 furnaces in operation, while the Jones & Laughlin Steel Co. has only four of its 11 furnaces making iron and those which are producing are checked. Makers have met with fair success in shipping consumers and the Garfield order has had the effect of increasing somewhat the supply of iron at plants of consumers where it was possible to make deliveries. Inquiries for iron for first half delivery are no longer numerous, consumers appreciating the fact that producers are well committed for that period and have no offerings to make. Some producers, however, are taking bookings for the second half, although tonnages sold for that delivery so far are limited. It is believed that second half business will open up briskly soon and consumers will be covered within the next 30 or 60 days. Bookings for last half shipments are taken with the understanding that prices are subject to revision on April 1 and some producers are proposing a further provision that government prices are to apply only during the war, or while federal regulations are in effect, and any business that may be delivered after that period is to be taken at trade journal or open market quotations. One prominent producer is inquiring for 20,000 tons of basic iron for second half to make up shortage output.

Coke Pool Plan Adopted

Representatives of Fuel Administration and Railroads Arranging Details —Movement in Connellsville Region Shows Improvement

Pittsburgh, Jan. 22.—Shipments of coke during the past few days have shown some improvement, partly due to the Garfield order and also to the fact that energetic efforts have been made with some success to relieve the congestion of loaded cars in the Connellsville region. While the tie-up of cars there is still serious and the extremely cold weather has interfered greatly with their movement, large supplies of fuel have either reached furnaces, especially those in the east, or are about to do so. Considerable has been accomplished through the elimination of crosshauls and the trading of tonnages by which the output of ovens at the north end of the region are shipped direct to the east and that of ovens in the south end shipped to the west. Discussion is still being made as to pooling of coke shipment, a question which was gone into yesterday at a meeting in Pittsburgh between Warren S. Blauvelt of the federal fuel administration and railroad officials. Upon the perfection of the detailed plan, it was announced the coke pool will be organized. Mr. Blauvelt has asked for data on production and movement of coke in this district to be submitted to Fuel Administrator Garfield. Pittsburgh, Connellsville and Uniontown are being considered as headquarters for the proposed pool. The committee of coke operators recently named also held a meeting last night at Uniontown, Pa., regarding the distribution of coke shipments. The car supply in the Connellsville region has been low, running from 30 to 50 per cent, and it is expected to increase this after the congestion has been further relieved. The supply today was 30 per cent and will be 30 per cent tomorrow. Production for the week ended Jan. 12 was 237,707 tons, as compared with 216,098 tons during the preceding week, according to the *Connellsville Courier*.

Railroads Want Coke

New York, Jan. 21.—With the exception of long-time contracts which some makers have accepted from eastern blast furnaces of late, the market in this district continues devoid of business. Many inquiries are out for prompt or nearby coke both for foundry and furnace consumption, but none is to be had. Among foundry users who are inquiring are the New York Central and the Erie railroads. The former wants 1000 tons. The New England producer still is out of the market. This interest recently devised a new form of contract to make it accord exactly with the desires of the fuel administrator, but the forms are not yet ready.

Shipping Tangle at Worst

Cincinnati, Jan. 21.—Shipments were never in a worse condition. The oven operators were unable to get cars and the cold weather has made labor very uncertain so that when any cars are placed it is difficult to get them loaded. Railroad delays are more vexatious and no relief can be expected until the weather moderates. Occasionally a few cars slip through from the Wise County field, but they are hard to get across the Ohio river.

Shortage More Keenly Felt

St. Louis, Jan. 19.—Dealers report semiparalysis in the coke trade. Results of the blizzard are still seriously felt and tonnages are increasingly scarce and hard to lay hands on. Eastern ovens are furnishing contract material but are offering nothing for sale. Southern producers are in much the same fix. Southwestern smelters are beginning to feel the pinch more acutely than at any time since the scarcity commenced. Production of lead and spelter is reflecting this and strenuous efforts are being made by the independents to cover their needs. Local distribution sources are frankly informing them they can offer no help. There were the usual number of telegrams from national and state fuel administrations ordering dealers to supply coke to specified points. These have gotten no better results than inquiries of private individuals and corporations. The leading local producer has helped out materially.

Watching Production Closely

Birmingham, Ala., Jan. 22.—While the production of coke is being kept up to above normal in southern territory there is no great confidence over the situation. If big contracts or long-time contracts are being accepted nothing is being said of it. The production is being closely watched, since demands call for the whole output. There was no disturbance of coke making operations following the fuel administrator's coal conservation order.

Propose New Scrap Body

Dealers and Consumers Recommend Formation of General Committee —Many Objections Are Made to Present Price Classifications

FOR COMPLETE SCRAP PRICES SEE PAGE 296

New York, Jan. 22. (By wire.)—Meeting scrap iron dealers and consumers representing iron mills, gray iron, steel and malleable foundries today decided to recommend to the general steel committee of the American Iron and Steel institute the appointment of a new subcommittee on iron and steel scrap. The new committee will include not only scrap dealers and distributors, but also consumers. Representatives of the buyers object to the maximum price on No. 1 heavy melting steel being made to apply to malleable and to cast-iron scrap of all kinds. The iron mills object to the classification under No. 1 railroad wrought of making the price of $35, delivered, to include yard and track scrap, busheling and all kinds of iron scrap. It was decided to recommend that the basis of prices delivered consumers' works be maintained. The recommendations regarding the personnel of the new committee are to be made before the end of the week.

New York, Jan. 22.—Notwithstanding the temporary idleness of many plants as a result of the Garfield closing order and the difficulties attending shipments, a good demand continues to come out for iron and steel scrap. Prices generally have advanced. Old steel shafting now is quoted $37.50 to $38; short city wrought is unchanged at $26 to $26.50, but long stock now is quoted at $32 to $32.50; wrought pipe is held at $31, an advance of $1; mixed borings and turnings have advanced from $15.50 to $16, and stove plates and grate bars, New Jersey points, are held at $21.50 compared with $20.50. The uncertainty as to the scope of the government's price ruling on melting material now appears to be entirely cleared away by the recent explanation of the American Iron and Steel institute. This statement was to the effect that the maximum price of $30, f.o.b. consumers' works, is to be paid for any kind of cast iron scrap, whether car wheels, machinery cast, railroad cast, etc., and whether it is for consumption by a steel mill or not.

Want More Grades Fixed

Buffalo, Jan. 22.—Extreme shortage of certain scrap grades on which the government has not fixed prices has forced up the figures appreciably this week. Bundled stamping scrap from $19 to $20 is up to $22 to $24; stove plate which was $22 to $23 is now $25; locomotive grate bars which were $20 to $21 are $25; No. 1 busheling has gone from $26 to $27 to $30; No. 2 busheling from $17 to $18 to $22 to $24, and wrought pipe from $26 to $27 to $29. The market has been very strong with a real shortage of material due to lack of labor to classify and load. So stringent has the shortage become that for the past two or three months some producers have not attempted to issue a list of grades for sale. Though the sales are few, the demand is heavy. Some local dealers are attending the meeting of the American Iron and Steel institute in New York today, at which it is expected recommendations will be made that a maximum price be placed on every scrap grade. Local dealers say that the expectations of the government that the setting of prices on the main scrap classes automatically would adjust the other grades, have failed to materialize. It has, on the contrary, they say, had a tendency to boost the prices to a maximum on all grades. This is especially noticeable in the case of No. 1 busheling steel. The price of this grade virtually is $35 because it forms such an important component of No. 1 wrought which has been fixed by the government at that figure. Expanding the equation it is readily seen that the price of shoveling steel of which No. 1 busheling also forms a part is affected. Furthermore, 20 per cent of shoveling steel always has been accepted as a part of heavy melting steel. The government price on this grade is $30. The inextricable relation of the various grades, it is pointed out, has made the $30 price of heavy melting steel an anomaly. Buffalo consumers are confronted with a very serious situation because of the lightness of their stocks.

Strength Is Shown

Boston, Jan. 21.—The scrap market still shows decided strength on a limited volume of business, the latter being due to a lack of anything like normal transportation facilities. The closing down of the foundries is expected to add to the shortage that now exists in cast scrap. Offerings of rerolling rails are still a little too heavy for the market to absorb. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought, No. 1 yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $22 to $23; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $27 to $28; steel rails, $26 to $27; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $20 to $21; machine shop turnings, $13 to $16; cast borings, $17 to $17.50; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $35 to $37.

Inquiries Are Active

Cleveland, Jan. 22.—Inquiries for iron and steel scrap in this district are as plentiful as available freight cars are scarce, and the net result has been little or no business. On account of the Garfield order the trade has been virtually at a standstill since late last week, and dealers are fearful lest the ban on shipments be continued by some railroads. A western Pennsylvania melter is making inquiries for 1000 tons each of clean machine shop turnings, clean cast iron borings and heavy breakable cast machinery scrap. A sale of No. 1 busheling has been made at $28.50 net, or $31.92 gross. Drop forge flashings, large and small, have been advanced approximately 50 cents, while short steel rails are bringing about $1 more than last week. Dealers have yet to be convinced of the good the Garfield shutdown period may accomplish, although they are hewing to the line.

Storm Stops Trading

Chicago, Jan. 22.—Storm conditions that closed most plants all last week and five days of enforced idleness after that, resulting from the fuel conservation order, has caused trading in iron and steel scrap to drop to a minimum. With consumption cut off short over a period of about 12 days the attention of buyers has been directed elsewhere for the time being, to the detriment of trading. Prices are on an upward grade on all classes on which a maximum figure has not been declared. Rises are steady in the face of shortage of material, even though consumption also is reduced. In fact there is little scrap in the market, all sources usually producing

it being less productive than usual. Railroads are offering little, having too much work on hand digging out from the snow and getting coal and other traffic moving again. The Rock Island offers 750 tons and the Monon 185 tons in current lists.

Pittsburgh Market Firm

Pittsburgh, Jan. 22.—The market for scrap is firm and limited sales are being made by brokers who are allowed 3½ per cent commission. There is some dispute as to whether the commission can be paid to those who are purely yard dealers and who sell directly to consumers from their stocks. Brokers, however, who may or may not have supplies but who in the past have acted as agents supplying consumers are being allowed commissions on sales. While the market in this district has been dull it is due to the fact that consumers are unable to cover their requirements and have either withdrawn inquiries or are quietly seeking tonnages. Dealers are greatly handicapped and are not able to get sufficient supplies and are also meeting with difficulties in making shipments owing to embargoes. The greatest demand involves heavy melting and low phosphorus steel and there is some inquiry for hydraulic compressed sheets which are now quoted at from $27 to $28, f.o.b. consuming points, but are scarce.

Shipments Virtually Nil

Cincinnati, Jan. 21.—All of the scrap yards are closed and will not be opened until Wednesday morning. As it is almost impossible to make any outside shipments dealers state that the yards might as well be closed the entire week or until the weather moderates. In the absence of transactions there can be no changes in previous quotations.

Study Coal Order Effect

St. Louis, Jan. 19.—The market for scrap iron and steel here is at a standstill. Buyers, while in need of material, are holding off, and sellers are not pressing matters, owing to uncertainties attending deliveries. Prices throughout the week remained stationary, with the exception of a few minor changes in miscellaneous grades. Dealers are undecided as to what ultimate effect the Garfield order will have. Some believe it will help out by putting more freight cars at the disposal of scrap shippers. Others, however, believe that this feature will be more than offset by reduced demands consequent to closing down of plants and that the railroad relief will bring in old contract shipments, long delayed.

Settle Shell Controversy

Questions Over Specifications for Projectile Steel Are Adjusted—Acute Shortage in Billets and Sheet Bars—Rods in Demand

Youngstown, O., Jan. 23.—Producers and ordnance department officials met in Baltimore this week to discuss further the chemical specifications for shell steel which, according to makers, was causing a 20 per cent loss in production of the steel. While no details were announced, it is understood a compromise between the manufacturers and the representatives of the government was effected. As a result of the failure of the railroads to clear mill yards of loaded cars during the 5-day suspension, many thousand tons of shell steel are waiting shipment. One large producer received several telegrams for a Detroit munition maker asking that shell steel be forwarded at once as the latter's stock of this material is about depleted. Similar telegrams were received from munition plants in the Cleveland district. The steel, however, cannot be shipped, due to embargoes and shortage of cars. It is understood priority orders no longer have any effect either on production or transportation of steel, and they may be discontinued.

Small Tonnages Are Sold

Pittsburgh, Jan. 22.—Small tonnages of sheet bars have been sold in this district, but there is an acute shortage of both sheet bars and billets. While there is a pressing need on the part of consumers, most of them have withdrawn from the market, realizing the impossibility of covering their requirements. The shortage in the output of billets and sheet bars is due principally to the lack of pig iron. Operations of mills in this district do not exceed 70 per cent of capacity, having been reduced since the railroad situation has become so serious. Considerable bessemer tonnage is being supplied by makers on contracts in order to conserve the supply of open-hearth material for the government. The resulting reduction in the output of sheets will make it impossible for consumers of the latter product to secure adequate tonnages.

Fairly heavy demand is being made for wire rods and this comes from both domestic and foreign consumers. Some mills are not taking any tonnages. Business for shipment to the orient has been closed. Some domestic consumers also were supplied with tonnages. Canada, France and Italy have been in the market, but railroad embargoes have made it impossible to ship to Atlantic ports and therefore European countries have been unable to cover their requirements.

New Strip Business Light

Pittsburgh, Jan. 22.—Operations of plants making cold rolled strip steel are considerably below capacity and new business coming to them is light. The government is buying tonnages, some being placed indirectly. The automobile trade has not entered the market actively as yet to take care of its purely domestic requirements, but there has been some buying for motor trucks, ordered by the war department. The prospect of price revision on April 1 together with railroad embargoes has also affected the market for cold rolled strip steel.

Ore Producers

Await Price Fixing Before Planning Season's Work

Cleveland, Jan. 22.—Reservations of iron ore for delivery this year continue to be made by buyers and sellers but actual contracting will await further developments in the government's price-fixing program. The ore trade would like to see definite developments soon in order that the uncertainty regarding mining operations this season might be cleared up. Ore operators, generally, by midwinter have been able to plot out their mining schedules so as to supply the ore which had been sold.

Plans for handling the ore shipments this summer will be formulated in March by the mobilization committee of lake vessel owners. Centralized direction will be followed this year in handling all lake trade, as well as the coal shipments from mines to lower lake ports. This plan is expected to bring into play at all times the maximum freight moving capacity of the lake fleet and to avoid most of the delays which seriously retarded the vessels last summer.

Index is Ready

The index to Vol. LXI of The Iron Trade Review covering the last six months of 1917 now is ready for distribution. Copies will be sent to all subscribers who express their desires for them.

Bar Contracts Repudiated

Fabricated Shops and Nut, Bolt and Rivet Makers Decline to Take Out Tonnage—Auto Industry Outlook Improves

Philadelphia, Jan. 27.—Many thousand tons of steel bars which were on a contract for the last quarter of 1917 have been repudiated principally by fabricators, and by rivet, nut and bolt makers. The latter say that by taking the bars at the contract prices they are unable to come out even at the government prices on their products. In many cases it is probable they will have to take this tonnage, as they are unable to place new lots at the government bar prices of 2.90c, Pittsburgh, because of the huge tonnage of shell rounds which the bar mills are rolling. The Pennsylvania railroad wants 1000 tons of steel bars. Iron bars are quiet and continue to sell at 3.50c, Philadelphia.

Automobile Demand Liberal

Cleveland, Jan. 22.—Business lately booked for the coming season by builders of pleasure automobiles has been very liberal and the outlook for better operations of this industry has been improved. A great portion of the demand has been for moderate-priced cars, while the sale of the higher priced machines has been light. These divergent conditions, it is estimated, will produce about a 50 per cent capacity operation of the whole pleasure car industry during the coming year. Part of the capacity of some of the higher-priced makers is being devoted to war work. Implement manufacturers in this district have been placing orders for their needs of rail steel bars and other sections over the first quarter. These are in the form of specifications, since makers are not entertaining contracts. Some negotiations for soft steel bars for first quarter and for first half also are going forward. Some makers have intimated they may take first half tonnage. Several inquiries for bars for war work remain under negotiation.

Demand Fair at Chicago

Chicago, Jan. 22.—Soft steel bar business is practically stifled in this territory by the cessation of traffic due to the snowstorms of a fortnight ago and the plant closing order of the fuel administration. In spite of this demand is fairly heavy in this as in all finished steel products. The leading interest continues to sell small tonnages to regular customers for delivery at convenience, subject to announced prices at the time of delivery. During the past week specifications have been filed in unusually large volume, though most were on government tonnages. This is especially true of material for ship construction. Bar iron makers are selling only spot material and have not yet begun to book second quarter or last half business. The likelihood seems to be that when such contracts are made they will carry a cancellation provision to protect buyer and seller in case prices prove unsatisfactory. Hard steel bars are inactive and most mills in this territory have been idle for nearly two weeks on account of storm and fuel conditions.

Implement Makers Want Bars

Buffalo, Jan. 22.—There has been a fair demand for bars and shapes in this market on the part of makers of agricultural implements and some bookings. The additional bar and plate tonnage inquiry is on account of new war orders.

Iron Bar Makers Busy

Pittsburgh, Jan. 22.—Books of makers of iron bars are comfortably filled with orders which have been taken from various sources. Considering transportation conditions, deliveries are being made in a satisfactory manner. Some of the requirements are being placed either directly or indirectly for the government. The buying of iron bars as in other lines has been checked somewhat on account of the fact that prices are subject to revision on April 1. Specifications for soft steel bars are being made rather freely and implement makers are contracting for their first half requirement. The output of bar mills has been greatly curtailed on account of traffic congestion, and some of them have had to suspend operations temporarily. The government is understood to have placed large orders for steel rounds.

Congestion Relieved Somewhat

Pittsburgh, Jan. 22.—Shipments of nuts, bolts and rivets are expected to become less difficult if the Garfield order succeeds in relieving traffic congestion. Railroad embargoes have had a serious effect upon makers of nuts, bolts and rivets, making it impossible for them to ship more than 50 per cent of their output and some of them have not been able to ship at all. They also have had extreme difficulty in getting steel bars for a similar reason. Demand is active, a great part of it coming from interests engaged on government contracts.

Embargoes Affect Shafting

Pittsburgh, Jan. 22.—Railroad embargoes have greatly affected shipments of cold rolled shafting and this has compelled some makers to suspend entirely or curtail operations. The government is placing requirements for relatively small tonnages of shafting.

Hoop Demand Is Active

Pittsburgh, Jan. 22.—Active demand continues to be made for hoop steel and comes from barrelmakers and miscellaneous manufacturing lines. Producers have been able to take care of requirements and to promise satisfactory delivery. The market for bands is less active and some makers are unwilling to take the business at 2.90c, Pittsburgh, the steel bar price.

More Activity

Shown by Private Cast Pipe Buyers —Oil Interests Inquire

New York, Jan. 22.—Considerable demand for cast iron pipe is noted in the east. Private consumers during the past week have been showing more interest in their requirements. These requirements in some instances have been accumulating for several months. A factor in the present demand is the feeling in many quarters that there is little possibility of a downward revision in prices by the government April 1. Public work at this time is scarce. Export trading also is at a standstill owing to the inability of shippers to obtain vessels. Several inquiries which have been before the market for a number of weeks are being held up. Undoubtedly, much foreign trading would be done if it were not for the present shortage of bottoms. Pipe plants generally have suspended operations temporarily in compliance with the Garfield closing order.

Oil Interests Seek Tonnage

Pittsburgh, Jan. 22.—Oil country interests are making active demand for lap weld iron and steel pipe, but a number of makers are unable to take this business, while others are able to take some tonnages. Producers have been meeting with fair success in catching up on deliveries and in the case of butt weld iron pipe, the inquiry for which is extremely dull, tonnages can be taken for prompt

shipment. Makers of butt weld steel pipe are from one month to 18 weeks behind on deliveries. Independent makers are from one to six weeks behind on shipments of lap weld pipe while the leading interest is about 60 weeks behind.

Alabama Plants Shut Down

Birmingham, Ala., Jan. 22.—The cast iron pipe plants in the Birmingham district shut down following the orders of Fuel Administrator Garfield and there will be no resumption until the middle of this week. Plants in the Anniston section were practically down before the coal conservation order was issued because of the dull market. There is hope of an early recovery in the market, as municipalities and others are making preparations to figure on specifications for spring and summer needs. Machine shops and foundries generally in the Birmingham district managed through special permission and by reason of the fact that they use power from the Alabama Power Co., a hydroelectric company, to continue in practically full operation.

Spiegel Advanced

By Eastern Maker, But Sales Still Lower—Ferro Less Firm

Pittsburgh, Jan. 23. (By wire.)—The market for 80 per cent ferromanganese has softened, and is now quotable at $240 to $250, delivered, for nearby delivery. A consumer in Ohio is understood to have taken 150 tons, for delivery during January, February and March at $240.

New York, Jan. 22.—One of the principal eastern producers of spiegeleisen has advanced his price on this metal to $75, furnace. The advance resulted from this interest's desire to turn away business temporarily. Other makers still are taking such business as is offered, at $60, furnace. In some cases, $61 and $61.50 are being obtained for carload lots for quick shipment.

Some Sales Are Made

Pittsburgh, Jan. 22.—Limited lots of 80 per cent ferromanganese for first quarter shipment have been sold at $250, delivered. Inquiry is light. Demand for 20 per cent spiegeleisen is not active. Some tonnages for nearby delivery have been sold at $60, furnace. Considerable demand for the lower grades of bessemer ferrosilicon exists, but makers are well committed for the first half.

Plate Production Rushed

Urgent Needs of Fleet Corporation Keep Mills Operating Through Conservation Period—Coal Lack Restrains Eastern Output

Pittsburgh, Jan. 22.—Mills making sheared plates for the Emergency Fleet corporation or other government purposes were exempted under the Garfield order and have continued to operate without interruption. The government is desirous of obtaining as much plate and fabricated tonnage as it can in the shortest time possible in order to hasten the shipbuilding program. With this end in view, plate mills and fabricating shops doing Emergency Fleet corporation work have been kept in operation. There has been some speculation in the trade as to whether or not concentration of production of plates and fabricated material would not actually result in a congestion at the shipyards and be the possible cause of having to curtail plate and fabricated output. Such a result would be directly contrary to the interests of the shipbuilding program, but the production has been so great that some believe that the contingency may develop. The plate market continues to be quiet with no offerings made. No car orders have been placed in this district during the past week.

Small Lots Cancelled

Cleveland, Jan. 22.—Some cancellations of plate tonnage, due for current delivery in this district, have been made owing to the inability of mills to obtain steel. These lots have not been large. In other cases makers have shown a disposition to compromise on higher priced contracts which call for 8 to 10-cent plates. It is expected that the prices will be about halved in certain cases. Some makers with whom orders have been less active of late report better specifications. Some shipments of destroyer plates with local mills have been held up by the enforced closing of these plants the past week. Prices locally quoted continue from 3.25c to 4c, mill. Universals still are being offered by eastern makers at 3.33c, mill. It is understood from Washington that the American Shipbuilding Co., which now is building many government boats, will receive orders for an additional number in the near future.

Mills Resume Rolling

Chicago, Jan. 22.—Exceptions to the closing order of the fuel administration have been made in the case of the leading interest and the leading independent to allow production of plates for government ship work, as well as other finished steel needed for war purposes. Plate mills accordingly started operation as soon as possible after the storm effects had been overcome and are producing this material as rapidly as circumstances will allow. Demand for plates continues strong but makers are unable to book tonnages except such as the government asks for its war work. Practically all the tonnage now being booked is preferential, under government orders.

Production is Handicapped

Philadelphia, Jan. 22.—The Emergency Fleet corporation continues to place new plate tonnage almost daily. Other demands for plates upon eastern mills are much quieter than in recent weeks. Eastern production of plates has been handicapped by lack of fuel and it has been impossible for the plants to take full advantage of their exemption from the fuel administration order.

Fuel Exemption

For Tin Plate Makers Fails to Prevent Some Shutdowns

Pittsburgh, Jan. 22.—Mills making tin plate for food containers for perishable foods last Sunday were exempted from the Garfield order and in consequence resumed operations where this was possible. Some mills have been closed down, however, on account of the fact that they have exhausted storage capacity where great quantities of tin plate have been piled up owing to inability to make shipments. The 30 mills of the American Sheet & Tin Plate Co. at Farrel, Pa., continued idle for this reason. The pressing need of supplying tin plate makers has also caused the fuel administration to exempt tin bar mills from the Garfield order.

Sell Scale and Cinder

Philadelphia, Jan. 21.—The annual buying movement in mill scale and cinder, practically has been concluded. Slightly higher prices on scale prevailed than last year, averaging between $6.50 and $7.50 per ton, delivered at consumers' plants.

Now Ask Cancelled Shapes

Fabricators Who Repudiated Contracts in East Willing to Take in Original Tonnage—Few Revocations Elsewhere

Philadelphia, Jan. 22.—Some fabricators who recently repudiated shape contracts for eastern mills now say they will take this material if it is delivered as first agreed. The situation that now arises is that these repudiations had caused a considerable derangement of mill schedules and some of the shapemakers now are devoting their capacity to the rolling of large shell rounds. Structural requirements of the local market remain light. The Phoenix Iron Co. recently took an order for 6000 tons for an extension to the Baldwin Locomotive Works, at Eddystone, Pa.

Extension Is Deferred

New York, Jan. 22.—Aside from government contracts, little new business has come before the New York structural market during the past few days. Practically nothing is being done in the way of new building. The E. W. Bliss Mfg. Co., Brooklyn, has withdrawn its inquiry for 5250 tons of steel for extensions. This action, it is understood, was due to a change in plans with regard to government work.

Market Is Quiet

Pittsburgh, Jan. 22.—Practically no business from private consumers are coming to fabricators. While some of them are unable to take additional tonnages, others are in a position to accept new business, but buying has been restrained on account of the high prices and also by reason of the fact that levels are subject to revision after April 1. The American Bridge Co. operated part of its plant during the five-day period when the Garfield order was in effect, the portion of it being exempt because the company is doing work for the Emergency Fleet corporation. This company has taken 1200 tons for a paper mill in West Virginia.

Western Fabricators Slack

Chicago, Jan. 22.—As a rule fabricating shops are not heavily burdened with work, though here and there an instance is found where a fair tonnage is on the books. Other shops would have practically nothing to engage their activities were it not for the material being fabricated for the Emergency Fleet corporation. Indications are this condition will continue well through the coming season. St. Louis and Milwaukee shops are an exception to this rule as each of these districts have much industrial work in progress calling for fabricated material. The general contract for Butler Bros. warehouse building, which will require 9000 tons of steel, has been let to John Griffiths & Sons Co., but the steel will be bought by the architects, Graham, Anderson, Probst & White, Chicago.

Western mills have not had cancellation of business contracted before prices were fixed in September, buyers filing specifications fully from month to month. Mills in this territory did not book much tonnage at the extreme premium prices, selling mostly for delivery at convenience at prices not much above the level established by the government. Production at present is exclusively on those contracts except the tonnage allotted by the government for war purposes.

CONTRACTS AWARDED

Extension to Baldwin Locomotive Works, Eddystone, Pa., 6000 tons, to Phoenix Iron Company.

Government nitrating plant, 8000 tons, to American Bridge Co.

Government building, 105 and 112, and range finding tower, 700 tons, to McClintic-Marshall Construction Co.

High school, Pipestone, Minn., 153 tons; general contract let, steel not bought.

Butler Bros. warehouse, Chicago, 9000 tons; general contract to John Griffiths & Sons Co.

Philadelphia Free Library, 2000 tons, to the American Bridge Co., by John Gill & Sons Co., general contractors.

A paper mill in West Virginia, 1200 tons to American Bridge Co.

Government power house, 2000 tons to McClintic-Marshall Co. by the J. G. White Engineering Corp.

Armory, Ninety-fifth street and Park avenue, New York, 250 tons to Passaic Structural Steel Co.

Government building in West Virginia, 300 tons to Eastern Steel Co.

Loading pier, Perth Amboy, N. J., 500 tons to T. A. Gillespie & Co.

CONTRACTS PENDING

Four buildings for the ordnance department at Baltimore and Atlanta, about 1000 tons, bids being taken this week.

Grand central viaduct, New York City, 300 to 400 tons, bids being taken.

Bridge for Lehigh Valley Railroad, 500 tons, bids being taken.

Chronic hospital, Brooklyn, 250 tons, bids being taken.

Bank building at Titusville, Pa., 200 tons, bids being taken.

Bridges and track scales for Pennsylvania railroad, 700 tons, bids being taken.

Pier No. 6, State barge canal, 350 tons, bids being taken.

Bridge work for Southern railroad, 500 tons, bids pending.

Eight signal corps buildings for American Expeditionary forces in France, 250 tons each. Bids opened Jan. 10.

State pier in East river New York City, 425 tons, bids being taken by I. Stander & Co., contractors.

Machine shop for E. W. Bliss Co., Brooklyn, 5250 tons, action deferred by change in plans.

Government buildings, 400 tons, bids being taken by J. G. White Engineering Corp.

Building for navy yard, Washington, 200 tons, bids being taken.

Equipment Buying

For Railroads by Government Still Awaited—4400 Cars Wanted

New York, Jan. 22.—Although demand for railroad equipment appears to be improving slightly, no large buying is anticipated until plans for financing the roads have been further developed.

Few car inquiries are before the market. The recent inquiry of the Baltimore & Ohio for 3000 freight cars has been withdrawn. There are, however, a number of inquiries out from private consumers, including the following: Brier Hill Iron & Coal Co., 10 gondolas, 40 coal cars and 25 general service cars; Equality Refining Co., Oklahoma City, Okla., thirty 8000-gallon tank cars; W. D. Jenkins, New Orleans, 10 tank cars; Samuel Baer, Nashville, Tenn., 10 tank cars; the Western Contracting Co., Kansas City, Mo., 25 tank cars; Lowell R. Gaidri, New Orleans, 10 tank cars; the Southern Oil Corp., Tulsa, Okla., 25 tank cars; the Jarecki Chemical Co., Cincinnati, six tank cars; and Earl Petty, Eldorado, Kans., 20 sulphuric acid tank cars. The war department is about to place orders for spare parts and specialties for freight cars.

The Republic Iron & Steel Co., placed orders for 200 coke cars with the Pressed Steel Car Co. The Colombian Northern has ordered six wooden gondolas from the American Car & Foundry Co. and the navy department several 60-ton steel underframe box cars with the same builder.

Among inquiries for locomotives are 50 for the Chicago, Milwaukee & St. Paul railroad and five for the Western Pacific railroad. The American Locomotive recently has taken the following orders: Fifteen Mikado locomotives for the Delaware, Lackawanna & Western; nine mountain types for the Rhodesian railways, and 20 Mikado locomotives for the Chilean State railways.

Rail Market Is Quiet

Pittsburgh, Jan. 22.—The market for standard rails is dull. The leading interest is not taking any business and is sold up for all of the present

year. A producer in the nearby district is understood to be in a position to take limited lots of standard and light sections. The government price of the latter is 3c, mill, while bessemer and open-hearth standard rail prices, for which levels have not been established by the government, appear to be quotable at around $55 and $57, mill, respectively. Some fair-sized tonnages of light rails have been sold by a maker in this district. The market for small spikes is fairly active and some jobbers are pressing producers for shipments, but railroad embargoes have made it impossible to deliver to some of them. The market for standard spikes is dull.

Government Wants Cars

Chicago, Jan. 21.—An inquiry for 4400 freight cars has just been put out by the government. Of these 4000 are of standard gage and 400 of narrow gage. It is not stated whether the larger cars are for domestic or foreign war use but probably the latter, as the narrow gage cars would be of use only on the light military railroads.

Chicago, Jan. 22.—Inquiry for standard steel rails and track fastenings is noticeably better in the west, for 1919 delivery. This is the best that can be offered by the Chicago mill unless conditions later in the year allow speeding up to a degree not now expected. In that case some additional tonnage might be sold for this year. Car buying is absent and no inquiry of any importance is now before the builders in the west.

Manganese Ore Retarded

Philadelphia, Jan. 22.—According to a cable received today, the Central Railroad of Brazil has embargoed, because of a lack of coal, all shipments of manganese ore from the state of Minas. This followed advices received five days ago that this road was only accepting 50 per cent of the normal shipments. As a result of this condition present imports of manganese ore to the United States will be made up entirely from stocks at Brazilian seaboard, estimated at from 60,000 to 100,000 tons. The manganese ore market is very strong. Sales of round tonnages have been made at $1.35 to $1.45 per unit at tidewater. The latter is the minimum figure.

Robert J. Anderson, formerly metallurgist, Cleveland Metal Products Co., Cleveland, was recently appointed engineer of tests of war materials, war department. Mr. Anderson has been assigned to the plant of the Brier Hill Steel Co., Youngstown, O.

Sheet Output is Cut Low

Fail to Get Exemption From Fuel Order and Industry is Resuming Gradually—Little Business Done

Pittsburgh, Jan. 22.—Operations of sheet mills in this district have been further curtailed and perhaps do not exceed 45 per cent of capacity. This is due to the shortage of steel and the transportation congestion. Sheet mills have not been exempted from the Garfield order and have been closed down altogether since last Friday, when the cessation became effective. The five-day period close down expires at midnight tonight, when the mills will resume running on the schedules that were maintained previous to last Friday. Mills have made their allotments for the first half for blue annealed and black sheets and for the first quarter for galvanized sheets and are not taking additional domestic business. Government requirements are heavy.

Mills Get Under Way

Youngstown, O., Jan. 23.—Valley sheet mills which have been suspended since last Friday are gradually getting under way again. A few mills were started at midnight Tuesday, while others did not start until late Wednesday morning. Domestic inquiry continues to come in, although the mills are booking light tonnages only. No government tonnages have been placed in this territory for some time, although nearly all mills have more or less of this business on their books. Foreign inquiry practically has disappeared. Sales managers state that since sound credit has been established by nearly all foreign buyers, their business is welcomed. However, in the past large tonnages of export sheets under sale were resold in this country on account of the difficulty experienced in obtaining permits for shipment of this material abroad. Strict railroad embargoes are still in force among the mills in this territory and at present include shipments west as well as east.

Export Inquiry Strong

Chicago, Jan. 22.—Strong demand for steel sheets for export continues to be the feature of the market here but makers are unable to book this business on account of the uncertainty of buyers being able to ship the material. It is necessary to obtain an export license, a priority order, railroad authority for shipment and a letter of credit. This makes it a complicated transaction. Additionally, most of the export demand is for prompt shipment. Some small lots are being sold by the leading independent for second quarter delivery, though the contracts allow cancellation in case prices are unsatisfactory to buyer or seller. This is unsatisfactory business and is kept down to a minimum.

Quiet Business

Shown By Jobbers, But This Not Due To Shutdowns

Boston, Jan. 19.—Business continues quiet with local jobbers in steel and iron products. Buyers working directly or indirectly on government work are the chief sources of business and since this class has been less disturbed by the Garfield order then those engaged on nonessential work, the shutdown cannot be blamed for the current lack of activity. It is believed warehouse business would be helped by a more extensive building campaign than is now possible with the government needing practically all the spare funds that are available. Prices being on the government basis, hold unchanged, but they probably would be firm if not actually strong in the face of current quietness, for supplies are not burdensome in any direction. Actually, most jobbers feel they are making quite a concession to the government in selling at the prices that have been fixed for them.

Restored Output

In Wire Products Still Matter of Uncertainty—Better Demand

Pittsburgh, Jan. 22.—Transportation conditions and the lack of fuel and of steel have greatly curtailed the output of wire and wire nails in this district, operations of some plants having been entirely suspended. There is no prospect that they will be able to return soon to anything like a normal schedule. Demand for both wire and wire nails is fairly brisk and some sales, involving considerable tonnages, have been made during the past week. The government has been placing fairly large orders for nails and commercial interests have been buying wire. Bessemer steel is being used by makers as much as possible in order to conserve open-hearth steel to meet the government demand.

Garfield Edict Brings Little Relief

Close of 5-Day Period of Industrial Suspension Finds Coal and Traffic Conditions Seriously Entangled—Washington Asserts Ships Are Getting Bunker Coal—Freezing Weather Hampers Railroads

GARFIELD'S order under which industrial activities were suspended for five days, failed to relieve coal and traffic conditions. Whether the fault rests with the wisdom of the order itself, or with the severe winter weather, is problematical. The fact remains that when the plants started up Wednesday morning in the territory from Boston to Chicago, the coal and railroad situation was as serious as when the shops closed down on Thursday of last week.

Washington states that ships have received bunker coal and are rapidly clearing for Europe with the freight which has been blocking eastern terminals. But reports from the east indicate that the confusion resulting from a multiplicity of federal agencies, each striving by its own method to clear the terminals and harbors, practically nullified all attempts to straighten out the tangle into which the eastern freight situation has become ensnarled.

St. Louis sees a visible improvement. Youngstown asserts some betterment resulted. The east finds little change, while Cleveland and Chicago awoke Wednesday to find the situation unimproved. Pittsburgh reports that railroads have cleared their main lines and hope now to disentangle the yard tie-ups.

Some manufacturers support the order as a necessary measure, others patriotically hope that some good has resulted to others if not to them, while many condemn the ruling as futile. An Ohio manufacturer of gun lathes lost two days before a belated exemption order was granted. In the full five days, this firm would have saved 200 tons of coal or $1000, would have burned 200 tons or $1000 in keeping the plant warm, and its employes would have lost $12,000 in wages. This manufacturer points out that the cost of any delay in making the gun lathes which are needed to turn out guns so that the American forces in France can finally be equipped with American artillery, can hardly be reduced to terms of $1000—the value of the coal saved.

Another firm which is producing one marine engine a day for the Emergency Fleet corporation, lost two days before the delayed exemption came. In those two days, about 40 tons of coal or $200 were saved—and 24 hours more were lost in outfitting two vessels which the country desperately needs.

Effect of Order in Leading Districts

WASHINGTON

Washington, at the close of the five coalless days, announces that ships were bunkered and the needs of public utility and domestic consumers greatly served. Mr. Garfield, however, has asked Railroad Director McAdoo to embargo for five days more all freight except food, fuel, munitions and essential supplies. Mr. McAdoo has declined, but may consent within a day or two to make the order. The Garfield request was inspired by the embargo announced Monday by the Pennsylvania railroad and would include the Reading and Baltimore & Ohio railroads.

Enough coal is on hand or in sight to bunker all ships now at seaboard, Mr. Garfield said Tuesday night. The ships which have sailed carried cargoes, which greatly relieved congested tidewater terminals.

How industry fared generally was not stated by Mr. Garfield, but he pointed out that industries, capital and labor patriotically co-operated in observing the order.

Various coal distribution plans will be considered by a commission named by McAdoo and Garfield. Mr. McAdoo named Howard Elliott and A. G. Gutheim, of the interstate commerce commission car service committee and Mr. Garfield named C. E. Lescher, coal statistician; G. N. Snider, traffic expert, and Samuel A. Taylor, technical expert, all of Garfield's own staff.

CHICAGO

At Chicago the railroads made every effort to clear their yards and transport fuel during the five days of enforced idleness, but conditions at steel plants were not materially improved.

Practically the entire manufacturing world in the Chicago district was idle for five days and the railroads were able to concentrate their energies on handling freight already in cars and yards without any additional loads being handed them. The yard blockades resulting from heavy snows were cleared up during the five days and the carriers generally were able to deliver cars to plants or to team tracks and to expedite unloading.

General fuel conditions are better and coal from Illinois and Indiana mines is coming in more freely. Plants using this coal are getting more fuel as the short hauls are being made much more easily now than a week ago, before the general shutdown.

PITTSBURGH

At Pittsburgh, the effects of the Garfield fuel order on traffic conditions are becoming apparent. At some iron and steel plants, however, congestion in yards has not been relieved and in instances is worse than it was before the order went into effect. Railroads have cleared their main lines to a considerable degree and this is believed to be a prelude to relieving the congestion in yards and to improving the movement of coal and coke to industrial plants. Some improvement in this movement has already appeared. The weather has been so severe that the efficiency of motive power has been reduced greatly and this has prevented much improvement.

In the Pittsburgh district, the effect of the Garfield order was lessened by the fact that the output in several branches of the iron and steel industry was either greatly curtailed or was altogether shut off through a lack of fuel and steel and because of the traffic congestion. Included in this category were wire, tin plate, sheet and bar mills.

The railroads are exerting vigorous efforts to relieve the congestion in this district, particularly at junction

points and terminals and in yards of industrial plants. The rivers are frozen, but nearly a score of steamboats are engaged in the Monongahela valley in breaking ice. At some points the ice is 20 inches or thicker and it is a serious question as to whether or not it can be broken up by this method.

NEW YORK

The end of the 5-day closing period finds coal terminals still badly congested. Less than 20,000 tons of coal arrived in New York City Tuesday, or less than for any one of 10 days preceding the Garfield edict. Coal shipments to tidewater railroad statistics show, have not increased. One bright spot in the situation is the improvement in bunker coal supplies to ships. Tuesday, 24 ships were coaled, including those most important to allies, but 81 still await coal.

Extreme cold weather and heavy snow in the eastern states is hampering the efforts of railroad authorities and the fuel administration to clear up traffic congestion. However, it is believed that the dropping of passenger trains and the decrease in new freight handling, due to the Garfield order, has laid the foundation for steadier and larger coal supplies to eastern plants and ports. Leading makers of pig iron and finished steel products say it is too soon to express an opinion as to how effective the closing order will prove in bettering industrial operations. In some quarters it is thought that the closing period should be extended. The situation is complicated by the fact that all shipments to New England points must be consigned to the government while all roads require shipping licenses and local embargoes are numerous. As yet, none of these embargoes has been lifted.

Interest in carrying out the fuel administrator's order, as it affected the large steel companies, centered at the office of Elbert H. Gary, chairman of the committee on iron and steel products of the American Iron and Steel institute, and chairman of the United States Steel Corp. Meetings to discuss the order and the consequent action to be taken were held both on Thursday and Friday at Judge Gary's office. Following adjournment of the Thursday meeting, Judge Gary issued the following statement:

"We shall probably not pay the wages of our men when they are not actually employed. To do so would be contrary to the custom of the trade and would establish a precedent that eventually would be unfair to the employer as well as to the employe."

YOUNGSTOWN

In the Youngstown district, coke, pig iron and steelmaking plants are operating at from 63 to 75 per cent of capacity. The Garfield order has not yet brought any decided improvement in transportation conditions, although most traffic managers say that the district is bound to be benefited in spite of the cold spell which prevailed during the suspension.

Many cars which had been sidetracked for two months or more were dug out of the jammed yards at East Youngstown while many remained untouched. It is reported that the New York Central railroad alone has 2000 cars waiting to be dispatched on to its main line, but that they cannot be moved owing to lack of motive power. The railroads promised to relieve the steel plants in this district of all loaded cars during the 5-day period, but in only a few instances were these promises carried out.

Carriage Cost Steep

THE unprecedented conditions and high costs prevailing today in connection with transportation is reflected by the experience of a Cleveland concern which recently sought to fill its requirements of 30 tons of chrome vanadium tool steel. This material was ordered forward by express and the carrier decreed it had to go in two cars. The shipment actually came in two refrigerator cars, consumed four days' time between a western Pennsylvania point and Cleveland and the express bill was approximately $600.

BOSTON

In Boston, present conditions hardly warrant the optimistic utterances from Washington that the industrial suspension has materially helped the traffic situation. The railroads have made some progress in relieving the car congestion, but the tracks are by no means clear. New England is still short of coal and much of the good that has come from the shutdown and from other measures may be undone by the heavy snowstorm now raging in that region. In Boston, the scarcity of coal is still acute.

Fuel administrator James J. Storrow also takes a rather gloomy view of the situation. He says that the 5-day closing order helped but did not remove the congestion, and asserts that favorable weather conditions are necessary to bring material relief to the industries affected.

Actually, tangible signs of material improvement in the situation are lacking. The railroad embargo, slapped on to help relieve the congestion, has not yet been lifted. Shipments of iron and steel consigned to government plants are coming through fairly satisfactorily.

DETROIT

At Detroit, the Detroit Edison Co. reported that the saving of fuel through curtailment of power amounted to about 25 per cent. The Garfield order, it is felt, did not produce the results sought for. Freight congestion has not been cleared up greatly and the saving in fuel was comparatively small. The order affected 250,000 industrial workers. Many specific exemptions were received by firms manufacturing war materials, one being the Ford Motor Co., employing 32,100 men. This company closed down last Thursday night at midnight and when notice of its exemption was received it was too late to recall the men so that the company has less than 1000 men at work.

BUFFALO

At Buffalo, due to the fact that all available car equipment is being utilized to carry coal to New England, as a result of a Garfield order of Jan. 7, diverting 80 per cent of Buffalo's supply, the city faces the gravest fuel crisis in its history. Even the 5-day closing order, tending to loosen traffic, was practically useless for all industries using coal exclusively.

Lack of cars forced the closing of the Rochester and Pittsburgh mines, Buffalo's big source of supply, and a chamber of commerce statement issued Tuesday says there must be a general closing down of industries within a few days unless the situation is relieved.

ST. LOUIS

In St. Louis, as a direct result of the Garfield order, the fuel situation is rapidly improving. In the past 24 hours, 642 cars of coal were brought across the Mississippi river, the best showing since the cold weather commenced. Railroad officials report a general loosening up, and at least two of the important western lines have cleared their tracks. In the big East Side yards, cars and even trains which had been embedded in what appeared to be a hopeless congestion, are being moved. Steel plants and industries generally on the East Side report increasing deliveries of all varieties of materials, especially fuel. They say they are receiving empties more promptly upon demand.

Contract Form

In Pig Iron Causes Thought Because of Revision Clause

Chicago, Jan. 22.—Changed conditions in the selling of pig iron resulting from the provision late in December that new contracts for delivery on or after April 1, 1918, must provide for revision in accordance with the government price in force at time of delivery, have caused much thought to be given to the form of contracts. In the past a pig iron contract has been absolute as to price and delivery, and not subject to revision no matter what course the market had taken between the time of selling and delivery. The new order of things changes this situation materially and gives rise to a number of contingencies. Many sellers have delayed execution of contracts until these could be provided for definitely. Makers are inclined to protect themselves by providing for cancellation if the announced price proves unsatisfactory to the buyer. One clause now under consideration is phrased as follows:

"The prices herein named are subject to revision by any authorized United States government agency in respect of any materials delivered hereunder after March 31, 1918, so that the prices on such delivery shall not exceed the maximum price then in force. It is understood, however, that should any tonnage be withheld, due to the failure of the buyer to accept it, such tonnage to be postponed and billed at the price in force for the period in which it was due."

One criticism of this form is that it seems to provide for revision downward "so that the price shall not exceed the maximum", does not provide for increasing the price in case the maximum is raised.

One maker is making contracts containing the following clause, which has seemed sufficient for the seller and is being accepted by the buyer:

"Above price is subject to change in the government schedule, buyer to pay any advance or receive the benefit of any decline. It is understood and agreed that if the ———— Co. is not satisfied with the price set by the government the said ———— Co. has the privilege of cancelling this order."

Another company proposes the following, which has not yet been adopted:

"Price net to furnace, subject to government revision in prices or if the government withdraws its price regulation on account of the discontinuance of the war or other cause the furnace is to receive the market price at the time of shipment, either upward or downward."

The latter covers a point that is not touched in other clauses. When the government terminates its supervision of prices, some contracts will be in force providing for payment at the fixed price. Makers perceive it

Reaffirm Copper Price

Washington, Jan. 23. (By wire.—The copper price has been reaffirmed at 23½ cents for all grades until June 1 on condition that wages be not reduced. The price is the same for allies, the public and the government.

Wants Iron Tonnage

New York, Jan. 23. (By wire.)—Considerable tonnage of second half foundry iron has been sold in this district subject to price revision.

The Worthington Pump & Machinery Corp. wants 7500 tons, mostly foundry, with some charcoal and some silveries.

Sales of 2000 to 3000 tons of English ferromanganese have been sold for first half at somewhat lower than the domestic price.

A middle western consumer wants 600 tons of ferromanganese and 800 to 1200 tons of spiegeleisen, for March-April-May delivery.

Brier Hill Steel Shows Heavy 1917 Earnings

Net earnings of the Brier Hill Steel Co. for 1917, after the usual charges and excess profits tax, aggregated $10,587,335. After payments of dividends—7 per cent on preferred and 6 per cent on common, as well as an extra on common of 14 per cent, the surplus as of Dec. 31 was $17,542,032. Net current assets at that date were $14,092,552. Gross business for 1917 approximated $51,000,000, and gross earnings about $24,000,000.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Jan. 22.—Owing to the clause in the fuel administration's closing order, exempting industries which must operate continuously, the smelting of non-ferrous metals was not interfered with seriously by the ruling. Mining of ores and smelting and refining of copper, lead, spelter and aluminum in the regions affected were generally continued. An exception to the copper industry was the Long Island refinery of the Nichols Copper Co., which was shut down by order of the local fuel administrator, who misinterpreted the order. If the order had thus generally been applied to the copper refineries, the loss of 13 days operations would have decreased output by about 110,000,000 pounds, which would have been serious indeed, in view of urgent munition requirements of this country and the allies, at a time when 75 per cent of the copper refined is being consumed in war supplies.

About 31 zinc producing companies were represented at the spelter meeting. No action was taken with regard to prime western and hopes of producers of this grade of spelter that something would be done to relieve their position were short lived. It now appears probable that the curtailment of prime western output will proceed more rapidly, as many smelters are operating at a loss of ½c to ¾c per pound. On the other hand, it developed that the government has taken large tonnages of high and intermediate grades of spelter, quietly. It has dealt directly with individual producers, instead of asking for bids. No price was made in many cases, the metal being taken with the understanding that both parties to the contracts would abide by the price to be fixed later by the war industries board. It is understood now that such a price has been fixed, both for high grade spelter and for sheet zinc. Announcement probably will be made by the war industries board this week. The spelter market has been dull and has changed little the past week. Quotations are about as follows: Prime western, prompt and January shipment, 7.70c to 7.80c, St. Louis; February, 7.80c to 7.85c; March, 7.85c to 7.90c; brass special, 8c to 8.25c; high grade, 11.50c to 12c, St. Louis.

Representatives of aluminum producing and manufacturing companies were scheduled to meet with the war industries board last Thursday, but this meeting is said to have been postponed for two weeks. The contract price of the Aluminum Co. of America remains 38c, for 1918 and 1919, No. 1 virgin ingot aluminum. The outside market has retained the strength of previous weeks, due rather to small supplies rather than heavy demand. Outside quotations follow: No. 1 virgin, 38c to 39c; No. 1 remelted, 37c to 38c; No. 12 alloy, 31c to 32c.

The tin situation has not changed on the surface since last week, nor in many weeks. Spot supplies have gradually disappeared, some extraordinary prices have been reported in some cases. One sale of 500 pounds of Straits tin is reported at $1.10 a pound. Several sales were made at around 96c to 98c for one and 2-ton lots.

Production of lead has been affected considerably by the labor, fuel and ore shortages in the west, but statistics are lacking to indicate just how much output has suffered. Little demand is evident in the outside market and probabilities are the government is taking increasing amounts, for prices are gradually strengthening. The American Smelting & Refining Co. continues to quote 6.75c, New York, while outside sellers are quoting 7.25c to 7.37½c, St. Louis, for prompt, January and February shipment. An advance by the leading interest is expected soon.

The antimony market is inactive, with prices unchanged at 14c to 14.25c, duty paid, New York, for spot Chinese and Japanese brands.



King George on the Clyde Inspecting the Harland & Wolff Shipyard

Two Years of State Control is Effective

BY JOSEPH HORTON

British Correspondent The Iron Trade Review.

THE control by the British government of the iron and steel industry took effect early in November, 1915. The trade thus has had a full two years' experience of these novel conditions, and the time is opportune for a review of the general results. We realize now much more fully than when the works were taken over, how urgent that step had become. During the first year after the outbreak of war, owing to the many dislocations caused, the output of steel was considerably reduced; but in July, 1915, when the large demands for shell steel came into sight, it became evident that steps would have to be taken to increase the output. The whole year, however, showed a considerable reduction in output, although not nearly as great as the reduction that took place in Germany over the same period. The output of iron ore for the second year showed a substantial reduction largely because 1200 miners had been sent into the army. Supplies of fuel and raw material were inadequate, labor was scarce and furnaces were running considerably below their capacity. In August of that year there were only 65 furnaces in blast in the whole of the north of England, the lowest total for many years. This represented a reduction of eight furnaces from the beginning of the year. This serious fall in output was due partly to the continuance of speculative conditions, which at times made production unprofitable and consequently discouraged it. The simple fact is that the blast furnace owners, faced by declines in demand and a scarcity of labor and raw material, had to save themselves from loss by the deliberate restriction of output, while in the labor field they had to make the hardest possible fight to prevent further depletion of the man power below the danger line. It is appalling to think what might have happened if that "Business as usual" policy which irritated our allies, had not been resolutely arrested by the act of focussing the entire steel business under one common supervision. In this matter America has profited by our mistakes and we are looking forward to the time when our friends from over the ocean will in their turn counterbalance the effect of these early deficiencies.

The following letter from Winston Churchill issued in the autumn is reproduced as evidence that the vast importance of steel is now fully realized. This letter was posted prominently in all the steelworks and has no doubt had a very good effect in stimulating the workpeople to do their best in this very important sphere of practical patriotism. The letter had to do in the first instance with the question of working during holidays.

Ministry of Munitions of War,
Whitehall Place, London S. W.,
10th September, 1917.

Gentlemen:

I am told that in some works in the steel trade there is an idea that the supply of steel and of all kinds of steel material is not a very urgent matter nor one directly connected with winning the war. My council have therefore asked me to write to you and point out how absolutely false and dangerous such a view would be.

It is in fact the exact reverse of the truth.

This is a steel war. The immense supplies which Germany has of steel and the way in which she has succeeded in grasping nearly all the steel centers of Europe is the principal cause of her being able to maintain the struggle. With the exception of our own country and northern Italy there is hardly a single important steel works which the Germans have not seized in this or previous wars; and but for the fact that the resources of America are to some extent available to us, the German steel output each year would largely exceed the whole production of the allies. The

foundation upon which all our chancse of victory stand is steel. The greatest possible quantities are required not only to hurl at the enemy in the form of shells, but to build the cargo ships vitally needed to replace those sunk by submarines and so safeguard us against famine and ruin.

Apart from these two paramount demands for steel there is a host of other prime necessities for the successful conduct of the war and for the maintenance of our industrial life. Railways, locomotives, wagons, lorries, plows and tools all depend on steel production. The ships which feed ourselves and our armies, the shells and guns our soldiers fire, the rifles they wield, the loopholes through which they fire, the revetments which uphold their trenches, the dugouts which afford them shelter and protection, the light railway lines that bring them food and ammunition all depend on iron and steel. Not only do we have to supply ourselves but we have largely to aid our allies particularly the French who were robbed of their best steel works at the first German onslaught.

Steel is not only our principal means of war, but it is our best chance of saving the lives of our soldiers. This is a war of machinery; and generalship consists in using machinery instead of flesh and blood to achieve the purposes of strategy and tactics. Every man or manager who is engaged in steel production is directly engaged in smiting down the enemy and bringing the war to a speedy close. And although he may not share the perils and sufferings of the fighting troops he can win for himself the right to share their honor when victory is attained.

You are at liberty to post this letter if you think it useful in any portion of your works and I urge you to impress the facts to which it refers upon all helpers in the cause.

Your obedient servant,
Winston S. Churchill.

The latest authoritative statement we have with regard to the effect upon output was furnished by Dr. Addison, formerly of the ministry of munitions, in the house of commons, June 28 of this year. He stated that before the outbreak of war the output of steel in this country was about 1,000,000 tons a year. At the date when he spoke, it had been increased to nearly 10,000,000 tons and he said that he would be disappointed if it did not reach 12,000,000 tons at the end of 1918. According to the statistics of German production, it may be remarked here that in 1914 Germany's production of steel in metric tons was 14,975,106, and for the 10 months ending in October, 1917, the figure was 13,354,418 tons. If this average was maintained during the remaining two months, Germany's production in 1917 would be 16,035,000 tons of steel, so that, while England is still far behind Germany in production, our rate of progress is considerably more rapid. Dr. Addison said: "Steel produced from home ores except in the case of the rich ores of Cumberland was mainly the basic kind. To increase the use of home ores involved extensive rearrangement of blast and steel furnaces. A scheme has now come into operation and if it succeeds, by May, 1918, we shall have added to our production of basic steel from home areas by about 30 per cent within 14 months." Notwithstanding this increase the severe system of control over steel and the increased demand of the shipping and munitions programs offer no prospect of better supplies for private users. The process of fixing prices has been successful and notwithstanding the increased cost of material and labor steel plates in this country were less than half their cost in the United States, and shell steel was 30 per cent lower than in the United States."

Dr. Addison also said that spelter production would be doubled by the end of the year and we should be able to use Australian ore, which before was mainly under the control of German companies. The country was also able to produce sufficient tungsten to meet all the national requirements and to spare something for our allies. Among other things the department had supplied 1,500,000 steel helmets during the past six months. Dr. Addison anticipated that, if the war lasts, the country ought to find itself with a capacity for steel production more than 50 per cent greater than before the war.

There was a significant reference to the growth of the work of the department which had almost doubled within the last 12 months. Americans probably will have noticed how one additional product after another has been brought under the supervision of the ministry. The control began with pig iron, then extended to half-finished steel, to finished steel products, to scrap, high-speed steel and various other manufactures. Control obviously is a sort of slippery slope on which any halfway arrest is practically impossible. It is self evident that if half-finished steel is controlled steel scrap cannot be left out, in view of the very large extent to which such residuals can be utilized to replace billets, bars, etc.

A glance at the returns of selling

Maximum Prices on Rolled Steel and Scrap Products

PRICES, NET, AT WORKS FOR HOME CONSUMPTION ONLY

Pre-maximum prices	Joists	Rails, 60 lbs.	Rails, 50 to 60 lbs.	Sheet and tin plate bars	Blooms and billets (ordinary)	Blooms and billets (special)	Steel scrap heavy melting	Steel scrap crucible use	Steel turnings and borings	Steel turnings and borings, special short ext. heavy	Higher high tensile steel plates 10 lbs. thick and up	Higher high tensile steel angles 7 in. and over
	$53.40	$52.80	$53.46	$60.00	$60.00	$62.40	$24.00	$25.20	.....	.....	.....	.....
Apr. 7, 1916..	53.40	52.20	.....	49.80	49.80	52.80	.....	.....	.....	.....	.....	.....
July 7, 1916..	53.40	52.20	.....	49.80	49.80	52.80	26.40	.....	$13.20	.....	.....	.....
Nov. 1, 1916..	53.40	52.20	52.80	49.80	49.80	52.80	26.40	27.60	13.20	$18.00	*$105.60	100.80
Jan. 1, 1917..	.....	.....	.....	.....	.....	.....	25.20	.....	12.00	16.80	.....	100.80
Jan. 5, 1917..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.80
Aug. 28, 1917..	.....	.....	.....	.....	.....	.....	25.20	.....	16.80	.....	.....	.....

*Per net ton f. o. b. maker's works.

Pre-maximum prices	Ship, bridge and tank plates	Ship, bridge and tank plates ¼ to ⅜-in.	S. M. boiler plates	Steel angles and bulb angles	Steel angles 6 to 4 in.	Steel angles 4 to 3 in.	Steel angles 3 to 2 in.	Steel rounds squares and hexagons, 3 to 5½ in. without tests	Steel rounds squares and hexagons 3 to 5 in. with tests	Small steel rounds squares and hexagons 3 to ¾ in. without tests	Small steel rounds, squares and hexagons, 3 to ¾ in. with tests
	$55.20	$69.60	$57.60	$53.40	$67.80	$70.20	$72.60	.....	.....	.....	.....
Apr. 7, 1916.	55.20	69.60	60.00	.....	.....	.....	.....	.....	.....	.....	.....
July 7, 1916.	55.20	69.60	60.00	53.40	.....	.....	.....	60.00	.....	.....	.....
Nov. 1, 1916.	55.20	69.60	60.00	53.40	67.20	69.60	72.00	60.00	62.40	72.00	74.40

prices and wages under the midland iron and steel wages board shows that although selling prices are very high compared with those of Germany, yet a very effective arrest has been obtained. A year ago there was a rise in the average selling price between November and December of 1915, and July and August, 1916, from £11 4s 4d ($53.84) to £14 2s 2d ($67.72). Between the latter period and July and August this year, the last period for which returns are furnished, the advance has only been up to £15 5s 9d ($73.98), a very marked reduction in the upward movement imposing a restraint on wages very greatly

ing the war it will be realized that an arrest in this upward progress is much desired.

Not only does the control of iron and steel production extend in area taking in additional products, but it appears every week to increase in intensity. Official restraints are becoming more rigid in many directions. It has been found in the midlands that some manufacturers have sought to over-requisition raw material ostensibly for war work, while making use of the surplus in other departments of their business. That appears to have happened only to a trifling degree in the steel trade and has

ous government departments concerned in these matters are practical men. Some of the most familiar figures for many years on the Birmingham, Glasgow and Middlesbrough exchanges are to be found holding offices of authority in the steel and kindred departments of the ministry of munitions. The controller is a practical steelmaker with a full inside knowledge of the iron and steel trades. The other officials have had to do for many years with steel supplies either to the admiralty or some other steel consuming department. The assistant director of materials for the admiralty had for many years

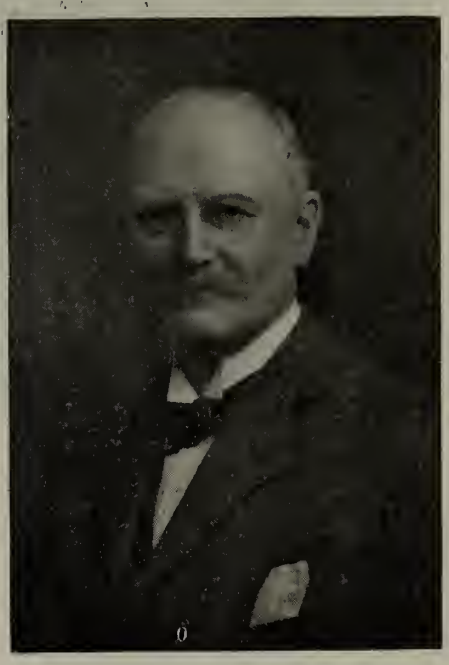
Men Who Direct Control of British Iron and Steel Industry



COL. R. S. HORNE, K. C.
Director of Materials and Priority for the Controllers Department, Admiralty



JOHN ROGERS,
Assistant Director of Materials and Priority for the Controllers Department, Admiralty



SIR JOHN HUNTER
Head of Steel Production in Great Britain, Ministry of Munitions

desired by the ironmasters. The advances secured by the men during the 12 months ended August last were only 12½ per cent, a material reduction compared with the previous year. The last bimonthly return covering July and August shows an actual fall in values in the two months from £15 6s ($74.04) to £15 5s 9d ($73.98), being the average selling price obtained by the 17 selected firms whose returns are the basis for wage settlements. This is the first fall since the war began, and though the amount is slight employers are thankful for small mercies in view of the mischievous effects of the extravagant earnings of the workpeople. The advances in the north of England are about similar and as the workmen in that district have had their wages lifted 67½ per cent dur-

been much more manifest in the nonferrous metal department. However, a system of rationing has been introduced and the control now is so complete through the comprehensive documents circulated that the government practically knows of every order turned out of the mills.

Practical Men in Saddle

All these revolutionary changes have been carried out with a minimum of friction and the relations between the departments, the iron and steel masters and their managers are as cordial as they can be, a fact which has been largely due to the loyal and patriotic anxiety of both employers and workmen to expedite and increase the output by every means in their power. It is due also to the fact that the heads of the vari-

been looking after steel supplies on behalf of the department. This practical knowledge on the part of the officials commands confidence, and has facilitated and stimulated production. The chiefs know from long experience what can be done by certain mills. Orders are grouped with the object of minimizing roll changes, and the avoiding of stoppages for the purpose of turning on to small parcels. Practical knowledge has also done a great deal in the direction of standardizing to the fullest possible extent. Figures, of course, must not be given, but it has been found possible to reduce enormously the number of sections of angles, tees, zees, etc., used in shipbuilding, a most important branch of economy.

A personal difficulty presented itself rather early in the necessity of in-

creasing the amount of inspection which had to be done. This difficulty was overcome largely by the combination of forces between Lloyds, the admiralty steel department, and the department devoted to the supply of steel for munitions. The inspection was reduced by restricting it to samples instead of going into detailed examinations.

The introduction of the human element occasionally is made manifest by the receipt by some manager of a letter of appreciation recognizing exceptional services in the effort to increase production and to meet the urgent needs of the moment. The mills of the country are working in absolute harmony with the offices of the steel controller and putting the whole of their resources at the disposal of the authorities. There is a very good system of decentralization under which a steel superintendent is appointed in each district who practically controls the whole of the firms in his district for the admiralty steel department and the ministry of munitions. The first named department has to take cognizance of steel supplies not only for warship building but also for mercantile shipping which in these days of submarine activity has become so important. Fortunately the matter has been simplified by the fact that in the early days of the war the supply of shell steel was tackled in earnest, after the necessity was really understood. In commenting on this feature Dr. Addison said:

"For a long time the output of explosives was in advance of the output of shells and other forms of ammunition, but during the last few months the one has been balanced with the other and production adjusted accordingly. In March, 1917, the capacity for the production of high explosives was more than four times that of March, 1916, and 28 times as great as that of March, 1915. The great national projectile factories for the production of heavier natures of shell had been in full operation during the year and produced in March exactly one-third of the total output of heavy shells. They recently reached such a state of production that they were able to divert certain of the national factories in whole or in part to assisting other sections of the munition program."



A NEW CRANE OPERATOR



Courtesy of Ministry of Munitions.

WOMEN DOING THE ARDUOUS WORK OF FILLING BUGGIES WITH ORE AT AN ENGLISH BLAST FURNACE

It was because the shell question was tackled some time ago that such excellent progress is now possible in the application of steel to shipbuilding requirements, a development in fact constituting one of the most hopeful features in connection with the present prosecution of the war.

As Dr. Addison suggested, there has been every encouragement for production to maximum capacity, and the control officers have been able to give useful hints in this direction. A large number of new mills have been erected and additional furnaces built. This extension is constantly in progress with the result already indicated. Economy has been effected also by the much larger substitution of scrap for pig iron in the production of steel. Here again figures must not be used but it is common knowledge that the shortage of pig iron has been largely overcome by the skillful use of scrap.

The same knowledge has been employed in relieving the scarcity of basic material and the energies of officials have been exerted for some time past in the diversion of furnaces, which used hematite in making ordinary forge and foundry material, to the production of basic iron for which such a great demand exists. Fortunately, recent discoveries of iron ore promise greatly to assist this branch of the industry. But the more complete and efficient working of ore beds known to exist is of much more importance. Arrangements are being made at the present time for the exploitation on a large scale of a most valuable ore bed in the neighborhood of Banbury, estimated to contain 50,000,000 tons of ore. Four of the largest firms in the kingdom are arranging to work this ore.

One of the awkward tasks falling to the lot of the ministry in determin-

ing priority has been the selection for execution of orders from among the applicants for steel not strictly definable as war steel. The maintenance of the railways is a good example, and this difficulty has been met by the presentation on behalf of the railways of a schedule representing their minimum requirements for the purpose of maintaining operation. It is evident that when the war ends the railway renewal program for great Britain will reach gigantic dimensions. For the present they have to be satisfied merely to "carry on" and it has been found possible to meet the inventory of tonnage required for the maintenance of the various lines. As the railways also are controlled the problem has been somewhat simplified, as it has enabled the steel department to deal with a representative body instead of a number of rival lines. The commercial work, generally, is pretty well at a standstill.

A certain amount of economy has been found possible in the department of transit and transport. The whole area has been divided into three or four large distributing centers comprising Glasgow, the northeast coast, South Wales and the midlands. As far as possible each district has been made self-contained, and every effort is made to avoid the needless transportation of material from one manufacturing center to a consuming center in another part of the kingdom. This has been carried through successfully in almost every instance.

An exception will have to be made to the story of cordial relations as far as merchants are concerned. Merchants appear to have been more or less crowded out of the government scheme of operation and such friction as has arisen has occurred in this department. It perhaps was inevitable that a system which deals directly with manufacturers in some degree should ignore merchants, and one of the results of government control has been the formation of large associations of merchants for the purpose of looking after their interests now and after the war. It seems a pity that a larger number of iron and steel merchants did not place their comprehensive technical knowledge at the disposal of the government in one or another of the iron and steel control departments. The lot of the merchant has not been a happy one, as much of his time is being devoted to efforts to obtain from the department supplies of steel for commercial purposes. On the other hand, he has had to endeavor by hook or by crook to maintain friendly relations with dissatisfied customers. Great offense was given some time ago by an article in The Times in which some short-sighted writer referred to the merchants as "parasites". No government official ever used this offensive term, but certain merchants have saddled the ministry with the responsibility for the epithet. No doubt the merchants eventually will get back to his old place and will take his share of the greatly enlarged business that will follow the war.



WOMAN DRIVING STEAM HAMMER



Courtesy of Ministry of Munitions.

SANDING PIG BEDS—ONE OF THE MORE STRENUOUS WAR TASKS WOMEN HAVE UNDERTAKEN

The story of the steel control department would be incomplete without some notice of the enormous contribution made by women workers. This has been one of the surprises of the war and the part played in the heavy trades by the women has astonished everyone. Some idea of their labors may be gathered from the photographs accompanying this article presented through the courtesy of the ministry of munitions, which has devoted itself especially to the employment of women and which is described as the D. A. dilution section. The last issue of the Board of Trade Labor Gazette tabulates 1,500,000 new women workers of which it is said 670,000 are employed on munitions and 632,000 engaged on other government work, such as the manufacture of clothing and food for the troops. Roughly speaking, the trades

connected more or less directly with iron and steel and munitions, which include the very important branch of engineering, employ about 1,000,000 women, of whom at least 800,000 have come in specially for the war. The D. A. dilution section recently has given exhibitions showing photographs of the women at work, and the exhibition certainly revealed a sort of new industrial world.

American visitors to Belgium years ago in connection with Iron and Steel institute meetings were astonished at the employment of women in blast furnaces, and iron and steel works. We have out-Belgianed Belgium in this respect, and women are at work in blast furnaces and steel works, bolt and nut works, foundries, metal mills, forges, etc. In blast furnaces and steel works women are to be seen attending frost fires, breaking billets, breaking limestone, coke, slag, etc., discharging coal, ashes and cinders, driving electric cranes, loading slag and ore barrows, wheeling bricks, operating circular saws, sanding pig beds, etc. The women have been successful in the foundry and they have been efficient molders, grinders, fettlers, sand blasters, etc. In the iron and steel mills a great deal of the engine driving is done by women and they transport materials in and out of the foundry, assisting and charging at the furnaces, for example two women assisting one man in the charging of a 300-pound bloom, piling scrap, operating shears, cold saws, etc. It has been found possible to put the women in complete charge of power houses involving the starting and stopping of motors, looking after pumps, cleaning plant, etc. Similarly with galvanizing shops the women discharge practically all the duties satisfactorily, but it is a little startling to find them hooking on at a cogging mill and charging and putting off in a reducing mill. They work successfully in assisting with heat treatment of steel forgings, grinding forgings, operating drop hammers, steam hammers, hydraulic presses, punching sleepers and in general manual work.

Show Remarkable Aptitude

The endurance and nerve manifested by the women has surprised everybody, while their aptness in acquiring processes for which they have had no sort of preparation prior to the war, has satisfied those responsible for the arrangements. It is a revelation to see women manipulating the lathes devoted to the production of big shells where they show unexpected aptitude for such highly skilled operations as welding, heat treatment, etc. They are equally successful also with the setting of the tool in connection with various engineering employments.

A good example of the nerve of one woman engineer is cited. She was in charge of a large centrifugal engine when she had the misfortune to drop her key into the engine pit. She discovered her loss only when the machine began racing. The engine was a sufficiently formidable one to manage at ordinary times. She, however, had the courage to descend into the pit and to recover the key which enabled her to slow down the machine. Another story relates to the patriotism manifested by two

Finished Iron Prices

MAXIMUM PRICES, NET, AT WORKS FOR HOME CONSUMPTION ONLY

	Marked bars South Staffordshire	Common bars South Staffordshire	South Yorkshire bar iron	North of England bar iron	Lancashire bar iron	Heavy wrgt. iron scrap ⅜-in. thick and over includ'g horseshoes	H'vy wrgt. iron scrap ¼-in. thick and ov. includ'g heavy country wrgt. iron scrap
Pre-maximum prices	$72.00	$64.80	$67.20	$64.80	$67.20	.....	.....
Apr. 7, 1916.....	*72.00	†66.00	†66.00	66.00	66.00	.....	.....
July 7, 1916.....	72.00	66.00	.....	.....	.....	.....	.....
Aug. 15, 1916.....	74.40	.....	.....	.....	.....	.....	.....
Nov. 1, 1916.....	74.40	66.00	66.00	66.00	66.00	.....	.....
Mar. 22, 1917.....	.....	.....	.....	.....	.....	27.60	25.20
Aug. 28, 1917.....	.....	.....	.....	.....	.....	30.00	30.00

*Less 2½ per cent maker's works.
†Net f. o. b. maker's works.
Fixed prices do not apply to sections rolled by works which buy blooms, billets or puddled bars in the open market.

Maximum Prices of Pig Iron

PRICES, NET, AT FURNACES FOR HOME CONSUMPTION ONLY

	Cleveland No. 1, 2 and 3	East coast Hematite, No. 1, 2 and 3	Scottish Hematite, No. 1, 2 and 3	Welsh Hematite, No. 1, 2 and 3	West coast Hematite, No. 1, 2 and 3	Derbyshire forge	Derbyshire foundry	Lincolnshire basic or foundry	Northamptonshire No. 4 forge
Pre-maximum prices	$22.20	$30.00	$28.20	$36.00	$30.60	$21.60	$22.20	$22.20	$20.64
Apr. 7, 1916..	19.80	29.40	29.40	29.40	30.60	20.40	22.20	21.00	19.80
July 7, 1916..	21.96	29.40	29.40	29.40	30.60	20.40	22.20	21.00	19.80
Aug. 15, 1916..	.....	.....	.....	.....	.....	.....	.....	22.20	21.00
Nov. 1, 1916..	21.96	29.40	29.40	29.40	30.60	21.60	22.20	22.20	21.00

	Northamptonshire No. 4 foundry	North Staffordshire forge No. 4	North Staffordshire foundry	South Staffordshire Shropshire and Worcestershire time forge	South Staffordshire Shropshire and Worcestershire part time foundry	Common Staffordshire	Staffordshire cold blast	Scottish foundry and forge Monkland, Dalmellington, Eglinton and Govan
Pre-maximum prices.....	$21.00	$21.60	$22.20	$21.60	$22.20	$20.40	$40.80	.....
Apr. 7, 1916.	20.64	21.60	22.20	21.60	22.20	20.40	42.60	.....
July 7, 1916.	20.40	21.60	22.20	21.60	22.20	.....	42.60	$27.36
Aug. 15, 1916.	21.36	22.80	23.40	22.80	23.40	21.60	43.80	.....
Nov. 1, 1916.	21.36	22.80	23.40	22.80	23.40	21.60	43.80	.....

High Speed Tool Steel Prices

MAXIMUM PRICES, NET, AT WORKS FOR HOME CONSUMPTION ONLY

	Finished bars 14 per cent tungsten	Finished bars 18 per cent tungsten	Finished rounds and squares 3 to 8 in. inclusive	Extras rounds and squares ½ to ¼-in.	Extras Flats under 1x¾ to ½ x ¼-in.‡	Extras bevels of approved sizes and sections	Scrap iron high speed tool steel Extras bars cut to length	millings and turnings	Scrap bar ends
Pre-maximum prices.....	$0.72	$0.90	†	†	$0.06	$0.12	12	§	$0.08
Apr. 7, 1916...	.68	.92	...	...	...	...	...	...	...
July 7, 1916...	.68	.92	....	....	...	...	...	.10	.12
Aug. 15, 1916...	...	...	...	...	...	...	...	*.10	*.12
Nov. 1, 1916...	.68	.92	.08	.06	.06	.12	10	.10	.12

*Both net delivered consumers' works.
†Charged by some makers only.
‡And all sizes over four times in width over thickness.
§Not sold.

women workers who had managed to get at cross-purposes with the management and had given in their notices. The factory in question was producing explosives and as the result of the visit of hostile aircraft, a certain amount of damage was sustained. The next morning these two women came to the management and asked to be allowed to withdraw their notices, which they handed in on the day previous to that of the air raid as they considered the time was not opportune for them to desert their posts. It is believed that this represents the loyal and patriotic spirit in which thousands of women have entered steel works and ammunition factories. It has been found possible to utilize their services very largely in scientific and laboratory work, and useful contributions have been made in the research field.

The training of the women has been different to that ordinarily adopted with apprentices and male assistants who have to be turned loose into the shop to receive just enough instruction to enable them to do their daily work. That system has been condemned as lacking thoroughness and as tending to develop a great deal of habit which has to be unlearned. The only way to make women useful has been to teach them one operation after another and for this purpose a number of training schools have been established at which the women are carefully taught each single operation. Usually they pick up the job in a few days or weeks, and where the highest possible accuracy is called for, in a few months. While the range of their knowledge is limited, it is at all events thorough. These women have been drafted in from domestic service, shops, dressmaking establishments, etc. Wherever possible the size of the tools has been reduced to bring it within the smaller capacity of the woman worker. It is a question how many of these will prefer to remain in workshops after the war providing they have the opportunity to do so; but it is believed that the majority will go back to their former employment.

Another problematical question relates to the permanent effect of control which must remain after the war. England will of course have an enormously larger steel output and capacity. The government will desire that capacity to be maintained if only as a means of protection against our enemies, and there is a general belief here that some form of fiscal protection will be introduced in order to prevent the dumping of foreign steel to the injury of the British manufacturer. There will be a natural desire on the part of the steelmaker to recover the full control of the works on the old system, but it is recognized that unless there is to be chaos and confusion state control will have to be withdrawn gradually. It is believed that the immense demand for steel for all sorts of purposes must prevent unemployment for a long time to come. The industry will benefit from the fact that the new plants laid down are most modern and electrical driving has been introduced to a degree almost involving a mechanical revolution.

In no branch of industry has there been less friction than among iron and steel workers. This is due mainly to the fact that wages have been regulated by the northern and midland wages boards, while every effort with the co-operation of the ministry of labor, where this has been found necessary, has been made to deal with the wages of these workmen not governed by the scale. The trade undoubtedly has benefited from the coincidence that John Hodge, the minister of labor, who has all along commanded widespread confidence from men of all classes and parties happens to be a well known leader of the steel trade.

One of the collateral results of the control has been to bring about a more nearly complete combination of iron associations in all districts. A series of conferences have been held at which the following associations have taken part, namely the Lancashire Bar Manufacturers' association, Northeast Coast Bar Makers' association, South Staffordshire Iron Masters' association, Scottish Bar Iron Manufacturers' association, South Yorkshire Bar Iron association, and "Best" Yorkshire Iron Makers' association. Various sections of the iron trade thus have been brought into closer combination than ever before, and this joint action certainly will be maintained in a large way after the coming of peace.

Metric System

Urged at Scientific Meeting at Pittsburgh—Is Used by Japanese

Universal adoption of the metric system as a means of measurement was urged by George F. Kunz, New York, president of the American Metric association, in a paper he read on Saturday, Dec. 29, at the convention in Pittsburgh of the American association for Advancement of Science. Mr. Kunz pointed out that the metric system will have to be employed in the reconstruction of Europe.

Mr. Kunz spoke briefly of trade schools in this country and Germany. He conceded that Germany's trade school system was wonderful, but declared there is no trade school in the world that is the equal of the Carnegie Institute of Technology, Pittsburgh.

Dr. Shigetaro Kawasaki, chief geologist of Korea, stated that in Japan and Korea a theoretically correct system of mensuration is employed, but it is complicated.

"It has been employed among the Japanese and Koreans for a very long time," he said, "and it is still a national mensuration system. But with the coming of European civilization," he continued, "the metric system was imported into Japan among other innovations and was partly adopted by the Japanese because of its simplicity and exactness. At present the metric system is employed in Japan in military and naval affairs and is also used by men of science. I am of the opinion that because of the growth of international commerce, the use of the metric system will increase considerably in the future."

Producing Magnesium at Niagara Falls Plant

Prior to the war practically all of the magnesium used in the United States was imported from Germany, but since the stocks in this country were exceedingly small, it practically disappeared from the market in less than 12 months. The price reflected its extreme scarcity. In January, 1917, the American Magnesium Corp. was organized at Niagara Falls, N. Y., for the purpose of building a plant for the manufacture of magnesium and magnesium alloys. These works now are in operation and are producing this metal in such large quantities that the price has been greatly reduced and is rapidly approaching the prevailing quotations before the war.

The principal uses for magnesium are for alloying with aluminum for airplane parts where lightness is essential. By the proper combination of magnesium, aluminum, and other metals in small quantities, an alloy can be produced, which will reduce the weight to nearly one-half that of No. 12 aluminum. Magnesium also is being employed more extensively as a deoxidizer and a scavenger for copper, brass and bronze, and the American Magnesium Corp. has introduced a new magnesium alloy designed particularly for use as a deoxidizer for tool and alloy steels.

Creating the Cripple's Opportunity

The Problem of the Cripple in Industry and as a By-Product of the War Now Confronts the Engineer—Its Solution Points to a Change in Vocational Education

BY FRANK B. GILBRETH AND L. M. GILBRETH

THE purpose of this paper is to report progress in the solution of the problem of training the crippled soldier, and the part that the engineer should take in the work. Certain conclusions may be drawn from the work at this time and they are briefly stated as follows: The crippled soldier problem is identical with the problem of the cripple in general, and in the solution of this double problem lies a new type of education. The solution will be based on finding one best way to do work and the adequate assignment to work. The engineer is best fitted to determine the one best way to do work, to formulate its methods and to supply the necessary devices and mechanical appliances.

All cripples, no matter what the cause of the crippling, require a training that will be mentally satisfying and physically beneficial. This training must be such as will enable them to become productive members of the community, and to remain on the world's payroll. This implies either competing with non-crippled workers in occupations open to all, or setting aside certain work for crippled workers exclusively, or both. It implies discovering and making available opportunities for crippled workers, discovering which cripple is best fitted to utilize the opportunity, and training him to make the best possible use of it. It also implies not only opportunities for individual development, but such social opportunities as will enable the cripple to fit back into the ordinary social life with the greatest ease and the largest amount of durable satisfaction.

Those crippled in war furnish a small percentage of the total crippled as compared with those crippled from other causes, such as disease and accidents, especially in the industries. This is true even in Canada, which has furnished such a remarkable quota of fighting men in comparison with the total number of her population.

The solution of the crippled soldier problem as outlined consists of a type of education that is new in that it eliminates the greatest amount of waste possible in the educational process. It teaches the one best way at the outset, instead of following the old practice of "learn every way", with the vague hope of arriving at efficiency as an outcome. It enables the learner to arrive at a desired outcome with the greatest amount of speed and the least amount of effort, and with the largest return in efficiency and resulting satisfaction.

Repairing Human Wrecks

THAT same ingenuity which has enabled American engineers to bend the inanimate forces of steam and electricity to the uses of mankind is now called upon to set to work the latent powers of men crippled in war and industry. Whether it be by a boche bomb or crushing shop wreckage that a cripple is produced, repairing the damage and overcoming the mental depression incident thereto, is a problem for the engineer. Nature compensates to a great degree for that which is destroyed. The blind sometimes hear with unusual acuteness, and the perceptions of the deaf quicken to the ability to read lip language. To find those compensating abilities, to supplement lost members and to repair human wrecks to the point of further world service is the work outlined and explained by Mr. Gilbreth in this article.

Because of those qualities, this new education is bound to be used in the future not only in the re-education of cripples in what is to be their new life work, but in education in general. Just as the Montessori method of teaching children, which originated in an effort to discover the best method of training subnormals, proved so successful in that field and demonstrated such underlying principles of general applicability that it now occupies an important place in the training of normal and supernormal children, so this new method of education, discovered as a result of synthesizing measurements of champion workers in the quest of the one best way to do work, is spreading, through the general interest in re-educating military cripples to the re-education of all cripples, into the manual training schools, corporation schools and the general educational fields.

The new education has two parts—the discovering of the one best way to do work, and the testing of the individual and placing him at the demonstrated most efficient work. By work is meant activity of any kind, whether physical or mental, for the investigations and the resulting methods are being made and applied in both mental and physical fields of activity.

There is little argument as to the desirability of finding the one best way to do anything, regardless of whether it is immediately learned, taught or habitually practiced. There has been considerable discussion as to the possibility of finding it, if it does exist. The important thing is that there is one best available way, as has been demonstrated in both theory and practice. This way seldom if ever exists in the consecutive motion cycle units of any one individual, though their units may be in general use, and many will undoubtedly be used by every expert in the activity.

In the matter of tests and assigning individuals at the most appropriate work for them, it is demonstrated that the discovery of the one best way of doing the work and the consequent standardization of the best methods and equipment will allow of tests that are made more adequate. For this reason, if a test can be made of the proposed worker with the method and device that it is planned he shall use, there will be fewer variables in the testing process, less difficulty in the valuation of the tests and fewer necessary transfers.

The extent of the cripple problem is practically unlimited. When we come to consider the subject closely we see that every one of us is in some degree a cripple, either through being actually maimed or through having some power or faculty which has not been developed or used to

From a paper read at the annual meeting of the American Society of Mechanical Engineers, December, 1916. The authors are specialists in industrial management, motion study and labor problems.

its fullest extent. The degree of crippling extends from the worker who, through some accident, has lost his eyesight, his hearing, and the use of his legs, arms and hands except for the use of one finger (and by the way this is no imaginary illustration, as we have lately received a skillfully woven bag made by such a cripple maimed through a mining accident) to a man who is dependent upon glasses for reading. From an efficiency standpoint a policeman with corns on the soles of his feet or a golfer with the gout in his toe is more of a cripple during his working hours than a legless man while operating on a typewriter. We can, then, think of every member of the community as having been a cripple, as being a cripple, or as a potential cripple. Conversely, we can think of a badly mutilated man as not being a cripple during the period that he is at that work the performance of which is not affected by the mutilation.

The problem of the cripple is a problem of education. With the present state of the art of teaching it is largely a problem of re-education, since most of us, noncrippled as well as crippled, have received the wrong type of education and must be re-educated even in the fundamentals. As education becomes more scientific the problems of re-education will become simplified and the processes will become shortened.

A government bureau for collecting and conserving all data will come naturally as a development of the activity in other fields and of the present activity of various government departments along various lines. This bureau should contain a museum that would include among its exhibits models of artificial limbs and appliances for cripples. This, supplemented by state and municipal museums along similar lines would bring first-hand knowledge to the cripple, who too often buys the first artificial limb that he sees, and usually averages three or four purchases before he gets the one best suited to him. Such a national museum should also contain fatigue- eliminating devices, which would enable all workers to become more productive with less accompanying fatigue. The writers first called attention to this need in 1910, feeling that fatigue study, like accident prevention, is a function of the engineer.

The Case of the Crippled Soldier

The crippled soldier is at a disadvantage as compared with the industrial cripple, in that he is often at a distance from aid of various kinds at the time the crippling takes place, and thus misses the chance for the early re-education that is desirable and necessary. Further, through mistaken kindness the crippled soldier is not taught work of any kind during his convalescence and during the period immediately after his return home. In fact, he is often encouraged by misguided friends to remain idle until the possibility of teaching the maimed member and the mind that has stopped learning has decreased, and re-education becomes more difficult if not actually impossible. Another handicap to the crippled soldier is the terrible physical and mental anguish that often precedes as well as follows the crippling.

The crippled soldier has the advantage over the industrial cripple in many regards. He is the object of great interest and patriotic sympathy, therefore is a member of the community to be courted rather than shunned. He suffers in the limelight, and therefore is practically assured of assistance as soon as the world is convinced as to what he needs. He will have, if he has not now, expert training at his disposal. He has the consolation of fame and of having done something worth while, even though he had to pay the penalty of being crippled for having done it.

For these reasons it is advisable that the engineer turn his attention immediately to the problem of the crippled soldier, supplying the new education in the form of re-education for this soldier, with the assurance that when the methods and devices have been supplied the industrial and other cripples will benefit exactly as will the crippled soldier.

The engineer's part in adapting methods and devices to the cripple may be roughly divided into three classes:

First.—In inventing or adapting detached devices that will make it possible for cripples to do various kinds of work, such as various devices furnished by the makers of standard typewriters, that enabled a one-eyed, legless, one-armed and one-fingered typist to write many more short letters in a given time than can the unmaimed champion typist of the world.

Second.—In providing artificial limbs to replace those missing. Particular attention is called to the possibilities of inventing countless designs of articulated limbs controlled by systematized use of the trunk muscles controlling the joints of the limbs by means of wires and springs for replacing other muscles and tendons.

Third.—In inventing or adapting devices that may be attached to the cripple himself, not to replace missing limbs, but in effect to supply new ones, i. e., additional limbs that will enable him to use existing equipment and thus accomplish work.

Some Methods of Fuel Conservation

The bureau of mines, department of the interior, recently asked the advice of a number of prominent fuel engineers throughout the country as to the best way to conserve in the use of coal during the period of the war. Martin A. Rooney, stoker expert, Detroit, has the following to say:

"In every trainload of coal laboriously hauled from the mines to our coal bins, one carload out of every five is going nowhere and worse. In a train of 40 cars the last eight are dead load that might better have been left in the bowels of the earth.

"Every fifth shovelful of coal that the average fireman throws into his furnace serves no more useful purpose than to decorate the atmosphere with a long, black stream of precious soot. These are not meaningless statistics nor a "goblin" story, but cold facts on a warm subject. At best, one-fifth of all our coal is wasted.

"And it is shamelessly and needlessly wasted. Instruments and machinery for getting out all of the heat there is in it, are not nearly so complicated nor expensive as the cash register which you use to keep tab on your cash receipts or the truck which you operate to clip a few cents off your delivery costs. Carbon dioxide, temperature and draft are easier subjects to comprehend than bank discount or freight rates.

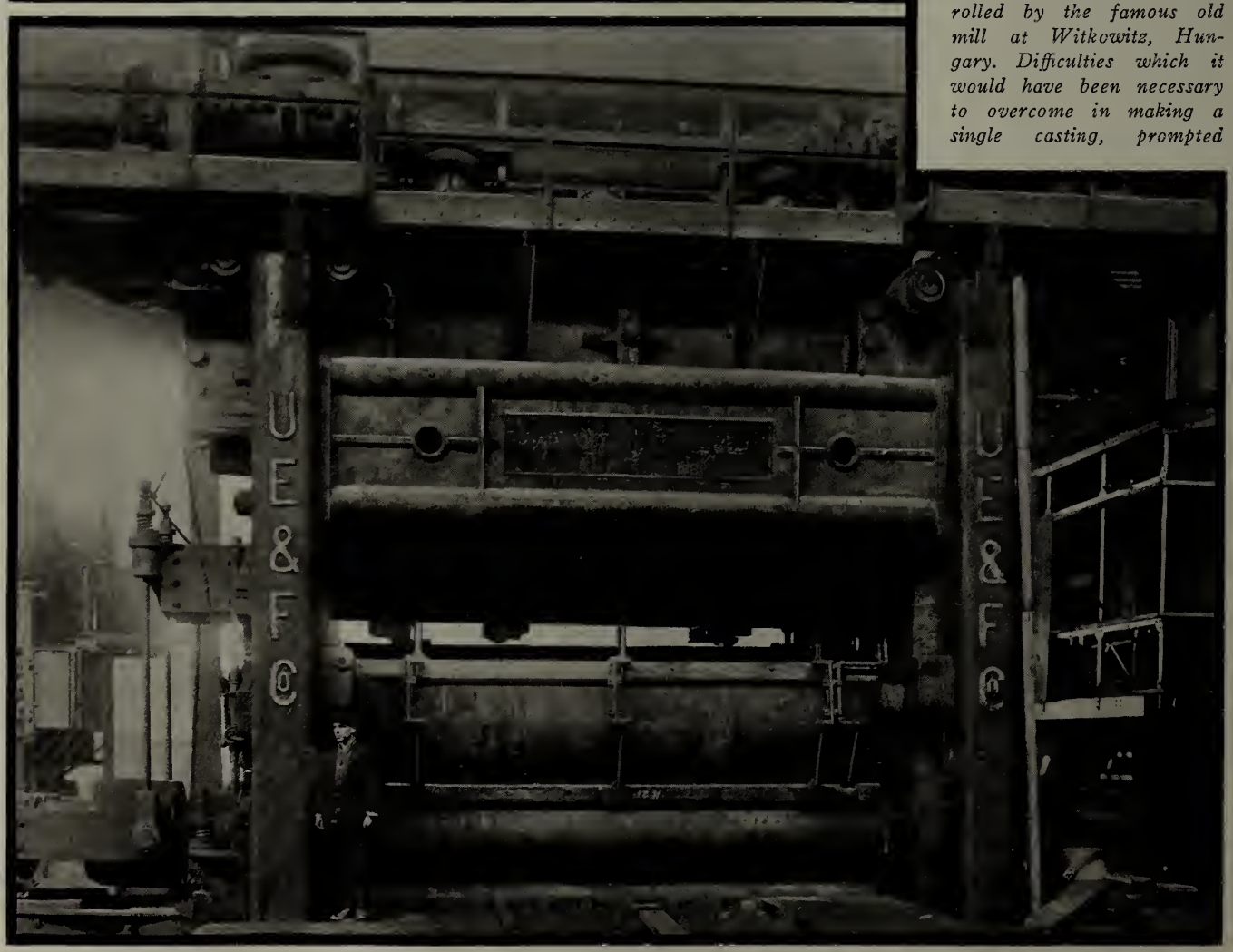
"The moral is, get busy and learn what they are and how to use them. The time is coming when the government is going to limit the amount of coal that is dumped down your chute, and in the name of fairness, when we must deny fuel to some manufacturer, let it be to him who cannot show that he is going to use it efficiently. In the name of fairness to the miner who digs it, in fairness to the heavily burdened railroad which transports it, in fairness to a number of our people whose very existence and whose future happiness depends absolutely on the use we make of this most precious of our resources, let us make efficiency the criterion to judge by when we come to determine which shall survive.

"Let us send in to our furnaces and boiler rooms men who can show our engineers and firemen how to burn their fuel with the least waste, as we have sent them among our fields and orchards to show the farmer how to increase the productivity of his soil."

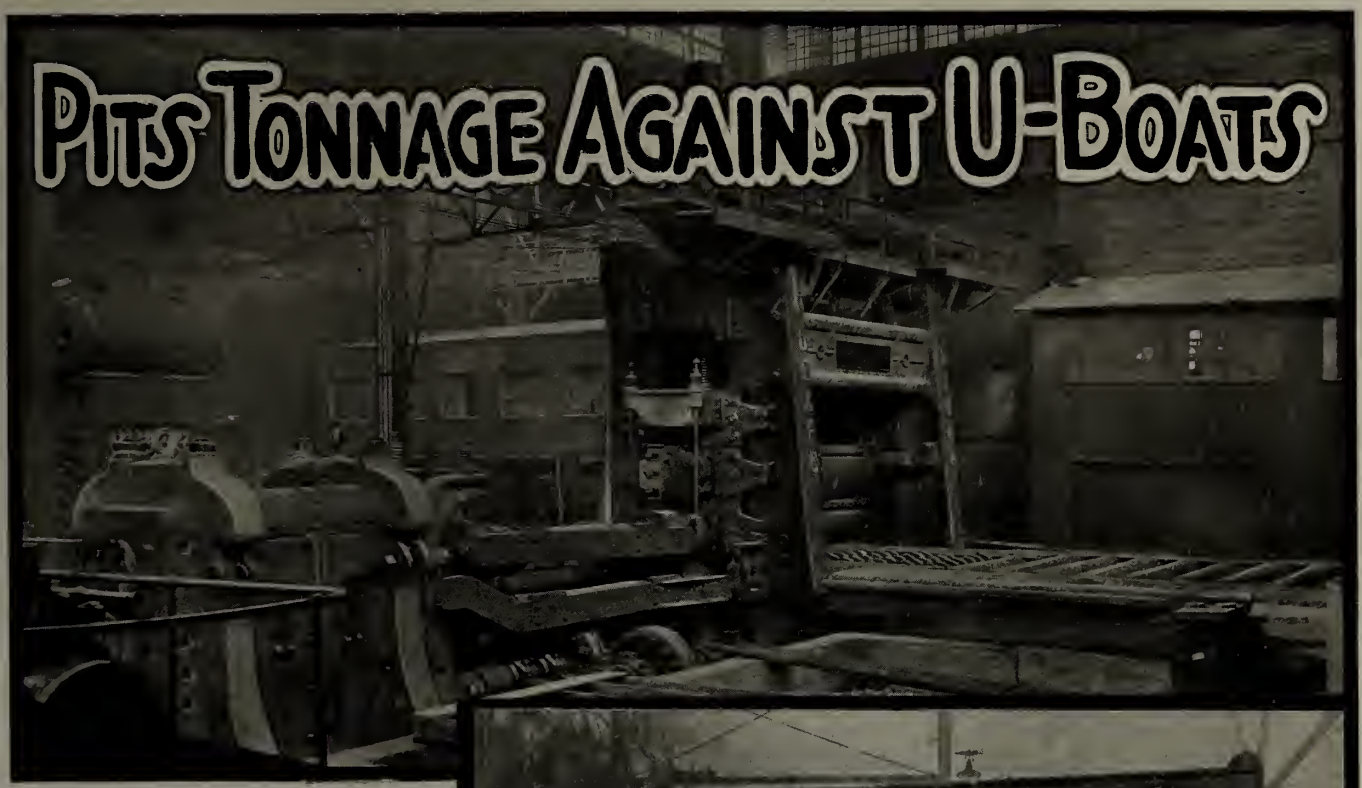
WORLD'S LARGEST PLATE MILL

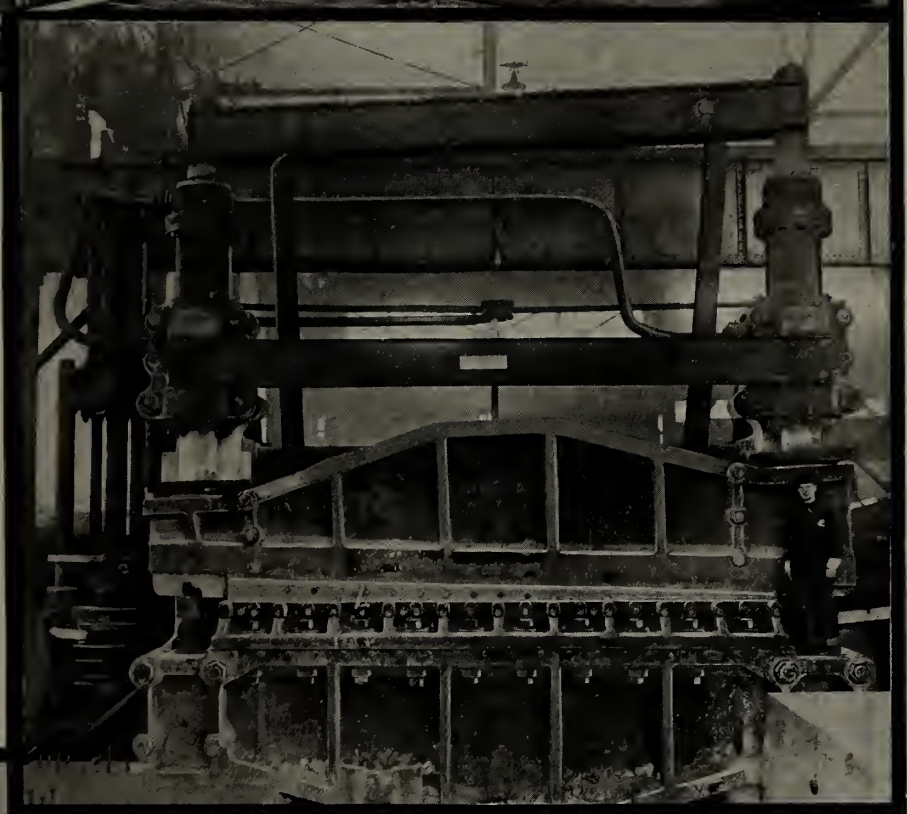


COMPLETE, except for a few minor details, the huge new 204-inch plate mill of the Lukens Steel Co., Coatesville, Pa., will soon be regularly turning out a tremendous tonnage for American shipyards and other important war industries. The new mill, which is the largest in the world and the only four-high plate mill in existence, will roll plates 192 inches in width. These will exceed in width by 26 inches the plates rolled by the famous old mill at Witkowitz, Hungary. Difficulties which it would have been necessary to overcome in making a single casting, prompted



PITS TONNAGE AGAINST U-BOATS





the United Engineering & Foundry Co., builder of the mill, to cast the housing in four parts. Power will be supplied by a twin, reversing, condensing engine, built by the Mesta Machine Co. The cylinder dimensions of the power unit are 46 and 70 inches bore by 60 inches stroke. Reproduced above is a view showing the two-to-one pinion housing, friction devices, spindles and method of supporting them. At the right is illustrated the hydraulically operated shear, which is capable of readily cutting mild cold steel, 2 inches thick. This shear was built by R. D. Wood & Co. The steel supporting roll, shown below, is 50 inches in diameter and weighs 65 tons; the working rolls, which are cast iron and 34 inches in diameter, weigh 30 tons.



Flywheel Design for Rolling Mills

The Intermittent Character of the Rolling Mill Load Requires the Equalizing Effect of a Flywheel—Limiting Speed, Location, Load and Control Factors Govern Design

BY G. E. STOLTZ

THE general question of flywheel capacity to be installed on a rolling mill should receive almost as much attention as the application of motors. On electrically driven mills especially it is easy to analyze the requirements of the mills and definitely determine the relation between the motor and flywheel capacity.

The intermittent character of the rolling mill load generally makes it necessary to include flywheel capacity to equalize the power requirements and avoid heavy momentary overloads on the driving unit, as well as on the generating station. In some cases the magnitude of the peak loads is not so great, but it has been found that a small amount of flywheel capacity protects the electrical equipment from shocks obtained on the mill. Where there is a demand for a flywheel to equalize sustained peaks, the use of the proper flywheel effect permits the installation of driving and generating equipment designed to carry a load of practically a constant character. Better over-all economy is obtained although the friction loss of the flywheel is added.

Any mass in motion possesses energy and is capable of doing work by reason of being in motion. According to the elemental theory of kinetic energy this capacity for work is one-half the mass of the moving body times the velocity squared.

When considering the power required to roll steel, the length of pass is usually measured in seconds, and the size of the driving equipment is rated in horsepower. By a simple substitution in the formula for kinetic energy we obtain:

$$\text{Horsepower seconds} = \frac{W v^2}{64.4} \times \frac{1}{550} = \frac{W v^2}{35{,}400}$$

Since energy varies as the square of velocity, it is important to use as great a velocity as is practicable.

The total flywheel effect of a body rotating about an axis is equal to the sum of the products obtained by multiplying every elementary mass by the square of its velocity. The equivalent of this is found by using the total weight and the peripheral velocity at the radius of gyration. The radius of gyration of a plate wheel is 0.707 of the outside radius. This value for a spoke wheel depends upon the displacement of its metal, but for practical purposes, it is satisfactory to use 0.8 of the outside radius for wheels of usual design. In these calculations the weight of the shaft is not included.

Fig. 2 is a curve showing the relation between speed of a wheel and kinetic energy measured in horsepower seconds. It may be noted how rapidly the stored energy increases in the wheel at the higher speeds. The diameter of this particular wheel is 12 feet, its peripheral velocity being 19,400 feet or 3.7 miles per minute. In this particular case the equipment was designed to operate on a basis of 20 per cent drop. The energy which is therefore available for flywheel effect is the difference between that stored at 100 per cent and 80 per cent speed of 62,500-horsepower seconds which is 36 per cent of the total energy in the wheel at 100 per cent speed.

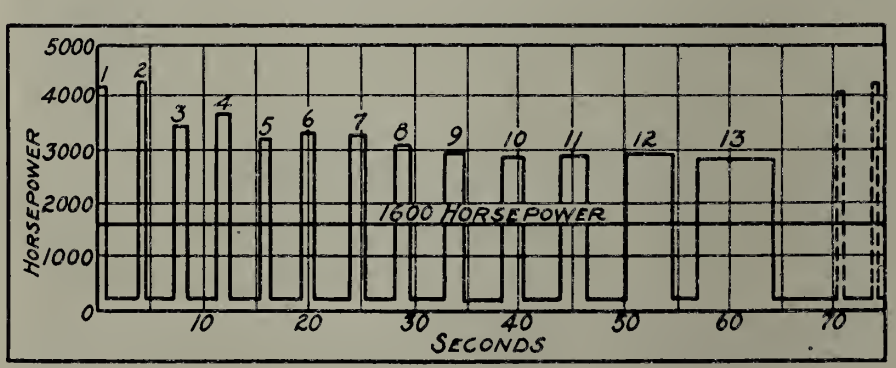


FIG. 1—MILL LOAD ON A SMALL BLOOMING MILL—PEAKS ABOVE 1600 HORSEPOWER TAKEN BY THE FLYWHEEL

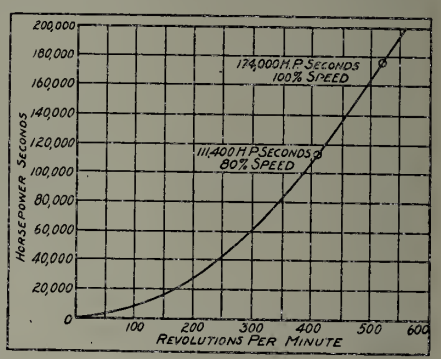


FIG. 2—ENERGY CURVE OF FLYWHEEL SET

Plate wheels are usually limited to a peripheral speed of 25,000 feet per minute, in order to keep the centrifugal stress within 16,000 pounds per square inch. Due to the presence of blow-holes and shrinkage strains it is impossible to calculate the actual stresses in the cast wheels, so that the values of 12,000 feet per minute for solid cast steel and 6000 feet per minute for cast iron wheels, have been arrived at arbitrarily as safe speeds. There are a number of cast steel wheels operating as high as 17,000 feet per minute, but they are of special design and more expensive, due to the rigid specifications they are required to meet.

Location of Flywheel

It is logical that the flywheel should be placed as near the load as possible to avoid transmitting the peaks through apparatus which might otherwise carry only the average load. However, on some applications, such as sheet mills, this is not feasible as the mill speed is too slow. If it were desired to properly equalize the load on an 8-stand mill with a flywheel operating on the mill shaft at 30 revolutions per minute, a wheel of 350 tons weight would be required. This, of course, is not practical, and while on engine-driven mills a com-

From a paper read before the Association of Iron and Steel Electrical Engineers at a meeting in Pittsburgh on Dec. 15. The author is associated with the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

paratively large engine may be used with a moderate sized wheel, still the engine does not fully compensate for lack of flywheel capacity, with a result that the speed drops considerably when peak loads are obtained. With electric drive, the motor is usually operating at about 240 revolutions per minute, and a herringbone gear unit is provided to obtain the proper mill speed. The flywheel capacity is usually obtained by placing a wheel at each end of the pinion shaft. By doing this, the total weight of the wheels would be 30 tons to provide the same flywheel effect as would be obtained if a 350-ton wheel were placed on the mill shaft. This, of course, has the disadvantage of transmitting all the peaks through the gears, but is the practical solution for this type of drive. Where sheet-mill engines have been replaced by motors with adequate flywheel effect, the monthly output may be increased approximately 10 per cent. This is due to the elimination of periods when the mill is slowed down sufficiently to interfere with its operation.

Selecting the Flywheel

The selection of the proper flywheel for a mill drive can often be calculated to a fairly close degree if the operating conditions are properly represented. These conditions can be obtained by comparing the mill in question with a number of similar mills on which an analysis has been made of power requirements. However, on some mills it is practically impossible to make any calculations, in which case it is necessary to depend entirely on tests made on a number of mills of the same type. Unless these tests are used as a guide, it is easy to assume conditions which will not be obtained in actual practice. For instance, tests were made on a motor driving eight sheet mills. Graphic charts were obtained, the total length of each test being 30 minutes. Although a large number of these charts were obtained over a long period of time, it was surprising to find that not more than four stands out of eight had metal in the rolls at the same time. On one chart the following results were obtained:

Time no metal was in rolls....	26.6	per cent
Time metal was in one stand..	39.1	per cent
Time metal was in two stands.	26.3	per cent
Time metal was in three stands	7.36	per cent
Time metal was in four stands	0.64	per cent

Without making much investigation, it might be thought that it would be necessary to provide flywheel effect to take a peak obtained from metal in five or six stands at one time, when in fact only three stands need be considered. On applications of this kind, it is necessary to test similar mills having a different amount of flywheel effect in order to determine which ones have the proper amount. No method of estimating would be of any practical value.

Plotting the Mill Load

Fig. 1 is an estimated mill load on a 3-high 28-inch blooming mill operating at 70 revolutions per minute. The average load is found to be 1284 horsepower. This includes the friction load of the mill and is the value on which the rating of the motor should be based. In preparing a curve like this, no difficulty will be met in determining the length of the passes, as the size and speed of the mill are known.

Flywheel Energy Expressed in Horsepower Seconds

Pass	Flywheel load during pass	Accumulated flywheel debt at end of pass	Restored during interval	Flywheel debit at end of interval
1	1670	2370	2370	....
2	2050	2050	2050	....
3	1620	1620	1620	....
4	1940	1940	1940	....
5	1800	1800	1800	....
6	2180	2180	2180	....
7	2450	2450	2450	....
8	2520	2520	2520	....
9	2870	2870	2870	....
10	3110	3110	3110	....
11	4570	4570	4200	370
12	5780	6150	4200	1950
13	7150	9100	8400	700

Observations were made to determine the interval between passes, and it was found that under the most favorable conditions, they averaged from three seconds to 3.8 seconds. Occasionally delays were obtained which increased the intervals even to 10 or 15 seconds, but these were unusual. There will be delays which lengthen the cycle to 80 seconds or more, but it is not safe to estimate on an average cycle of 80 seconds, as this extra time may be introduced after any one or more passes. We might take one of the shortest cycles observed in which let us assume a slight delay occurred during the latter part of the cycle. If, while rolling another ingot, this delay came earlier, the flywheel might not be adequate during the last passes. However, it is a simple matter to assume the minimum interval throughout and let this ideal cycle represent 25 per cent overload on the equipment. Some portion of this cycle will prevail when rolling almost every ingot, but in no case would the equipment be subject to a continuous overload. If it is desired to increase the size of the equipment over the calculated values to take care of unforeseen conditions, this can be done after the correct relation between the motor and flywheel is determined. The everything above 1600 horsepower

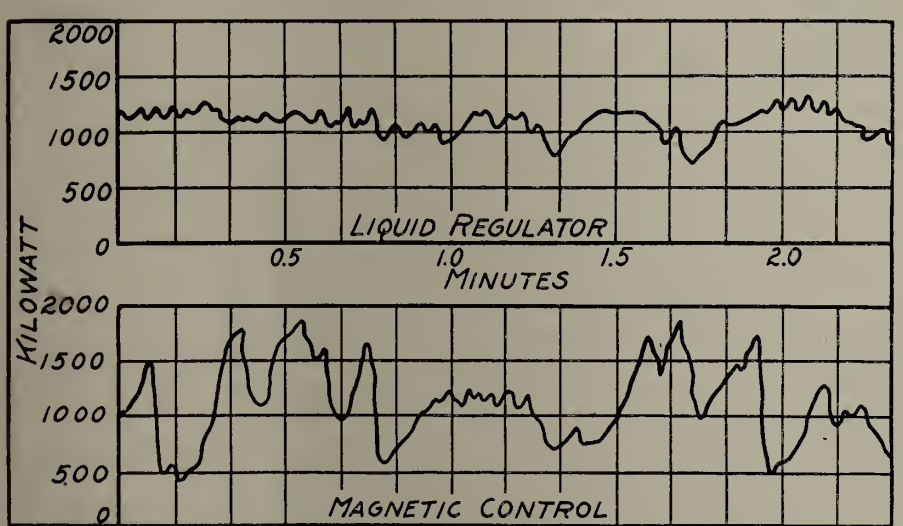


FIG. 3—GRAPHIC WATTMETER CURVES ON A SHEET MILL, COMPARING LIQUID REGULATOR AND MAGNETIC CONTROL ON THE SAME MILL—MOTOR SECONDARY WAS SWITCHED FROM ONE CONTROL TO THE OTHER TO OBTAIN TEST

on both the motor and the flywheel.

The curve in Fig. 1 is plotted using intervals of three seconds between passes and six seconds between ingots. Since this cycle is to impose a load of 125 per cent on the motor, everything above 1600 horsepower should be absorbed by the flywheel during the passes, and during the interval the difference between 1600 horsepower and 200 horsepower friction load, would be restored to the flywheel.

The values given in the second column of the accompanying table representing the flywheel load during the pass, are taken from the load curve. As the flywheel is of sufficient capacity to return 4200 horsepower-seconds during the intervals, it will be observed that the motor is capable of bringing the flywheel back to normal speed, after each pass, until the eleventh pass is reached. At the end of this interval, there is a flywheel debt of 370 horsepower-seconds. Therefore, in starting calculations to determine the size of flywheel, we should start with the eleventh pass and continue the cycle through the thirteenth back to the first and on down to the tenth. During the interval after the first pass, the flywheel debt is wiped out and the wheel again attains normal speed. This continues until the eleventh pass is reached, at which time it again comes to the heaviest part of its cycle.

Application of Data

In the third column it will be noted that the maximum energy which the flywheel must deliver is 9100 horsepower seconds, which is obtained by adding the energy required during the thirteenth pass of 7150 horsepower seconds, to that which has accumulated previous to this pass, which is 1950 horsepower seconds.

The maximum per cent speed drop permitted is 20 per cent at 25 per cent overload. Under ordinary conditions, 15 per cent will not be exceeded. In dropping down to 80 per cent speed, the flywheel has given up 36 per cent of its total energy, which, in this case, is 9100 horsepower seconds, found from our calculations. Therefore, the wheel at its normal speed would have a total of 25,300 horsepower seconds.

As the speed of this mill is 70 revolutions per minute, a split cast-iron wheel can be used having a diameter of 26 feet, which gives a peripheral velocity of 5700 feet per minute. As the radius of gyration of this type of wheel is 0.8 of the outside radius, the velocity at this point is 4560 feet per minute, or 76 feet per second. This latter value is the one which we are to use in the formula.

As we are now interested in obtaining the weight of a wheel which is to have a given amount of energy, this formula should read as follows:

$$\text{Horsepower seconds} = \frac{W v^3}{35{,}400}$$

$$W = \frac{\text{Horsepower seconds} \times 35{,}400}{v^2}$$

$$= \frac{25300 \times 35{,}400}{76^2}$$

$$= 155{,}000 \text{ pounds}$$

The Choice of Control

It is important to take into consideration the type of control used, as some utilize the flywheel effect to a better advantage than others. On the sheet mill referred to previously, Fig. 3 shows the kilowatt input with notching in relays which regulates the amount of grid resistance of the secondary circuit of the motor, while the other curve is taken with the liquid slip regulator in the secondary circuit. The flywheel effect is the same but the regulator does not come into action until the motor is fully loaded. With grid resistance in the secondary of the motor, the flywheel and motor slow down in direct proportion to the load, and when full load on the motor is obtained, the flywheel may be operating at 15 per cent slip and any further peak load cannot be absorbed by the flywheel to the same extent as if it were at its full speed, as is borne out by the two curves. It will be noticed that the average load in each case is 1100 kilowatts.

Quite often motors are applied to tandem or cross-country mills on which the majority of passes are rather long and it would not be natural to expect that a flywheel would be required. The mill, however, may be so arranged that there is an overlapping of several passes which will impose short high peaks upon the motor.

German Made Tubes N. G.

Tests by Prominent Metallurgist Shows Inferiority of Teuton Product—High in Phosphorus and Brittle

VICTORY of American ingenuity over German vandalism in repairing interned German liners was not without honor even for pig iron producers and tube makers. While engineers were engaged in the task of welding the broken cylinders and repairing other parts, the tubes in the boilers of the PRESIDENT GRANT, now the U. S. S. PRESIDENT GRANT, disclosed that all things made in Germany are not superior to competing American goods. This is particularly true of the tubes themselves.

When the PRESIDENT GRANT was being put through preliminary tests before being turned over for war servcie, the discovery was made that her boiler tubes were defective. Orders were issued immediately for the replacement of the tubes and of those taken from the ship, samples were submitted to William Campbell, consulting metallurgist, New York navy yard. His researches disclosed the inferiority of the German product.

Prof. Campbell made the tests without knowing where the tubes were obtained. Along with them other tubes taken from stock were submitted. Two were charcoal iron and two puddled iron. Standard tests were applied, photographs were made and the metallographic report submitted to the navy department where it is now in the official files. Of the one German and four American samples tested, the German one was found to be poorer than the poorest of the four American samples, one which had been rejected by the navy.

"The charcoal tubes were free from mottling but the puddled tubes showed it," Professor Campbell said in his report. "This is what we should expect if we assume that the mottling is due to segregation of phosphorus. None of these tubes showed the abnormally coarse grains met with in the tubes of the U. S. S. PRESIDENT GRANT."

Analyses of the five tubes disclosed the following: In one of the puddled iron samples the phosphorus content was shown to be 0.163 per cent, the silicon content 0.24 per cent, manganese 0.016 per cent and sulphur 0.017 per cent. Another test showed: Phosphorus, 0.111 per cent; silicon, 0.24 per cent; manganese, 0.023 per cent, and sulphur, 0.018 per cent.

The American charcoal-iron tubes disclosed the following: In the first, 0.033 per cent phosphorus; 0.09 per cent silicon; no manganese; and 0.016 per cent sulphur, and in the second, 0.052 per cent phosphorus, 0.02 per cent silicon; no manganese, and 0.017 per cent sulphur.

All of these tubes showed less mottling than the German-made tubes in the PRESIDENT GRANT. In these the phosphorus content was 0.263 per cent, the silicon 0.25 and the manganese 0.02 per cent. The sulphur was about the same as in the American tubes, 0.018 per cent.

Analysis of Electric Steel Making

A Brief Review of the Development of Melting Processes Over the Last 40 Years—General Results of Experiments on Physical and Chemical Properties

BY JOHN A. MATHEWS

FORTY years ago Sir William Siemens constructed and patented an electric arc furnace for melting steel. Although he gave no evidence of a belief in the ultimate commercial success of his laboratory experiment, he formulated a conclusion respecting the superiority of electric furnaces to other types of furnaces, stating that the function of electric melting is to "effect such reactions and decompositions as require for their accomplishment an intense degree of heat, coupled with freedom from such disturbing influences as are inseparable from a furnace worked by the combustion of carbonaceous materials".

Early Development

Early experimenters favored the duplex process and looked with disfavor on the production of electric steel by a combination of the melting and refining processes in one operation. They compared the large amount of slag oxides and general lack of homogeneity of the pure materials used in crucible melting with the product, and concluded that the more uniform liquid product of the open-hearth furnace, made from the same pig iron, formed a more desirable base material for the electric furnace. This, coupled with the reducing and deoxidizing properties of the electric process and its ability to remove sulphur to a great degree, made an ideal combination. This view was accepted about 10 years or more ago by Dr. Heroult and other metallurgists. The earliest installations of electric furnaces included an open-hearth furnace for preliminary melting and refining; the liquid being transferred to the electric furnace for deoxidation, desulphurizing and for making additions or adjustments to bring about the desired analysis. Installations of this kind were made in the United States at the plant of the Halcomb Steel Co., Syracuse, N. Y., which now is in its twelfth year of operation. Other plants soon appeared, both here and abroad, nearly all using the duplex process. In addition to the belief in the metallurgical soundness of the process, there was the further belief that electricity could not be successfully and commercially used to do the first melting. This was true at the time, but now the lower cost of wholesale power and increased electrical efficiency make cold melting feasible in many localities.

Paul Girod, a successful French manufacturer of steel and ferro-alloys, and the inventor of the electric furnace bearing his name, challenged the electric refining ideas then current at a meeting of the society held in May, 1909, stating that one cannot make steel of crucible quality in the electric furnace when a molten charge of open-hearth or bessemer metal is used as a base. Mr. Girod's argument was based on his contentions that at the high temperature of melting, the respective solubilities of open-hearth and bessemer steels for metallic oxides, oxides of carbon, hydrogen and nitrogen were greatly increased; in fact, to such a degree that it was afterward impossible to free the steel wholly from them in the electric furnace, unless the charges were allowed to cool off and were later remelted. Many manufacturers, however, have since experienced little difficulty in this respect and maintain that if large furnaces of greater than 10-ton capacity are to be a success, molten charges must be used, as electric furnaces have not altogether proved themselves to be satisfactory as cold melters. The choice of processes seems to be an economic rather than a metallurgical consideration, and local conditions for each installation must govern the choice, while the final success by either process is a matter of individual skill of operation. Replacement of the crucible furnace, or crucible steel, has not been effected by the electric furnace; its field has been the production of a high grade steel for special purposes. In this capacity, the advent of the electric furnace was timely, in that it met the demands for this class of material—a demand which arose simultaneously with the birth of the automobile, airplane and, more lately, the munitions industry.

Practical results which follow from the conditions obtainable in the electric furnace are due mainly to the fact that "fusion is effected in a perfectly neutral atmosphere", as Siemens concluded in summing up the advantages of his laboratory furnace. With proper handling, the electric furnace has demonstrated its ability to produce a superior product, adequate for the most severe requirements. Exhaustive experiments that demonstrated that:

Claims for Electric Steel

First.—The chemical composition of conconsecutive heats, most notable when handling easily oxidizable metals like vanadium, chromium, silicon and manganese, can be held more closely to a standard than with any other process.

Second.—To insure a given final minimum, less of these metals need be added, hence there will be less of the oxides of these metals produced in the steel and less to be removed.

Third.—Successful heat treating is improved according as composition can be controlled.

Fourth.—Electric steel usually is chemically purer than any other steel. Irrespective of whether or not uniformly distributed sulphur is as harmful as is generally believed, it is obvious that the segregation of elements is impossible if they are absent. It also follows that if the segregation of sulphur and phosphorus are not to be feared, the percentage of cropping may be reduced and the yield of sound metal increased.

Fifth.—Low sulphur in electric steel usually indicates a prior reducing condition favorable to complete deoxidation, sound ingots, freedom from blowholes and resulting seams. Quiet metal has less tendency to segregate in the mold, in respect to either metallic or non-metallic elements, and produces steel free from laminations.

Sixth.—Alloy additions may be made in the furnace itself rather than in the ladle, which increases the probability of thorough assimilation, diffusion and homogeneity.

Seventh.—Results indicate that electric steel is less easily injured by overheating than other steels. It has a wider heat range and will withstand variations in forging and heat treating without injury.

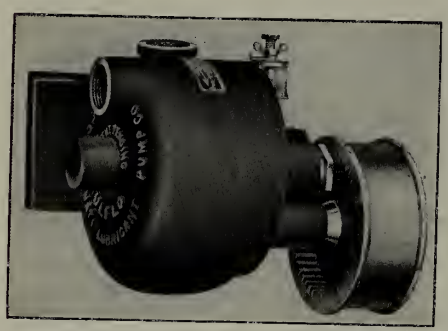
Eighth.—Electric steels are usually freer from slag and nonmetallic inclusions than bessemer and open-hearth steels.

Ninth.—The foregoing characteristics tend toward the production of a steel of better quality. The electric furnace possesses an economic value in its adaptability to the recovery of scrap values, and has decided advantage over the open-hearth furnace in that some alloy scraps do not make desirable additions to open-hearth furnaces, or if such additions are made, usually result in a great deal of the scrap metal being lost in the slag. With the widespread and increasing use of alloy steels it is highly desirable that alloying elements be not lost when contained in the scrap.

From a paper presented at the Detroit meeting of the American Electrochemical society, May 2-5, 1917. The author, John A. Mathews, is president of the Halcomb Steel Co., Syracuse, N. Y.

Manufactures Lubricant and Grinder Pumps

The Fulflo Pump Co., Cincinnati, which a short time ago marketed its new grinder and lubricant pumps, announces that these pumps have been adopted as standard equipment by a number of machine tool builders. One

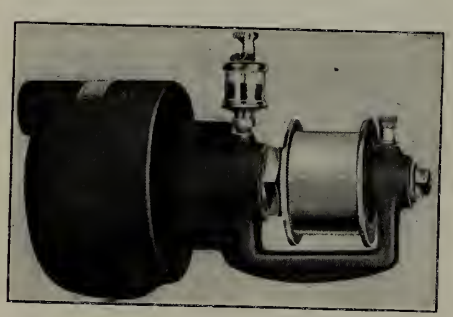


ROTARY LUBRICANT PUMP

of the salient features of the lubricant pump lies in its ability to retain the fluid necessary for priming. Both intake and discharge openings are at the top of the pump and it is impossible for the lubricant to siphon out since a lowering of it will uncover one of these openings, admit air to the body of the pump and break the syphoning action. No strainer is supplied as there are no passages smaller than ¾-inch in diameter. The pump's capacity depends on the speed at which it is operated. Speeds varying from 1200 to 1800 revolutions per minute produce a flow of five to 20 gallons per minute. If heavy oils are used, the flow is approximately two-thirds as great. The pump casing is cast iron, the shaft is cold rolled steel hardened and ground and the bearings are S. A. E. specification bronze.

New Box Tool

A steel tangent-cut box-tool of improved design is being sold by the Biggs-Watterson Co., Cleveland. In this tool strength and rigidity are aimed at by mounting and supporting the cutting members on a one-piece steel body. The tool was designed with the object of eliminating the use of hollow mills. Roller back rests as well as second cutter attachment are supplied as regular equipment. When it is desired to take heavy cuts, all movable parts may be locked to the steel body. The tool bar may be reversed so as to permit the cutter to lead or follow the rollers, and it is said the bits may be removed, ground and replaced without changing the adjustment. The straight line travel of both tool and roll-carrying slides, the maker contends, give support to the work at proper angles and furnish natural clearance to the cutter for all diameters. Three models of the tool are being marketed. Cutting ranges vary from 1/16 to ⅞ inch; turning lengths, from 1 to 2½ inches; shank diameters, from ⅝ to 1 inch; length of shanks, from 1⅛ to 2 inches; and holes through shanks, from ¼ to ½ inch.



CENTRIFUGAL GRINDER PUMP

Guns for Riveting and Slag-Cutting Purposes

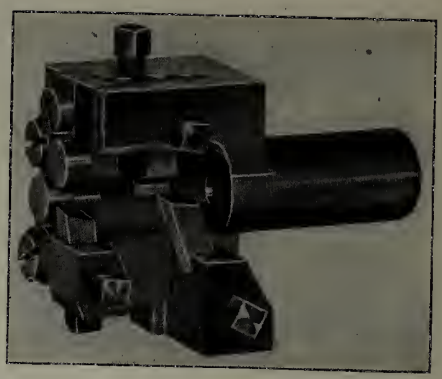
Impact delivered through the work of compressed air is the agency employed in operating the rivet-cutting gun manufactured by the Rivet Cutting Gun Co., Cincinnati. The apparatus consists of a cylindrical gun about 4 feet in length, to one end of which is attached an air line leading to a compression source. The air is controlled at the point of admission to the gun, and a cross handle for directing and placing the gun is attached at this point. At the opposite end of the gun is a tool retainer which will hold a rivet-cutting tool, a punch, or a hammer attachment.

The gun is employed for cutting rivets and driving them out without the application of heat. With this tool it is said that no drilling is necessary and the gun does the work of both a sledge and a cutting bar.

A special gun has been designed for cutting away slag in open-hearth furnaces. This gun is 3 feet 6 inches in length and weighs 60 pounds.

Develops Radial Drill

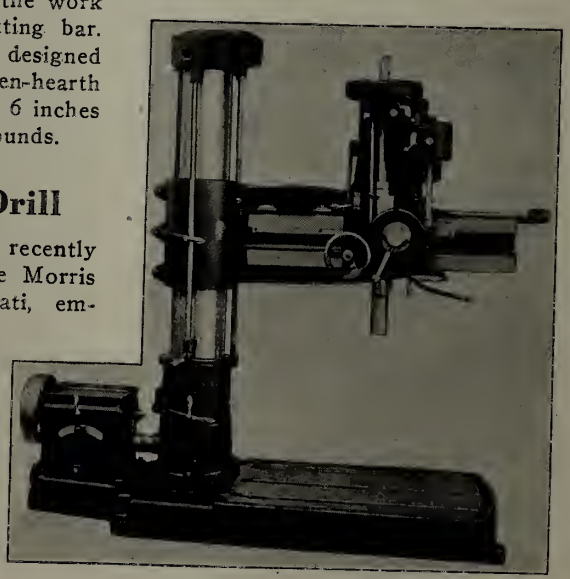
A new 4-foot radial drill recently placed on the market by the Morris Machine Tool Co., Cincinnati, embodies many practical features. As shown in the accompanying illustration, this tool is of rigid construction throughout. The arm travels up and down the column by power feed and is equipped with stops at the extreme position. The entire weight of the



NEW TANGENT-CUT BOX-TOOL

column and arm is carried by a combination annular and thrust bearing. The base is heavy and well-ribbed and is provided with a lubrication channel that drains into a reservoir. All levers are arranged for the convenience of the operator and all gears are enclosed. The head is of heavy construction and is provided with long spindle bearings. It traverses the arm on wide contact surfaces and is actuated by a hand wheel through reduction gears. A tapping attachment is also provided. The spindle is equipped with a ball thrust bearing. All journals are of bronze and are provided with felt wipers. The spindle hole is No. 5 Morse taper.

This machine drills to the center of an 8½-foot circle, while the maximum distance between the spindle and base is 60 inches. The height over-all, with arm and spindle at its highest point, is 10 feet. All gears, with the exception of the semisteel spindle gear are steel. The back gear clutches and clash gears are nickel steel, heat-treated and case-hardened. The machine illustrated is equipped with a speed box drive. This tool is also furnished with cone pulley or direct motor drive.



A NEW RADIAL DRILL

New Light Problems Are Discussed

What the Industrial Commission of Ohio is Doing to Standardize Lighting Methods in Various Industries—A Simple Code Consisting of Four Rules Was Discussed at a Recent Hearing in Cleveland

THE problem of equipping industrial machinery with adequate guards to protect workers against accident has received a great deal of consideration during the last few years. The question of industrial lighting, however, has not been given the attention it deserves. A careful study of the lighting conditions under which workingmen labor in numerous industries discloses the fact that serious injury, total disability and often death frequently occur through incorrect or inadequate lighting. As a matter of fact, 25 per cent of all industrial accidents can be traced to this cause. These factors were mentioned by Victor T. Noonan, safety director of Ohio, in addressing a recent public hearing in Cleveland on a tentative code of industrial lighting, which was prepared by the Industrial Commission of Ohio.

Mr. Noonan also explained that the Industrial Commission does not desire to impose a hardship on employers, but on the other hand the co-operation of manufacturers is encouraged to the end that a just code, which will protect the worker and at the same time not handicap the employer, will be adopted.

Mr. Noonan did not mince words, however, when he stated emphatically that there were employers of labor who in times past had made it a point to block all proposed legislation for the protection of the workingman. "We are here to save lives and limbs," he said.

Prof. F. C. Caldwell of the department of electrical engineering, Ohio State University, is the chairman of the special committee that prepared the code. This code is remarkably free from complications; in fact, it consists of but four rules, as follows:

RULE 1—GENERAL REQUIREMENTS.—Working or traversed spaces in buildings or grounds shall be provided with light during the time in use in accordance with the following rules:

RULE 2—INTENSITY REQUIRED.—There are spaces in industrial properties which need not be lighted. For those which must be lighted the desirable illumination intensity to be provided and the minimum intensity, which shall be maintained, are shown in Table I.

RULE 3—GLARE.—Glare resulting either from natural or artificial light sources shall be avoided.

RULE 4—DISTRIBUTION OF LIGHT ON THE WORK.—Lamps shall be so installed in regard to height, spacing and accessories, as to secure a good distribution of light on the work, avoiding objectionable shadows and objectional contrasts of intensity.

The code also contains an appendix which explains various lighting factors, among them being the following:

FLUX OR QUANTITY OF LIGHT.—Every light source emits a definite quantity of light flux which may be looked upon as a volume of light rays proceeding out from the source on straight lines in all directions. When these fall upon any body, they are either transmitted, reflected, or absorbed.

UNIT OF FLUX—THE LUMEN.—The amount of this flux, other things being equal, is a measure of the value of the source of light. Its unit is the lumen.

CANDLEPOWER.—The unit of light intensity is the candlepower. A lamp is said to give a light intensity of five candlepower in the direction of some given small object when it gives five times as much light to this object as would be given by a candle if it were substituted for the lamp under consideration.

ILLUMINATION.—These two units refer to the light source itself and are independent of its surroundings. When a light source is used for purpose of illumination, the light falling upon a surface to be worked upon, or otherwise observed, becomes the object of interest. This illumination depends not only upon the amount and distribution of the light from the source, but also depends, in a varying degree, upon the reflection from the ceiling, walls and other lighted surfaces.

UNIT OF ILLUMINATION—THE FOOT CANDLE.—This lighting of the surface is called quantitatively illumination and its common unit is the foot candle, which is the illumination on a surface one foot from the light, giving one candlepower in the direction of the surface. The foot candle also corresponds to one lumen per square foot of lighted surface. Minimum and good practice values are given in Table I. In Table II is given a classified list showing the intensity grades recommended for various working places directly connected with the mechanical arts.

Prof. Caldwell read the code, after which a general discussion followed. Taken as a whole, the various manufacturers represented at the Cleveland hearing showed a willingness to cooperate with the industrial commission and many points involving legal technicalities were brought up. Mr. Noonan informed the members of the meeting that they were assembled for the purpose of discussing lighting problems instead of legal points.

Three reels of motion pictures were run which showed how accidents could be caused by improper lighting. Special apparatus was also used to demonstrate the effect of light diffusion, glare and brilliancy.

Table I

Foot Candle Intensities

Grade	Place	Minimum	Good practice
A	Roadways and yard thoroughfares ...	1/20	1/10 to ½
B	Intermediate and auxiliary spaces in interiors.....	¼	½ to 2
C	Rough operations..	1¼	2 to 4
D	Medium operations.	2	3 to 5
E	Fine operations....	3	4 to 8
F	Special operations.	5	7

Table II

Specific Classifications Under Grades A to F

Assembling
C—Rough assembling.
D—Medium assembling.
E—Fine assembling.
F—Extra fine assembling.

Boiler and engine rooms—power houses.
C—Boiler rooms.
C—Coal and ash handling.
D—Engine rooms.
C—Auxiliary equipment.
D—Oil, switch and transformer rooms.
D—Switch boards.
C—Storage battery rooms.

Forge Shops.
C—Rough forging.
D—Fine forging.
D—Drop forging.

Foundries.
C—Rough molding.
D—Fine molding.
D—Core making.
C—Charging floor.
C—Tumbling and cleaning.

Inspecting.
C—Rough inspecting.
D—Medium inspecting.
E—Fine inspecting.
F—Extra fine inspecting.

Machine Shops.
C—Rough bench and machine work.
D—Medium bench and machine work.
E—Fine bench and machine work.
F—Extra fine bench and machine work.
D—Automatic machines (ordinary).
E—Automatic machines (fine).

Plating.
D—Plating.
D—Polishing and burnishing.

Sheet Metal Working.
D—Bench work (ordinary).
E—Bench work (fine).
E—Punch presses, shears, stamps and welders.
E—Spinning.
D—Miscellaneous machines.

Iron and Steel Mills.
D—Automatic machines.
C—Charging floor.
C—Casting floor.
C—Soaking pits and reheating furnaces.
D—Rolling mills.
D—Shears, presses, punches and riveters.
D—Rod mill.
D—Wire drawing (coarse).
E—Wire drawing (fine).
C—Pickling and cleaning.

Note. — Simple and inexpensive foot candle meters are available. By means of these any factory manager can readily inform himself approximately as to the illumination in any part of his factory.

England is Short of Iron

Some Plants Forced to Close—Coal Prices Raised—Government Steel Orders Not So Numerous

Bureau of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Jan. 10, 1918.

IT still is impossible to report any definite government decision with regard to pig iron prices. Demand is as urgent as ever. In the midlands, at all events, it is quite impossible to meet all requirements. A great deal of iron called for today cannot be supplied. Many of the furnaces are fully booked up, and it is a common experience for large smelters to decline any orders exceeding 25 or 50 tons. The best, however, is being done in the matter of deliveries of small parcels, with a view to the prevention of actual stoppages; but the effort is not always successful, and occasionally one hears of foundries beginning on Tuesday or stopping on Friday, because supplies of pig iron have run out. The position of the small foundry is rather trying, and the decreasing proportion making domestic and similar articles occasionally has to stop for want of iron. However, a great many of the small foundries devote three-fourths of their production to war material, so that, on the whole, they are not being treated badly in the matter of pig iron supplies. In the Cleveland district a very strong tone is reported with good sales.

In the midlands the nonsettlement of the price question causes much dissatisfaction. For several weeks past the question of a subsidy has been hanging fire, but there was a general expectation that the government would grant this. No definite announcement, however, has been made. In the meantime, many makers report themselves in a serious position. Production is costing them in coal and coke alone from 10s ($2.40) to 12s ($2.88) more per ton, while there are other increases.

Mill Situation Upset

If the position of pig iron makers is difficult, it is a bed of roses compared to that of the makers of finished material. They have applied to the government for an advance, various amounts being suggested. It is said they have asked as much as £2 10s ($12) per ton. Undoubtedly, in presenting their claim they have in mind the fact that expenses have increased fully 25s ($6) per ton since the last price was fixed, and they know quite well that the government is entirely indisposed to reopen the price question for a long time to come. They have framed their demand accordingly. They have really met with no success so far and are in a serious dilemma. So far as is known, the workers in pig iron have raised no objection to the subsidy; but the case is very different in the finished iron department, in which wages are governed by the northern and midland wages boards through the machinery of the sliding scale. Employers and workmen alike are very proud of this scale, and, rightly or wrongly, the workmen look upon the subsidy idea as a device to deprive them of further advances. It is said that at a recent meeting of the midland wages board the men declared that the moment a subsidy was introduced they would "down tools". It so happens that, in this attitude, they have a large degree of sympathy from the employers, who will bitterly resent anything that even threatens a rupture of their remarkably cordial relations with their workmen.

Puddled Bar Prices

The position of the maker of finished iron may be judged from the fact that puddled bars easily realize £12 10s ($60) to £12 15s ($60.20), while the price for the finished unmarked bar is £13 15s ($61.20). This leaves £1 ($4.80) to £1 5s ($6) to cover all charges in connection with the finishing rolling.

Merchants have been making further efforts to get American steel, but the only success realized has been in the making of some contracts for wire rods, of which a fair supply has all along been coming from the states. The American makers of rods have shown themselves by no means indisposed to undertake further commitments of this kind; but at present the shipments are being held up for lack of tonnage. When the supply of wire becomes really urgent, it is assumed that the government will make special efforts to provide the requisite ships.

The recent order of the government classing shell discard steel as war material, requiring to be bought or sold strictly under official permit, will probably have a great effect on the Sheffield cutlery trade, where a good deal of this steel has been used for the making of knives. Table cutlery, in fact, for some time has been made almost wholly from this class of material.

There is to be a great increase in the production of alloy steels in Sheffield, makers having been advised by the government that production must be doubled by February, and, if possible, trebled by June next. One effect of the stoppage of work on Russian contracts has been to release a considerable quantity of tools and tool steels, for which very good and satisfactory use can be found.

Lake Men Meet

Vessel Operators Discuss 1918 Movement at Annual Convention

Consideration was given at the annual convention of the Lake Carriers' association at Detroit on Thursday of last week to the problem of handling the 1918 movement of iron ore on the Great Lakes. Harry Coulby, president of the Pittsburgh Steamship Co., and a director of the association, urged that the vesselmen should contract to carry in 1918 a tonnage of bulk freight not greater than the 1917 movement. This action he thought necessary in view of the fact that the 1918 shipments will probably not be much in excess of last year's.

Mr. Coulby, as head of the mobilization committee, which will have general supervision this year over vessel operations on the Great Lakes, stated that a definite program for carrying out this plan of central control would be formulated in March. Some preliminary work has been done but definite action will not be taken until a short time before the season opens when outside conditions, such as available railroad facilities and water levels, will be more clearly defined.

In his annual report, William Livingstone, president of the association, discussed the obstacles which the vesselmen had been forced to overcome last year in satisfying the country's need for iron ore, coal and grain. Despite serious delays from ice conditions and traffic congestion on the land carriers, the total movement of bulk freight closely approximated the record tonnage of 1916.

The officers of the association were re-elected. These officers are William Livingstone, president; J. S. Ashley, vice president; Harvey D. Goulder, general counsel; George P. McKay, treasurer; and George A. Marr, secretary. Members of the executive committee are, William Livingstone, chairman; J. S. Ashley, Harry Coulby, John Mitchell, H. S. Wilkinson, D. Sullivan, G. A. Tomlinson and C. L. Hutchinson.

Ore Production Increases

Production in 1917 Shows Small Gain Over Previous Year—Lake Superior District Supplied 85 Per Cent of Output Last Year

The iron ore mined in the United States in 1917 amounted to about 75,324,000 gross tons, compared with 75,167,672 tons in 1916, an increase of 0.2 per cent. The figures for the two years are so nearly the same, however, that when the final returns are received from all the producers the actual quantity mined in 1917 may prove to have been less than that mined in 1916. The shipments from the mines in 1917 are estimated at 75,649,000 gross tons, valued at $236,178,000, compared with 77,870,553 tons, valued at $181,902,277 in 1916, a decrease in quantity of 2.9 per cent, but an increase in value of 29.8 per cent. The general average value of the ore per ton at the mines for the whole United States was, therefore, $3.12 in 1917, as compared with $2.34 in 1916. The stocks of iron ore at the mines apparently decreased from 10,876,352 gross tons in 1916 to 10,560,000 tons in 1917, or 2.9 per cent.

To obtain these statistics preliminary figures received from producers of nearly 95 per cent of the normal output of iron ore were compiled under the direction of Ernest F. Burchard, of the United States geological survey, and were supplemented by estimates covering the remainder of the output.

About 85 per cent of the ore mined in 1917 came, as usual, from the Lake Superior district, which mined about 63,964,000 gross tons and shipped 64,275,000 tons. These quantities represent a very slight increase and a decrease of 3.2 per cent, respectively, compared with 1916. The shipments of iron ore by water from the Lake Superior district amounted in 1917 to 62,498,901 gross tons, and in 1916 to 64,734,198 gross tons.

The south mined and shipped more than 8,100,000 tons of iron ore, the bulk of which was produced in the Birmingham district, Alabama, but the iron mines of Georgia, Tennessee, North Carolina and Virginia contributed about 1,400,000 tons to the total. The northeastern states—New Jersey, New York and Pennsylvania—increased their production slightly as compared with 1916 and shipped to blast furnaces approximately 2,446,000 tons of ore. This quantity, however, represented a decrease of 4.1 per cent as compared with shipments in 1916. Colorado, New Mexico and Wyoming, the principal iron ore producing states in the west, are estimated to have mined and shipped approximately 666,000 tons of iron ore, compared with 717,660 tons in 1916, a decrease of 7.2 per cent. Other states, such as California, Connecticut, Iowa, Maryland, Massachusetts, Missouri, Nevada, Ohio, Utah and West Virginia, in which there are small iron mining operations, are estimated to have shipped about 144,000 tons of ore, compared with 134,002 tons in 1916, an increase of 7.5 per cent.

The imports of iron ore for the 11 months ending Nov. 30, 1917, according to the bureau of foreign and domestic commerce, department of commerce, amounted to 913,500 gross tons, so that probably the imports for the whole year reached 988,500 tons, compared with 1,325,736 tons in 1916.

The accompanying table shows the iron ore mined and shipped in the United States by the principal producing states. The figures for 1916 are final, but those for 1917 are subject to revision.

Making Gun Bed Plates

The Lake Erie Engineering Co., Buffalo, has been purchased by St. Louis capitalists and will hereafter be known as the O'Neil Iron Works. The foundry, which has been idle for five years, has been placed in operation and at present is molding bed plates for United States coast defense guns. The O'Neil plant also manufactures engines, cane sugar mills and crushers, and general machinery including head punches, hydraulic shell presses, tire forcers, etc. The officers of the O'Neil Iron Works are as follows: J. F. O'Neil, chairman of the board; J. W. O'Neil, president; W. D. O'Neil, vice president; and D. S. Drake, treasurer. These officials recently disposed of their holdings in St. Louis known as the Fulton Iron Co.

More Steel

Promised Government by Canadian Makers—Suggest Tearing Up Tracks

Toronto, Can., Jan. 17.—As a result of conferences held between the war committee of the Canadian government and representatives of the steel manufacturing companies to consider the question of steel shortage, it is announced that the manufacturers have undertaken to increase this year's output of steel 20 per cent over last year, provided the raw materials are available as usual.

The plans of the Canadian government for ship construction, as recently announced by Hon. C. C. Ballantyne, minister of marine, have been somewhat modified as regards the sizes of vessels to be built. The type to be constructed in the yards on the Great Lakes will be of 2800 tons, and the two other classes, which will

Iron Ore Mined and Shipped in the United States in 1916 With Estimates for 1917

District	Ore mined, gross tons 1916 Actual	Ore mined, gross tons 1917 Estimate	Ore shipped 1916, Actual Quantity, gross tons	Ore shipped 1916, Actual Value	Ore shipped 1917, Estimate Quantity, gross tons	Ore shipped 1917, Estimate Value
Lake Superior:						
Michigan	18,071,016	17,709,000	18,995,797	$49,054,340	17,473,000	$61,505,000
Minnesota	44,585,422	45,053,000	45,869,251	106,628,784	45,624,000	141,450,000
Wisconsin	1,304,518	1,202,000	1,529,459	3,644,542	1,178,000	3,703,000
Total	63,960,956	63,964,000	66,394,507	159,327,666	64,275,000	206,658,000
Southeastern states:						
Alabama	6,747,901	6,707,000	6,801,839	10,843,231	6,733,000	13,279,000
Georgia	256,949	318,000	252,143	413,259	297,000	995,000
North Carolina, Tennessee	520,140	616,000	532,047	986,345	613,000	1,766,000
Virginia	440,492	471,000	486,798	1,000,118	475,000	1,193,000
Total	7,965,482	8,112,000	8,072,827	13,242,953	8,118,000	17,233,000
Northeastern states:						
New Jersey....	493,004	501,000	528,084	1,877,056	489,000	2,295,000
New York.....	1,342,507	1,365,000	1,464,917	5,571,429	1,383,000	7,612,000
Pennsylvania ..	559,431	574,000	558,556	702,633	574,000	1,001,000
Total	2,394,942	2,440,000	2,551,557	8,151,118	2,446,000	10,908,000
Western states Colorado ..... New Mexico. Wyoming	717,660	666,000	717,660	736,241	666,000	803,000
Other states...	128.632	142,000	134,002	444,299	144,000	576,000
Grand total..	75,167,672	75,324,000	77,870,553	$181,902,277	75,649,000	$236,178,000

be built in plants on the seacoast, will be of 5000 tons, and of from 8200 to 10,000 tons, respectively. The number to be built is as yet undecided. It is understood that an adequate supply of ship plates for the vessels to be built this year can be secured from the United States. Negotiations are in progress with the Dominion Steel Corp., Nova Scotia Steel & Coal Co. and Algoma Steel Co., looking to the establishment of rolling mills in connection with their plants as a permanent source of supply. These companies are inquiring into the economic feasibility of the project, which it is estimated would involve an expenditure of about $3,000,000 in each case. Should it be found impracticable, the government has in view the establishment of its own mills. The question as to the operation of the government ships has not yet been settled. It may either operate them itself or adopt the plan of the British government and hand them over to private shipping companies, paying the latter operation fees, and retaining excess earnings for the public treasury.

The Canadian Bartlett Automobile Co., Ltd., of Toronto, capitalized at $10,000,000 with factory in Stratford, Ont., went into liquidation of the 15th inst., when the court granted a winding up order on the petition of R. C. Bartlett, director. The liabilities are stated at approximately $8500, including $7000 for wages.

The Canadian railway war board has decided to recommend to the government that in order to supply the urgent need for steel rails to keep the leading roads in operation, between 1500 and 2000 miles of rails on lines not so vitally necessary should be taken up and relaid on the main arteries of traffic. At least 20,000 laborers would be required, and as no such supply is available they ask the government to hold up the Chinese laborers who are passing through Canada to Europe and employ them for this purpose. Owing to the general shortage of labor, all sorts of reports and suggestions for the conscription of workers, particularly aliens, are current, but so far no decisive action has been taken. The labor unions, while some of them are disposed to favor the conscription of aliens, are strongly opposed to Chinese labor.

Representatives of the steel companies had a conference at Ottawa with the imperial munitions board Jan. 9, respecting the inspection of munitions. They complain of the number of rejections and object to the method of inspection. The work is done by a company employed by the British government, and the manufacturers claim that unskilled men are employed. The board did not hold out much hope of a change in the system.

The government has decided for the present and until further notice to permit under license the free export of the metals, molybdenum, tungsten and their ores, concentrates, alloys and chemical salts to approved consignees in the United States and France. Since the embargo was placed

Obituaries

EDWARD McKIM HAGAR, president of the American International Steel Corp., subsidiary of the American International



EDWARD McKIM HAGAR

Corp., died suddenly Jan. 18 from pneumonia, at his home, 960 Park avenue, New York City, at the age of 45. Mr. Hagar was prominent in the iron and steel industry having served as president of the Universal Portland Cement Co., a subsidiary of the United States Steel Corp., for 15 years. After graduating from the Massachusetts Institute of Technology in 1893 and from Cornell university in 1894, he organized and conducted the business of Edward M. Hagar & Co., Chicago, manufacturers' representatives in different lines. Upon the formation of the Universal Portland Cement Co., in 1900, he was elected to the presidency, in which connection he served until February, 1915, when he resigned. For a term of two years he was president of the Association of American Portland Cement Manufacturers and he also was organizer of the Cement Production Exhibition Co., which held its first annual industrial exhibition in 1907.

John Wesley Ostrander, founder of the Ostrander-Seymour Co., Chicago, a pioneer in building printing machinery, died recently and was buried Jan. 12.

Frederick M. Bachman, president of the Indianapolis Drop Forge Co., and the V. M. Bachman Lumber Co., Indianapolis, died recently in that city at the age of 68 years.

Nathaniel Hoyt Ingraham, formerly president of the Taber Organ Co., but latterly treasurer of the Worcester Lawn Mower Co., Worcester, Mass., died recently at his home in that city at the age of 76.

Joseph Thonet Sr., inventor of the first lower lever breechloading shotgun, died suddenly, Jan. 6, in Brooklyn, N. Y. He was born in Liege, Belgium, in 1820, and came to this country in 1859.

Rear Admiral John Adams Howell, U. S. N., retired, inventor of gyroscopic steering torpedoes and other naval weapons, died of pneumonia, Jan. 11, at Warrenton, Va. He was born at Bath, N. Y., in 1840 and participated actively in the Civil war.

Colonel Thomas L. Livermore, vice president of the Calumet & Hecla Mining Co. for 21 years, died at his home in Boston, Jan. 10. He was born in Galena, Ill., in 1844. He held official positions in several other large mining corporations.

Carl Anderson, vice president Anderson Engine Co., 4036 North Rockwell street, Chicago, died recently after a lingering illness covering a period of 12 months, age 66. He was also founder and late president of the Carl Anderson Co., Chicago, machinist.

Cornelius W. Walls, Worcester, Mass., identified with the iron industry as an ornamental iron worker, etc., since 1872 in that city, died Jan. 12 from internal injuries received in a coasting accident earlier in the week, aged 71.

Labor War Board Formed

Secretary of Labor Wilson Names Committee of Six to Advise With Him in Handling Employment Questions

SINCE the council of national defense with the approval of the President, recently placed in the hands of Secretary of Labor Wilson, the formulation and execution of a war-labor administration, the latter now has appointed a national war-labor board to be known as the advisory council. This consists of six men and one woman, as follows: John Lind, chairman, former governor of Minnesota, who was President Wilson's envoy and personal representative to Mexico; as representative of the public, Waddill Catchings, president of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., and chairman of the war committee of the chamber of commerce, and A. A. Landon, general manager American Radiator Co., Buffalo, who is likewise vice chairman of the aircraft board of the council of national defense, as representatives of the employers; while John B. Lennon of Illinois, former treasurer of the American Federation of Labor and a member of the industrial relations commission in 1912 with former Congressman John J. Casey of Pennsylvania will act for the employes. Prof. L. C. Marshall, of the University of Chicago, will serve as an economist, while Agnes Nestor of Chicago, president Chicago Woman's Trade Union League, member of the committee on women's defense work, council of national defense and member of the subcommittee on women in industry, will represent women on this council.

Secretary of Labor Wilson intends later to increase the council by appointing representatives from the war, navy and agriculture departments and the shipping board. Standardization of labor policies; the providing, distributing and maintaining of a stable and adequate supply of workers; labor dilution and training; priority demands; the adjustment of disputes and the safeguarding of employment, living and housing conditions are some of the problems that will be taken up immediately.

Big Decline in Seven-Day Furnace Work Shown

Statistics published recently by the United States department of labor, cover a 2-year period in the iron and steel industry ending May, 1915. The value of this bulletin largely is for comparative purposes, since the data end at the time the general depression in the iron and steel industry began to subside. That depression had not materially affected rates of pay, which had substantially increased in the spring of 1913. However, by affecting the tonnage output and consequently the incentive for rapid work, it did decrease the earnings per hour of tonnage workers. As compared with May, 1913, tonnage workers' full time weekly earnings in blast furnaces, in May, 1915, decreased 4 per cent. In bessemer plants, blooming and sheet mills, bar mills, standard rail mills and open-hearth plants, the per cents of decrease were 10, 5, 4, 3 and 1, respectively. Plate mills showed no change while tin plate mills showed an increase of 3 per cent.

A marked reduction in seven-day work is noted. Whereas 97 per cent of blast furnace workers worked seven days a week in 1907, only 59 per cent worked full time in 1915. The per cents for 1913 and 1910 are 80 and 95, respectively. In 1915 the average rate per hour for laborers was 18.0 cents while the full-time hours per week averaged from 57.5 to 74.3.

English Get Much Less

The high puddling wages now prevailing in this country contrast sharply with those being paid in England. While $14.30 per ton is the rate in the United States until February, the rate in Birmingham, Eng., is but $4.258 per ton. Consul E. Haldeman Dennison reports that a bonus of $0.122 is paid to puddlers only so that while other mill and forge wages remain unaltered, the total rate for puddlers until Feb. 2 will be $4.38 per ton. This announcement was made recently by the Midland iron and steel wages board.

Labor Notes

More than 1,000,000 are being furnished employment by the industrial plants of Ohio, one-third more than a year ago, according to the estimates of the state industrial commission.

Work for approximately 70,000 persons was obtained during 1917 by the State-City Free Labor Exchange, Cleveland, which co-operates with the state clearing house at Columbus.

Eleven states—all of them with the exception of North Dakota in the south—are lacking some sort of workmen's compensation, according to the annual report of the workmen's compensation publicity bureau.

The strike of molders employed by the Androscoggin Foundry Co., Auburn, Me., has been settled. The demand for a minimum wage scale of $4 per day has been granted and the men have returned to work.

Men employed by the Webster Mfg. Co., Tiffin, O., in its gray iron foundry to take the places of union molders discharged because they wouldn't work with non-union men, went out on strike recently. They demanded $7 per day instead of the $6 they were receiving.

Notification that the 10 per cent bonus system will continue in force from Jan. 1 until July 1, 1918, has been given the employes of the Standard Co., the Excelsior Needle Co., and the Progressive Mfg. Co., subsidiaries of the Torrington Co., Torrington, Conn.

Based on a survey made in 15 states for the National League of Women's Service, it is estimated that 1,200,000 women are engaged in war industry in the United States, with approximately 100,000 of that number making munitions. In 1910 but 3500 women were employed in munition factories.

To enforce a demand for higher wages, shorter hours and recognition of the union machinists employed in seven shops at Oshkosh, Wis., have struck. The Oshkosh trades and labor council has adopted a resolution for a general union strike to support the machinists in their demand for an advance from 42½ to 45 cents an hour and advances to 30 and 35 cents for helpers and specialists, respectively.

Three reasons are given by the Massachusetts state board of labor and industries for the increase in awards under the state compensation act from $1,700,000 in the year ending June 30, 1913, to slightly more than $5,000,000 in the year ending June 30, 1917. They are as follows: Faulty methods of reporting in 1913, the abnormal industrial conditions in 1917 and the increase in the maximum award of from 50 to 66-2/3 per cent of the wages.

That thrift stamps will serve the double purpose of rewarding faithful regular service and promote thrift is the hope of the Queen City Machine Tool Co., Cincinnati, O. Each man who works four full weeks straight will receive five 25-cent stamps. If 12 weeks are made without a break, an extra stamp is given and the odd amount is paid to make a $5 war savings certificate. Modifications of this plan are made when less regular time is shown by the time clock.

Non-Essential Plants Win Victory

Fuel Administration's Sweeping Order for Conservation of Coal by General Industry Interpreted as Change of Heart in Policy Toward Non-War Manufacturers —Heavy Loss Arises From Indefiniteness of Order

WASHINGTON, Jan. 21.—The order of Fuel Administrator Garfield for conservation of fuel is virtually a victory of nonessential over essential war industries. For weeks the administration has been considering conservation in certain industries not engaged in essential war production and only one order has been issued although several agreements had been effected by which nearly 15,000,000 tons of coal were to have been saved this year. Now, apparently, this is all off.

Dr. Garfield, in his testimony before the senate committee on manufactures said it is expected the conservation order will save from 35,000,000 to 50,000,000 tons of coal. This is the total amount which had been expected to be saved through curtailing nonessential industries. No reason was given by the administrator as to why he had abandoned the nonessential conservation plan but it has been hinted that the nonessential producers used such pressure as to have the administration include all industry in the general order.

Wants Effect Equalized

The administrator said it was desired that no one industry profit at the expense of the other, whether any particular plant used coal, coke, wood, waterpower, gas or other fuel, either on hand or easily obtained. This, he stated, was to equalize the burden of sacrifice. It was absolutely essential because of congestion at seaboard terminals and on the railroad rights of way. In discussing the enormous economic loss which will be entailed through enforcement of his order, Dr. Garfield said:

"The economic loss of war we agree is untold, it is beyond estimating; but we throw it away, so to speak, in the face of a necessity that compels us to go forward with the chief business in hand. If we are arguing the case on the basis of pure economics, I have not a word to say to justify the act of myself as fuel administrator."

No word has been passed at the administration but it is generally conceded that with this explanation, the "coal budget plan", decided upon only a short time ago, has gone glimmering and that nonessential industries, as they are able to obtain materials, will be permitted to operate freely and unhampered.

A statement of the administrator in his third explanation, said: "To single out industries not engaged to some extent in war manufacture is to select industries which in the aggregate will bring relief only if suspended indefinitely. To require all industries except a comparatively small part to cease for a few days quickly accomplishes the desired result and permanently injures none. This order as it stands put all industry on an equal footing, favoring none and avoiding unfair competition."

Blast Furnaces Exempt

Blast furnaces, by-product and beehive coke plants, iron and nonferrous metal ore mines, coal mines, and other raw material industries, because of the need of those materials and because of the loss involved in shutting down plants where continuous heats are necessary, have been exempt from the general coal conservation order by section I and section III, exception (a), of the order itself.

Section I exempts by-product coke plants supplying gas for household use. As many such plants furnish this gas, they are automatically exempt. If they do not, they may come under section III, exception (a), which exempt "plants which necessarily must be continuously operated seven days each week to avoid serious injury to the plant itself or its contents." This section applies to other general exemptions.

Haphazard Decree Criticized

Severe criticism is being heaped upon the fuel administration for the haphazard manner in which the coal conservation order was issued without first exempting plants which since have been told they may operate after having been forced to shut down. The financial loss because of this contradiction of orders, which apparently could have been avoided by establishment of an exemption list first, undoubtedly has been enormous.

When the summary of the official order was sent out like a bolt from the sky, Wednesday night, it declared no industries, not even those working on government war contracts, would be exempt. This same declaration was officially affirmed in the order itself and was repeated in explanatory statements by Fuel Administrator Garfield. And simultaneous with the release of the official order there came a list of 42 plants, owned by 35 companies, which would be exempt.

This list was the first intimation of exemptions and the flood of protesting telegrams which reached the President, Da Garfield and the heads of various government war purchasing departments had the effect of hundreds of additions being made to those industrial plants previously exempted.

Many steel mills, after shutting down cold, were telegraphed permission to fire up again. No announcement has been made of what mills were included in this new list.

The second list of exemptions, which includes those of the first, follows:

Gas Mask Manufacturers

B. F. Goodrich Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Mechanical Rubber Goods Co., Cleveland.
C. Kenyon Co., Brooklyn.
Gas Defense Plant, Long Island, N. Y.
Astoria Light, Heat & Power Co., Astoria, Long Island.
Fulford Manufacturing Co., Providence, R. I.
Nashawanna Mill, New Bedford, Mass.
Wamsutta Mill, New Bedford, Mass.
Sayles Bleacheries, Saylesville, R. I.
Hero Manufacturing Co., Philadelphia.
All plants of the Du Pont Powder Co.

Explosives Manufacturers

Hercules Powder Co., Wilmington, Del.
Aetna Powder Co., New York.
Du Pont Powder Co., Wilmington, Del.

Arms Manufacturers

Savage Arms Co., Utica, N. Y.
Marlin Arms Corp., New Haven, Conn.
Remington U. M. C. Co.
Colt Patent Fire Arms Co., Hartford, Conn.
Marlin Rockwell Corp., New Haven, Conn.
Winchester Repeating Arms Co., Eddystone, Pennsylvania.
U. S. Cartridge Co., Lowell, Mass.
National Brass & Copper Tube Co., Hastings, N. Y.
Peters Cartridge Co., Cincinnati.
Western Cartridge Co., Upper Alton, Ill.
Smith & Wesson, Springfield, Mass.
U. S. Machine Gun Co. (Hopkins & Allen plant, Meriden, Conn.)

Manufacturers of Forgings

Bethlehem Steel Co., South Bethlehem, Pa.
Midvale Steel Co., Nicetown, Pa.
Hydraulic Pressed Steel Co., Cleveland.
American Car & Foundry Co., Detroit.

Makers of Other War Essentials

Allis-Chalmers Mfg. Co., Milwaukee.
Burks Electrical Co., Erie, Pa.
Electric Machinery Co., Minneapolis.
General Electric Co., Schenectady, N. Y.
Goodman Mfg. Co., Chicago.

Jeffrey Mfg. Co., Columbus, O.
Pittsburgh Transformer Co., Pittsburgh.
Reliance Electric & Engineering Co., Cleveland.
Triumph Electrical Co., Cincinnati.
Westinghouse Electric & Mfg. Co., East Pittsburgh.
Julius King Optical Co., 12 Maiden Lane, New York.
Taylor Instrument Co., Rochester, N. Y.
National Cash Register Co., Dayton, O.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn.
American Radio & Research Corp., 21 Park Row, New York.
American Steel & Wire Co., Trenton, N. J.
Bausch & Lomb Optical Co., Rochester, New York.
Hartzell Walnut Propeller Co., Piqua, O.
West Woodworking Co., Chicago.
Flottorp Mfg. Co., 4611 West Twelfth street, Chicago.
John A. Roebling Sons Co., Trenton, N. J.
Western Electric Co., 463 West street, New York.
Weston Electric Instrument Co., Waverly Park, Newark, N. J.
Eastman Kodak Co., Rochester, N. Y.
Splitdorf Electric Co., 98 Warren street, Newark, N. J.
Wyman Gordon Co., Worcester, Mass.
American Propeller Co., Baltimore.
Astoria Veneer Mill & Dock Co., Long Island City, N. Y.
Curtiss Engineering Corp., Garden City, Long Island, N. Y.
L. W. F. Engineering Co., College Point, Long Island, N. Y.
Aeromarine Plane & Motor Co., Keyport, New Jersey.
The Burgess Co., Marblehead, Mass.

Manufacturers of Locomotives

American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Corp., Lima, O.
H. K. Porter Locomotive Co., Pittsburgh.

For the manufacture of products intended for the shipping board the following firms are exempt:
General Electric Co., Erie, Pa.
General Electric Co., Schenectady, N. Y.
General Electric Co., Lynn, Mass.

Builders of Destroyers

Fore River Shipbuilding Corp., Quincy, Mass.
William Cramp & Sons Ship & Engine Building Co., Philadelphia.
New York Shipbuilding Co., Camden, N. J.
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

For the manufacture of forgings for destroyers:
Camden Forge Co., Camden, N. J.
Allis-Chalmers Co., Milwaukee, Wis.
Erie Forge Co., Erie, Pa.

For the manufacture of boilers for destroyers the following firm is exempt:
Babcock & Wilcox Co., Bayonne, N. J.

For the manufacture of seamless tubes less than 1½ inches in diameter:
National Tube Co., McKeesport, Pa.
Pittsburgh Steel Tube Co., Pittsburgh.
Pittsburgh Steel Products Co., Pittsburgh.
Ohio Seamless Steel Tube Co., Shelby, O.

For the manufacture of condenser tubes ⅝ inch in diameter:
American Brass Co., Bridgeport, Conn.
Bridgeport Brass Co., Bridgeport, Conn.

Aircraft Products Makers

A. C. Clark Co., Chicago.
Packard Motor Co., Detroit.
Ford Motor Co., Detroit.
Lincoln Motor Co., Detroit.
Trego Motors Corp., New Haven, Conn.
Nordyke & Marmon Co., Indianapolis.
Union Switch & Signal Co., Swissvale, Pa.
Pittsburgh Model Engine Co., Pittsburgh.
Wright Martin Aircraft Corp., New Brunswick, N. J.
Willys Overland Co., Toledo, O.
Aeronautical Engineering Corp., Long Island City, N. Y.
General Motors Corp., Detroit.
Curtiss Aeroplane & Motors Corp., Buffalo.
Thos. Morse Aircraft Corp., Ithaca, N. Y.
Fisher Body Corp., Detroit.
Dayton Wright Airplane Co., Dayton, O.
Standard Aeroplane Corp., Elizabeth, N. J.
Cutler Desk Co., Buffalo.
Rubay Co., Cleveland.
Engel Aircraft Co., Niles, O.
Lewis Spring & Axle Co., Chelsea, Mich.
W. H. Mullins Co., Salem, O.
National Gauge & Equipment Co., La Crosse, Wis.
U. S. Gauge Co., Sellersville, Pa.

Shipbuilding Companies

Bethlehem Steel Co.
Midvale Steel & Ordnance Co.
Lukens Steel Co., Coatesville, Pa.
Carnegie Steel Co.
Crucible Steel Co., Pittsburgh.
La Belle Iron Works, Steubenville, O.
Otis Steel Co., Cleveland.
Lackawanna Steel Co., Buffalo.
Illinois Steel Co., Chicago.
Jones & Laughlin Steel Co., Pittsburgh.
Donner Steel Co., Buffalo.
Inland Steel Co., Indiana Harbor, Ind.
Central Steel & Iron Co., Harrisburg, Pa.
Republic Iron & Steel Co., Youngstown, O.
Brier Hill Steel Co., Youngstown, O.
McKinney Steel Co., Cleveland.
Forged Steel Wheel Co., Butler, Pa.
Whittaker-Glessner Co., Portsmouth, O.
Youngstown Sheet & Tube Co., Youngstown, O.
Alan Wood Iron & Steel Co., Conshohocken, Pa.

War Board Will Control Shipping Licenses

Washington, Jan. 22.—In order to secure an even closer supervision over foreign commerce than has existed in the past, the war trade board has adopted a set of regulations governing the granting of licenses for necessary fuel and stores for vessels in foreign trade. These regulations become effective on and after Feb. 1.

They are specifically set forth in "General Rules No. 1". To secure a license it will be necessary for the owner of a vessel under the flag of a neutral country to sign an agreement binding himself to comply with the rules. The foreign owner of vessels under the flag of a neutral country must vest someone in the United States with the proper authority to enter into an agreement with the war trade board.

Voyages and charters for all neutral vessels and all American vessels not requisitioned by the United States shipping board, however, should still be approved by the chartering committee at New York. The war trade board will receive from the chartering committee notice of its decisions.

It will be impossible for any vessel to clear port without securing a license. In order to prevent a heavier loss of tonnage, the rules likewise provide that no application shall be granted for a sailing vessel wishing to enter the war zone. The applicant for a license must also sign an agreement that the vessel will return to the United States for discharge of the entire return cargo.

The war trade board at the present time is distributing the printed regulations which include forms of agreements, affidavits, applications and licenses.

Scrap Exports Barred

Washington, Jan. 15.—The war trade board has issued a warning to exporters that the classification of second-hand rails, car wheels, etc., or any articles of iron and steel, as such when it is the intention to use them as scrap at their destination, constitutes a violation of the trading-with-the-enemy act and subjects the shipper to penalties provided in the law. Such classification is false declaration. At the board's headquarters it was not stated whether any violations had occurred, but it was said the situation calls for warning. Scrap is under general embargo, but second-hand rails, car wheels, etc., except when consigned to any of the European neutrals, take license under their own identity and, if intended ultimately for scrap, would lead to violation of the law.

Exhibit Trade Papers

Over 1000 trade journals, house organs and advertising sheets form one of the most interesting features of a technical exhibit being conducted at the Newark library and museum, Newark, N. J. In addition to the trade journals, the exhibit, which will continue till Feb. 12, shows the developments of a number of local industries and presents much information on technical subjects in general.

Stops Gun Making

The S. R. Avis & Sons Co., West Haven, Conn., maker of gun barrels and operating under a contract with the New England Westinghouse Co., has closed its plant and laid off 500 hands as a result of the cancellation of the Russian gun contract. The company had completed 350,000 of an order received in October for 400,000 barrels, and had been in operation about two years. Its output was 2500 barrels a day.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ANDREW GRAY YOUNG, traffic manager of the American Sheet & Tin Plate Co., who has been appointed chairman of the subcommittee on traffic by the general committee on steel and steel products of the American Iron and Steel institute, with headquarters at 71 Broadway, New York, was born at Peoria, Ill., in 1861. After graduating from high school in 1879, he entered the railroad serve as clerk for the Toledo, Peoria & Western railroad. His advancement was rapid, and after serving in traffic departments of several roads, he was appointed assistant freight manager of the Fort Wayne, Cincinnati & Louisville and Lake Erie & Western railroads. He was affiliated with those roads until 1899 when he resigned to accept the position of traffic manager of the American Tin Plate Co., which is now the American Sheet & Tin Plate Co., where he has remained until the present time. The eleven other members of the subcommittee on traffic conditions include nine traffic managers of various steel companies as follows: S. P. Bentley, Illinois Steel Co., Chicago; J. M. Gross, Bethlehem Steel Co., Bethlehem, Pa.; H. R. Moore, Republic Iron & Steel Co., Youngstown, O.; L. C. Bihler, Carnegie Steel Co., Pittsburgh; W. H. Higgins, Wheeling Iron & Steel Co., Wheeling, W. Va.; W. E. Howes, Lackawanna Steel Co., Buffalo; H. C. Crawford, Midvale Steel Co., Philadelphia; C. L. Lingo, Inland Steel Co., Chicago, and J. L. Roney, American Rolling Mill Co., Middletown, O. The other two members are J. A. Coakley, division freight agent, the American Steel & Wire Co., Cleveland; and C. A. Muse, superintendent of transportation, the H. C. Frick Co., Pittsburgh.

Stephen J. Leonard has been elected a director of the General Foundry Co., 90 West street, New York, succeeding W. L. Kluttz, resigned.

W. Frank Roberts, who early in 1916 was made vice president of the Bethlehem Steel Co., in charge of operations at South Bethlehem, Pa., has been made manager of the Maryland plant at Sparrows Point to succeed F. W. Wood, who retired recently, but who will continue in an advisory capacity. Mr. Roberts is one of the youngest men of the Bethlehem organization. Mr. Wood, whom he succeeds has been connected with the steel industry for 40 years and has been at the head of the Maryland plant since it was started in 1887. Mr. Roberts' business career commenced at the age of 12, when he became office boy for Coxe Bros. & Co., in the anthracite coal regions. After his graduation from the mechanical engineering school of Lehigh university in 1902, he became affiliated with the Bethlehem company. Since that time, he has occupied posts of constantly increasing responsibility, and in 1914 he was made a director. Other appointments made recently by E. G. Grace, president of the Bethlehem company, to become effective immediately, are as follows: Quincy Bent, who has been general manager of the Steelton, Pa., plant, becomes vice president in charge of operations at Bethlehem; M. J. Scammell, formerly general superintendent of the Maryland plant, has been made assistant general manager of the Maryland plant; F. A. Robbins will succeed Mr. Bent as general manager of the Steelton plant, with E. F. Entwistle as assistant general manager, and the Lebanon blast furnace properties will hereafter be under the supervision of John P. Brock, general manager of the American Iron and Steel plant,



W. FRANK ROBERTS

Kurt R. Sternberg, resigned recently as treasurer and general manager of the Dickinson Mfg. Co., electric molded insulations, Springfield, Mass.

D. A. Stuart has been appointed Pittsburgh district manager in charge of sales of the Sizer Forge Co., Buffalo, with headquarters at 908 First National Bank building.

Fred F. Bennett, who has been affiliated with the Daisy Air Rifle Co., has been appointed general manager of the Michigan Crown Fender Co., Ypsilanti, Mich.

D. G. McIntyre has accepted an appointment to succeed F. R. Faller, who resigned recently as general manager of the Skagit Steel & Iron Works, Sedro-Woolley, Wash.

Walter F. Kaine, secretary of T. P. Kelly & Co., New York, manufacturers of foundry facings and supplies, has been elected president to succeed the late Michael F. Kerby.

Harding Allen has been elected a director of the Merchants National bank, Worcester, Mass. He is head of Charles G. Allen & Co., iron founders and machinists, at Barre, Mass.

J. H. Bickley, mechanical engineer for 17 years of the Reading Iron Co., Reading, Pa., has resigned to accept the position of superintendent of inside engineering for the Merchant Shipbuilding Corp., Bristol, Pa.

George B. Gehret, chief burgess of Bridgeport, Pa., and a member of the firm of Gehert Bros., founders, is supervising iron and construction work for the government in one of its new shipyards.

W. W. Crawford, president of the American Trust & Savings bank, Birmingham, Ala., and J. W. McQueen have been elected directors of the Sloss-Sheffield Steel & Iron Co., to fill vacancies.

G. F. Evans has been appointed resident engineer in the Ohio territory for the National X-Ray Reflector Co., Chicago, with headquarters

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

in the Columbus Savings & Trust building, Columbus, O.

H. O. Price is now affiliated with the Iron & Fuel Trading Co., First National Bank building, Pittsburgh, having resigned his position in the Cleveland office of the E. C. Humphrey Co.

Asa A. Weimer of the Weimer Machine Works, Lebanon, Pa., who is serving his second term in the Pennsylvania state legislature, is being urged as a candidate for the Republican gubernatorial nomination in Pennsylvania.

H. G. Gibson has accepted the promotion to the position of sales manager of the Clarendon Refining Co., Oliver building, Pittsburgh. He succeeds W. E. Weidler, who is serving the United States in the ordnance department.

Robert L. Lake, in charge of purchasing and traffic regulation for the De La Vergne Machine Co., New York City, has resigned to accept a position as purchasing agent at the Alexandria, Va., plant of the United States Steamship Co., Inc.

Chas. A. Swan, formerly superintendent of the Becker Steel Co. of America, has become affiliated with the sales organization of the Hess Steel Corp., Baltimore, Md. He will have charge of the Cleveland and Detroit territory.

P. C. Gunion, affiliated with the sales department of the Hyatt Roller Bearing Co., Newark, N. J., and later manager of that company's Pittsburgh office, has been made advertising manager of the industrial bearings division at Newark.

Stanley D. Winger, formerly associated with the Prest-O-Lite Co., in charge of railroad sales, has been made general manager of the compressed acetylene department of the Oxweld Railway Service Co., with offices in Chicago. He was educated at Ohio State University.

Charles C. Gorsuch was recently reelected chairman of the board at the recent annual meeting of the Savage Mountain Fire Brick Co., Frostburg, Md. John A. Caldwell remains president for another year and W. F. Caldwell is secretary. These officers with H. G. Caldwell and G. A. Shuckhart, serve as the board of directors.

Henry R. Moore, traffic manager of the Republic Iron & Steel Co., has been named the Youngstown, O., representative of the American Iron and Steel institute's subcommittee on traffic and transportation, which will have charge of making daily reports to Director General of Railroad McAdoo on carrier conditions.

Paul Wright, for the past three years sales engineer for the American Cast Iron Pipe Co., Birmingham, Ala., has resigned to accept the position of assistant chief engineer of the Fairfield works of the Tennessee Coal, Iron & Railroad Co., Birmingham. No announcement has been made regarding his successor at the pipe plant.

Frank W. Baillie, president of Canadian Aeroplanes, Ltd., Toronto, Ont., has received the title of Knight Commander of the Order of the British Empire in recognition of his services. As president of the Canadian Cartridge Co., Hamilton, Ont., he returned to the government a large sum representing his company's profits on a war order.

Joseph N. Pew Jr. has been elected president of the Sun Shipbuilding Co., Chester, Pa. His brother, J. Howard Pew, who has been that company's president, takes his position as vice president. J. A. Sims resigned as manager of the hull construction department of that company recently to become affiliated with a new shipyard in Portland, Oreg.

C. W. Bonfield, who for 10 years was connected with the machine tool house of James R. Kelly & Co., Leeds, Eng., acting as that company's representative in this country for about two years, now has charge of the new machinery department of the W. F. Davis Machine Tool Co., New York City. C. W. Westphal has been transferred from the Cincinnati office to the New York office of the W. F. Davis Co.

Franz Wollaeger Jr., has been granted leave of absence by the Kempsmith Mfg. Co., Milwaukee, Wis., of which he is secretary, so that he may enter active service as a member of base hospital No. 22, Milwaukee, which has been ordered to report for duty and which expects to sail within three weeks. Peter Lowe, sales manager and assistant secretary of the company, will assume Mr. Wollaeger's duties for the present.

J. H. Hackenburg has been promoted from the position of assistant purchasing agent to succeed the late H. J. Gearhart, as purchasing agent for the Pressed Steel Car Co., Pittsburgh. H. B. Fisher and C. C. Clark are now assistant purchasing agents; W. C. Howe, formerly in charge of the Allegheny plant, has been made assistant to the vice president, and J. C. Ritchey has been appointed electrical engineer.

S. A. Newman was elected president and treasurer of the Ohio Iron & Metal Co., First National Bank building, Chicago, upon the recent resignation of Samuel Deutsch and Moise Dreyfus, who founded the business 33 years ago. L. J. Newman was made vice president and L. Robechek secretary. B. L. Newman has charge of the Cleveland office, Citizens building, and J. M. Zehner has charge of the Montreal, Que., office, in the Transportation building.

F. M. Nourse, formerly associated with the Electrical Engineers Equipment Co., Chicago, in an important capacity is now technical writer in the advertising department of the Cutler-Hammer Mfg. Co., Milwaukee. After graduating from the University of Illinois with the class of 1912, he held several positions and in 1915 took charge of the Portage, Wis., division of the Wisconsin, Power, Light & Heat Co., where he remained until he located in Chicago.

R. A. Van Houten has been appointed vice president and general manager of the Sellers Mfg. Co., Chicago, railway materials. He was formerly works manager. George M. Hogan, formerly sales agent, has been promoted to be assistant secretary and W. H. Siegmund, cashier, has been made assistant treasurer. E. M. Kerwin, the company's secretary-treasurer, has been granted leave of absence to enter military service as captain in the ordnance department.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Fuel Order Shocks, Then Reassures

WALL street received with dismay the first shock of the fuel administration's closing order. Stocks recorded net declines of one to two points. Protest against enforcement of the ruling were widespread. But gradually a different feeling began to prevail. The expressions of confidence in the government's judgment in this matter by such financial leaders as J. P. Morgan had great weight in the market. The street felt that there must be some reason, unknown to the public, for the government's drastic action. For example, many felt that the need of the hundred or more vessels in New York for bunker coal might have justified the order. In any event, the market failed to break after the initial selling and the week closed with net advances, as a rule. Some of those who had criticized the order most sharply at first, after the first of the workless days had passed, expressed the new view that production would be increased in the last analysis through the benefits of transportation which might accrue from the shutdown. This optimism was increased by the exemption of iron and steel manufacturers, copper refiners and other essential industries from the order.

Widespread criticism, however, was expressed with regard to the fuel administration's stand on the payment of wages on the workless days. For example, the fact that many contracts are taken on a narrow margin, with wages a big item in costs, would cause actual losses, and in many cases possibly insolvency, if the employer would undertake to pay wages on 13 workless days. Many employers, as well as employes, are living from hand to mouth these days. Consequently, Wall street felt that the fuel administration, in trying to shift the responsibility of some of the ill effects of its drastic order, was working an injustice upon employers.

Many employers, however, have shown the utmost inclination to assist their workmen in every possible manner so far as they could without embarrassing themselves financially. Some companies are advancing their employes their wages as usual and will take a refund from overtime wages when normal work is resumed. Other companies have loaned their employes the amount of their usual wages, to be deducted at the rate of 5 per cent each subsequent week until the amount is paid back. Many such plans have been adopted to lessen as far as possible the hardships caused by the enforced shutdowns.

The New York financial district has talked of little other than the fuel administration's order during the past week, but at no time has the stock market lost sight of the next government war loan. Conjecture already is being made as to the date of issue of the next loan, its probable amount and rates of interest. When the final installment on the issue of 4 per cent bonds was paid, the price of that issue dropped to 96.08, the lowest figure ever touched. It is generally believed that the next issue will carry a rate of 4½ per cent. The date will be determined in large measure by the financial needs of the government, but it is thought that arrangements will be undertaken for the next loan in the near future.

Foreign Holdings of Steel Again on Increase

That the foreign liquidation of American securities, which after the outbreak of the war assumed such large dimensions, has been checked, would seem to be evidenced by the fact that holdings abroad of United States Steel common stock increased during the quarter ended Dec. 31, 1917. At the close of the quarter these amounted to 484,190 shares, a gain over Sept. 30 of 7081 shares. While the foreign holdings are a long way from the ante-bellum high mark of over 1,250,000 shares, it is the first increase since the outbreak of hostilities in August, 1914. On June 30, 1914, 1,274,247 shares or 25.07 per cent of common and 312,832 shares or 8.68 per cent of preferred, were held by residents of foreign countries. At the beginning of the war, liquidation commenced and continued until September, 1917, when but 477,109 shares or 9.39 per cent of common were held. Preferred stock showed a much smaller gain, since holdings Sept. 30 totaled 140,038 shares and this increased to 140,077 by Dec. 31, 1917. Considerable decline is shown by the complete 1917 figures, however, from the holdings of record Dec. 31, 1916. At the latter date, 9.89 per cent of common and 4.34 per cent of preferred or 502,632 and 156,412 shares respectively, were held abroad.

The following tables give the comparative holdings in foreign countries for June 30, 1914, and Dec. 31, 1917:

COMMON STOCK

	June 30, 1914	Dec. 31, 1917
England	788,512	123,074
France	68,948	30,059
Holland	356,945	229,185
Canada	43,129	41,639
Belgium	1,539	2,625
Switzerland	465	1,442
West Indies	1,810	3,690
Germany	2,633	612
Austria-Hungary	704	472
Total foreign holdings	1,274,247	484,190
Per cent of issue	25.07	9.53

PREFERRED STOCK

	June 30, 1914	Dec. 31, 1917
England	180,188	39,779
France	36,406	25,763
Holland	28,740	25,274
Canada	35,794	35,201
Belgium	773	331
Switzerland	2,540	2,848
West Indies	517	1,259
Germany	3,546	862
Austria-Hungary	586	683
Total foreign	312,832	140,074
Per cent of issue	8.68	3.88

In the common stock it is significant to note that in Belgium and Switzerland as well as in the West Indies, holdings are greater than before the war, but the gain in the last quarter is due to the increase in Canadian holdings, which grew from

33,980 shares in September to 41,639 in December.

Vulcan Steel Products is Reorganized

The Vulcan Steel Products Co., 120 Broadway announces that on Dec. 1 the syndicate headed by Gen. T. Coleman du Pont, which owns a majority of the stock of the corporation, assumed the active management of the company's affairs, Otto Kafka, who for a time served as president and manager, having relinquished his connection with the corporation. The board of directors of the company as reorganized includes Le Roy W. Baldwin, Lewis L. Dunham, T. Coleman du Pont, Frank H. Hitchcock, Stuart McNamara, R. D. Ward.

Funds Are Advanced

To facilitate construction of ships, Uncle Sam has become a money lender. Chairman Hurley recently announced that the United States shiping board will lend $5,000,000 to the Bethlehem Steel Co., to be used in housing men at the great shipyards at Sparrows Point, Md. The city of Baltimore will advance $700,000 additional for the same purpose and both loans will bear interest at the rate of 4 per cent, payable in 15 years. An advance was recently made by the government to the Newport News Shipbuilding & Drydock Co., Newport News, Va., amounting to $1,200,000 to meet this housing problem.

Republic Has Best Year in Its History

Earnings from operations during the last 12 months of the Republic Iron & Steel Co. show the best year in the history of the company. A summary of results shown by the final quarterly report gives the net revenue as $29,071,907. This is $12,527,271 in excess of the previous high record of 1916 which was $16,544,635. An excess profit tax reserve of nearly $10,000,000 was set aside last year and this left $17,902,288 for dividends. With no excess profits tax in 1916, $14,802,288 was the dividend aggregate and the balance available for common stock dividends in 1917 was equal to nearly $60 per share as compared with $36.60 the year before.

Of the four quarters, the final made the poorest showing, net earnings for it being $5,398,695. In the previous quarter ended Sept. 30, $8,697,465 was the total. The fixation of steel prices by the government undoubtedly was the cause of the decline. The following table shows the comparative annual earnings for the two years, as compiled from the company's quarterly statements:

	1917	1916
Net earnings	$28,710,683	$16,544,636
Income from inv.	361,224	348,577
Gross income	29,071,907	16,893,212
Depreciation, etc.	2,273,832	1,245,313
Bond interest	759,325	858,737
Excess profit tax	9,936,462	.....
Net income	17,902,288	14,789,163
Preferred dividend	1,750,000	*4,500,000
Common dividend	1,631,460	407,865
Surplus	14,520,828	9,881,298

*Including arrearage payments.

The December quarter brought a balance available for the common stock of $2,519,249, equal to 9.3 per cent on the junior shares, or at the rate of 37 per cent for a year. The surplus for the final three months was $2,111,384 after dividends had been paid. Unfilled orders at the end of the year aggregated 418,943 tons, a decrease of 73,105 tons from the bookings three months previous.

Financial Crop Ends

A report of the condition of the American Brake Shoe & Foundry Co., as of Dec. 11, filed with the Massachusetts commissioner of corporations, shows cash and debts receivable, $4,429,733; surplus, $7,244,165; reserve, $825,036, and total assets and liabilities of $20,302,883.

* * *

The corporate name of Trimble, Mudge & Co., scrap dealers, 1330-1335 Oliver building, Pittsburgh, has been changed to the H. N. Trimble Steel Co. The officers of the company are H. N. Trimble, president and treasurer; W. H. Barr, vice president and secretary and J. H. Gilmore, assistant treasurer.

* * *

In a pronouncement addressed to President Wilson, members of the cabinet and the council of national defense, the credit defense committee of the National Association of Credit Men urges uniform and adequate systems in all purchasing departments that will permit the prompt payment of all obligations to private concerns for war contracts.

* * *

During December, loans aggregating $9,309,959 were paid out to farmers of the United States by the federal land banks on long-time first mortgages. Since the establishment of these banks a total of $39,112,115 has been paid out in 18,154 loans, while applications for $243,622,295 have been filed. The total amount of loans approved was $125,500,406.

* * *

Annual meetings of the Norton Co., and Norton Grinding Co., Worcester, Mass., were held Jan. 15. The following officers were elected to serve for both corporations: George I. Alden, president; Charles L. Allen, treasurer and general manager; and Aldus C. Higgins, secretary and general counsel. These with the following will serve as the board of directors for the above companies: John Jeppson, George N. Jeppson and R. Sanford Riley.

Business Let-Up

Has Little Effect on Production of Coal Tar Products

New York, Jan. 22.—Producers of sulphate of ammonia have been notified by Dr. Charles W. Merrill, chief of the division of chemicals of the food administration, Washington, that licenses and forms covering the sale of this product are being distributed. In the meantime, the market practically is at a standstill and efforts are restricted to getting out shipments. It is extremely difficult to make deliveries due to the railroad congestion. This situation applies to all coal tar products. It is not expected that the general cessation of manufacturing from Jan. 18 to 23 will have much effect upon the output of coal tar products since by-product coke plants have continued to operate.

Normal business in benzol was transacted this week. A number of fair-sized contracts were closed. The market on pure benzol continues at 35 to 40 cents per gallon, both for spot and contract. This product displays a slightly stronger tone due to reduced production resulting from the coal shortage.

No toluol yet has been released by the navy department to the general trade. No assurance yet has been received that such releases will be granted, and there again are some misgivings. Solvent naphtha displayed a fair amount of business this week with the market unchanged at 18 to 22 cents per gallon both for spot and contract. Phenol, of which the output is sold practically through the first quarter, shows no new business. The market continues strong at 53 to 55 cents per pound for spot shipment, with the contract market nominal.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52

Per 100 Pounds at Seaboard

Sulhate of ammonia (nominal)	$4.90 to 5.00

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia.....nominal

Tool Plants Closed By Fuel Order

Builders Engaged in Producing Equipment for Shipyards Alone Are Exempted—Repair Shop Equipment for Destroyers Soon to be Purchased—Pittsburgh and Chicago Machine Tool Markets Quiet

MACHINE tool builders, except those engaged in the production of shipyard equipment, have not been exempted from the general order of the fuel administrator requiring plants to be closed at stated intervals. Some doubt exists in the industry whether this was a wise expedient or not. Steady progress in the nation's destroyer program is reflected by the recent inquiry of an eastern builder for 85 precision lathes to be used for destroyer repair shop equipment. With the destroyer program so well along that inquiries are being made for ship-outfitting tools, it is believed that a goodly number of initial difficulties have been ironed out.

Shipbuilders, as well as the government, still are asking for tools. These inquiries, emanating mostly from the east, have included one lot of 30 lathes; a second lot of six lathes to have from 18 to 86-inch swing and a third lot of 12 lathes. Crane inquiries from the same sources are of large volume and call for electric traveling cranes for the most part. One large order for 28 locomotive cranes was placed during the week by an eastern builder.

Deferred deliveries have contributed to a general lack of interest on the part of buyers in the Pittsburgh and Chicago districts. Other unfavorable influences in these districts are considered to be the high prices now being asked for tools; delayed shipments of steel and fuel, and pressing labor problems. Considerable support is being given by manufacturers to the appeal made by the ordnance department to producers of nonessential products, for machinery for ordnance requirements, even at this early time.

Brisk Buying of Tools in Small Lots Continues

BUILDERS of machine tools were generally affected by the closing order of the fuel administrator, shutting down their plants on the morning of Jan. 20. An exception, however, was made in the case of manufacturers making machines needed by shipbuilders, who continued operations as usual. As the production of machine tools at present is one of the most essential war industries, owing to the need for machines to turn raw materials to war purposes the loss of five days is a serious setback. On Friday, builders were anxiously endeavoring to obtain exemptions from the order

Inquiry for machines continues active, although, as in the recent few weeks, buyers are scouring the market, trying to pick up machines here and there, rather than futilely issuing long lists. However, a few lists are coming out constantly. The Federal Ship Building Co., 54 Dey street, New York, is inquiring for 30 to 40 lathes, of various sizes. The Brooklyn navy yard is inquiring for a half dozen lathes, ranging in size from 18 to 86-inch. It develops that the 85 lathes for which the Fore River Shipbuilding Corp., Quincy, Mass., is inquiring, are small precision lathes for tool room equipment aboard destroyers. The Watervliet arsenal, Watervliet, N. Y., is inquiring for about 12 additional machines, including lathes and grinding machines. The Neptune Meter Co., Long Island City, N. Y., has been buying tools, which are understood to be against a fuse contract. The ordnance department of the United States army, at Washington, has issued a long list, including 500 planers, several hundred engine lathes and some horizontal and vertical milling machines, which it will need within the next two months. It is asking not only builders and sellers, but users as well, to co-operate with the government in supplying these tools, which are urgently needed for the production of heavy guns. The Watson-Stillman Co., 50 Church street, New York, has closed for practically all of the $100,000 worth of general shop equipment needed to start work on a contract for hydraulic jacks for 9.5 guns. Carpenter & Wooward, machinery dealers, 233 Broadway, New York, are liquidating machines from the Long Island plant taken over by the government from the estate of J. K. Stewart. The machines are all new, most of them never having been set up. Of a total of about $250,000 worth of machines, about $100,000 worth remains to be disposed of. The remainder consists of general machine shop equipment.

Several large orders are being placed in the New York crane market at this time. Among the larger of those recently placed is that of the American International Shipbuilding Corp., involving 28 locomotive cranes for its yard at Hog Island, Philadelphia. The Air Nitrates Co., New York, also has awarded 15 overhead traveling cranes, including seven 5-ton, four 20-ton and four special cranes, to three manufacturers. Negotiations for five electric cranes, ranging from five to ten tons, for the Washington navy yard are understood to be about completed. The Federal Shipbuilding Co. continues to figure on 11 electric cranes. The American Shipbuilding Co., which is erecting a yard at Alexandria, Va., is considering the purchase of several locomotive cranes and other miscellaneous equipment. This company closed last fall on a portion of its machinery requirements. Dutilk-Smith, MacMillan & Co., New York, are inquiring for one 10-ton electric crane for shipment to Argentina. The Alliance Shipbuilding Co. recently was incorporated in Delaware with $5,500,000 capital. According to reports, it will build a plant at Camden, N. J.

War Orders Furnish Only Buying Stimulus

BUYING of machine tools in the Chicago district has been decidedly interfered with by storm conditions, which have prevented the movement of freight and by other uncertainties in the market. Since the beginning



It's YOUR Steel All the Way Through

EVERY order for AGATHON Steel is "individualized" from the moment it enters our offices.

In other words, the USE to which YOU are going to put the steel is constantly in the minds of the men who create and handle it, from furnaces to shipping shed.

This is part of the AGATHON system and is one of the features responsible for AGATHON Quality.

AGATHON Steels will serve your purpose best.

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CENTRAL STEEL COMPANY

MASSILLON, OHIO

Branch Offices:

Detroit Office: 326-327-328 Ford Building.
F. Walter Guibert, District Representative.

Cleveland Office: Hickox Building.
The Hamill-Hickox Company,
District Representatives.

Chicago Office:
1370 Peoples Gas Bldg., 122 So. Michigan Blvd.
C. H. Beach, District Sales Manager.

Philadelphia Office: 603 Widener Building.
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Syracuse Office: 61 University Block.
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J. E. Dockendorff & Co., 20 Broad St., New York·
General Export Agents.

AGATHON STEELS
TRADE MARK

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon

Say you saw it in THE IRON TRADE REVIEW

of the year this lack of business has been noted and some dealers believe it is becoming intensified as time passes. Aside from companies having large government contracts for ordnance and shells, comparatively little activity is noted. Owners of small machine shops feel they are unable to pay present prices, especially in view of the fact that deliveries are almost monopolized by priority orders given to those who have government work. Even second-hand equipment is difficult to obtain and costs about as much as new machinery. Government and other orders recently placed have caused deliveries to be set back considerably. Advances continue to be made by various manufacturers, and a recent increase of 5 per cent on certain makes of screw machines has been announced. The W. Schuler Machine Co., Chicago, will build a machine shop. The McLaughlin Coal Reduction Co., Decatur, Ill., has plans ready for a machinery manufacturing plant. The Safety Signal Co., Peoria, Ill., is building a plant for the manufacture of tools and appliances. The Schultheiss Co., San Diego, Cal., is building a machine shop and foundry at Los Angeles. The Baker Iron Works, Los Angeles, is building a foundry. The war plant of the Standard Steel Car Co. at Hammond, Ind., will be 250 x 800 feet in size. The Hamilton & Beach Mfg. Co., Racine, Wis., is building a large addition. The Murray-Mylrea Machine Co. at Antigo, Wis., has bought two existing plants which will be further equipped. The Glenrock Foundry & Machine Co. at Glenrock, Wyo., is building a foundry.

Demand for Used Tools Grows Large

USED machine tools are being eagerly purchased in the Cleveland market by manufacturers in need of equipment. Outstanding in the week's news are a number of inquiries covering a wide range of tools from scattered sources. Dealers' activities are limited only by their ability to secure tools. An inquiry has been issued by the Cleveland City Forge & Iron Co., Cleveland, for one 42 to 50-inch gap lathe, two milling machines and one shaper. The Dayton Engineering Laboratories Co., Dayton, O., requires equipment inclusive of the following: Two sensitive bench drilling machines; one forge with 12-inch blower; one forge with water tank and blower, and one 8-inch internal grinder. Prices on a lathe, a shaper and a grinder are desired by the Acme Electric & Machine Co., Ajax building, Cleveland. The Universal Bottle Washer Co., Cleveland, is inquiring for a 12-inch, a 16-inch and an 18-inch x 8-foot lathe. Machine tools of the following types are desired by the Star Tool Co., Springfield, O.: One 20-inch used back-geared shaper and one 20-inch back-geared drill press. The Detroit Shipbuilding Co., Detroit, Mich., is in the market for one 6-foot vertical boring mill. Prices on one 4½-foot to 6-foot plain radial drill are requested by the Buffalo-Springfield Road Roller Co., Cleveland. The Glenn L. Martin Co., Cleveland, has issued an inquiry for one geared-head milling machine and one 30-inch punch press. Several 24-inch shapers and one bench lathe will be purchased by the Aluminum Castings Co., Cleveland.

Work on Government Crane Jobs Suspended

A check has been placed upon builders of heavy machinery—cranes, dock machinery, ore and coal handling equipment—in the Cleveland district, by the edict of the fuel administrator. Some builders state frankly that they are puzzled at the closing order, since 95 per cent of their production is going to the government. They are unanimous in their decision to obey orders, however. Small orders are being placed from time to time, although the current of inquiries shows considerable slackening. One 75-ton shipbuilding crane is under construction for the Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia.

Deferred Deliveries Discourage Buyers

INQUIRIES in the Pittsburgh district for machinery and machine tools have fallen off. This is attributed chiefly to the impossibility of buyers getting satisfactory deliveries, although high prices are undoubtedly a factor in the situation. Makers have had extreme difficulty in securing shipments of steel on account of the traffic congestion and entertain hope that the fuel saving order of Fuel Administrator Garfield will result in bringing about relief. Government orders continue to be heavy.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Along the Middle Atlantic Seaboard

ALBANY, N. Y.—The foundry of G. H. Thatcher & Co., producer of gray iron castings, Learned and Thatcher streets, will be rebuilt; the plant was damaged by fire in April with a loss of $75,000.

BROOKLYN, N. Y.—A charter of incorporation has been granted to David H. Smith & Son, capitalized at $100,000 to manufacture iron and steel products and hardware. Incorporators include D. H. Smith, M. F. Smith and J. C. Snyder, 256 Broadway.

BROOKLYN, N. Y.—A charter of incorporation has been granted to the Gregory-Gibbs Ordnance Co., capitalized at $30,000. The incorporators are W. G. Ivie, G. W. Gibbs and T. M. Gregory, 263 North Henry street.

BUFFALO.—The Oldman Boiler Works, 38 Illinois street, is having plans drawn for a 1-story, 50 x 100-foot addition to its plant. W. H. Zawadski, 798 Gilmore avenue, is architect.

JAMESTOWN, N. Y.—The Gurney Ball Bearing Co. has awarded to the Jamestown Construction Co. the general contract for a $20,000, 1-story, 20 x 256-foot plant addition.

LONG ISLAND CITY, L. I., N. Y.—The Akron Tire Co. is having plans drawn for the erection of a $12,000 factory building at Honeywell street and Skillman avenue. The new building will be 1-story high and 50 x 95 feet in size. Steines & Ludwick are architects.

MONTOUR FALLS, N. Y.—The Shepard Electric Crane & Hoist Co., which has recently increased its capital from $500,000 to $1,000,000, plans to build an addition to its plant.

NEW YORK. — The Smuggler Extension Corp. has been chartered with a capital of $25,000 to conduct a mining and smelting business. Incorporators include J. L. Tilton, D. and M. Hyman, 61 Broadway.

NEW YORK.—T. Paulson & Son, Inc., have awarded the contract for the erection of a



DELAWARE RIVER STEEL COMPANY

MANUFACTURERS OF PIG IRON

CHESTER, PENNSYLVANIA

To Pig Iron Consumers:

DELAWARE

DELAWARE RIVER STEEL COMPANY



2-story, 35 x 39-foot brick foundry to cost $6000.

NEW YORK. — The Consumers Tire & Rubber Corp., recently incorporated with $100,000 capital, plans to build a plant. Incorporators of the company are N. M. Blackley, E. D. Reecks and A. R. Aboud, 275 Eighty-sixth street.

NEW YORK.—The Liberty Steel Products Co., Woolworth building, is in the market for plate and angle shop equipment.

ROCHESTER, N. Y.—The Gleason Works, 1000 University avenue, manufacturer of gears and gear cutting machinery, plans to erect a 1-story, 75 x 80-foot addition to its factory. Cost is estimated at $12,000.

ROCHESTER, N. Y.—The Atlantic Stamping Co. has awarded contracts for a $5000, 1-story, 66 x 98-foot factory addition. The company has recently awarded contracts for a 2-story, 86 x 111-foot building for the manufacture of metalware.

EASTON, PA.—The F. S. Bixteler Co., 126 South Third street, is taking bids on a 1-story factory, 57 x 112 feet, to cost $12,000.

GIRARD, PA.—The plant of the A. M. Byers Co., manufacturer of pipe, was damaged by fire Jan. 9 with a loss of $15,000.

HARRISBURG, PA.—Contract has been awarded to the Austin Co., 14230 Euclid avenue, Cleveland, for the erection of a steel and concrete factory for the Harrisburg Pipe & Pipe Bending Co., to replace that damaged by fire recently. Cost is estimated at $95,000. W. T. Hildrup Jr., vice president of the company, is in charge. The new building will be 100 x 420 feet, equipped with steel sash.

JOHNSTOWN, PA.—The benzol plant of the Cambria Steel Co. has been damaged by fire with a loss of $25,000.

KITTANNING, PA. — The Carbon Steel Co., which has recently purchased the plant of the Kittanning Iron & Steel Co., plans additions to consist of two open-hearth furnaces.

LANCASTER, PA.—The Champion Blower & Forge Co. has awarded the contract for the erection of an addition to its plant, to be 50 x 100 feet.

LEWISTOWN, PA. — The Belmont Motor Co., Union Trust building, Harrisburg, Pa., will build a new factory. G. G. Gochnaur is president.

McKEESPORT, PA.—The National Tube Co. plans the erection of a plant costing about $1,000,000 to be used in the manufacture of munitions.

PHILADELPHIA.—The Chester Iron Co. has been incorporated with $50,000 capital by Allen R. Hoffer.

PHILADELPHIA.—The Standard Concrete Machinery Co. will take bids shortly on the construction of three factory buildings, each one story high, to cost jointly $25,000. C. J. Langlee, 821 Fulton building, is in charge.

SCRANTON, PA.—Contracts for extensive shop improvements have been awarded by the Erie railroad.

UNIONTOWN, PA.—The Uniontown Foundry Co. has been organized with a capital of $10,000. E. R. Floto is in charge of the company.

WHITE HAVEN, PA.—The Wilmot Engineering Co., iron and steel castings, has had plans prepared for the erection of a machine shop, power house and pattern shop.

WILLIAMSPORT, PA.—The foundry and pattern department of the plant of the National Foundry & Mfg. Co. have been damaged by fire Jan. 12 with a loss estimated at $40,000. The company has been working on government contracts.

YORK, PA.—The York Hardware & Brass Co., Wheatfield and Commerce streets, has purchased the former plant of Billmeyer & Small, which it will equip for the manufacture of bronze and aluminum castings.

JERSEY CITY, N. J.—Fire recently damaged the chair factory of the Joseph Partrige & Sons Co., causing a loss of about $150,000.

JERSEY CITY, N. J.—The G. W. Bradley Axe & Tool Mfg. Co., recently chartered with $10,000 capital, will build a factory. G. W. Bradley, Weston street, Westport, Conn., is interested.

NEWARK, N. J. — The Hayden Utilities Corp. has been granted a charter of incorporation to manufacture machines. The company is capitalized at $50,000 and its incorporators are Henry A. Hayden, Westfield, N. J.; Edward J. Hunt, West Orange, N. J.; and George C. Cook, Maplewood, N. J.

PATERSON, N. J.—The Barnes Chemical Works, Inc., has been chartered with $250,000 to manufacture chemicals. The incorporators include John W. Laffey, H. J. Laffey and L. E. Laffey.

PEARL RIVER, N. J. — A charter has been granted to the American Stove Corp., organized with $100,000 capital by Paul E. Fritsch, Brooklyn, N. Y.; Cornelius A. Cole, Hackensack, N. J., and Arthur A. Oakley, Pearl River.

SKILLMAN, N. J.—The Philadelphia & Reading railroad is receiving bids for the construction of a $30,000 power house and signal tower. A. T. Dice, Reading terminal, Philadelphia, is president.

TRENTON, N. J.—The Gulf Refining Co. has taken out a permit for an addition to its Princeton avenue plant, to cost $7000.

WILMINGTON, DEL. — The B. E. Shaw Co., Second and Lombard streets, manufacturer of steam fittings, will build a 1-story, 50 x 268-foot addition to its plant, to cost $41,000. Contract has been awarded.

BALTIMORE.—The plant of the American Propeller Co., Light and Poultney streets, has been damaged by fire with a loss of $100,000, partly covered by insurance.

CURTIS BAY, MD. — The Chesapeake Shipbuilding Co. has secured an option on a 75-acre tract on which it contemplates erecting a shipbuilding plant.

HAGERSTOWN, MD.—The Pangborn Corp., manufacturer of sand blast equipment, is receiving bids on the construction of a 100 x 150-foot foundry building and a 60 x 100-foot machine shop addition. The structures will be of reinforced brick with metal sash.

NORFOLK, VA.—The Marine Iron Works has been incorporated with a capital of $50,000. B. O. Colonna is president and W. B. Drewry secretary of the new company.

Activities in the Central States

GREEN BAY, WIS.—Architect C. H. Kane, of Swift & Co., Chicago, is preparing plans for a 2-story brick, frame and corrugated iron warehouse addition, to cost about $25,000.

JANESVILLE, WIS.—Joseph Denning has been awarded the contract for erecting two shop additions, 30 x 60 feet, to the plant of the Townsend Mfg. Co., gas and kerosene engines, tractors, etc. Most of the equipment needed for the improvement has been contracted for. R. B. Townsend is general manager.

MADISON, WIS.—The Southern Wisconsin Foundry Co., Pennsylvania avenue, has awarded the contract for a 50 x 200-foot foundry to cost $15,000.

ROYALTON, WIS.—The machine shop of James A. Haire, manufacturer of gasoline engines, has been damaged by fire with a loss of $7000.

STURGEON BAY, WIS.—Articles of incorporation have been filed by the Universal Shipbuilding Co., capitalized at $1,500,000. Philip Binzel, Theodore Froemming and Hubert Reisen are incorporators.

WRIGHTSTOWN, WIS.—Bids will be received shortly by the county commissioners for a reinforced concrete bridge with a 70-foot span and 20-foot roadway, to cost $7500. M. M. Torkelson, Madison, Wis., state engineer, is in charge.

DETROIT.—The Service Pattern & Mfg. Co. has organized with $35,000 capital to make wood and metal patterns and to do a machine shop business. The incorporators are Stanley Leech, C. I. S. Pulleyblank and H. E. L. Pulleyblank.

GRAND RAPIDS, MICH.—The Grand Rapids Varnish Co., Wallace E. Brown, president, has had plans prepared for an extension to its plant.

JACKSON, MICH.—The plant of the Perlman Rim Co., recently damaged by fire, will be rebuilt. G. S. Porter is in charge.

MARQUETTE, MICH.—Plans are being prepared for the erection of an addition to the municipal waterworks system, to cost $75,000. Address city engineer.

MENOMINEE, MICH. — The Menominee Electric Mfg. Co. is receiving bids on the erection of four 1-story additions to its plant, to cost jointly about $60,000.

CHICAGO.—The W. Schuler Machine Co., 200 Ann street, will build a 1-story brick and concrete machine shop to cost $20,000. Davison & Weiis, 53 West Jackson street, are architects.

DECATUR, ILL. — The McLaughlin Coal Reduction Co., recently organized with a capital stock of $25,000, will build a factory to manufacture machinery. The incorporators of the company include W. L. McLaughlin, L. W. Winchester and W. Williams.

MATTOON, ILL.—The Clark Meter Co. has had plans prepared for a one and two-story foundry to cost $50,000.

PEORIA, ILL.—Plans are being prepared by Reeves & Baillie, architects, for a tractor plant to include six units, consisting of thirteen buildings, to be built by A. E. Rosenthal, 122 South Michigan avenue. Cost is estimated at $175,000.

SOUTH CHICAGO, ILL. — The Iroquois

OHIO STEELS

Out in the wheat fields of the Great Northwest, where they harvest the Nation's grain, time is just as important as in the busiest factory.

Plowing, planting, reaping, threshing must be done on Nature's schedule. Mistakes or loss of time can never be made up. It is imperative that every machine and implement used be absolutely reliable.

The fact that Ohio Steel Castings are sought for use in tractors and other types of farm machinery, is proof of their quality.

The Ohio Steel Foundry Co.

Plants:

SPRINGFIELD, OHIO LIMA, OHIO BUCYRUS, OHIO

Service PLUS HH Quality



Iron Co. will build a slag handling plant to cost $100,000.

ANDERSON, IND.—The plant of the Hayes Wheel Co. will be enlarged by the erection of several additions to provide for the execution of large government contracts which the company has recently undertaken.

HAMMOND, IND.—The United Boiler & Foundry Co., 185 Wilcox avenue, has awarded the contract for a 75 x 100-foot factory to cost about $5000.

INDIANAPOLIS.—A charter of incorporation has been granted to the Ideal Tool Works, capitalized at $20,000. The company will manufacture tools and automobile parts. Incorporators include E. L. Crum, Edward C. Klinghoiz, Jesse W. Titus and others.

INDIANA HARBOR, ILL.—The plant of the Inland Steel Co. has recently been damaged by fire with a loss of $10,000. J. W. Lees is superintendent of the plant.

LOGANSPORT, IND.—The core room and foundry of the Western Motor Works have been damaged severely by fire, with a loss estimated at $75,000. The company manufactures castings for the Indiana Motor Co., which is working on government contracts. A. W. Patty, manager, announces that the plant will be rebuilt shortly.

VINCENNES, IND.—The Vincennes Galvanized Iron Works has been incorporated with $10,000 to engage in a sheet metal working business. The incorporators include Peter R. McCarthy M. O. McCarthy and John H. McCarthy.

AKRON, O.—Bids will be received shortly by Franz C. Warner, architect, 767 Hippodrome annex, Cleveland, for the construction of a meter building, power plant and heating system to be built by the Northern Ohio Traction & Light Co., Hamilton building. The structures will be of brick, steel and concrete, three stories high, 40 x 90 and 1-story, 40 x 50 feet, respectively. Total cost is estimated at $100,000.

BEDFORD, O. — Bids will be received shortly by W. C. Owen & Co., architects, 1900 Euclid avenue, Cleveland, for the construction of a plant for the Owen Tire & Rubber Co.

BELLEFONTAINE, O.—O. Hillicker is interested in a company, recently organized with $50,000 capital, which has purchased a site on South Main street, on which it plans to erect a 2-story plant for the manufacture of automobiles.

CINCINNATI.—Plans have been prepared by Oscar Schroeder, architect, 15 East Rochelle avenue, for a machine shop and foundry building which will be erected by the Fulflo Pump Co. The cost of the new construction is estimated at $20,000.

CLEVELAND.—Bids will be taken shortly by Allen Sogg, architect, American Trust building, for a machine shop and foundry building to be erected by the Buckeye Brass & Foundry Co. The building will be of brick and concrete, mill construction, 60 x 100 feet.

CLEVELAND.—The Glauber Brass Mfg. Co., Superior avenue and East Forty-ninth street, has had plans prepared for a 7-story concrete brass manufacturing plant. The cost of the proposed structure is estimated at $250,000. The building is to be unique in that the top floor will be given over to the foundry in an effort to supply the maximum of light and air to this branch of the work. M. H. Glauber is manager of the company.

CLEVELAND. — The Western Machine Products Co., recently incorporated with a capital of $100,000, has taken over the plant formerly occupied by the Marvel Accessories Mfg. Co. at St. Clair avenue and East Seventy-third street, which it will equip for its own use.

DAYTON, O.—The Dayton Machine Products Co. has been incorporated with $10,000 capital by L. E. Hamer, F. T. Lindsey, James Saunders, E. S. Hood and Henry Grosnickel.

ELYRIA, O.—The Colson Co. has been incorporated with a capital of $300,000 to manufacture bicycles, and will build a plant. The incorporators include H. Ingersoll and A. M. Whitehead.

FOSTORIA, O.—The Hydro-Carbon Wickless Burner Co., recently incorporated with a capital of $1,000,000, will build a plant. H. J. Sommers is president.

HAMILTON, O.—Plans are being prepared by H. Mueller, architect, for a $25,000 factory to be erected by the Liberty Machine Tool Co. The structure will be 100 x 200 feet in size.

LIMA, O.—The Imperial Tool Co., which has combined with the Automatic Transmission Co., Chicago, has removed its plant here and is in the market for considerable new machinery.

New Business in Eastern Canada

NANAIMO, B. C.—The Granly Consolidated Mining, Smelting & Power Co. is having plans prepared for the construction of coke ovens. Cost is estimated at $1,500,000.

VANCOUVER, B. C.—The Taylor Engineering Co. Ltd., 850 Hastings street west, is having plans prepared for the erection of a one-story brick factory to cost $20,000.

VANCOUVER, B. C.—Major Moore, North West Trust building, is interested in a syndicate which proposes to build a shipbuilding plant.

BRANTFORD, ONT.—The plant of the Watson Mfg. Co. was damaged by fire Jan. 8, and a large amount of machinery must be replaced. Loss amounts to $30,000.

CHATHAM, ONT.—The plant of the Canadian Des Moines Steel Co. was damaged by fire Jan. 6 with a loss of about $10,000. Some machinery will have to be replaced.

CHESLEY, ONT.—The Chesley Chair Co. is in the market for several electric motors.

COPPER CLIFF, ONT.—J. C. Nichols, mine superintendent, Canadian Copper Co., is in the market for an electric pump and one alternating current motor.

DUNDAS, ONT.—John Bertram & Sons Co. will build an addition to its shell plant, to be 70 x 300 feet in size, of brick and steel construction, to cost $150,000. Contract has been awarded to P. H. Secord & Sons, Brantford, Ont.

GEORGETOWN, ONT. — The Canada Needle Works has been incorporated to manufacture needles, jacks, sinkers, machinery and tools, with a capital stock of $50,000. Frederick A. Harley, Richard I. Creelman, Georgetown, and John McMurchy, Brampton, Ont., are incorporators.

HAMILTON, ONT.—The cooperage plant of the Steel Co. of Canada, which was damaged by fire Jan. 7 with a loss of $12,000 will be rebuilt and will require new machinery.

HAMILTON, ONT. — The Hamilton Bridge Works Co., Bay street north, will build a one-story addition to its plant, to cost $20,000. W. B. Champ is secretary of the company.

STAYNER, ONT.—Joseph Knox is in the market for alternating current motors.

TORONTO, ONT.—W. H. Banefield & Sons, 372 Pape avenue, have awarded contract for the erection of a foundry to cost $5500.

TORONTO, ONT.—The Dominion Metallurgical Co. has been incorporated to manufacture iron and steel products with $250,000 capital. Howard A. Harrison, William M. Cox, William N. Robertson and others, are incorporators.

TORONTO, ONT.—The Swift Canadian Co. has awarded to the John V. Gray Construction Co. contract for a boiler house to cost $12,000.

TORONTO, ONT.—The International Ore Corp., Ltd., has been chartered to treat ores, to manufacture iron and steel products with a capital stock of $1,000,000. Directors are Howard A. Harrison, 2 Wilton Crescent, Wilfred M. Cox, William N. Robertson and others.

MONTREAL, QUE.—The Colborne Trading & Transportation Co., Ltd., has been incorporated to build ships with $2,000,000 capital stock. Frederick S. Isard, Frederick H. Markey, Waldo W. Skinner and others are interested.

MONTREAL, QUE.—The Structural Steel Co. has been incorporated to manufacture structural iron and steel with $5000 capital stock. Walter R. L. Shanks, Francis G. Bush and George R. Drennan, are interested.

MONTREAL, QUE. — The Pyrene Mfg. Co. of Canada, has been incorporated to manufacture fire extinguishers, chemical engines, fire apparatus and machines with $100,000 capital. James A. Miller, Aubrey H. Elder and Maurice C. Lalonde, are incorporators.

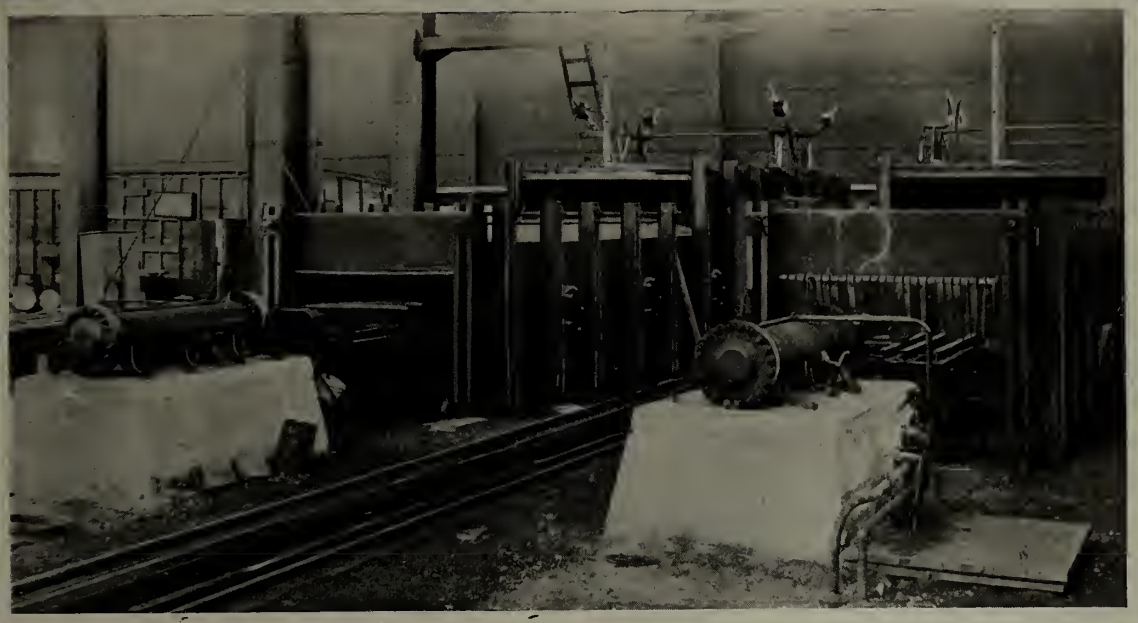
SOREL, QUE.—The St. Lawrence Shipbuilding & Steel Co. has been incorporated to build ships, engines, boilers and machinery with $1,000,000 capital stock. Peter Bereovitch, Ernest Lafontaine and Nathan Gordon, Montreal, Que., are interested.

THREE RIVERS, QUE.—Jules Caron, architect, 69 St. Francois Xavier street, is in the market for a 35-ton crane.

SYDNEY, N. S.—The Cross Fertilizer Co., Prince street, will build a mill house and engine room at a cost of $20,000, to replace the buildings recently damaged by fire

WINNIPEG, MAN.—The plant of the Winnipeg Brass & Fixtures Co. Ltd., was damaged by fire Jan. 8 with a loss to building and equipment of $13,000.

KANANASKIS FALLS, ALTA.—The Alberta Electro-Chemical Co. Ltd. will install new machinery and equipment for the manufacture of carbide. Dr. Harry Brett, Banff, Alberta, is interested.



Continuous Heating Furnaces

W-S-M Continuous Heating Furnaces afford a great saving in time and labor which is frequently expended in charging the furnace.

The Heating Furnaces shown above are used for heating blooms, billets and ingots. The pieces are fed onto a platform in front of the furnace and are pushed through the fire chamber by hydraulically operated cylinders, the heated pieces being discharged upon a roller table, which carries them directly to the rolls.

The furnaces may be fired by coal, oil, natural or producer gas.

For Steel Mill Equipment of any kind you can do no better than to specify W-S-M—used the world over.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, *etc.*
By-Product
Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	26.00 to 26.50
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.00 to 29.25
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	27.50 to 28.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	27.50 to 28.00
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	16.50 to 17.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	21.50
Stove plate, Birmingham	19.50 to 21.50
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.50 to 24.50
Stove plate, Cleveland	19.00 to 20.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$21.00 to 22.00
Boiler plate, cut, No. 1, St. L.	23.50 to 24.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago	22.00 to 23.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Cleveland	30.00 to 31.00
Busheling, No. 1, Buffalo	30.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	17.50
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	19.00 to 19.50
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	35.00
Forge flashings, small, Cleve.	26.00 to 26.50
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	24.00 to 25.00
Grate bars, Buffalo	25.00
Grate bars, Cleveland	20.00 to 21.00
Grate bars, N. J. points	21.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chgo.	19.00 to 19.50
Pipes and flues, Cleveland	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	35.00
R. R. wrgt. No. 1, Birming.	28.00 to 32.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 38.50
Angle bars, steel, St. Louis	29.00 to 29.50
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	38.00 to 39.00
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis	26.00 to 26.50
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.00 to 48.00
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	16.75 to 17.25
Pipes and flues, Chicago	23.50 to 24.50
Pipes and flues, St. Louis	23.50 to 24.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	32.00 to 32.50
Steel car axles, St. Louis	42.50 to 43.00

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	20.00 to 25.00
Cast, No. 1, Birmingham	25.00 to 27.50
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo.	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	21.50 to 22.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00 to 32.00
Malleable railroad Chgo.	30.00
Malleable, agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	23.50 to 24.00

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.50 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long Birming.	37.50 to 38.50
Locomotive tires, Chgo.	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, January 31, 1918 *No. 5*

Plants Keep Up Traffic Struggle

Production Continues Far Below Normal as Unfavorable Weather Conditions Retard Relief—Pig Iron Selling for Last Half More Expansive—War Buying of Steel Products Again Running Large

SEVERE weather conditions again have intervened to minimize the beneficial effects on the iron and steel industry of the nation-wide effort to re-establish adequate transportation service. Evidences of improvement are decidedly spotty. The worst conditions in many years of river traffic at Pittsburgh have strongly combined with the rail congestion to prolong the heavy loss of production in that district. Snow drifts in the Allegheny mountains have cut off the Connellsville coke region from many blast furnaces. It is estimated officially operations of open-hearth plants in the Greater Pittsburgh and valley districts last week were at 59 per cent of capacity and blast furnace and coke oven production was at 66 per cent. Eastern plate mills have been running 50 to 75 per cent full. Leading eastern Pennsylvania steel companies report shipments of finished products in January have been 50 per cent of those of December. Unfilled orders have increased accordingly.

Basic Needs More Acute

While production of merchant pig iron on the whole has improved, restrictions on shipments remain severe. As a result, various furnaces have been piling iron of which consumers are in feverish need. The steadily growing shortage in basic iron for shipment by July is being emphasized by the recent operating difficulties of the producers. It is estimated 200,000 tons of unsatisfied inquiry virtually is going begging in Ohio and Pittsburgh territory. Eastern buyers also are seeking this grade in vain. The result has been a stimulation of last half buying. As manifesting the anxiety of consumers to build up a dependable source of supply, a new northern Ohio works has placed its last half requirements in the Chicago territory. Following the adoption of a satisfactory form of contract to cover the provision for later governmental revision, Chicago producers have begun to sell heavily for last half. A New York state maker who is credited with having booked 100,000 tons for last half has withdrawn. Valley and lake interests which have booked over 200,000 tons recently for delivery after July continue to take business.

Uncertainty in Manganese

A far-flung effect of the coal stringency is found in the serious turn in the Brazilian manganese ore situation. The recent governmental suspension of transportation from the mines to seaboard because of the shortage of fuel, has been followed by the mandate to interests in this country not to load ore purchased on contract because sufficient mineral is not at shipping port. With the relatively insufficient Cuban production committed for this year and Indian imports not to be counted on, the foreign ore supply is in doubt. The uncertainty of the situation is being reflected by a stiffened market in ferromanganese. The government has refused to license exports of this metal. It is within the possibilities that a limitation may be imposed on makers to produce 40 to 60 per cent metal in order to utilize the low grade domestic ores.

War Buying is Active

Another wave of war buying appears to be coming on in finished materials. The Emergency Fleet corporation has made a number of additional allotments including 20,000 tons to an eastern interest and is about to come into the market for 600,000 to 700,000 tons additional of plates, shapes and bars, according to reliable authority. About 25,000 tons of structural material are wanted by the government for aeroplane and army buildings in France. December's record of 114 per cent bookings in fabricated steel reflects the heavy orders which the government recently has been placing. Great Britain is inquiring for 50,000 tons of shell steel. A notable export order closed calls for 12,000,000 carriage bolts or 9000 tons for military purposes.

The Iron Trade Review

EDITORIAL

Open-Minded Attitude Wanting

LESS legislation but more investigation is coming to be the function of congress as a result of the broadened field of government activity. This necessary province of our lawmakers is undisputed. Legislative inquiry should be exercised with diligence at this time when such tremendous sums are being applied toward defeating Germany. But investigations should be fair and should be entered upon with a mind open to conviction, free from personal animosity or political bias since otherwise constructive results are impossible.

Such a composite state of mind as is ascribed to the able jurist, assumed by the chronic debater and thrust upon each voter accepted for jury service, is attained with difficulty. The element of personal animosity is not displayed so frequently as are evidences of a firm conviction of the fault or shortcoming of the investigated. Real statesmen as well as congressmen of more ordinary attainments exhibit this weakness. The senate investigation of the Emergency Fleet corporation was conducted by the committee on commerce, which includes some of the ablest men in public life. But witness the following extract from the formal report:

SENATOR NELSON:—And you had no experience in the construction of vessels before you became a member of this corporation?

MR. PIEZ:—Not in that sense; no. I had large experience in the construction of large engineering works—works of considerable magnitude.

SENATOR NELSON:—But not in shipbuilding?

MR. PIEZ:—No; not in shipbuilding.

SENATOR NELSON:—And you do not know anything about it except what you have acquired lately?

MR. PIEZ:—No.

SENATOR NELSON:—Well, do you not think it would be advisable to have a practical shipbuilder occupy a position like yours—a man who is versed in shipbuilding instead of a man who has run a *belt line?*

MR. PIEZ:—Well, pardon me, Senator—

SENATOR NELSON:—It is rather personal, but we are after expert opinions.

This extract is not given to embarrass Senator Nelson, who is capable and usually broad minded. Nor is it intended to draw attention to Mr. Piez, the vice president of the Emergency Fleet corporation, who was formerly president of the Link-Belt Co. But the atmosphere of the average congression investigation here is reflected. Business men of superior attainments, particularly those who are giving their best talents to the government at this time, should be entitled to an unbiased hearing before any investigating body. Congressional committees too often make assumptions and then bend every effort to prove these assumptions by an investigation. Questions are developed to elicit replies which are favorable to preconceived theories. Investigations thus become trials with the committee in the role of the state prosecutor, and the procedure is simply a clever exhibition of nimble minds. War does not wait on these tactics and public patience is wearied by investigations for political advancement.

Brain Power Must Rule

REPETITIONS are being made in various quarters, some of them so illustrious as to attract thoughtful attention that the present war is freeing some social movements of extraordinary significance and character. The statement of Charles M. Schwab in a public address within the week that the day is dawning when the power of labor will be supreme in the world is a notable expression of this kind. A similar conviction is being voiced in various forms, some of which are quite radical, by others who are yielding to the impulse of prophecy and speculation as they observe the demoralization that now obtains in normal world conditions. Recent events in Russia, Great Britain and the Central powers are being pointed to as manifestation of the oncoming readjustment in the fundamental relations of society.

Mr. Schwab has something of a reputation as a prognosticator on the trend of industrial processes to his credit. Though he spoke of the coming power of the man who worked with his hands, he evidently did not intend to make his classification so restrictive. His subsequent remarks showed that what he had in mind was a sovereignty of achievement and not the exaltation of the man who works with his hands over the one who labors with his brain or contrarywise. Under such a ranking of deeds of mankind, Mr. Schwab himself would not be likely to suffer since he has a record of constructive accomplishment.

If this war has shown anything it has demonstrated that true national virility lies in the ability of a people to organize and to concentrate its resources. The very essence of successful organization lies in creative and masterful brain power. With it is linked indissolubly the wellbeing and prosperity of labor. For labor to dominate the world and stay in that position means that its creative abilities must be greatly extended and its responsibilities to society must be more freely assumed than is true at the present time. Much education of labor as a whole, and especially of its

leaders, is necessary before the utopian day when capital and labor may sit in equality at the same conference table and settle disputes on the basis of exact justice to all. The greatest trouble with labor always has been that it has not been willing to assume a share of the responsibility for the success of business enterprise which would entitle it to a proper voice with capital in the distribution of rewards, although it has insisted in a constantly growing fashion on dictating how the latter should be apportioned.

Exacting Care, a Shipping Necessity

SHIPPING today presents one of the most vital problems of industry. In fact it may be called properly *the* vital one. In order to escape the present difficulties many shippers have resorted to the express service. Before the heritage of abuse long directed against the railroad is willed the express companies, several factors should be considered. The labor supply has not paralleled the tidal wave of business which has swept over them and inefficient and inadequate help has filled the claim adjusters' files and the on-hand departments. To see that all possible aid and co-operation is extended these public carriers is the duty of shippers. This lies in the direction of proper packing, wrapping and marking and too much care cannot be taken.

It is true, however, in many cases no proper reason can be given by express companies for so-called "lost" shipments. A bundle of steel rods recently was taken from its burlap wrappings at an express office in Cleveland, the shipping tags removed and stuck under the wire holding the rods together. For some unknown reason it was not delivered and after weeks of delay was finally located in the on-hand department.

The war has brought many dislocations of business systems and methods. In no direction have these been more sweeping than in matters of transportation. That being so, ordinary standards of efficiency and of service are out of question and should not be expected. The shipper must take upon himself more than the usual prudence and responsibility in guarding against miscarriage in the delivery of his goods. The first duty of each shipper is to see that no act of inefficiency or omission within his own organization adds to the general confusion. There never was a time when more scrupulous attention should be paid to the manner in which shipments are made than under present conditions.

Checking Up the Ships

THE recently issued regulations showing the exhaustive tests to which an applicant will be subjected before he may secure a license for the necessary bunker fuel, port, sea and ship stores which will enable his vessel to clear port, reveal more clearly the intent of the war trade board to keep a close check on every ton of shipping in the service of Uncle Sam and his allies.

To secure a license a vessel owner must answer satisfactorily all the questions submitted in the regulations effective Feb. 1. Licenses will not be granted to sailing vessels wishing to enter the war zone; to any vessel which has previously disobeyed any order issued by the United States shipping board; to any vessel owner who refuses to deliver to the war trade board the names of all the vessels with their masters owned by himself; to any vessel which refuses to be bound by all of 19 individual regulations. These latter regulations cover principally the destination of the vessels and the nature of their cargoes. Of course, shipping touching parts of Germany, her possessions and allies are prohibited.

Vessel owners must sign affidavits that the return cargo of the vessel will be unloaded at a United States port; that there be no transfer of cargo, bunkers or stores while the vessel is en route to its destination or returning home. It is also specified that all neutral vessels and all American vessels not requisitioned by the United States shipping board shall first be approved by the chartering committee of the United States shipping board at New York. The committee will then hand down its decision to the war trade board.

The latest action of the war trade board will receive the hearty indorsement of the country. Tremendous responsibilities have resolved themselves upon that body to get the most out of available tonnage and to prevent any success or support to the enemy. That to enable this to be accomplished, drastic efforts of the severest character may be necessary, is reflected by the sweeping order of the fuel administrator which was aimed at insuring the ships a proper supply of bunker coal. By exercising a closer surveillance over outgoing vessels, the alleviation of the congestion on the Atlantic seaboard, owing to the improper distribution and the scarcity of fuel will be advanced. Furthermore, the guarantee which the regulations insure that the whole shipping world is exerting a unified and concentrated effort in the same direction will be of great importance.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 348

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern) ....$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)....base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft) ....base plus $1.50
Over 3.25 silicon .... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00 to 255.00
Spiegel, 20 per cent fur.	60.00
Spiegel, contracts, furnace	58.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	170.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts 8.00c
Sheet piling, base, Pitts. 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts. $7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l. 30
Iron, 3½ to 4½ inches, c. l. 12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 30, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 30, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	30.00
Lake Superior charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	30.00
Basic, eastern Pa.	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia	34.25	34.00	34.00	30.50
Ferro mang., delivered	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts.	51.00	51.00	65.50	60.00
Open hearth billets, Pitts.	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh	2.90	2.90	2.90	2.975
Steel bars, Chicago	2.90	2.90	2.90	3.19
Iron bars, Philadelphia	3.50	3.685	4.935	3.159
Iron bars, Cleveland	3.64	3.64	4.50	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Jan. 30, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Iron bars, Chicago mill	3.50	4.50	4.50	2.85
Beams, Chicago	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.575
Tank plates, Chicago	3.25	3.25	3.25	3.89
Tank plates, Philadelphia	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pitts.	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	7.875	4.125
Sheets, gal., No. 28, Pitts.	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh	3.50	3.50	3.875	3.00
Connellsville fur. coke	6.00	6.00	6.00	7.25
Connellsville fdy. coke	7.00	7.00	7.00	6.375
Heavy melting steel, Pitts.	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	30.00	28.75	26.10	21.50
Heavy melting steel, Chicago.	30.00	28.50	27.00	20.25
No. 1 wrought, eastern Pa.	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago	35.00	31.50	36.25	25.35
Rerolling rails, Chicago	35.00	35.75	36.00	27.25
Car wheels, Chicago	30.00	29.50	31.00	21.85

(For Additional Prices See Page 348)

Basic Supply Problem of Consumers

Thousands of Tons of Steelmaking Metal for Delivery by Midyear Are Unobtainable —Last Half Selling of All Grades More General and Heavy Tonnage Booked—Furnaces Forced to Pile Iron

Cleveland, Jan. 29.—A tremendous shortage of basic iron for delivery by July 1 continues to be marked by the energetic but futile efforts of consumers in this and surrounding territory to fill their needs. It is estimated that 200,000 tons of unfilled demand by midyear are in sight. A Pittsburgh district consumer wants 30,000 tons; a northern Ohio plant which has been buying freely 20,000 tons additional for second quarter and 25,000 tons for last half; a Massillon, O., buyer, 15,000 tons; a Lorain, O., works, 5000 to 10,000 tons; an Ohio river consumer, an indefinite tonnage, and there are various other lots in sight. The difficulties of obtaining first half metal have intensified the desire of steelmakers to buy basic for the last half and some further large sales have been made. A northern Ohio interest added 15,000 to 20,000 tons to its recent last half purchases during the week. A Lorain, O., plant bought its last half requirements, representing 20,000 to 25,000 tons and was obliged to go to the Chicago district to fill this order. Selling of foundry, malleable and other grades for last half by certain producers along the lakes and in the valleys still is going forward. One maker's sales of the week reached 30,000 to 40,000 tons; another has disposed of only slightly less than 100,000 tons this month. A Buffalo interest which has been booking freely and has collected a large aggregate of orders, including about 5000 tons in this territory, has withdrawn. The General Electric Co. wants 2000 tons of malleable and 200 tons of high silicon bessemer. New government inquiries are numerous, including 800 tons of foundry for Chicago delivery, 800 tons of malleable for Beloit, Wis., and 900 tons of foundry, including a small amount of charcoal for the Brooklyn navy yard. All but 1000 to 1500 tons of charcoal remain to be placed of the recent 8000 tons inquiry for the navy. The 1000 tons of foundry for Italy probably will go to Alabama makers. Little improvement in traffic conditions among the furnaces is noted because of embargoes though production is a little better. Makers have been obliged to pile iron or keep it in cars because it could not be hauled away at once.

A tendency is manifest on the part of some producers to sell to Canadian customers on practically a cash basis. The reasons given for this are that the financial status of Canadian foundries is not so good and that taxes are stifling many of the industries. Implement makers in Canada are buying limited tonnages of foundry.

Business at Low Ebb

Boston, Jan. 28.—Current business in pig iron is at a very low ebb, for there is so little spot or prompt stock available and what is offered is mostly offgrade that will hardly fit into the needs of those who have not obtained what they contracted for and badly need supplies to tide them over. Shipments of iron billed to government plants or government inspectors from the northern regions are coming along in fairly satisfactory fashion but deliveries from Virginia and Alabama are very slow and unsatisfactory. There are plenty of inquiries in the market, but the great trouble is in placing them. Embargoes still play havoc with companies work-

ing on nonessentials which have iron on the way and the coal shortage is still a long way from being relieved. Indeed, the belief gains ground that the coal shortage is not going to be relieved by the efforts that are now being put forth, but will come only with warm weather. There is more or less inquiry for last half iron with a fair amount of business being booked subject to government revision of prices March 31. Some New York state makers have closed considerable tonnage in New England territory for last half shipment.

Furnace Prostration Threatened

New York, Jan. 26.—Estimates are heard that sales of second half foundry iron in the metropolitan district during the past 10 days or two weeks have aggregated 40,000 to 50,000 tons. This iron, all of which is to be billed at the government price prevailing at the time shipment is made, was sold by only a few furnaces, none of which are in the immediate eastern district. So far, the selling of second half iron subject to price revision has not become popular in the east. As far as known, the iron sold of late for second half shipment is going entirely to consumers who are engaged on war requirements. Scarcity of coke at eastern furnaces is reaching a most acute stage. Stacks on all sides are being forced to bank and a great many which still are in operation report they have only sufficient coke on hand to keep them going for another day or two. Unless deliveries of coke show a material improvement without delay, by far the greater portion of the eastern production threatens to be prostrated. Inquiries continue to come out for pig iron for all positions. A great deal of it involves first quarter or first half shipment. Anything short of July 1, however, is almost impossible to obtain, with the exception of odd lots of off-iron which occasionally can be had. The Worthington Pump & Machinery Corp., which early this week put out an inquiry for some 7500 tons of foundry, charcoal and silvery iron for second half delivery to its various plants, has not closed. An inquiry for basic iron, which a New York state melter recently put out, is understood to be unclosed.

Weather Retards Relief

Buffalo, Jan. 29.—Blast furnaces in this district still are working under serious handicaps through lack of coke due to only partial railroad service, and on account of the continued cold which has done much to counteract the relief which would have resulted from the five-day suspension order. Producers find some hope in the fact that the arrival of better weather should allow some of the good effects of the order to make themselves evident. Quite a little last half business was taken on by one furnace, practically the only one in a position to contract. Due note has been taken of the possibility of the government making some sort of a revision on pig iron prices on March 31 and this has resulted in the following arrangement: All iron sold now for last half delivery will be sold with the proviso that what iron has been shipped at the time of revision will not be subject to the revised prices. All iron, however, which is part of a contract made now, and which remains unshipped at the time of revision will be subject to new prices. In the aggregate very little tonnage was disposed of throughout the district and not much gain was made in catching up on behind-hand shipments. Foundries and other plants not working on war orders find themselves unsupplied. The situation is tight as to obtaining iron for the first half now and what small lots have been offered have been eagerly bought.

Freight Situation Unchanged

Cincinnati, Jan. 28. — Moderate weather the latter part of last week gave some encouragement to pig iron producers and consumers, but this optimistic feeling was short-lived. Today the transportation situation is in almost as bad shape as it was during the first week in January. There does not seem to be any likelihood of the different freight embargoes being lifted at any early date. This will mean that southern iron cannot enter this market, and should the foundries run out of iron entirely they will have to depend on northern producers to supply their needs. Due to the very serious coke shortage production in all districts, especially in Ironton and vicinity, is very materially cut down. Inquiries for last half foundry iron still are coming in, although southern furnaces appear to be the only ones that will take on business for that delivery.

Embargoes Hit Business

St. Louis, Jan. 26.—Embargoes, blizzards, shutdown orders and other unusual disabilities have worked havoc with the pig iron industry in this district. Dealers are at sea. There is little likelihood of a return to even an approximation of normal for days to come. Business for prompt delivery or to April 1 reported this week was confined to a few stray carlots, and not of volume sufficient to gage the market. Inquiries have fallen off radically, for the chief reason that consumers know there is nothing to be had and are saving themselves labor and postage. St. Louis is hemmed in at the moment by embargoes.

Many Inquiries Being Received

Birmingham, Ala., Jan. 22.—Southern furnaces are receiving many inquiries for iron and are selling in some cases, though not in great quantity. Some of the producers announce they are out of the market for delivery before July 1 except on a few grades. Reiteration is made that all contracts made for iron for delivery after April 1 are subject to government revision, but this has lost effectiveness and consumers are willing to buy where they can get their business accepted. Production and delivery are both slow in the southern territory. Improvement has been expected in both directions, but obstacles come up almost weekly. The railroad situation shows no improvement and attention is called to the nine cars of iron bound for Pennsylvania consumers that still are standing on side tracks in this district because embargoes are in effect toward the east.

Study Form of Contracts

Pittsburgh, Jan. 29.—Producers of pig iron are interested chiefly these days in the form contracts for last half shipment shall take. There are three distinct periods, the present, with prices fixed by the government, March 31, after which prices are subject to revision and the end of the war when the tendency of the market is an unknown quantity. The proposed contract that appears to meet with most favor provides that in the event there is no government price—or when peace is restored—the levels to prevail shall be those in effect at the time the contract was made. This, it is pointed out, has merit in that it guarantees consumers their supplies of iron and furnishes a basis upon which their estimators can work, and therefore be in a position to quote definitely on their semifinished or finished products, and also protects the seller. Another proposal makes the prices subject to revision on April 1, with the maximum government level in effect at the time shipment is made. Still another suggestion calls for the application of trade journal or open market quotations at the time deliveries are made, a condition that would, of course, prevail after the war and when government regulation ceases. A number of producers are selling

iron for last half delivery and the aggregate mounts up to a fair-sized total. Foundry and basic iron are the chief grades involved in these sales. Makers are as a general thing selling only to their regular customers and are not actively soliciting business for last half, inquiries for which are increasing. There is practically no inquiry for first half makers being either entirely committed for that period or unwilling to sell except on a spot basis. Free tonnages are extremely small. A steelmaker east of Pittsburgh wants 30,000 tons of basic before July 1. Blast furnace operations in this district continue to be made on a sharply restricted basis due to a shortage of coke. The Carnegie Steel Co. is operating only 30 out of its 59 furnaces and the Jones & Laughlin only four out of its 11.

Can't Get Basic in East

Philadelphia, Jan. 29.—Pig iron sales in this district the past week totaled from 20,000 to 25,000 tons, including 10,000 to 12,000 tons of second half foundry, and some 6000 second and third quarter basic. The remainder was made up mostly of nearby foundry and off iron. The second half foundry was sold principally by furnaces not in this immediate district and on price revision basis. This maker now has withdrawn from the market, having booked a heavy tonnage for last half in all districts. Eastern furnaces continue to decline business on this basis.

Buying Freely at Chicago

Chicago, Jan. 29.—With the form of contract decided on to cover pig iron sales for last half, the Chicago market has opened up with much activity and a real buying movement is on. Contracts accepted tentatively, subject to the new revision clause, have been executed and are satisfactory to consumers. These are believed to cover practically one-third of last half production in the Chicago district, and with buyers anxious to cover their requirements for the remainder of the year the entire available tonnage to Jan. 1, 1919, is expected to be under contract within a short time. The new clause incorporated in current contracts by Pickands, Brown & Co., is as follows: "The prices to be paid by the purchaser for any of the materials named herein, which are shipped under this contract after March 31, 1918, shall be the price fixed for that time by proper U. S. government agency by agreement or otherwise, as the public or market price for such material, instead of the price herein named."

Snow Upsets Coke Traffic

Drifts in the Mountains Shut Off Connellsville Regions from Many Furnaces—Modified Weather Revives Hope of Betterment

Pittsburgh, Jan. 29.—The extreme storms and heavy snow drifts have demoralized traffic conditions in the Connellsville coke region. Telegraph wires were torn down and interrupted the movement of trains and shut off direct communication of blast furnace interests with coke operators and the railroads in the region. In consequence the movement which was already unusually slow has been delayed further and made the shortage of fuel at furnaces more acute. Later reports indicate that the lines of the Pittsburgh & Lake Erie railroad and the Monongahela railroad are being cleared up and wires are being restored. The principal difficulty was in the mountains beyond Connellsville and this side of Rockwood and between Johnstown and Altoona, Pa., where drifts of snow 12 feet deep at some points stalled trains, some of them carrying shipments of coke. Trains were also snowbound on the Pennsylvania railroad east of Greensburg. This also delayed the movement of coal and coke which are so urgently needed at blast furnaces and steel works. Provided the weather continues to moderate as it has been doing during the past two days, marked improvement is expected to be shown in the movement of fuel. At the same time there is some apprehension that the extremely heavy blanket of snow lying in the mountains and the valleys together with the ice in the rivers would cause a tremendous flood and do vast injury in this district if an abrupt thaw took place. The fuel administration is making efforts to concentrate on the shipments of coke and coal, the movement of the latter to be expedited through the creation of zones. Fuel was exempted in the embargo order recently issued by Director General McAdoo, with a view to making shipments of coal and coke as freely as possible. It has had the effect, however, of further congesting traffic conditions in the yards of iron and steel plants and caused an additional check in operations. Production for the week ending Jan. 19 was 238,425 tons as compared with 237,707 tons for the preceding week, according to *The Connellsville Courier.*

Closing Yearly Contracts

New York, Jan. 26.—Numerous yearly contracts, both for foundry and furnace coke, have been closed in eastern territory during the past couple of weeks, involving many thousand tons per month. A large part of the contracts call for delivery over the year. Other contracts call for shipment over the remainder of 1918. All of this business was closed at government prices and went to Connellsville and other Pennsylvania producers. The New England by-product coke producer continues out of the market, because of heavy bookings and also to fears over the maintenance of coal supply.

Situation Grows Worse

Cincinnati, Jan. 28.—A prominent seller says: "The coke situation is the same as it has been for the past four weeks—except that it is worse." Labor appears to be giving a great deal of trouble in all districts. The ovens are short of help and the last cold spell has made this situation a more serious one. In some fields it is stated that practically no 48-hour coke has been made lately, as labor is too scarce to draw charges on time.

Expected Relief Denied

St. Louis, Jan. 26.—Surpassing difficulty is experienced by consumers in this district to secure metallurgical coke. For the first time since the advent of the acute shortage, several plants have been obliged to shut down entirely or abandon part of their activities. The breathing space afforded by the Garfield 5-day order has failed to help things out here in the matter of coke, though more coal is crossing the river than at any time since the recent severe weather set in.

Demands are Extraordinary

Birmingham, Ala., Jan. 26.—Both coal and coke production in Alabama are being maintained on a high keel, but the shortage remains acute. The action of the government in dividing the coal production and distribution into zones and appointing an agent for each zone, may bring about some satisfactory results. The new administrator will not interfere with the state and local administrators. The coke plants have been fairly well cared for but at most the output is none too great for the demand. The production of coal is being maintained as well as could be expected. The prospects now are that in the next few days many differences between operators and union miners will cease.

Embargoes Stifling Scrap

Demoralized Traffic Conditions Make Consequential Business Impossible—More Inquiry at Pittsburgh—General Scarcity Acute

FOR COMPLETE SCRAP PRICES SEE PAGE 348

Pittsburgh, Jan. 29.—No. 1 heavy melting steel, low phosphorus scrap, cast borings and machine shop turnings are in active demand. One large consumer is in the market for a good sized tonnage of heavy melting steel. Supplies are inadequate to meet the demand. Dealers report their stocks either are entirely exhausted or extremely low and that much difficulty is being experienced in obtaining material. Shipments are also hindered greatly because of embargoes. The American Bureau of Scrap Iron Dealers, with headquarters in Philadelphia, is aiding in facilitating the business of dealers in the way of obtaining permits for them to make shipments. This is being done frequently where cars have been rejected and reconsigned to other consumers. Reports are in circulation that some dealers have been compelled to pay prices in excess of those established by the government in order to obtain tonnages, but there is no known instance where consumers have paid more than the government prices plus the permissible commission of 3½ per cent. The price of $35 fixed for No. 1 busheling scrap is taken by the trade to be entirely out of line with the price of heavy melting steel.

Buying at Standstill

Boston, Jan. 28.—Business in old iron and steel has come pretty much to a standstill in this territory as a result of the railroad situation. Embargoes are in force and these make impossible shipments, although much stock is wanted and would be moving if the transportation facilities were available. Prices are firm and inclined higher, for the railroad situation is operating against collections and supplies also are restricted by the fact that mills cannot get new machinery to scrap old and much worn equipment. Once the rails get cleared, it is believed a big business in scrap is going to be done. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought No. 1, yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $21 to $22; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $27 to $28; steel rails, $27 to $28; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $22; machine shop turnings, $13 to $16; cast borings, $16 to $17; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $35 to $37.

Scarcity More Marked

New York, Jan. 29.—Although scarcity of iron and steel scrap has become more marked during the past few days, prices generally have undergone but little change. What is regarded by many in the trade as a steadying factor is the possibility of a downward revision of prices on several grades as a result of recommendations made to the Iron and Steel institute last week. These recommendations followed the meeting in this city of scrap iron dealers and consumers' representing iron mills, gray iron steel and malleable foundries throughout the country. The appointment of a new subcommittee on scrap to consider a readjustment of prices which was recommended, has brought no announcement as yet. Demand continues plentiful, but owing to difficulties in making shipments much of this business falls short of consummation.

Stagnant Condition Continues

Buffalo, Jan. 29.—The scrap situation in the Buffalo district presents little change from its stagnant condition of last week brought about by the confusion of general business due to the fuel and traffic situations. Severe weather has multiplied the difficulties of the scrap dealers. Shipping is virtually impossible not only because of the lack of labor, but because of the multiplicity of embargoes. Three put into force last week on eastern railroads still are in force and these have further knotted a complicated condition. Scrap is growing scarcer in most consumers' yards, though some are said to have been farsighted enough to anticipate the present traffic situation and make the best of the privilege they had of buying scrap last year. The demand would be good if there was any way of shipping. Dealers are inclined to believe there may be a modification of all grades of scrap coming under the heading of No. 1 wrought, due to the action of the American Iron & Steel institute in recommending the appointment of a new committee on scrap. There has been no further change in prices.

Chicago Market Dull

Chicago, Jan. 29.—Owing to reduced operation on the part of most scrap consumers and slow transportation conditions, the Chicago scrap market is simply marking time. With railroads engaged practically in moving coal and food, scrap is difficult to deliver and dealers find that the conditions which limit its delivery likewise cut down offerings and both sides of the market thus are reduced to a minimum. Most consumers find it possible to continue their limited operation on reserves already in hand and cars now in transit are being delivered slowly to add to their supply. Following the enforced idleness of most manufacturing concerns a week ago, production of industrial scrap has been reduced and railroads are offering comparatively little. The Chicago, Milwaukee & St. Paul has issued a list embracing 450 tons and the Michigan Central has asked figures on an open list, in which tonnages are not given.

Fixed Prices Not Established

Cincinati, Jan. 28.—Very little scrap is being received from the outside, but labor is so scarce during the present cold weather the dealers rather welcome this condition. Scrap sorters in zero weather are hard to get. Some confusion exists as to prices on cast scrap. No sales of consequence have been made since the government's schedule was issued and many dealers say these new quotations have not been established in this market. No shipments can be made to the large consuming districts and not much scrap is wanted locally.

Market Without Life

St. Louis, Jan. 26.—The market for iron and steel scrap locally has degenerated into a state of almost total paralysis. Sales during the week were astoundingly light for a market of this magnitude. Prices have been shaded a bit on certain grades but the changes are based more on sentiment than actual transactions. The shutdowns had relatively little effect on this market, as none of the plants on the west side of the Mississippi river were affected. Dealers' stocks in yards and in transit are fairly liberal, but to offset this fact, consumers' reserves have been cut heavily

and certain of the more important melters must soon replenish, especially if their contract material does not arrive more promptly. Consumption, despite the various unfavorable factors, continues near the recent maximum.

Scrap Uncertainty Continues

Birmingham, Ala., Jan. 26.—Stocks of iron and steel scrap on yards of dealers here are beginning to diminish by reason of no receipts. Quotations are given as last week, but it is openly stated that these prices are about $1 per ton higher than those that probably would command material. Embargoes on railroads in several directions are having the effect of making outside business impossible. It is even difficult now to get cars with which to handle scrap in southern territory. While cast iron pipe plants have resumed operation again there has not been acceptance as yet on much scrap. Some little deflection in the production of steel has also been felt by scrap iron and steel dealers.

Dealers More Hopeful

Cleveland, Jan. 29.—Iron and steel scrap dealers in this district seem more optimistic than at any time since railroad congestion, coal shortage, government price fixing and unseasonable weather began to dominate the market. Permits for shipments have come much more easily the past week, and though no large movement took place, a noticeable picking up in every branch of the trade is expected. Dealers generally are confident that milder weather and the new zone system of distributing coal, together with a general easing up of the railroad situation, will mean increased business all around. One melter in northern Ohio whose great need is for low phosphorus from a Cleveland steel plant was forced to suspend entirely last week because the latter was down from lack of coal. Few inquiries are reported and no sales worth recording have been made. Melters' stocks are fair, although some have been badly reduced and soon will be in need of replenishment. In the past week stove plate has been marked up $2 a ton; grate bars, $1.50; small forge flashings, 50 cents, and hydraulic pressed sheets, $1. Considerable uncertainty still exists in the minds of some Ohio dealers as to the definition of cast scrap.

The General Electric Co., Schenectady, N. Y., has completed a 56 x 809-foot addition, which will be used exclusively for the manufacture of motors.

Revive Shell Controversy

Decide on New Specifications But These Held Up—Contracts Transferred—Steel Shortage Becomes More Pronounced

New York, Jan. 29.—Important changes in shell steel specifications have been arranged for as the result of meetings the past week between representatives of the government and of the producers. The new specifications have been decided upon, but they have been held up due to the complaints from some of the various plants interested. In the meantime a number of the mills are held up in the operations awaiting the final adoption of the specifications. As a measure to help untie the rail tangle by reducing the length of the haul, the government has withdrawn a number of shell steel contracts which it had placed during the past couple of months. These have been transferred to other mills which are nearer to the plants at which the steel is to be converted into shells. Transfers of contracts in this manner, it is understood, are to be carried out as extensively as possible. As far as known, such switches as have been made up to this time, involve only shell steel.

Small Strip Sales Made

Pittsburgh, Jan. 29.—Small tonnages of cold-rolled strip steel are being taken by domestic consumers. Automobile manufacturers have not become an active factor in the market and it is apparent that buying is being restrained because prices are subject to revision on April 1. The government continues to take good-sized tonnages for airplanes, grenades, trench mortars, etc. Producers are operating at about 50 per cent of capacity and are having extreme difficulty in making shipments. They appear to be well supplied with steel, however, and operations have not been affected by a lack of rolling material.

Inquiries are Limited

Pittsburgh, Jan. 29.—Realizing the impossibility of covering their requirements, many consumers have withdrawn from the market for billets and sheet bars. Sellers report that they have no available tonnages for additional needs. Railroad embargoes are also holding up shipments. Sheet bars are being furnished as much as possible to tin plate mills which are rolling tonnages required in connection with the food conservation program. Sheet mills have been compelled to curtail operations because of a lack of steel and traffic congestion and some of them are producing at the rate of less than 40 per cent of capacity. The output of sheet bars and billets was further curtailed by the five-day shutdown order as well as by the one in effect yesterday. This reduction in steel output is not causing any serious concern except for the resulting restriction of the production of sheets and tin plate inasmuch as the steelmaking and rolling capacity exceeds the pig iron supply. The production of bessemer steel has been at a negligible point during the shutdown as none of this kind of steel is represented in war requirements.

Can't Get Material

Cleveland, Jan. 29.—Slabs and sheet bars continue exceedingly difficult to obtain by the consumer without a government contract. Companies in this class which recently put out inquiries have found the mills blocked with war business and are asking for material less vigorously, appreciating the difficulty. The best these buyers can do apparently is to pick up odd lots of misfit heats. Producers of semifinished steel in this district continue to receive various orders for billets, slabs and sheet bars to go into government business, and practically 100 per cent of their output is being distributed in this way. An inquiry for 400 tons of forging billets for Denver ordnance manufacture has been current.

British Want Shell Steel

Youngstown, O., Jan. 30.—Large tonnages of shell steel continue to lay in the mill yards pending the nullification of embargoes. However, Erie railroad officials announced if the cold spell the latter part of last week had not occurred, they would have lifted their embargoes. The Baltimore & Ohio has agreed to distribute 100 cars daily among the large steel companies in this city for the movement of government material west. Of this number one steel company is receiving 22 cars daily and is loading them with shell steel from a 2500-ton stock pile which had accumulated over the past three weeks. Great Britain is about to place a 50,000-ton order for 4.5 millimeter stock. Mills here have been asking whether they will accept a part of this tonnage. In view of the tremendous government bookings in shell steel, it is possible valley mills will be compelled to pass this business.

Insist on Bar Reduction

Nut, Bolt and Rivet Makers Declare They Must Have 2.90c Figure Written Into All Contracts—Fleet Needs Tonnage

Philadelphia, Jan. 30.—Further repudiation of steel bar contracts with independent producers with eastern plants have been made mainly by the nut, bolt and rivet manufacturers. The latter declare that it has been the general custom of producers in their line throughout the country to waive the high prices on old bar contracts and to substitute therefor the government price of 2.90c, Pittsburgh. These particular interests state they are being forced to follow suit. What course of action the mills intend to pursue has not been indicated. Much interest is being manifested in the trade as to the outcome of this situation owing to its bearing on other products.

Production at Low Point

Pittsburgh, Jan. 29.—Production of steel bars by mills in this district is at a low point, some of them operating at not more than 50 per cent of their capacity and others being down altogether on account of shortage of steel and the transportation situation. Demand is fairly heavy and most producers are well booked for the first half. The Emergency Fleet corporation is expected to come into the market soon and place contracts for approximately 30,000 tons of steel bars. Makers of iron bar report that demand is heavy and that they are well committed for the first half. The government is taking fair sized tonnages of iron bars and is also placing orders for steel rounds.

Mills Willing to Sell

Cleveland, Jan. 30.—Several makers continue to be receptive sellers of bars to the general trade, but outside of the implement manufacturers no extensive buying is being done. Production has been greatly reduced during the past week by the continued unfavorable weather and traffic conditions. A jobber has been inquiring for 2000 tons. Various miscellaneous war requirements are in the market and these include a new lot of 600 tons of 2-1/16-inch rounds for a Canton consumer. There is an active call for large rounds which the mills have difficulty in filling.

Government Buys Shafting

Pittsburgh, Jan. 29.—While commercial buying of cold-rolled shafting is extremely limited, fair-sized tonnages are being taken by the government. The automobile trade has not come into the market. These prospective buyers evidently are withholding purchases partly because they have not yet consumed all the stock they have on hand and also on account of the fact that prices are subject to revision on April 1. Lack of fuel and the congested condition of transportation greatly have restricted operations.

Western Market Quiet

Chicago, Jan. 29.—Selling of soft steel bars is limited, although the leading interest continues to book contracts for small tonnages to be delivered at convenience. The leading independent is unwilling to book further business for second quarter and has as much as it can handle for first quarter delivery, especially in view of reduced production following untoward weather conditions. Makers of bar iron are selling practically only on a spot basis and contracts for this product are not being made. Demand is light and small tonnages are being taken for nearby delivery. Production is considerably reduced by the closing order of the fuel administration.

Hard steel bars are inactive and mills are running only part time with demand light and comparatively little new business offering.

Navy Wants Rivets

Pittsburgh, Jan. 29.—Active demand is being made for nuts, bolts and rivets, either directly or indirectly for the government. The navy department has put out an inquiry for 3000 tons of rivets and the business is expected to be closed within the next 10 days. Heavy requirements for nuts and bolts are also being placed, much of this business coming from the Emergency Fleet corporation and the war department. While some makers have sufficient supplies of fuel to operate, they will be compelled to close down within the next day or so, unless relief comes from the congested condition of traffic in their yards.

Big Bolt Order Closed

Youngstown, O., Jan. 30.—Considerable tonnage for nuts, bolts and rivets has been placed lately with valley mills by the Emergency Fleet corporation. While government requirements comprise a large per cent of the output of the mills, domestic and foreign buyers are being served. The production of steel bars has been at a low ebb for some time due to coal and shipping conditions. In spite of this setback, one maker closed an order recently for 12,000,000 carriage bolts for export. The order will aggregate close onto 9000 tons, since about 65 per cent of it calls for 6 and 8-inch bolts. It is understood the material will be used in constructing transportation wagons, gun carriages, and other miscellaneous purposes. Rumors are current that a manufacturer in a nearby district is offering bars to July 1. However, makers in this territory are adhering to the government request and are confining their sales to April 1.

Hoops in Active Demand

Pittsburgh, Jan. 29.—Active demand is coming from domestic consumers representing miscellaneous lines for hoop steel, tonnages of which are being sold at 3.50c, Pittsburgh. There is also inquiry for foreign shipment. The government has taken 300 tons for shipment to France. The market for bands is dull.

Cities Delay

Purchases of Cast Iron Pipe—Jobbers Want Mill Goods

Chicago, Jan. 29.—Cast iron pipe sellers find little tonnage pending, although indications are that some municipal inquiries will come out within the next few weeks when annual appropriations have been completed. It appears likely that buying for city extensions will be light this year, in view of difficulty encountered in marketing improvement bonds. The market for this class of securities is said to be backward. Bids will be opened Jan. 31 at Akron, O., on 900 tons. Pipe shops are not rushed with orders and one large producer is able to keep up activity because of a heavy order for pipe to be sent to Japan.

Inquiries Are Held Up

New York, Jan. 29.—Despite the season and difficulties attending shipments, a good demand continues to come out in the east for cast iron pipe. Public work is scarce, but manufacturers report a good volume of inquiry from private sources, and within the past few — several sizable tonnages have been placed. Nevertheless, business is moving under a heavy handicap as a result of insufficient transportation facilities. Consumers in many instances are withdrawing their inquiries. This is par-

ticularly true in the case of exporters. Italy, it is believed, would place a large tonnage if it were not for the uncertainty over shipments. Considerable business in the Far East also is being held in abeyance until more adequate transportation facilities are afforded, and such is the case with two or three good-sized inquiries from South America. Perhaps the latest inquiry to come before the trade from a foreign country is one from the Philippines. Among difficulties confronting manufacturers at this time is the scarcity of pig iron.

Jobbers Increase Demands

Pittsburgh, Jan. 29.—Jobbers are making more active demand for iron and steel pipe, having shown greater interest in the market as the result of the Garfield shutdown order, and are covering requirements in anticipation of a curtailment of production. Mills making oil country and railroad goods are exempted under the order, which permits some to operate fully, among them being those of the A. M. Byers Co. The buying movement also follows the recent seasonal dullness during which inventories were taken. Lap weld grades chiefly are being sought. The market for butt-weld tonnages does not show marked improvement, due to the small amount of building operations over the country.

Still Waiting for Improvement

Birmingham, Ala., Jan. 22. — Cast iron pipe plants again are melting iron though not as voluminous as before the recent shutdowns. Hope is expressed that as the severe weather of the winter soon will be on the wane and spring will set in that considerable work will be given consideration, for which cast iron pipe will be needed in quantity. Foundries and machine shops throughout the Birmingham district are working practically on full time.

Nail Demand

Better than for Wire—Outputs Brought Down Sharply.

Pittsburgh, Jan. 29.—Domestic demand for wire is only moderately active, while it is somewhat better for nails. The government continues to place requirements for nails. Wire mills have lost large tonnages on account of lack of steel and fuel and because of railroad embargoes. Some have been entirely down several weeks, while others are operating only a small portion of their capacity. Both buying and selling are restricted by reason of the fact that prices are subject to revision on April 1.

Huge Plate Orders Near

Fleet Corporation to Close 400,000 to 500,000 Tons—Eastern Mills Allotted Further Tonnages by Government

Pittsburgh, Jan. 29.—Reports coming from reliable sources indicate that the Emergency Fleet corporation is about to place contracts for between 600,000 and 700,000 tons of steel. Of this about 70 per cent or 420,000 to 500,000 tons will be for plates, about 25 per cent or 150,000 to 175,000 tons will be shapes, and approximately 5 per cent or 30,000 to 35,000 tons will be steel bars. It is understood that these tonnages will be distributed among a number of makers and that mills will be in a position to produce it, and make satisfactory deliveries provided there are no interruptions to operations in the way of shortage of steel or traffic conditions. There is also an increasing belief that the government is about to place orders for cars, although the report so far is of a more or less nebulous character. No car orders have been placed during the past week. Builders report that they have sufficient supplies of plates on hand and have no difficulty in obtaining requirements when they are needed. The Pressed Steel Car Co. has been granted full exemption under the Garfield order and was operated as usual yesterday.

More Ship Steel Needed

Cleveland, Jan. 29.—About 10,000 tons of steel will be required for eight ocean-going steamships of 3550 deadweight capacity which have been ordered by the Emergency Fleet corporation from the Toledo Shipbuilding Co. Two of the vessels are for delivery this fall and the remaining six for 1919. The steel requirements of this order have not reached the mills. Modifications of high-priced plate tonnage continue to be made by some of the mills. In some cases this is taking the form of enlarging the tonnage called for so that the net loss on the original contract under the government price shall be spread over a greater quanitty.

Mill Production Slow

Chicago, Jan. 29.—Although steel plants producing plates for government use have been exempted from the fuel administration's closing order, other conditions have prevented anything like full operation and production is greatly curtailed. Both the leading interest and the leading independent have made every effort during the past week to turn out material needed for ships and other government purposes, but nothing like 50 per cent production has been possible. The former producer is handicapped by lack of fuel and the latter by inability of railroads to furnish cars to handle the finished material as fast as it can be turned out. Blizzard weather at the end of last week opposed a further obstacle to railroad operation, both in transportation of fuel and finished material. This puts further into the future the time when mills can do still more effective work.

Fleet Tonnage Allotted

Philadelphia, Jan. 30.—The Midvale Steel & Ordnance Co. has been allotted 20,000 tons additional consisting mostly of plates for the Emergency Fleet corporation. Other eastern mills received smaller tonnages. Production among eastern plate makers generally is being restrained to 50 or 75 per cent owing to the coal shortage. The mills have been forced to be dependent upon day to day receipts of fuel. Apart from government requirements, plate demand in the east is diminishing.

Stored Tonnage

Of Tin Plate to be Moved Swiftly to Avoid Damage

Pittsburgh, Jan. 29.—Efforts are being made to have priority given to shipments of tin plate in order to move in greater volume tonnages which have been stored on account of a lack of cars. Apprehension prevails that unless tonnages which are stored along the rivers in this district are moved they may be flooded as a result of softening weather and rains. This condition would break up the ice in the river and also melt the heavy blanket of snow that lies in the mountains and in the valleys. Mills making tin plate for containers for perishable food, being exempt under the Garfield order, operated yesterday where it was possible to do so. Some mills have been down on account of a shortage of sheet bars, and also by reason of traffic congestion. The government continues to place orders and its requirements, it is reported, will involve extremely large tonnages in the near future.

Structural Awards Jump

December Lettings Second Best on Record Due to War Work—Airplane Buildings in France Call for Big Tonnage

New York, Jan. 29.—Coming within 3000 tons of the biggest monthly total in the history of the Bridge Builders and Structural society, structural bookings in December went beyond all expectations. According to the monthly statement issued by the society, December contracts aggregated 205,200 tons, or 14 per cent more than the estimated capacity of shops. The highest record ever announced by the society was for December, 1915, when orders amounted to 121 per cent. At that time, however, the estimated capacity of structural shops was 172,000 tons a month, as compared with the present monthly capacity of 180,000 tons. The gain made by December over the preceding month was 66,600 tons. Although it was known that several large contracts for ship steel were placed last month, estimates in the trade of late as to December bookings fell far short of the recorded tonnage. The scope of government buying in carrying out the various phases of the war program appears to have broadened beyond expectations. Following is a comparative statement:

Month	Per cent	Approx. tonnage
December, 1917	114	205,200
November	77	138,600
October	61¼	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Buying in the east at this time continues largely for government account. The J. G. White Engineering Co., which is in charge of the erection of various buildings at the nitrate plant at Mussel Shoals, Ala., has placed orders so far for 10,000 tons of structural steel, and still is in the market for an additional 2400 tons.

Government Taking Tonnages

Pittsburgh, Jan. 29.—The government is distributing additional tonnages to fabricators and those awarded during the past week are understood to have constituted a large quantity. Fabricators report that the great portion of their operations is devoted to government work, which is being placed directly by it in increasing volume, while that placed indirectly for it is not so great as it has been. It is understood that the Emergency Fleet corporation is about to place large requirements for shapes, one estimate running as high as between 150,000 and 175,000 tons. Fabricators are having no difficulty in getting steel because of the fact that their operations are principally for the government. Domestic business is extremely light due to several causes, among them being scarcity of steel and the high cost of material and labor and deferred shipments. Some fabricators are not taking orders and others are not actively soliciting business, their commitments for the first half filling their books comfortably. Fabricators have been exempt in part under the Garfield order.

Big Store Tonnage Placed

Buffalo, Jan. 29.—The T. Eaton Co., Toronto, the biggest department store in Canada has awarded the contract to the Dominion Bridge Co. for 8000 tons of structural steel for a mail order department building. This is in addition to plans calling for 22,000 tons of steel for a new retail department building held in abeyance until after the war. The Dominion Bridge Co. and McGregor & McIntyre participate jointly in a contract calling for the furnishing of 1800 tons of steel for a shipbuilding company in Canada.

Tank Tonnage Placed

Chicago, Jan. 29.—Absence of important structural lettings continues to characterize the market in the west. Slow mill operation is limiting delivery of plates and shapes to fabricators engaged on emergency ship work, but the effect of this probably will not be felt until some time later as present supply of finished material is probably sufficient for shop use for some days. Bids have been taken on 2000 tons of structural steel for a new building for the Western Union Telegraph Co. in Chicago, but the tonnage has not been awarded. No award of the steel involved in the Butler Bros.' warehouse has been made, this tonnage being about 9000 tons. The United States Smelting & Refining Co. has ordered 14 storage tanks, involving 330 tons, for use in Mexico.

Want Tonnages for France

Philadelphia, Jan. 30.—A slight improvement in the general structural demand is shown in this territory. Several small jobs which have been dormant since last year have been revived and figures have been asked upon them. Bids on heavy tonnages of fabricated new material for construction work in France have been asked by the government. For 500 airplane buildings 17,500 tons are asked, or 35 tons to each structure. Eight or nine buildings for army purposes in France, each requiring 425 tons, also are up for figures. An award of 4000 or 5000 tons for radial towers is reported to have gone to an independent shop.

Tonnage is Increased

Cleveland, Jan. 30.—Steel requirements of the new ordnance plant of the Morgan Engineering Co., Alliance, O., have been increased to 11,000 tons and the Bethlehem Steel Bridge Corp. has been awarded the contract for the entire amount. Fabricators continue to make sales in the general market from surplus stocks at prices between the mill and warehouse figures.

CONTRACTS AWARDED

Buildings for quartermasters department various locations, 3000 tons, to American Bridge Company.

Bridge work for Virginian railroad, 250 tons, to American Bridge Co.

Bridge work for Pennsylvania railroad at Monongahela Junction, Pa., 250 tons, to the McClintic-Marshall Co.

Bridge for Lehigh Valley railroad at New York, 250 tons, to McClintic-Marshall Co.

Government nitrate plant, Sheffield, Ala., awarded to American Bridge Co., increased from 8000 to 8500 tons.

Addition to the plant of the Wellman-Seaver-Morgan Co., Akron, O., 500 tons, awarded to the Canton Bridge Co., by George A. Fuller Co., general contractors.

Fourteen storage tanks for United States Stores Co., purchasing agent for the United States Smelting & Refining Co., 330 tons, to Kansas City Structural Steel Co.

Mail order department building for the T. Eaton Co., Toronto, 8000 tons, to the Dominion Bridge Co. New retail department building, 22,000 tons, held in abeyance.

Ship building construction in Canada, 1800 tons, to the Dominion Bridge Co. and McGregor & McIntire.

Radial towers for government 4000 to 5000 tons reported to have gone to independent.

Additional requirements of Morgan Engineering Co., Alliance, O., raising total to 11,000 tons, to Bethlehem Steel Bridge Corp. by George A. Fuller Co., general contractors.

CONTRACTS PENDING

Western Union Telegraph Co. building, Chicago, 2000 tons, bids being taken.

Bridge work for Southern railroad 800 tons, bids being taken.

Bronx bridge and repairs for New York Central railroad 250 tons, bids being taken.

Marine railroad, Boston and Charleston, 1000 tons bids rejected and will be readvertised.

Five hundred airplane buildings in France, 17,500 tons, bids being taken by government.

Eight or nine buildings for army in France, 425 tons each, bids being taken by government.

Heavy Demand

For Sheets Made Upon Valley Mills —New Business Small

Youngstown, O., Jan. 30.—Demand for all grades of sheets is extremely heavy among valley mills. New business is being booked in small quantities. A government order for about 2500 tons of black and blue annealed was taken by one maker whose rolling schedule has several openings at present on account of existing embargoes. Eastern and western shipments of sheets from Youngstown mills are still embargoed by all railroads, although as soon as the present cold spell lifts, it is announced, the restrictions will be modified. However, the Baltimore & Ohio railroad is dividing 100 cars daily among the mills for western movement and several tonnages for western consumers have already gone forward. Mills in the upper part of the valley are not restricted entirely and have been making western shipments.

Heavy Tonnage Being Taken

Pittsburgh, Jan. 29.—The government is buying sheets freely, its requirement for blue annealed and black sheets being unusually large. Mills are committed for the first half on these grades and for the first quarter on galvanized sheets, and are not selling additional tonnages to domestic buyers. Operations are perhaps lower than they have been at any time since 1914, some of the mills producing at the rate of not more than 30 or 35 per cent of their capacity, due to the shortage of steel and traffic conditions.

Light Gages Scarce

Chicago, Jan. 29.—Consumers of steel sheets find it difficult to place further contracts, especially for lighter gages, which appear to be sold out to a greater degree than heavier gages, especially in wide sizes. The leading independent in Chicago is entirely out of the market on light gages, but could book some tonnage for heavy sheets in wide sizes for second quarter. Demand for export continues heavy with domestic users also seeking material.

The blast furnace of the Robesonia Iron Co., Ltd., Robesonia, Pa., was blown out on Dec. 31 for repairs.

Ore Situation Tightens

Restrictions on Manganese Shipments by Brazilian Government Affect Ferromanganese Market—Producers Selling More Cautiously

Chicago, Jan. 29.—Shortage of ore and difficulty of transportation of the available supply already in this country are bringing about a dangerous condition in the ferromanganese market. Although no quotations over $250 per ton, furnace, have been made yet, so far as is known, it is probable that a higher price will come out shortly. Brazil seems inclined to release ore only in exchange for coal, which is badly needed in that country, and shipping to carry the ore to the United States is difficult to obtain. In the present railroad situation it is almost impossible for ore to be delivered and a trainload within a few miles of Chicago has remained unmoved for some time, as railroads are concentrating their efforts on coal and perishable freight. It is likely that the local producer may be forced to make spiegeleisen while the shortage of ore remains severe.

The government is aware of the situation and has refused to give export licenses for ferromanganese, which has caused cancellation of some tonnages sold at a much higher figure than the present market. Reduced operation of steel mills will give some reduction in demand, but this is temporary. The local producer is unable to take more tonnage for second quarter until conditions are relieved somewhat. Consumers are inquiring for last half, but selling for that delivery has not yet been started. It is believed possible that the government may limit ferromanganese producers to an alloy containing 40 to 60 per cent manganese in order to promote the use of low-grade ores available in this country.

Ferro and Spiegel Improve

New York, Jan. 26.—Inquiry for ferromanganese and spiegeleisen has shown an improvement recently. Several middle western consumers have put out inquiries for round tonnages for second quarter and the remainder of first half. None of this business has been closed. Apparently the minimum quotation which has been submitted is $250, delivered. The market is strong, due to the tight situation and the high prices prevailing in manganese ore. Spot lots of ferromanganese are selling at $250 to $255, delivered. Sales of English ferromanganese for first half shipment so far have been made only by one representative. The bookings by this interest for first half total about 5000 tons, about one-half of which was booked prior to this month. Large tonnages which for second half of 1917 shipment have been caried over to the first half. Additional inquiries have been cabled to England. It is apparent that the amount of this metal available from England, is limited.

In 50 per cent ferrosilicon the market is materially stronger. Demand for spot carloads is insistent and prices range from $175 to $180, delivered.

Many Locomotives

Under Orders to be Diverted to Eastern Lines by McAdoo

New York, Jan. 29.—Distribution of 4500 cars of various types which were recently bid upon at Washington has not as yet been made. These cars, which are for service in France, are similar to those awarded by the the road that ordered them.

Practically no inquiries are coming out from the railroads. A recent development of considerable interest is the order to locomotive builders by Director General McAdoo stipulating that all locomotives built on order in January, February and March should be turned over to specified eastern lines, regardless of government about a month ago.

The Chesapeake & Ohio is out for a number of 10-wheel switching engines; the Philadelphia & Reading, it is understood, will build 15 in its own shops; and the Illinois Central has ordered four Santa Fe types from the American Locomotive Co.

Railroads Show More Interest

Pittsburgh Jan. 29.—Slightly increased interest in the market for standard spikes is being shown by railroads. Inquiries are greatly below normal, however, both in number and volume. Demand is being made by several lines and one carrier is seeking 2000 kegs while others are inquiring for smaller or similar lots.

Some Rail Buying

Chicago, Jan. 29.—Small tonnages of standard steel rails for 1919 delivery are being booked by the western mill, but nothing of importance is developing along this line. Some small tonnages are also being taken for frog and switch manufacturers on which earlier delivery probably can be made, although ordinary business for 1918 cannot be taken.

Traffic Situation Improves Slowly

Recurrence of Severe Storms Holds Back General Betterment from Strenuous Remedial Measures—Pittsburgh Conditions Unprecedented—Open-Hearth Operations at 59 and Blast Furnaces and Coke Ovens 66 Per Cent Active

BEHIND the wall of embargoes and aided by the Monday shutdowns decreed by the government, the railroads continue to make strenuous efforts to clear their rails of the terrific congestion which has been paralyzing industry. While there has been a betterment in a spotted way, the iron and steel industry yet is to show any appreciable beneficial effects from the Garfield order. Heavy snows and a recurrence of wintry conditions of unusual severity during the past week, have, however, materially interfered with the realization of the full effects of the cessation of business. Conditions of river traffic at Pittsburgh and of snow drifting in the Allegheny mountains have been a factor contributing greatly toward further demoralizing production and transportation in the Pittsburgh and Connellsville districts.

Operating conditions in the Mahoning and Shenango valley and the Pittsburgh district for four days ending Jan. 27 show little improvement over the previous week. Blast furnaces and coke ovens in these districts operated at 66 per cent of capacity and open hearths at 59 per cent. This showing is considered extremely low by operators and is attributed to the cold weather and the difficulties experienced in getting the various units under way again after the 5-day suspension. Shortage of labor and cold weather are the chief factors affecting transportation in this district.

Railroad officials state if the present cold spell would end, they would experience little trouble in train movements, but that they are handicapped under present weather conditions. The Baltimore & Ohio railroad while not modifying their embargoes entirely has agreed to distribute 100 cars daily for western shipments only among the various iron and steel industries in Youngstown. The mills are requested to inform this road concerning shipments for the following day. By this agreement congestion of shipping platforms will be relieved somewhat since about 2500 tons of western shipments will be dispatched daily. The plan of dividing the country into zones for coal distribution as a possible remedy for the clogged condition of the railroads is welcomed by traffic managers. They contend this plan will not only help the railroads, but the coke ovens as well.

New England in Bad Way

The coal situation in New England was never more serious and unless relief comes within a very few days it is predicted industries by the wholesale as well as business generally will have to be suspended. Instead of 500 cars of coal a day being shipped to Boston, as promised, but 200 are coming, of which 150 go to public utilities corporations and the balance must take care of everything else. No coal of consequence is expected by water for two or three weeks. In Worcester, the Osgood Bradley Car Co., which has a $7,000,000 contract from the government for the making of gun carriages and was one of the plants exempted for the five days period shutdown indefinitely Jan. 23, for lack of coal to heat the various buildings. The New England Power Co., which supplies many Worcester and other New England industries with power, especially in the metal trades lines, has been obliged to borrow 1800 tons of coal from the Norton Co., to keep that and other plants from shutting down. In Bridgeport, Conn., Fuel Administrator Carl F. Siemon has appealed to E. B. Noyes, assistant federal administrator at Washington, to not grant any more exemptions to manufacturers in that city because he cannot take care of the 18 already so classified unless an immediate start of substantial shipments of both anthracite and bituminous coal is made. Bridgeport needs daily deliveries of at least 1300 tons of hard coal and 1000 tons of soft coal to take care of immediate requirements. The L. S. Starrett Co., Athol, Mass., maker of small tools, has shut down its plant because of the coal shortage. The company has been doing 100 per cent government work in the manufacture of delicate gun sights, etc. The Monday holiday closing order through the east is not believed to be helping conditions much.

Won't Allow Overtime

A ruling has been obtained from the coal administration in reply to the request of members of the Illinois Manufacturers' association to be allowed to work extra time the remaining five days of the week to make up to some extent the loss of time caused by closing their plants Mondays. The ruling is as follows:

"Any increase of the working time on other days of the week by industrial establishments for the purpose of making up the lost time brought about by the fuel administrator's order prohibiting work on Mondays, is considered by the fuel administrator an evasion of that order and a violation of its spirit.

"Signed P. B. Noyes, Director of Conservation."

More Fabricators Exempted

Exemption from the Monday closing order of the fuel administration has been granted a number of structural steel fabricating shops in Illinois which are engaged on material for shipbuilding under the direction of the Emergency Fleet corporation. These shops include the following: Chicago Bridge & Iron Works, Gage Structural Steel Co., Hansell Elcock Co., Kenwood Bridge Co., Morava Construction Co., Mohr & Sons, South Halsted Street Iron Works, Vierling Steel Works, all of Chicago; the Rock Island Bridge & Iron Works of Rock Island; William Graver Tank Works of East Chicago; Continental Bridge Co. of Peotone; Heggie & Sons of Joliet; the Decatur Bridge Co. of Decatur, and the plant of the Chicago Bridge & Iron Works, at Greenville.

Mining Meeting Called

On Feb. 18, 19, 20 and 21, the American Institute of Mining Engineers will meet in New York City. This will be its 116th meeting, and the main topic for discussion will be war work for the engineer and the concentration of effort to meet the country's mineral needs. Fifty technical subjects are to be discussed including economy of electric power over steam in mines; the extraction of gasoline from natural gas; erosion of guns; Chilean nitrate industry and various phases of the labor problem.

The Wisconsin Steel Co., South Chicago, Ill., has built a large lunch room for its employes. Hot meals will be served at moderate prices.

Concentrate War Duties

Appointment of E. Stettinius as Surveyor of Purchases Another Move Away from Unwieldy Management Without Legal Powers

WASHINGTON, Jan. 29.—Appointment of Edward R Stettinius as surveyor general of all army purchases is considered to have been a master stroke for Secretary Baker, storm center of the administration's war policies. It centralizes the war department's buying, a move long necessary, and it relegates further to the background the war industries board, in place of which a director of munitions is advocated both by leaders in congress and in the war board itself. It has been reported that Mr. Stettinius will only assist Col. Palmer E. Pierce, the official head of the new army purchasing system and a member of the war industries board, but in view of the former's wide experience, it seems certain that he is not likely to occupy a subordinate position. Other reports are to the effect that if the President is won over to a compromise on the question of a director of munitions and a three-man war cabinet, Mr. Stettinius will be in charge of what organization may develop from the compromise.

War Board's Position Wanes

It is an almost foregone conclusion Mr. Stettinius will not be bound by the red tape involved in the functioning of the war industries board. As Admiral Samuel McGowan has done in notifying steelmakers he intended to make certain purchases through the bureau of supplies and accounts for the navy without reference to the division of steel supply, so Mr. Stettinius is expected to do for the army. It is certain he will not let the head of any other division do anything that he can do himself.

With Admiral McGowan and Mr Stettinius each going his own way, consulting each other and others when they find their needs will overlap, it will be only a matter of time until the war industries board will have little to do. Most of the shipping board's urgent requirement having been placed and with most of the present orders calling for later delivery, it is altogether likely that board too will adopt an independent schedule.

This general trend argues against the war industries board and for a director of munitions. If each of the four war purchasing agencies is to go its own way, the need for their co-ordination under one authority is likely to become more insistent. The war industries board, as admitted by Secretary Baker, former Chairman Daniel Willard and B. M. Baruch, a member of the board, is only an advisory body. According to Messrs. Willard and Baruch it requires an organization similar to the food and fuel administrations, with authority and a responsible chief.

Buys for Five Divisions

Through Mr. Stettinius five divisions of the war department will make their purchases, ordnance, quartermaster, signal corps, engineers corps and medical corps. The ordnance and quartermaster bureaus are vitally affected. The other departments remain practically as they were. In ordnance, the chief's office, in charge of Brig. Gen. C. B. Wheeler, is subdivided into three bureaus, general administration, under Col. William S. Peirce, engineering under Col. John H. Rice and control under Col. Tracy C. Dickson. These three bureaus have concurrent jurisdiction over the operating divisions, procurement under Col. Samuel McRoberts, production with Col. Guy E. Tripp in charge, inspection under Col. Beverly W. Dunn and supply in charge of Col. Odus C. Horney.

Maj. Gen. George W. Goethals, who has announced changes in the quartermaster bureau, has placed R. J. Thorne, Chicago, in charge of the division of maintenance and distribution; A. L. Scott, Boston, division of clothing and supplies, and D. M. Lilly, New York, division of shipping. Under Mr. Scott, Col. John P. Wood will be in charge of the wool section; Daniel A. Lentz, Philadelphia, fuel, with Preston Davies, New York, as assistant; Col. H. M. Lord, finance division with Lieut. Col. James Colby assisting; and storage with Col. A. E. Williams in charge.

Corporation to Finance Government War Aid

Washington, Jan. 29.—The War Finance Corp., capitalized at $500,000,000, which has been proposed by Secretary McAdoo to congress will centralize all government financial aid to industries and to banks financing industries engaged in war work, according to views expressed here. The measure includes practically every line of new financing, such as shipyards, munition plants, machine builders, etc., except railroads which come under the McAdoo railroad control. All stock of the corporation would be subscribed by the United States. All new private financing would become subject to the approval of the corporation. Such issues would be limited to $100,000. This undoubtedly would turn all financing into such channels as the government would wish and would prevent any interference with Liberty bonds and other war campaigns. Secretary McAdoo plans the secretary of the treasury should head the corporation and shall appoint four other members to manage it subject to the President's approval.

Will Allot Coal Output by Mine and District

Washington, Jan. 28.—The permanent systematic plan for the distribution of the country's bituminous coal supply, which the fuel administration is adopting, contemplates a system that will insure the speediest possible movement of coal from the mine to the consumer, and the immediate return of empty cars, according to an announcement. It will eliminate so far as possible cross-hauling of coal by providing for the movement along the shortest possible transportation lines.

Under the plan each state will be alloted its quota of the estimated output of bituminous coal. This allotment will be supplied from the output of certain definite producing districts. Coal for each state must move from the producing districts in which the states allotment is located and from no others. The producing fields of the country have been divided into some twenty districts and a district representative will be named in each of these. These district representatives will equitably allot all orders and requests for fuel from the fuel administration among the various shippers and mines within his district. They will be responsible for the prompt filling of coal orders and the prompt movement of coal out of the producing fields.

The whole system of coal distribution and apportionment will be under the general direction of J. D. A. Morrow, who has been appointed manager of apportionment and distribution. Representatives of the fuel administration and representatives of the railroads named by Director General McAdoo are now at work developing the phases of the plan which concern transportation.

Huge Earnings

Made by Steel Corporation in 1917—Cut Heavily by Taxes

Had it not been for the setting aside of approximately $235,000,000 for war income and excess profits taxes, the 1917 net earnings of the United States Steel Corp. would have aggregated $510,270,380, as compared with $333,625,086, the net earnings for 1916. Revisions of the 1917 figures may have to be made, when the corporation's official statement is issued. The net earnings, as given by quarters during the year, are as follows:

	1917	1916
First quarter*	$56,621,018	$60,713,624
Second quarter	90,579,204	81,126,048
Third quarter	68,243,784	85,817,067
Fourth quarter	59,724,125	105,968,347
	$275,168,121	$333,625,086
Set aside for excess profits*	235,102,259	
Total earnings	$510,270,380	$333,625,086

*Approximate.

Without the war income and excess profits tax, the net earnings would have been nearly $10,000,000 in excess of the outstanding common stock. Difficulties in transportation and the effect of price regulation are reflected in these figures. The balance for common stock dividends in the final quarter was equal to 7.44 per cent against 8.54 for the preceding quarter. Indicated earnings on common stock for 1917 were 46.3 as against 48.4 in 1916, and 9.3 in 1915. A detailed statement of the quarter's figures follows:

October	$21,835,991
November	19,902,862
December	17,985,272
Net earnings for quarter	59,724,125
Deprec. and sinking funds	11,688,781
Net income	$48,035,344
Interest and premiums on corporation's bonds	5,470,103
Balance	$42,565,241
Adjustment for credit	1,600,808
Total	$44,166,049
Prfd. divs. $6,304,920	
Common divs. 21,602,857	27,907,777
Surplus	$16,258,272

Awards Decrease

In Structural Material During 1917—Fabricators Hold Yearly Session

New York, Jan. 28.—Due to the depression of commercial business which followed the United States' entrance into war, sales of structural shops fell off in 1917, according to a report by Secretary Gifford, presented at the annual meeting of the Bridge Builders & Structural society, Jan. 18. According to the figures set forth, total sales for 1917 amounted to 1,285,000 tons, compared with approximately 1,500,000 tons for both 1915 and 1916. In his address Secretary Gifford said:

The period of depression which has followed the entrance of the United States into war, causing the practical suspension of all the commercial business in fabricated steel, has resulted in the sales for the year 1917 falling considerably below those for the years 1915 and 1916. Our figures for the year, compiled from reliable sources with which you are all familiar, show that the total sales of fabricated steel for the year 1917 amounted to 1,285,000 tons, as against about 1,500,000 tons for both 1915 and 1916. This amount is probably less than it should be, because the collecting with accuracy of statistics on fabricated ships seems to be well nigh impossible.

The work of the society during 1917 went on with little or no change, so far as the operation of the open price plan with its attendant reporting features are concerned.

The effect of fixing of prices has not stimulated materially general buying, but this is due to government priority requirements which make it almost impossible for the general purchaser to secure deliveries, as well as the financial situation which makes it difficult or impossible to secure capital for commercial or speculative building.

Takes Washington Post

F. B. Richards, a partner of M. A. Hanna & Co., Cleveland, has joined the Cleveland contingent now doing war work in Washington. It is understood that he has been attached to the war department in an important capacity with the title of captain.

Ice Gorges

Threaten Damage to Iron and Steel Plants Along the Rivers

Pittsburgh, Jan. 30. (By wire.)—Great damage to iron and steel plants and tonnages that are stored, including tin plate, is threatened by tremendous gorges of ice which began yesterday to force their way down the Monongahela river.

Points along the line of water were on the verge of being flooded when a heavy ice dam formed at Brownsville, Pa., threatening the rush of ice floes and averting for the time being what promised to be one of the worst floods in the history of the district. The gorges began to break loose as a result of the moderating weather and rains.

The mantle of snow lying on the mountains and valleys was also added to the seriousness of the situation. The ice in the river is extremely thick and is said to be more than two feet in some points.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Jan. 29.—Monday of this week was altogether a workless day in the metal markets. The metal exchange was closed and brokers and dealers, profiting from their experience of a week ago, did not attempt to do any business. The week just passed was almost devoid of developments, the commandeering of further tin supplies from New York warehouse being the one feature attracting general interest. A few months ago the navy department ordered all tin in bonded warehouses analyzing 99.95 per cent or higher held subject to its requisition. The tin so held amounted to 800 tons. The Emergency Fleet corporation last week ordered all remaining supplies of all grades held subject to its requisition. As this metal is practically all owned by consumers, a strained situation is thus made more acute. Figures are not yet available as to the tonnage so commandeered or the price to be paid the former owners. No spot supplies of tin are yet available and so no spot market can be quoted. Some buying of future shipment Banca and Chinese grades is being done. Banca January-February shipment from Batavia sold last week at 69c, while Chinese No. 1 for January shipment from Hong Kong sold at 62c. Block tin has become extremely scarce, due to the lack of pig tin, the scrap metal going as high as 80c, according to reports. American spot tin, 99 per cent, was offered today at 78.50c, March shipment; Straits, 69.50c; January arrival of Banca, 85c.

The war industries board has not yet announced prices fixed on sheet zinc and high-grade spelter, despite expectations that such announcement would be made last week. Prices have been fixed and referred to the President, but this matter is understood to have been shelved temporarily pending congressional action on the price-fixing bill which in turn is said to hinge on the munitions cabinet legislation. Production of prime western spelter steadily is decreasing, but prices are unchanged at about the following levels: Prompt shipment, 7.70c to 7.75c, St. Louis; February shipment, 7.75c to 7.80c; March, 7.80c to 7.85c.

With the announcement by the war industries board of the continuation of the 23.50c price for copper until June 1, copper producers have begun to sell for deliveries in the second quarter. A good business was done for April, May and June the past week. The commission of 5 per cent or less than carload lots remains in effect.

Lead in the east has been rather scarce of late due to the traffic congestion and consumers have been paying considerable of a premium. Spot has commanded as high as 7.50c, New York, the past week, but this position now has been scaled down to about 7.25c, New York. Shipment inquiry is only fair, but prices are steady, as follows: Prompt, February and March, 6.87½c to 7.00c, St. Louis.

The antimony market is again easier, with only occasional consumer's demands in evidence. Spot Chinese and Japanese brands are obtainable at 14c, duty paid, New York.

Foundry Equipped in Record Time

How the Concentrated Energy of Four Men Enabled a Tractor Plant to be Converted Into a Modern Malleable Unit in 90 Days Despite Labor and Transportation Troubles

THIS is a true story. If it proves to be stranger than fiction, it is because American ingenuity has been compelled to go to great lengths in order to solve the complex problems of present-day industrial activity. The scene is Richmond, Ind., and the principal characters are four men who decided in 1916 to operate a malleable foundry.

In arriving at this decision, the four men took into account the unusual conditions prevailing at the time. It was clearly evident that the unusual demand for castings was far in excess of the existing productive capacity of foundries. The same activities which stimulated the demand for castings had the effect of slowing-up deliveries of other kinds of material. This feature of the situation made it necessary to devise ways and means of securing equipment in the shortest possible time and if the proprietors were to enjoy the benefits of the existing high markets, they could ill afford to lose time in getting the new foundry under way.

Utilize Tractor Plant

Therefore, when the question of building was considered, they eliminated the possibility of erecting a new foundry, and promptly decided to purchase a plant already built which would be suitable for their purpose. After investigating a number of factory buildings, they chose one which had formerly been used for making agricultural tractors. This plant was situated near the business district of Richmond, Ind., on the main line of the Pennsylvania railroad. It consisted essentially of a large brick and wood building of mill construction, having a high roof, and was unusually well lighted by large areas of sash in the side walls and cupola. Most of the sash in the cupola were pivoted, thereby affording good ventilation. This large building appeared to fulfill the requirements of a model molding room for a malleable foundry.

The deal by which the old tractor plant was acquired was negotiated Nov. 1, 1916. Two of the four men, who had been associated with one of the largest manufacturers of malleable castings in the United States, immediately assumed the task of putting the building in shape for foundry purposes. They found it necessary to tear up the floor in the main building, to install an automatic sprinkler system throughout the plant, to make a number of alterations in the roof construction of the main building, and to build a structure adjacent to this building for the installation of the annealing ovens and core room. In general, it was not necessary to make any radical changes in the large building which was to be used for the foundry proper. As shown in Fig. 1, which is a view of part of the molding floor, it was only necessary to install the wood stalls separating the molding floors. These are clearly shown in the illustration. Each molding floor was equipped with a hand squeezer made by the B. & B. Mfg. Co., Indianapolis, and snap flasks made by the Diamond Clamp & Flask Co., Richmond, Ind. The entire plant was then piped for compressed air and water. The air lines were supplied with air at a pressure of from 60 to 65 pounds per square inch by a Chicago Pneumatic Tool Co. air compressor situated in the southeast corner of the building.

The 10-Ton Furnaces

It was found necessary to make slight alterations in the building to accommodate the melting equipment. Profiting by their experience with the large manufacturer of malleable castings, the two men designed a type of 10-ton air furnace best adapted to their purpose. One of these units is shown in Fig. 2. Each furnace is essentially of the approved design commonly employed in malleable foundries, but is of unusually substan-



FIG. 1—VIEW OF THE MOLDING FLOOR IN THE RICHMOND MALLEABLE CASTING CO.'S PLANT RICHMOND, IND.



FIG. 2—ONE OF THE TWO 10-TON AIR FURNACES—THE BLAST PIPE EXTENDS UNDERGROUND FROM BLOWER TO FURNACE

tial construction. Brickwork is encased in heavy castings held in place by vertical steel rails anchored in the ground. The blast enters the furnace through five nozzles connected to a blast pipe which passes underneath the molding floor, thereby overcoming the objection of having an overhead pipe obstructing the headway over the furnace. A centrifugal blower manufactured by the Clarage Fan Co., Kalamazoo, Mich., provides blast for each 10-ton furnace. These fans are driven by individual 10-horsepower, 60-cycle, 3-phase motors, made by the General Electric Co., Schenectady, With the exception of the two double bungs, each bung is made of a single reinforcing forging, a single row of refractory fire brick, and a single adjustment device of the lever type. The double bungs which are removed for charging the furnace, consist of two of the ordinary single bungs bolted together at three places. The center bolt serves as a catch for the hook of a 1-ton chain hoist made by the Wright Mfg. Co., Lisbon, O., which traverses an I-beam suspended from the roof trusses. This arrangement is clearly shown in the illustration. The rectangular brick structure at the right serves as a bin for the coal which is used for fuel in the furnaces. The ashpan is shown in the foreground. The furnace is charged at about 7 o'clock in the morning and at 12:30, and pouring is commenced at about 11 o'clock in the morning and about 4:30 in the afternoon. The metal is tapped from each side of the furnace and is carried direct to the molds in small distributing ladles. The pour-back platform is shown at the left of Fig. 2. Skimming doors are provided on either side, as indicated in the above illustration. Unusually serious difficulties were encountered in attempting to build the addition in the foundry to house the annealing ovens. It was found that steel could not be secured in less than six or seven months, and when local lumber dealers and contractors were approached on the subject of providing large timbers on short notice, they replied that it was necessary to order the lumber from Alabama and that it could not be secured in less than six months. Rather than be balked by these obstacles, the president of the newly-formed company, accompanied by a gang of 10 men, went into the woods near Richmond and there they cut and shaped the timbers which were used as roof trusses for the new building. This expedient saved many months in the period required for constructing the new building, and was one of the factors which enabled the builders to complete construction work promptly. The heavy roof truss construction is clearly shown in Fig. 3, which is a view of four large ovens in the annealing room.



FIG. 3—AMPLE CAPACITY FOR ANNEALING CASTINGS IS PROVIDED BY FOUR LARGE OVENS



FIG. 4—VIEW IN THE CORE ROOM SHOWING ECONOMICALLY CONSTRUCTED RACKS AND CORE OVENS

The core room, hard iron cleaning room, annealing ovens, soft iron cleaning room and shipping department, are in a large room in the new building paralleling the molding floor. As shown in Fig. 7, which is a plan of the foundry, this arrangement provides for a steady movement of the castings in a straight line as they progress through the various stages of manufacture.

In the hard iron cleaning room, the castings are cleaned by a combination sand-blast and tumbling barrel made by the MacLeod Co., Cincinnati, and tumbling barrels made by the W. W. Sly Mfg. Co., Cleveland. The dust from this equipment is collected in a MacLeod dust arrestor shown in Fig. 6. Castings which have been annealed are cleaned by the sand-blast barrels and tumblers all made by the W. W. Sly Mfg. Co., Cleveland.

The Annealing Ovens

The annealing ovens are of the type shown in Fig. 3. The four ovens are coal-fired from fire boxes at the rear. Hot gases from over the grates enter the annealing chamber at the top and circulate downwardly over the castings and are exhausted through adjustable vents near the floor. The doors are made in four sections, each of which consists of a double row of bricks securely packed in heavily braced channel iron frames. Pending the arrival of a crane which will operate on the I-beam shown in Fig. 3. it has only been possible to move the two smaller sections of the doors into place. This has necessitated building-up the additional opening with common brick and tearing this out after each heat. When the new crane is in place, any one of the four sections of the door can be handled easily. The charging boxes containing the castings are handled by the charger shown in the illustration. As indicated in Fig. 7, the core room is in the northeast corner of the building. Coremakers' benches are situated along the east wall, while the core oven and the core storage racks occupy the west section of the room. The core racks have proved of unusual value in handling the light cores used in the foundry. They consist of two standards of wood, drilled for 1-inch pipes which serve as racks for core trays.

The arrangement of the various departments of the foundry is ideal for the economical handling of material. As shown in Fig. 7, the raw materials consisting of coal, pig iron and scrap enter the foundry proper at the west. Here the materials charged into the furnace are placed on wood trucks, as shown in Fig. 5. It will be noted in this illustration that a few of the trucks are numbered on the side. These numbers, which in one case is 385 and in the other 392, refer to the number of pounds



FIG. 5—CHARGES FOR THE AIR FURNACES ARE CARRIED FROM THE STORAGE YARD TO TRUCKS

of a certain material which should be placed on the truck. The truck, with its approximate weight of charging material, is placed on a platform scale made by the Fairbanks Co., New York, and is then hauled to the furnaces for charging. It is expected that in a short time these trucks will be handled to and from the storage yard and the furnaces by an electric storage battery truck. The castings in the cleaning room are handled in the steel barrels shown in Fig. 6. These barrels are made by the Ohio Mfg. Co., Painesville, O.

Sorting the castings after they have been cleaned in the annealed iron cleaning room, is a difficult problem because many of the pieces are of unusually small dimensions. A recent order filled in the foundry called for 50 tons of small chain links. As each of these links weighed 0.04 pound, there were 2,500,000 pieces in this single order. To facilitate the sorting of the castings, an inspection and sorting bench has been provided in the shipping room. The castings are taken from boxes on either of two sorting benches and are thrown into receiving boxes which are placed in a row between the benches.

The installation of equipment and

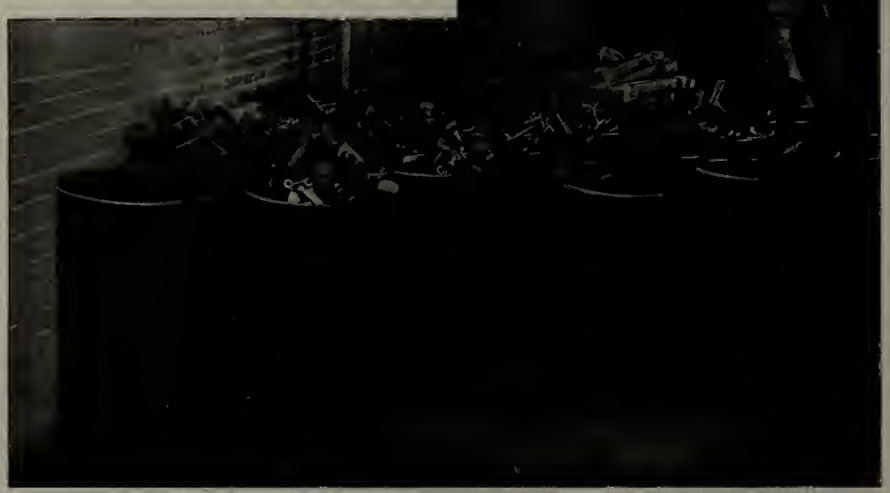


FIG. 6—CASTINGS ARE HANDLED IN THE CLEANING ROOMS IN STEEL BINS

machinery, although offering many difficulties, was accomplished in an unusually short time. The most serious stumbling block to the rapid formation of an efficient organization was the scarcity of labor. Long before the plant was ready for operation, it became necessary to scour the country for good molders. After considerable effort in this direction, it was found advisable to offer an inducement to molders who would become steady workers in the new plant. Accordingly, men were brought to Richmond from other labor centers with the understanding that houses would be provided for them and their families and that the rent would be paid by the company. This plan proved so successful in the earlier stages, that the company has adopted it in a general way. The fact that the company pays the rent is not allowed to have any bearing on the amount of wages paid the men. This policy, together with the knowledge that as soon as the man leaves the employ of the company his rent automatically stops, has been an important factor in building up a permanent and reliable labor organization.

In addition to the inducement that

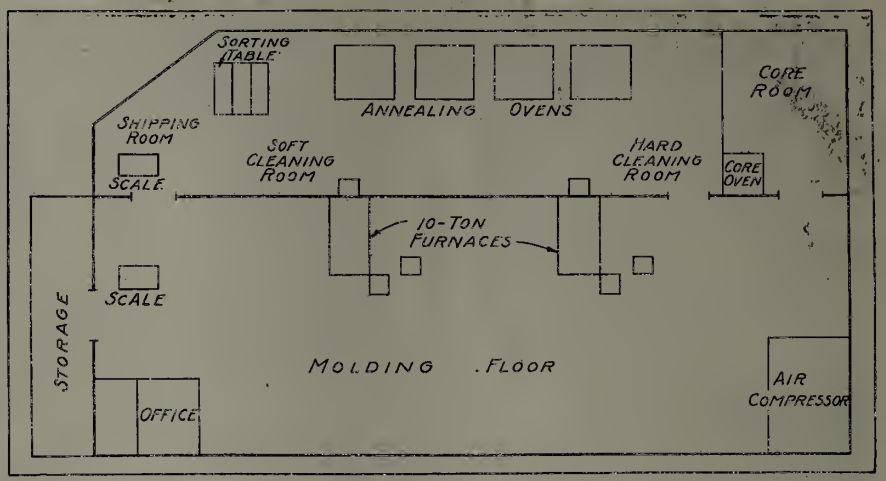


FIG. 7—PLAN VIEW OF THE RICHMOND MALLEABLE CASTING CO. FOUNDRY

is offered because of the rent-paying proposition and because of the unusually good working conditions obtaining in the foundry, the proprietors endeavor to make the wages attractive to workers. Molders who come to the Richmond shop for work and are accepted are put to work on a day-work basis. An accurate record is kept of the production of molds for each day, and as soon as a man acquires the skill and speed necessary to turn out a sufficient number of molds to make more money at piece work than he is already making at day work, he is placed on a piece-work basis. There is no tendency on the part of the owners of the foundry to interfere in any way with the amount of money a molder can make. It is felt that the extra production warrants the highest amount that a man can possibly make.

Most of the castings made in this foundry consist of light and heavy hardware parts, wrenches, clamps, parts for hay-carriers, automobile castings and parts for lawnmowers.

In spite of the difficulties encountered in perfecting this organization and installing the equipment, the plant, which was acquired Nov. 1, 1916, was ready for operation Jan. 31, this year, and on this day the first heat was successfully poured. This performance, which in reality means that a complete malleable foundry was put in operation in 90 days, was due principally to determination of the men interested to avoid and overcome the obstacles imposed by present-day deliveries of material.

The details of the organization were worked out by W. J. Blackmore, secretary and general manager, and C. D. Calvelade, superintendent. J. M. Lontz, president, and H. R. Lontz, vice president and treasurer, were also responsible for overcoming many of the difficulties encountered in selecting and installing equipment.

Shunt-Wound Reversing-Mill Motor

A New Drive Installed at the Plant of the Ashland Iron & Mining Co. Develops Unique Principles of Design in Electric Rolling-Mill Practice

THE first large reversing mill-motor received nation-wide attention because of the field it opened for further applications. Since the inception of the first reversing mill-motor, so many similar equipments have been installed in steel mills that alternating current, motor generator sets functioning through direct current reversing motors to the mill have become the predominating type of motive power. Although subsequent sets have been built with greater capacity and have been designed to perform under conditions slightly different from those existing at the plant of the Central Steel Co., Massillon, O., where the first unit was installed, the same fundamental principles of design have been followed. It is interesting, therefore, to study a new reversing equipment which embodies some unique modifications. This new equipment, designed and built by the General Electric Co. and installed at the plant of the Ashland Iron & Mining Co., Ashland, Ky., operates a 36-inch blooming mill. It is the first large unit of this type built at Schenectady. The most unique feature is the use of shunt winding on the mill motor, which does away with compounding.

The manufacturer's contract called for equipment having capacity for 60 tons of 4 x 4-inch billets per hour from 7000-pound ingots. It was understood, however, that occasional demand would be placed on the mill for heavier ingots. Power purchased by the consumer from a central station is transmitted to the plant as 3-phase, 6600-volt, 60-cycle current. Interposed between power supply and the flywheel, induction-motor generator set is a liquid slip regulator of usual design that is connected in the secondary circuit of the induction motor, thus providing for automatic retardation and acceleration of the flywheel. This ameliorates the peak demands of the mill during and between successive passes. The motor is rated at 1500 horsepower, 360 revolutions per minute, 6000 volts; and the generator, 2000 kilowatts, 360 revolutions per minute, 500 volts. The flywheel weighs 100,000 pounds. An unusual characteristic, somewhat contrary to general practice, is to be found in the full automatic magnetic current-limit control for starting and for plugging the flywheel set for the master controller. This limit control is employed in emergencies for stopping the flywheel set. This permits normal starting and stopping through the movement of a single master controller. In emergency it is said the set may be brought to rest within a period of four to five minutes.

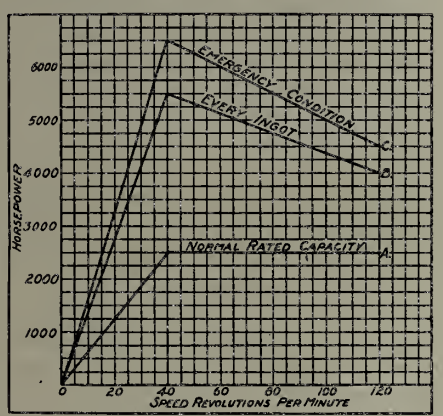


FIG. 1—HORSEPOWER CURVES OF 22-POLE, 2500-HORSEPOWER, 500-VOLT MOTOR

The main roll motor has a continuous rating of 2500 horsepower, while the speed variation is from 40 to 120 revolutions per minute. The maximum temperature rise is guaranteed not to exceed 50 degrees Cent.



FIG. 2—FLYWHEEL MOTOR GENERATOR SET WITH 2000-HORSEPOWER, 2300-VOLT MOTOR AND 2000-KILOWATT GENERATOR RATED AT 360 REVOLUTIONS PER MINUTE—FLYWHEEL WEIGHS 100,000 POUNDS

Fig. 1 is a curve indicating guaranteed values of horsepower for a continuous load, continuously recurring cycles and emergency conditions. Tests made in the factory under actual operating conditions served to demonstrate that the maximum momentary guaranteed value horsepower was conservatively given, since the question of maximum momentary rating is one chiefly of commutation. Momentary peak loads of approximately 14,000 amperes at 650 volts, corresponding to 10,500 horsepower at 50 revolutions per minute have been observed, while rolling billets, without appreciable sparking at the commutator. The guaranteed emergency torque was 850,000 pounds at 1 foot radius up to 40 revolutions per minute, but 1,100,000 pounds torque have been developed by the motor.

One feature of the motor is its acceleration characteristics. Complete reversal from 120 revolutions per minute forward to the same speed in the opposite direction may be obtained in approximately 5½ seconds; complete reversal at 50 revolutions per minute may be accomplished in two seconds. The motor may be rocked backward and forward in its bearings through an arc of approximately 12 degrees as rapidly as the master controller can function—from 50 to 60 oscillations per minute.

The fully compensated shunt winding and the elimination of compounding, which is almost universally used, accounts largely for satisfactory speed characteristics. Compounding affords protection to the motor but incidentally is said to give a drooping speed characteristic and consequently a sluggish drive as compared with a simple shunt machine. The equipment for the shunt-wound motor is further simplified by the elimination of the series-compound exciter as well as by the absence of the series field of the motor itself. Due to the intermittent character of the load, low average speeds and idle intervals, forced ventilation is supplied. Provision is included for washing and humidifying the air before it enters the motor.

In addition to this reversing drive and its auxiliary equipment, the General Electric Co. is furnishing for the Ashland company a 4000-horsepower, 83-revolutions-per-minute, 6600-volt, constant-speed induction motor for the new 140-inch plate mill, and an 1800-horsepower, 370 and 247-revolutions-per-minute, 6600-volt, adjustable-speed induction motor for the new 24-inch bar mill now under construction.

The flexible speed control of the induction motors for bar mills is of especial interest. It consists fundamentally of the double-range Sherbius system with modifications introduced by the builder. The motor has a synchronous speed of 300 revolutions per minute and at the discretion of the operator may be run as a simple, constant-speed induction motor with the auxiliary speed regulator set idle. It is possible to operate the mill normally at this speed with the auxiliary regulating set cut out, but for rolling sections requiring higher or lower speeds, the set is cut in by throwing a switch and any speed within the range of the set is obtained by a push botton controlling a pilot motor field regulator.

With this system, practically constant horsepower is obtained at all speeds. The speed is adjustable and practically constant under varying load for any setting of the controller; and without the regulating set in service, the synchronous speed point disappears giving strictly uniform speed adjustment at and near the normal synchronous speed point as well as at more remote points without sacrificing the maximum torque features.

Facts About War-Work Fatigue

AT THE outbreak of the war in 1914, the laws governing the hours of labor in the British munition factories were generally abrogated. The work was speeded up to a degree which made 80, 90 or even 100 hours of work a week by no means uncommon. The resulting discontent and the wide increase of excessive fatigue led to the establishment in 1915 of a health and munition workers' committee under the British ministry of munitions.

Investigations Not Complete

This committee, and other government agencies, has studied the relation of output to fatigue. These investigations are by no means complete, but a number of preliminary or progress reports have been published. The national industrial conference board, a co-operative body of American industrial associations, has published a short analysis of some of these British reports. The principal studies of the health of munition workers' committee were conducted by Dr. H. M. Vernon of Oxford university.

Dr. Vernon's reports definitely indicate that exceptionally long work schedules are not economical. The output from men working 70 or more hours per week was, in almost every case, less than that obtained under much shorter hours. For heavy labor performed by men, involving considerable hand work, the reports show that maximum output is secured from about 51 hours per week. For moderately heavy work performed by women, the reports show that maximum output is secured from 55 hours per week, but it is indicated that somewhat shorter hours would yield equal production. For lighter work, chiefly of the machine type, performed by women, 55 hours per week leads to maximum output, but Dr. Vernon contends that a moderate reduction of hours would not involve a serious decrease in production. Only the actual number of hours worked, after deducting the time lost because of tardiness, absence and minor interruptions, was considered in arriving at the foregoing conclusions.

The value of the investigation lies in its broad suggestion rather than in quantitative result. It indicates that reduction in work hours within certain limits does not decrease output, but on the contrary for some classes of labor actually increases production. Before establishing the number of hours in which a maximum production may be obtained, it is necessary that there shall be a much broader observation under more normal conditions. Normal conditions would of course eliminate such factors in the present production as patriotism, high piece-rates, the novelty of the work to many workers, and the noninterference of trades unions under the existing open shop arrangement.

Definite Recommendations

An upper time limit for the hours of work per week was recommended by the committee as follows: For men the average hours per week should not exceed 65 to 67 including overtime. For boys the same limit should prevail with the urgent suggestion, however, that 60 hours ought to obtain. For women and girls work in excess of 60 hours per week was strongly condemned.

In the investigation of the committee, the output was regarded as

the most satisfactory measure of fatigue, which it defined as the "sum of the results of activity which show themselves in a diminished capacity for doing work". Fatigue was compared not "with the failure of fuel as in a steam engine or with the running of a clock weight, but rather with the clogging of the mechanism by dirt". The following principle was stated:

"It is of vital importance for the proper study of industrial fatigue, however, to recognize not only that bodily sensations are a fallacious guide to the true state of fatigue which may be present, and a wholly inadequate measure of it, but also that fatigue in its true meaning advances progressively, and must be measurable at any stage by a diminished capacity for work, before its signs appear plainly in sensation. Industrial fatigue is fatigue of the nervous system, though in sensation its effects may be referred to the muscles themselves."

Long Hours Caused Sickness

The results of the committee's investigations showed very favorable conditions. This was surprising when it is considered that the war drew from industry into active service a large percentage of the strong and virile, and forced the employment of many of the less robust. The extremely long hours at the beginning of the war caused a certain amount of sickness, particularly among foremen and executives; but with the reduction of hours of work sickness due to fatigue was less evident. Patriotism and the better food and clothing incident to the higher wages no doubt contributed in no small degree to the good health under extra long hours.

All British investigators agree in recommending rest periods during the working day. It is suggested that these rest periods should be arranged and regulated and not left to the inclination of the worker. This is in order that the periods may not be disregarded through a desire to make more on the piece work plan. Where periodical rest is enforced the output per hour is actually increased. Rest pauses are regarded by the committee as especially important for women, and recreation in the open air for those engaged in sedentary work is strongly urged.

Coal—The Measure of a Nation's Power

SINCE the introduction of the first "metallic operations by fire" the lust for coal has been at the bottom of many wars of conquest. Some of our best historical scholars inform us that this coal greed is back of Germany's vicious attack on France, and that her running amuck through Belgium was a carefully planned confiscation of the coal fields of that prosperous little nation, as well as a "military necessity." Coal means power. The lust for coal has been uppermost in Germany's mind since her first conception of *der Tag*.

Viewed in the light of the struggle for national supremacy, the question of coal assumes a live interest and figures of production mean a measure of power by which nations may be gaged. In a paper to be read before the American Institute of Mining Engineers at a meeting in New York in February, George S. Rice recites some vital facts in connection with the coal situation.

In 1913, the last year in which a comparison may be obtained, the United States produced 40 per cent of the coal of the world. Great Britain was second and Germany third in production. Great Britain, the United States, and Germany were all coal exporting nations. France ranked fifth in production previous to the war, but the invasion not only caused a loss in coal production and mining property, but entirely cut off the chief by-product coke plants of the country. These would have been invaluable to the allies for the production of high explosives early in the war.

Germany's first thrust carried her armies down to the coal beds of northern France, which extend easterly through Belgium and into Germany. Here the Hun sat down according to the prearranged war plan, hoping to stifle resistance by holding the coal necessary to all industry. The battle line crosses the coal field from north to south originally through Loos to Arras. The latter, although south of the coal basin, was formerly headquarters of the mining district. This battle line was forced eastward last spring over Vimy Ridge which marks the southern boundary of the basin, and it now partly surrounds Lens, which was the largest French by-product coke center. During the time this possession has been maintained, the removal of coal throughout Belgium has been carried forward by the Germans, largely with forced civilian and war-prisoner labor.

United States is Handicapped

The coal resources of the world are unevenly distributed the United States having more than its share, while production is more unevenly divided, depending on the position of the coal supplies with regard to markets, the quality of the coal, and its accessibility. Great Britain has developed its coal supply to the greatest extent, for the reason that some of the finest grades, notably the Welsh steam coals, are found within a few miles of seaports. Germany and the United States are both handicapped by the long rail haul necessary for shipping, but Germany has had a slight advantage, due to the government ownership of the railroads which gave active aid to exporting. The other handicaps under which the United States has labored are the absence of shipping, the small amount of available dockage, and the lack of care in preparing coal for shipment, particularly in the matter of sizing. With the coming of war, the output of the United States promised to be far greater, but the shortage of railroad cars and labor troubles caused a falling off in output during 1917.

To offset the handicaps imposed by shipping conditions, the coal of the United States is mined with much greater ease than in other countries. The coal beds of Europe, particularly those in Belgium, France and Germany are badly broken by faults, the coal is more or less crushed, and occurs in thin beds which are deep in the earth. These difficulties have, however, served to develop the art of mining in Europe far ahead of American practice. There is waste in mining in this country. Only the most accessible coal is taken and the thin and irregular veins are left. In many cases the pillars are not extracted because their removal would mean an added expense which has not been compensated by low coal prices. The miners' unions have contributed to make this wastage necessary as they have insisted on unified wages on the basis of the most easily extracted coal, and inferior conditions are so severely penalized that the operators cannot afford to introduce new or improved mining methods. This shortsightedness of labor coupled with the difficulties of conveyance and shipping are co-operating at this time to prevent the United States from stepping far ahead in coal production and export.

It is asserted that there are enough men to produce the greater amount of coal needed at this time, if the miners could and would work every day. The former condition depends mainly on the car supply; the latter refers to the willingness of the men to stay on the job every day when work is possible.

Mechanical Tests on Copper Steels

Steel Bars of 1-Inch Square Cross Section Were Used in the Elongation Tests —For Tests After Heat-Treatment Round Bars Were Used —Results of Tests Are Shown in Full

BY C. B. HAYWARD AND A. B. JOHNSON

BEFORE modern testing methods had been developed, blacksmiths noted red shortness in iron, the cause for which was ascribed to the presence of copper. Numerous papers have been published on the corrosion of steels containing various amounts of copper and a few writers have discussed the effect of copper on the mechanical properties of steel. Among those who have published results of mechanical tests on copper steels are Ball, who states that copper increases the tensile strength and hardness but lowers the elongation. Stead states that copper steels closely resemble nickel steels containing equivalent percentages of nickel as regards tensile strength, resistance to shock, corrosion and hardness. Wigham found that copper in small amounts had no injurious effects on steel. Breuil found that with 1 per cent carbon, copper lessened the brittleness of steel and in low-carbon steel it increased the tensile strength and lowered the ductility slightly. H. H. Campbell states that copper up to 0.25 per cent slightly raises the elastic limit, elongation and reduction of area. It will be noted that all the writers agree that copper increases the tensile strength, but they disagree in regard to the ductility. There is little to be found on resistance to shock.

Materials Used

The steels used were furnished in the form of forged bars about 1 inch square in cross-section and of varying lengths. There were three bars of one composition marked Nos. 41, 42 and 43 and four bars of another composition marked Nos. 51, 42, 53 and 54. The chemical analyses furnished with the steel are as follows:

	Nos. 41, 42, 43	Nos. 51, 52, 53, 54
C	0.380	0.365
P	0.012	0.053
Mn	0.570	0.590
S	0.030	0.048
Cu	0.860	0.030

It will be noted that the analyses vary only slightly except in P and Cu, and it is probable that the effect of P will be neutralized by the slight difference in C.

Although 0.86 per cent Cu is not in general considered high, for the purpose of disignating the steels in this paper, the first will be called high-copper and the second will be called low-copper.

The bars were first cut to 7½-inch lengths. The cutting was done with an ordinary reciprocating mechanical saw. Three of the bars gave five specimens each, while the fourth bar, which was somewhat longer, yielded six specimens. This made a total of 21 7½-inch specimens of low-copper steel. Each of the other bars yielded seven specimens, making a total of 21 7½-inch high-copper specimens. The bars were now square, but as this form was not the most favorable for heat treatment, it was decided to turn them down round, on a lathe, in order to obtain the most uniform heating in the furnace. As the threads for the tensile specimens would eventually have to be cut on a ¾-inch round bar, it was decided to turn the 42 specimens down to this size prior to treatment. The steel as forged was fairly soft and turned easily on the lathe. There was no noticeable difference in the speed of cutting, between the high and low-copper steels.

Table I

Shock Tests of Copper Steel Specimens

Section of specimen	Per cent copper	Average breaking force ft.-lbs. per sq. in.	Average Brinell No.	Average Scleroscope No.
1	High	288	176	20
1	Low	246	149	16
2	High	240	158	18
2	Low	*173	135	15
3	High	327	171	18
3	Low	242	153	16
4	High	...	444	45
4	Low	...	241	26
5	High	128	350	39
5	Low	127	243	29
6	High	254	311	35
6	Low	231	233	26
7	High	358	254	29
7	Low	285	211	24

*Not averaged because of defect in specimen.

Three specimens of high-copper and three specimens of low-copper steel were taken for each test and in order to eliminate possible differences in the bars no two specimens in a set were taken from the same bar except in one or two instances. There were seven different heat treatments, and in order to identify the specimens the numbers 1 to 7 were prefixed before the original number of the bars.

Cooling Method

The six bars of section 1 were reserved for tests without heat treatment. The bars under section 2 were heated to 765 degrees Cent., the switch was pulled, and the final temperature rise registered due to residual heat was 865 degrees Cent. The bars were allowed to cool in the furnace over night, and removed next morning. The bars under section 3 were heated to 765 degrees Cent., the switch was pulled, and the final temperature attained due to residual heat was 860 degrees Cent. They were then removed and set inclined against a brick on the cement floor to cool in air. The bars under section 4 were heated to 765 degrees Cent., the switch was pulled, and the final temperature attained due to residual heat was 845 degrees Cent. They

Table II

Physical Tests of Copper Steel Specimens

Treatment	Yield point lbs. per sq. in. High Cu	Yield point lbs. per sq. in. Low Cu	Ultimate strength lbs. per sq. in. High Cu	Ultimate strength lbs. per sq. in. Low Cu
Cooled in furnace	52,900	45,800	86,530	78,130
Cooled in air	64,300	53,000	90,300	84,700
Bars as forged	60,900	46,600	92,600	83,200
Drawn at 580 degrees Cent.	110,600	80,000	123,700	109,600
Drawn at 455 degrees Cent.	136,900	100,000	151,500	129,300
Drawn at 360 degrees Cent.	130,000	100,000	190,800	135,300
Quenched at 825 degrees Cent.	?	110,000	(207,000)*	135,900

Treatment	Per cent reduction High Cu	Per cent reduction Low Cu	Per cent elongation High Cu	Per cent elongation Low Cu
Cooled in furnace	49.0	46.2	26.0	26.7
Cooled in air	52.7	52.7	27.3	27.3
Bars as forged	52.7	50.9	24.8	25.8
Drawn at 580 degrees Cent.	56.3	54.6	32.2	32.7
Drawn at 455 degrees Cent.	50.0	49.0	27.8	18.0
Drawn at 360 degrees Cent.	39.1	40.2	9.2	12.8
Quenched at 825 degrees Cent.	....	20.5	....	6.5

*Broke in threads because of annealing ends for threading.

From a paper to be presented at a meeting of the American Institute of Mining Engineers, February, 1918.

were removed from the furnace and dropped into buckets of cold water.

The bars under section 5 were heated to 765 degrees Cent., the switch was pulled, and the final temperature attained was 865 degrees Cent. They were removed and quenched in water. Then they were replaced and drawn at 360 degrees Cent., again removed and quenched in water. The bars under section 6 were heated to 765 degrees Cent., the switch was pulled, and the final temperature attained was 860 degrees Cent. They were removed and quenched in water; then replaced and drawn at 455 degrees Cent., and finally removed and quenched in water. The bars under section 7 were heated to 800 degrees Cent., by mistake, the switch pulled, and the final temperature attained was 900 degrees Cent. They were removed, quenched, and then drawn at 580 degrees Cent., and quenched in water.

Preparation of Test Specimens

After heat treatment there were 42 bars ¾ inch in diameter, and 7½ inches long. Thirty-six of these were sawed up into three pieces, 4 inches, 2½ inches and 1 inch long. The six bars under section 4 (quenched at 845 degrees Cent.) were found to be too hard to saw, and in order to cut them up a thin alundum wheel had to be used. As the wheel was in poor condition, the process took about 4 hours per bar, so only one high and one low-copper specimen from this section were cut for tests.

The 1-inch lengths were set aside to be polished on the ends for microscopic work, scleroscope tests, and Brinell hardness numbers.

The 4-inch lengths were turned into standard test specimens 0.505-inch diameter and 2-inch gage length with threaded ends. The bars to be tested as quenched were too hard to turn on a lathe. A 7-inch length was therefore used and the ends annealed in a blacksmith's forge to allow the cutting of the threads. During the heating, the center was kept cool with water. A 2-inch gage length was then ground at the center of the bar. The 2½-inch lengths were ground down into small rectangular bars 0.395 inch square, and 2 inches long, with a slot cut half way through in the middle of the bar. The slot cutter gave a slot 1 millimeter wide.

Each specimen was broken in an Olsen testing machine and readings were taken of its yield point, ultimate strength, reduced diameter and elongation in 2 inches. The yield point was determined by watching for the drop of the beam and in a few cases by measuring with calipers the change in elongation under equal increases of load.

The average values computed from the observations are ginen in Table II. The shock tests were made on the Charpy machine at the Watertown arsenal. The results of this test, the Brinell and scleroscope tests are tabulated in Table I.

The one fact revealed by the microscopic study was that for the same treatment the high-copper steel was finer grained than the low-copper. The quenched and drawn specimens of high-copper steel were also slightly more martensitic. The results need little interpretation. The table of tensile strengths shows a striking superiority of the high-copper steel. The yield point and ultimate strength are in every case higher while the ductility is practically the same, although here too the average figures for reduction of area are with one exception slightly higher for the high-copper than for the low. This, however, is offset by slightly higher values for elongation in a majority of the tests in favor of the low-copper.

Previous Tests Confirmed

The hardness tests by both methods show the high-copper steel in all tests to be harder than the low-copper. The Charpy shock tests show the high-copper steel in all cases to be superior to the low-copper. In general, the results confirm the work of Ball, Stead, Breuil, and Campbell as regards the effect of copper on hardness and tensile strength. They confirm the work of Breuil as regards brittleness and the work of Campbell as regards reduction of area. It is also true, that as Stead has stated, the behavior of the copper steel resembled that of nickel steel.

Standardization and the Metric System

IN A PAPER read at the annual meeting of the American Metric association held in Pittsburgh, Dec. 29, Herbert T. Wade outlined the progress made toward policies of general standardization in articles, machines and materials for general use. The war is forcing standardization, and the coming of peace will find an increased uniformity of standards, which started with munitions and has broadened to other manufactured articles.

Standards should be fundamental, invariable, logically developed, readily understood, and universally accepted. Accordingly it is necessary to consider all policies of standardization with regard to fundamental units and the systems which underlie these fundamental units. For the reason that a system of standardization depends upon exact determinations and precise measurements, it is proposed that the metric units are best fitted for use. The use of the metric system of weights and measures in scientific work throughout the world warrants this assumption. The metric system is said to be best fitted for standardization work for a number of other reasons. It is the simplest system, starting with fundamental units of length and mass. It is represented by appropriate standards of the highest scientific integrity and invariability. It is complete, in that all forms of measurement may be developed without comparison with arbitrary units or standards. It is equally adaptable to the purposes of the scientist in measuring diminutive wave lengths and to the uses of the engineer in specifying a girder span.

Weights and measures have furnished a barrier between countries which partly can be overcome by cumbersome processes of conversions or equivalents for the reduction of one system to the other. But styles, sizes and qualities must conform to the wishes of the consumer who will purchase where his requirements are met. Each country may have its own systems of measurement and may develop standards to its needs based on these measurements. International weights and measures, however, must be the point of departure for any system of international standards, and it is suggested that the speediest realization of international standards may be accomplished through the adoption and use of the metric system.

The harmony secured through international standardization is evidenced in the case of electrical units and standards which have been maintained for years by international agreement. In this case standardization has gone much further than units and definitions, for an international commission regulates international standardization while committees are seeking to secure the fullest measures of harmony even to details of standards and practice far removed from fundamentals.

Those who advocate and urge the early adoption of the metric system in English-speaking countries are firmly convinced that in no way can this movement of international standardization be further advanced than

by the establishment and use of the metric units. They claim that there will result no mechanical chaos nor commercial confusion. Such claims are made upon the premise that metrological reforms, like industrial and mechanical progress are distinctly evolutionary rather than revolutionary. It is no more possible to abolish the employment of arbitrary weights and measures, or the use of unstandardized articles, by legislative act than it is to eliminate inefficient machinery by such a process. But the way can be pointed toward an ideal system, its introduction may be facilitated by wise statutes, and its general use established in such a manner as to convince all of the inevitable advantages that will result. The metric system is not urged in connection with the movement for international standards with the idea of immediately displacing standards that have demonstrated their usefulness. Those standards may be defined and expressed in metric measurements, but when new standards are established the metric system alone should be used.

Hints for Molding Machine Operators

IN AN unusually complete and interesting catalog describing its full full line of molding machines, the International Molding Machine Co., Chicago, offers the following suggestions which will be of interest and value to foundrymen and others concerned with the production of castings of any sort:

"Do not attempt, if machines of the turn-over principle are required, to use hand-operated equipment on jobs which should be turned over by air; men do not work with maximum efficiency when they are continually laboring under excess strain. Adversely—do not use a power machine if the job to be molded can be turned over with facility and speed on a hand machine; you will slow up a small job if you apply a power machine to it.

"Do not use a machine on which the ramming is done by hand if the work is adapted for jar ramming; while ramming by hand is a very simple operation, on medium and large work it consumes a great deal of time. Adversely, do not use a jar-ramming machine if there is no appreciable saving in ramming time or if the density of the mold is not improved. Very shallow flasks as a rule cannot be jolt-rammed to advantage, and patterns that have a number of loose pieces and flasks in which chills of certain design are used quite frequently require hand ramming.

"Do not select a plain jolt-rammer or a plain turn-over draw machine if a combination design possessing ramming, turning over and drawing features would be a more advantageous equipment. The manner in which combination machines are built permits of each feature of their operation being used independently, so that it may be said there are three complete machines in one, and while the initial cost is somewhat greater, the combination machine when applied to work on which the complete operation of making the mold should be performed by air, is the best investment.

"On squeezer work, while hand-operated machines sometimes give excellent results and the initial cost is very low, power machines, if air is available, should be installed, not only because of the larger outputs that can be obtained, but also because by their use the strength of the operator is conserved.

"The introduction of molding machines, in order that every possible benefit may be derived from their installation, should be followed by consistent action in other directions. If power machines are to be used, it should be seen that there is sufficient compressor capacity to operate them properly. If the work is large, the crane should be of such a design that the molds can be carried off quickly without hampering the movements of the machine operators. Patterns should be properly mounted and kept in good repair. While it is not necessary on any modern machines to use either special patterns or flasks, it is obviously desirable that these items of equipment should receive at least the same attention that would be given them for hand molding.

Patterns Should be Repaired

"Each pattern, before being run regularly on a machine, should be carefully tested for back draft. Damaged patterns should be repaired before they are taken into the foundry. Imperfect patterns mean either the waste of considerable time in patching the molds or losses from bad castings. It will generally be found that in foundries in which molding costs are low and losses very small, there is an efficient man in charge of the pattern shop—one who knows the difference between the right and the wrong way to make a pattern and who takes care that every job, before it is turned over to the machine operator in the morning, is in proper condition and perfectly clean. This man will sometimes have an assistant whose work it is to see that all the machines are thoroughly oiled and the spring, flask rest and clamping rod adjustments properly made so that the full time of the machine man can be devoted to the work of making molds. Foundry equipment is by the very nature of the purpose for which it is used subject to certain inevitably unfavorable conditions, and it is most desirable, if machines are to give continuously satisfactory service, that all bearing surfaces should be kept well lubricated and that the machines should not be subject to such mistreatment as will cause rust and corrosion."

The catalog from which the foregoing suggestions are abstracted, consists of one hundred and ten 7½ x 10-inch pages. It is profusely illustrated and complete descriptions of the full line of plain and combination molding machines built by the International Molding Machine Co. are presented. The catalog also contains a large number of illustrations of machines in actual operation in foundries throughout the country.

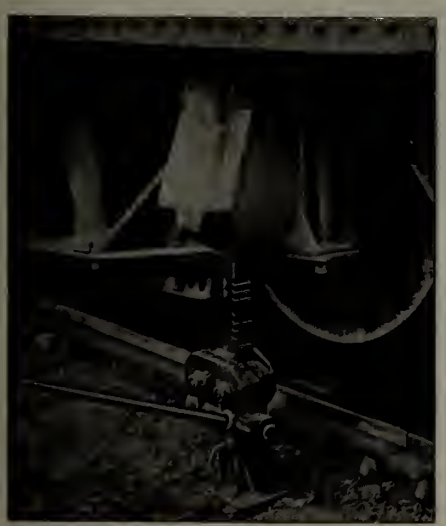
Japan's Steel Output

Japan's steel producing capacity at the end of August, 1917, was 888,000 tons, according to the Japan Advertiser, quoted by Consul General Scidmore of Yokohama, in a recent report. He states this is learned through recent investigations made by the mining bureau. During the first half of 1917, 289,000 tons were produced in Japan exclusive of colonies. The largest producer was the Government Steel Works with 200,000 tons. The Japan Steel Tube Co. came next with 22,000 tons and the Japan Steel Works turned out 14,000 tons, while the two smallest producers, namely the Kawasaki Dockyard Co., and the Kamaishi Steel Works, made 12,000 and 10,000 tons respectively. It is estimated that the year's production of those mills will reach at least 570,000 an increase of 50 per cent over 1916. If that ratio of increase is maintained by the end of 1918 production will equal if not exceed capacity.

Worm Drive Applied to Jacks

Double screw thrust and the principle of gear reduction to increase power are both used in the jack handled by the United States Jack Co., of which Chas. G. Sankey, Cleveland, is president. Two opposed worm gears placed on a horizontal shaft engage the larger of two concentric gears. The smaller gears in turn engage racks on each side of the lifting pedestal of the jack. The resulting thrust of the worm gears being opposed and on the same shaft is transmitted in lifting effort. The opposed worm gears in turning exert no end thrust on the shaft, but transmit the effort through the reduction gears to the lifting racks.

The jacks are being manufactured in one and two-ton sizes for use in automobile and motor truck work. Larger sizes up to 20 tons are furnished for all classes of heavy work. One of the larger jacks, shown in the accompany illustration, is engaged in lifting the wheel of a loaded railway car. The later railway jacks embody some changes in design of the base. The base is cast hollow with comparatively straight outside walls and with inner webs for reinforcement. This is to avoid bending or breaking the toe of the base casting in case the jack is disengaged by running the car forward instead of lowering the jack in the regular manner.



WORM DRIVE JACK FOR HEAVY LIFTING

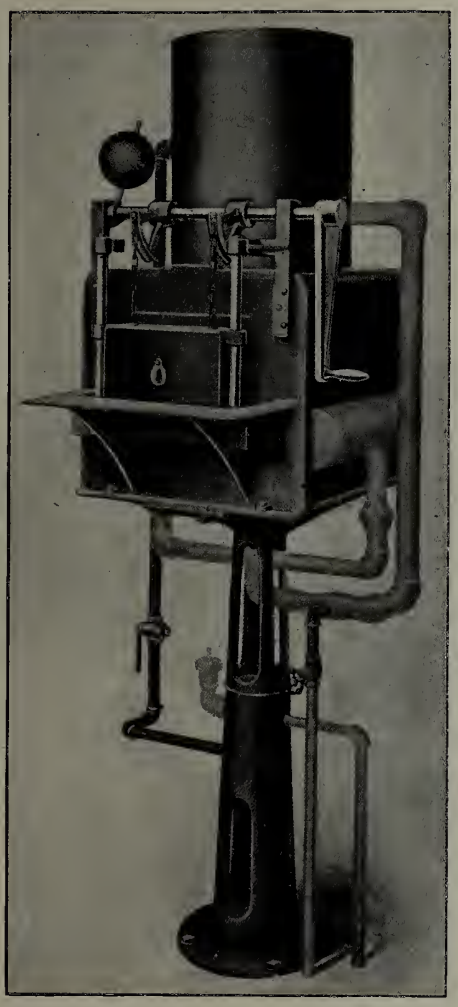
Recuperative Gas Oven Furnace

With the cost of all kinds of fuel used for industrial purposes advancing steadily, heating furnaces are being sought that will give the maximum amount of heat while consuming the minimum amount of fuel. The recuperative furnace shown in the accompanying illustration has recently been placed on the market by Tate-Jones & Co., Pittsburgh. This furnace embodies novel features and it is claimed that it is economical in operation.

The base or pedestal on which the furnace rests is cast iron while the outer case of the furnace is cast iron and boiler plate. The hearth walls are lined with highly refractory material. The burners are designed on the so-called blast system in which the gas and air are mixed at some little distance from the point of combustion. The burners, which are connected directly to a manifold, deliver the ignited fuel under the hearth. Among other features may be mentioned the fact that the thermocouple lies in a recess in the hearth, also the size of the vent that carries away the burned gases has been given consideration.

With the object of salvaging as far as possible the burned gas that otherwise would escape without performing its full quota of work, a recuperator has been added to this furnace. The advantages of recuperation are many, for aside from saving fuel it is said that a better furnace temperature is maintained, inasmuch as practically all the fuel is completely oxidized before leaving the combustion chamber. The recuperator used on this furnace is simple in construction consisting of a coil of wrought iron pipe, specially treated to eliminate oxidation.

The doors of the furnace are constructed to confine all the heat possible while the height of the furnace is such that a man of average stature can see the hearth clearly without stooping.

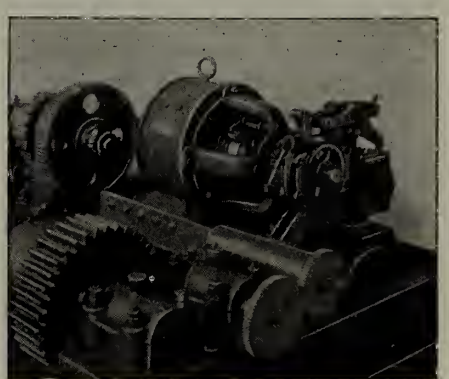


RECUPERATIVE GAS OVEN FURNACE OF NEW TYPE

Magnetic Safety Brakes

The type of magnet which has been incorporated in the design of magnetic controllers by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been employed by the company in a new line of magnetic brakes developed for mill, crane and hoist motors. The modified alternating current brake which has been on the market for some time and the new direct-current brake are similar in operation and have common parts throughout except for the armature lever and magnet.

The brakes are designed for quick action in release and setting. When voltage is impressed on the motor, the magnet is energized and the magnet armature lever overcomes the pressure of the compression springs through a toggle and releases the brakeshoe grip upon the brake wheel. While the magnet remains energized, the brake wheel is allowed to rotate freely. As soon as the current is shut off from the motor the brake magnet releases and compression springs force the shoes against the brake wheel, bringing the motor to rest. The amount of force exerted by the brake springs may be adjusted, and a means is provided for taking up the wear on the brake shoes. The accompanying illustration shows the mode of using the brakes.



QUICK ACTION MAGNETIC SAFETY BRAKE

Builds Structure in 49 Days

The accompanying illustration shows the exterior of a new building recently erected for the New York Air Brake Co., Watertown, N. Y., by the Austin Co., Cleveland. The building is 100 x 802 feet and was erected in 49 working days, from June 25 to Aug. 25, five days less than the contract time. All fabricated materials were obtained in Cleveland and were shipped to Watertown in three weeks. The roofing tile is of a gypsum material and was made on the job in 10-foot lengths. This method of roof construction was developed by the Austin Co. to save time. It lessens the number of purlins and truss members and allows the purlins to be loaded to maximum capacity. At the present time four more structures are being erected by the same contractor, having an area four times greater than that of the original building. The longest is 1000 feet in length.



A MODERN BUILDING RECENTLY ERECTED IN 49 DAYS

Manganese and Chromium

The California mining bureau is awake to the needs of munition and other related industries for manganese and chromium. A short bulletin, prepared by F. S. Boalich under direction of Fletcher Hamilton, the state mineralogist, gives the occurrences, some prices and the owners and operators of mines producing these minerals in California.

The characteristic occurrence of manganese in California is in the form of porous black oxide in the coast ranges, though smaller deposits are found in fragments disseminated in auriferous gravels or in deposits associated with igneous rocks in the Sierra Nevadas. Some of the gray carbonate of manganese is also found in California. The market for the greater bulk of manganese ore produced in California is in the steel producing centers of the east, and the freight rate which must be considered in forming a price comparison is $10 a ton to Chicago and $14.86 to the eastern coast.

Like manganese, chromium owes its present important position in the mineral industry to important conditions arising from the war. The major use of chromite is as a refractory lining in steel or copper furnaces, and lesser amounts are used in the manufacture of the chrome-steel alloys. In California, chromium occurs in association with serpentine as the black oxide, chromite and is found in both the coast range and the Sierra Nevadas.

Previous to 1916, California was the only state which mined chromium ore on a commercial scale. Large amounts of low grade chromite were necessarily mined along with the more valuable ores, and until recently this material was piled on the dumps. An effort is now being made to concentrate this low grade ore. One plant for this purpose was tested in October and another was recently completed. A trial run on 10 per cent ore yielded a 40 per cent concentrate and left 10 per cent of chromic oxide in the tailings. There are between 70 and 80 chromium ore mines in California.

Book Review

United States Rifles and Machine Guns, by Colvin and Viall; published by McGraw-Hill Book Co., Inc.; cloth, 332 pages; 8 x 11½ inches; furnished by THE IRON TRADE REVIEW for $3.00.

A new book on United States rifles and machine guns is particularly valuable at this time. In the preface of the book under review it is stated that the descriptions and methods were compiled in book form at the request of the ordnance bureau of the United States army for the purpose of assisting manufacturers in undertaking large contracts for this arm, should necessity arise.

The authors describe the methods used at the Springfield armory in manufacturing the Springfield 1903 model service rifle. The various steps in the manufacture of the numerous component parts are described at length and every operation is graphically illustrated. Many drawings are shown. Aside from the chapters devoted to the manufacture of the Springfield 1903 model service rifle there are included illustrated chapters on the evolution of the American military rifle, the modified Enfield 1917 model rifle, the United States 1909 model 30-caliber automatic machine rifle, the Lewis machine gun and the 1915 model Vickers machine gun. The book is written in a clear comprehensive style and will prove of value to arms manufacturers and others interested in modern ordnance.

New Japanese Steel Plant

A report received by the United States bureau of foreign and domestic commerce states that the Oriental Steel Mfg. Co., which will undoubtedly be one of the largest steel companies in Japan, will soon complete its organization. The company has been projected to take over the rights obtained by the Sino-Japanese Industrial Development Co. and to work the Taochun iron mine in Anhui. The promoters delayed the organization of the company to make sure of the official bounties under the steel industry encouragement law recently promulgated. The company plans to establish blast furnaces for the production of pig iron at the rate of 170,000 tons a year, steel works with a capacity of 100,000 tons of ingots a year, a rolling mill to produce more than 75,000 tons of various shapes a year, and other workshops which will turn out miscellaneous products.

Two furnaces, with a capacity of 250 tons a day, will be installed together with coke ovens. The company proposes to invest nearly $4,000,000 in this part of its plant. In the steel works three furnaces will be installed with auxiliary equipment at a cost of over $2,000,000. The company's experts for some time past have been investigating the possible location for its works, and Imari, Saga prefecture, has been approved as the site.

Increased Light With Less Glare

Overhead Diffused Lighting Helps to Maintain a Maximum Production—Objectionable Shadows Are Diffused by Large Reflectors—Metal Cap Intercepts Direct Rays—Glossy Porcelain Minimizes Dust Collection

THE problem of obtaining lamps with sufficient intensity to supply ample illumination, and yet free from strong glare, has been studied carefully in shops, factories and all industrial plants. Reflecting caps were first employed. The usual lighting unit consisted of a bowl or dome-shaped enameled reflector, a clear bulb gas filled lamp being used. Later, clear bulb vacuum lamps began to be substituted with an increase in light intensity but, often, with an undesirable increase in glare.

Glare Causes Trouble

These results led to the belief that the intensity produced was of too high an order. It has been pointed out, however, that the entire trouble was due to glare, the latter being the result of having a high power filament crowded into a small space and directly visible to the eye. Outdoor daylight intensities are said to be a thousand times as high as indoor artificial intensities, yet the former ordinarily cause no annoyance because the rays are correctly balanced and properly diffused. One of the first methods to be adopted for securing the advantage of the higher intensities offered by the new lamp, and at the same time minimizing glare, was that of using bowl frosted lamps. Methods of entirely

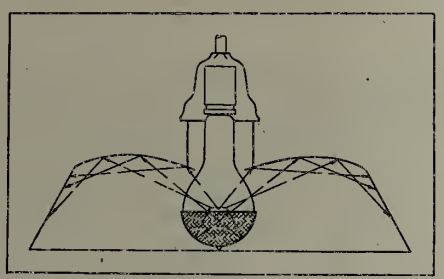


FIG. 1 — CROSS SECTIONAL VIEW OF LAMP WITH SILVERED CAP

avoiding glare have been studied, however, and for that reason, a recently designed unit is of particular interest. It consists of a metal reflecting cap, shown in Fig. 1, which clamps tightly over the bowl of the lamp, and a spceially designed reflector which has high diffusing qualities. By fitting the metal cap closely to the bowl of the illuminant, it is said that all opportunity for dust to reach the polished surface is obviated, while the exclusion of air circulation between the cap and the bulb prevents tarnishing, which would injure the reflecting properties of the metal cap. No direct light rays from the source can reach the eye. Instead, the light is reflected upward to the porcelain-enameled reflector which, in turn, redirects it downward.

Light is Evenly Diffused

A porcelain-enameled dome reflector is used which has a concave upper reflecting service, 20 inches in diameter. This large size is necesary to obtain the desired softness of appearance and shadow diffusion. The light emitted by the lamp filament is intercepted by the metal cap, shot upward to the enameled reflector and diffused evenly. Glossy porcelain is used in the upper reflector to minimize dirt collection and to make cleaning easy. Since the unit itself is of low, even brightness, the reflections on polished surfaces are free from glare.

The new unit has been adapted par-



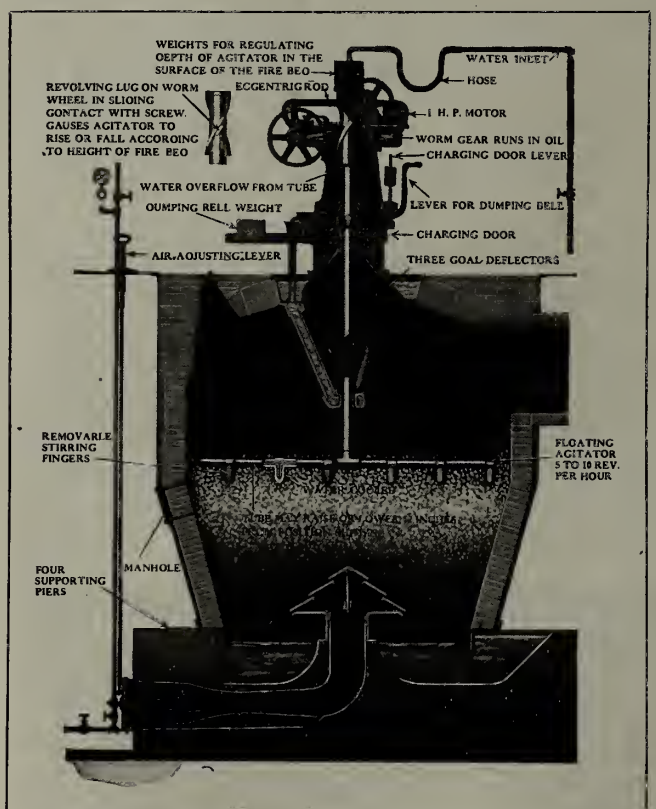
FIG. 2—MACHINE SHOP ILLUMINATED BY NEW TYPE OF LAMPS

ticularly for use in textile mills, machine shops, and factories of all kinds where efficient, diffused illumination is necessary.

An Automatic Agitator

The Chapman Engineering Co., Mt. Vernon, O., has brought out a floating agitator for gas producers which embodies several new principles. The accompanying illustration shows the construction of this device.

The agitator, which is in the form of an inverted tee, is made of extra-heavy seamless tubing. It revolves through the surface of the fire bed of the producer at the rate of five revolutions per hour, or more if desired. The cross arms of the tee are provided with high-carbon steel stirring fingers which extend down into the fire bed. An inner tube carries cooling water to the end of each finger.



A FLOATING AGITATOR FOR STIRRING THE FIRE BED OF A GAS PRODUCER

The important feature of the agitator is that it automatically accommodates itself to the varying heights of the fire bed. The device is raised and lowered by a driving head provided with two large screw-like spiral flanges. These flanges engage in sliding contact with two lugs projecting inwardly from the hub of the driving wheel. Normally the driving wheel and driving head revolve together, but should the agitator strike an obstruction, or become submerged deeply in the fire bed, it automatically screws up to a point where the forces are again in balance.

If an excessively high fire bed causes the agitator to float up to its limit, 2 feet, it automatically releases and relieves any strain on the machinery. The entire mechanism is driven by a 1-horsepower enclosed motor.

The agitator is not designed to break up clinkers after their formation, but to prevent their accumulation and fusion through the destruction of blow holes and hot spots by thorough stirring. It is claimed by the manufacturer that the frequent stirring of the fire bed increases the capacity of the producer and improves the uniformity of the gas. Practically all hard poking is said to be eliminated. The agitators are made in two different forms; one as a part of a complete producer and the other for separate installation on handpoked producers already in use. The agitator is built with or without an automatic coal feeder as required by local plant conditions. A test made with an agitator used on a gas producer in a large steel mill showed a rate of 1600 pounds per hour with the following analysis: Carbon dioxide, 5.0; oxygen, 0.4; carbon monoxide, 24.6; methane, 3.5; hydrogen, 11.5; nitrogen, 54.2; and 151 B.t.u. per cubic foot.

Copper Production for 1917

The production of copper in 1917 was slightly less than in 1916, according to preliminary figures and estimates collected by B. S. Butler, of the U. S. geological survey, department of the interior, from all plants that make blister copper from domestic ores or that produce refined copper. At an average price of about 27 cents a pound the output for 1917 has a value of $510,000,000, as against values of $475,000,000 for 1916 and $190,000,000 for 1913.

The figures showing the smelter production from domestic ores represent the actual output of most of the companies for 11 months and the estimated output for December. A few companies gave no figures for November, but furnished estimates of the combined outputs of November and December. The production of blister and lake copper from domestic ores was 1,890,000,000 pounds in 1917, against 1,928,000,000 pounds in 1916 and 1,224,000,000 pounds in 1913.

The output of refined copper (electrolytic, lake, casting and pig) from primary sources, domestic and foreign, for 1917, is estimated at 2,362,000,000 pounds, compared with 2,259,000,000 pounds for 1916 and 1,615,000,000 pounds for 1913.

War Affects South Africa

In Johannesburg and surrounding territory in South Africa, iron and steel are used principally in the mining industry and construction work, according to John B. Bray, United States consul in that district. Mining is the pre-eminent industry of South Africa, and since all other branches are related to it, a large demand for all kinds of iron and steel goods is created. Acute shortages exist since stocks which were large prior to the war have dwindled and great difficulty attends replenishment. Four things have resulted: First, increased cost of production which has raised the prices; second, substitutions in certain lines have been made, such as tiles for corrugated iron roofing; imports have increased (iron and steel imports from the United Kingdom and the United States in 1916 amounted to $4,242,148 and $1,252,618, respectively, as against $3,253,659 and $992,001 in 1915); and fourth, several small iron and steel plants nonexistent two years ago are working at full speed. Every effort is being made at the largest steel plant in the Transvaal at Vereeniging to convert old material into new, for which even at the higher prices there is a great demand. This has been brought about by the recent impetus given to house construction, the people believing it useless to wait for lower-priced material.

The Seattle Smelting Co., Seattle, through Henry G. Runkle, secretary, advises that one 5-ton electric furnace has been installed for the manufacture of ferromanganese and that the company plans to install other units later for the production of ferrosilicon and ferrochrome.

Determining the Proportional Limit

One-Man and a Two-Man Machine for Obtaining Semi-Autographic Tension Tests and Stress-Strain Diagrams Within the Proportional Limit Are Described in Detail

BY H. F. MOORE

ATTENTION of materials testing engineers has been called to the desirability of an appartaus for making rapid, yet accurate, determinations of the proportional limit of materials. Various ingenious autographic testing rigs have have been proposed, but in many cases such rigs have not been capable of great speed in use, and have been delicate and easily thrown out of adjustment. During the past year the writer has built and used an autographic testing rig in the materials testing laboratory of the University of Illinois, and a description of the apparatus and records of its performance are submitted in this paper.

It should be stated that the principle involved is by no means new. An autographic apparatus involving the principle used has been described by one experimenter and a method of locating the proportional limit which is somewhat like the method followed by the author was explained in detail by another investigator. The writer remembers a similar device used in 1896 on a torsion testing machine in the laboratories of the New Hampshire state college.



FIG. 1—SEMI-AUTOGRAPHIC TESTING APPARATUS FOR DETERMINING PROPORTIONAL LIMIT

As applied to tension testing, the apparatus is shown in Fig. 1. Attached to the driving gear of the poise of a testing machine is a screw which moves the pencil *P* vertically through a distance proportional to the travel of the poise. The pencil point draws a record on a paper wrapped around the drum *D*, and the drum is rotated by means of a cord *C* which is attached to a sheave mounted on the same axle with the toothed wheel *W* which is fitted with a ratchet *R*. If the test is to be made without stopping the testing machine, two men are required to conduct the test. One man operates the poise of the weighing beam, keeping the beam balanced as the test proceeds and the other man watches the dial of an extensometer *E* which is attached to the specimen. This extensometer may be of any type which is self-indicating, that is, one in which no handling of the instrument is necessary in order to obtain a reading. As the pointer of the extensometer moves past each successive division mark of the dial the operator watching the extensometer moves the toothed wheel *W* one tooth, turning the recording drum a short distance. This procedure is kept up until the yield point is reached, or until there is danger of rupture; the extensometer is then removed and the man at the beam

A paper presented by H. F. Moore, at the twentieth annual meeting of the American Society for Testing Materials held at Atlantic City, N. J., June 26-29, 1917. The author is professor of engineering materials, University of Illinois, Urbana, Ill.

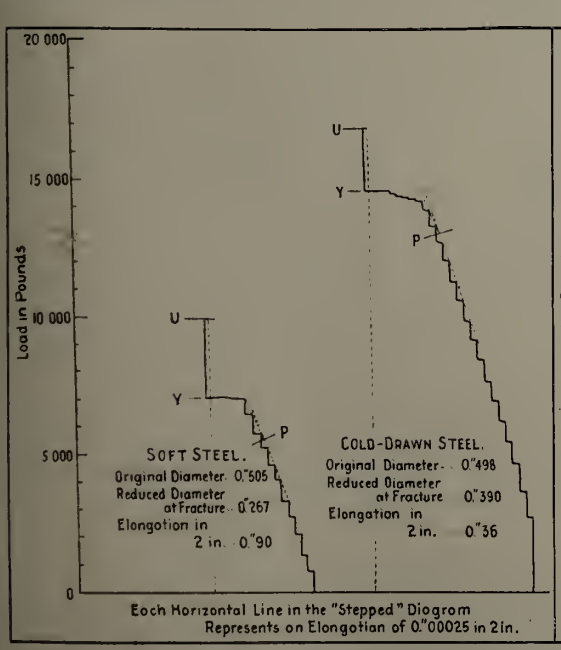


FIG. 2—TYPICAL TEST RECORD MADE FROM APPARATUS SHOWN IN FIG. 1

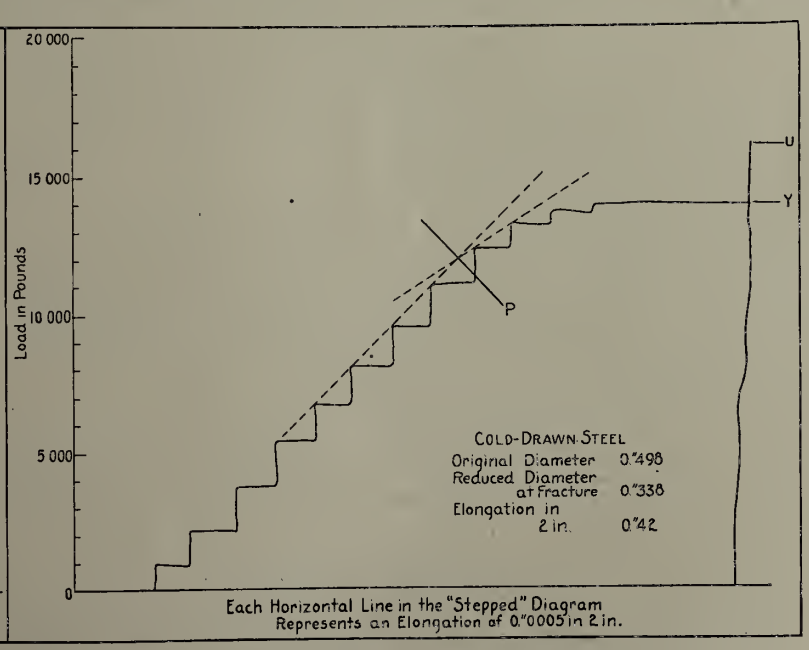


FIG. 3—RECORD MADE ON MACHINE SHOWN IN FIG. 4

keeps the beam in balance until the ultimate strength is reached. The testing machine is not stopped during the test and is usually speeded up after the yield point is reached.

A typical test record is shown in Fig. 2. This record consists of a number of steps decreasing in height as the proportional limit is passed. A curve connecting the edges of the steps gives the stress-strain diagram up to the yield point. In Fig. 2, solid lines are those actually recorded, and broken lines are construction lines used to locate the proportional limit, *P*. The yield point is located at *Y* either by the "drop" of the beam or the sudden increase in extensometer readings, the man at the extensometer stopped turing the drum as soon as the yield point was reached, and the ultimate strength, at *U*, is given by the extreme height of the diagram.

In Fig. 2 the width of each step on the diagram corresponds to an elongation of 0.00025-inch in the gage length of 2 inches. A deviation of 0.0001-inch from Hooke's law could readily be detected in Fig. 2.

The apparatus just described requires the services of two men during a test. An apparatus which can be handled by one man, and which, though slightly less accurate than the apparatus shown in Fig. 1, gives good results and is shown in Fig. 4. The spring of a steam-engine indicator is used to keep the beam of the testing machine in balance, the poise remaining stationary during the test. Bearing on the beam is one end of a pointed rod, the upper end of which bears against the piston of a steam-engine indicator, whence the pressure is transmitted to the indicator spring. The pressure against the indicator spring, and consequently the vertical motion of the indicator pencil *P*, is proportional to the load applied to the specimen. The rotation of the indicator drum *D* is controlled by a cord *C* attached to a toothed wheel *W*, the arrangement being similar in every respect to the device for rotating the drum shown in Fig. 1. In using the apparatus shown in Fig. 4 the operator watches the dial of the extensometer *E*, and as the pointer passes each successive division on the dial he turns the toothed wheel one notch. Fig. 3 shows a typical diagram obtained with this apparatus; the solid lines show the diagram actually obtained, and broken lines are construction lines used in locating the proportional limit *P*. The yield point is located at *Y*, and the ultimate strength at *U*. The testing machine is kept running continuously during the test. In Fig. 3, the width of each step on the diagram corresponds to an elongation of 0.0005-inch in 2 inches.

The speed of operation attained by the writer and an assistant using the rig shown in Fig. 1 on a test of six 2-inch threaded-end specimens of iron and steel was as follows:

	Time per specimen.
Measuring, marking, testing, measuring elongation and reduced diameter	3 min. 10 sec.
Locating, on diagram, proportional limit, yield point, and ultimate strength, computing stresses and filling in report blank	1 min. 22 sec.
	4 min. 32 sec.

The speed of the head of the testing machine was 0.1-inch per minute up to the yield point and 3 inches per minute beyond the yield point. Using the apparatus shown in Fig. 4 for a test of ten 2-inch shouldered specimens of steel, the speed of the testing machine was 0.05-inch per minute up to the yield point, and 1.63 inches per minute beyond the yield point. The speed of operation for this test was as follows:

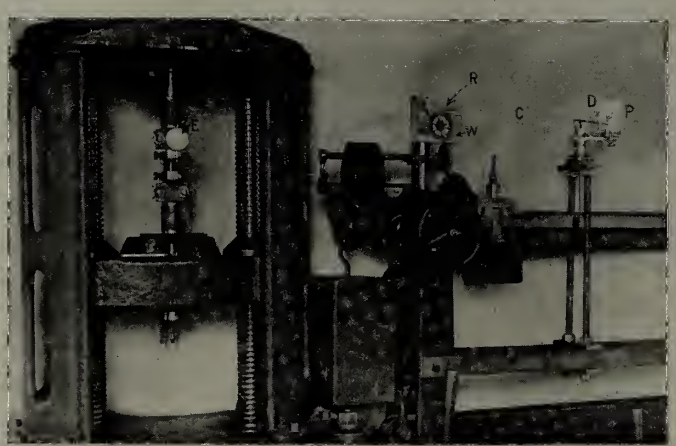


FIG. 4—ONE-MAN APPARATUS FOR DETERMINING PROPORTIONAL LIMIT

	Time per specimen.
Measuring and marking	0 min 41 sec.
Testing, measuring elongation and reduced diameter	3 min. 51 sec.
Locating, on diagram, proportional limit, yield point, ultimate strength, computing stresses and filling in report blank	1 min. 52 sec.
	6 min. 24 sec.

Both of the arrangements of apparatus described are rugged and simple. The extensometer used can be of any desired degree of sensitiveness, and the delicate parts of the instrument are not touched during the test. The proportional limit is determined from a diagram covering a series of readings, not from a single reading, and the smoothness of the curve outlined by the corners of the steps of the diagram gives an indication of the care and accuracy with which the test was made.

Producing Tool Steel

Greater production and conservation of tool steel resulting from the government's urgent demands upon manufacturers are visualized in a series of motion picture films prepared by the Atlas Crucible Steel Co., Dunkirk, N. Y. These films were presented at a meeting of the Cleveland Engineering society on Jan. 8, and F. B. Lounesburry, metallurgist for the Atlas company explained in detail the manufacture of high speed and other alloy steels. A comparison was drawn between the electric furnace and crucible processes of steel manufacture. The speaker expressed a preference for the electric furnace where its use is possible, but stated that tungsten steel is more satisfactory when made in crucibles. This was explained by the theory that the tungsten elements, being heavier, sink to the bottom of the molten mass in an electric furnace and segregation results. The same conditions may obtain in crucibles, but the mixing of the smaller portions in the ladle is said to break up the segregation. Mr. Lounesburry attributed the higher cost of crucible steel to the fact that more hand labor is required in the crucible than in the electric furnace process, and skilled labor is both scarce and expensive.

Fuel Shortage Abroad

That the fuel shortage is not peculiar to America is shown by the report that Denmark may be forced to import electric power from Sweden, where waterpower is harnessed. Commercial Attache C. W. A. Veditz at Paris likewise reports that the administrative council of the Swiss Federal railways has decided to install electric traction in the near future upon the branch railway lines between Scherzlingen and Berne and between Brigue and Sion. A credit of 9,700,000 francs has been voted. This electrification of railways has been postponed from time to time owing to the high initial cost, but the increasing scarcity of coal, which threatens to become a real calamity for Switzerland has made the change not only practical but necessary.

Foundrymen Elect

At the annual meeting of the New England Foundrymen's association, the twenty-second anniversary of the founding of the association was celebrated and officers elected for the ensuing year. The new officers are as follows: President, George P. Aborn, Blake & Knowles Steam Pump Works, East Cambridge, Mass.; vice president, H. Paul Buckingham, Arcade Malleable Iron Co., Worcester, Mass.; treasurer, George H. Gibby, Gibby Foundry Co., East Boston, Mass.; secretary, Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass. Executive committee, Charles A. Reed, Reed, Fears & Miller, Boston; Robert E. Newcomb, Deane Steam Pump Works, Holyoke, Mass.; A. N. Abbe, American Hardware Corp., New Britain, Conn.; A. B. Root, Hunt-Spiller Mfg. Corp., Boston; and W. J. Lavelle, New England Gas & Coke Co., Boston. The election of the officers was followed by a dinner and entertainment, with the new president, Mr. Aborn, presiding. More than 200 members and friends attended.

Large shipments of shapers and other toolroom equipment are being made to government arsenals and other plants by the Milwaukee Shaper & Transmission Appliance Co., Milwaukee. The entire output of the plant for 1918 has been sold.

Western Manganese Deposits Extensive

THE U. S. geological survey is directing every effort toward the discovery, prospecting and estimating of manganese deposits which war conditions have made vital. The shortage of manganese has stimulated production in the western part of the United States, and both high grade ores and those suitable for making spiegeleisen are produced in increasing quantities. In 1914 only 2635 tons of ore containing 40 per cent or more of manganese was shipped by 10 domestic operators, whereas in 1917 the output of similar ore indicated by reports on the first nine months of the year, will probably be over 122,000 tons by 90 to 100 operators.

The domestic production of low-grade ore suitable for making spiegeleisen is likewise rapidly increasing. Probably the output of 15 to 40 per cent manganese ore in 1917 will be nearly 500,000 tons and that of 5 to 15 per cent ore will be over 500,000 tons. The total production of manganiferous ores carrying less than 40 per cent manganese was less than 500,000 tons in 1914.

The geological survey has been active in making examinations of deposits of manganese and maganiferous iron during the season of 1917 with a view to appraising the domestic resources. A report which describes briefly the deposits in parts of Colorado, Montana, Nevada, New Mexico, Texas, and Arizona has just been issued.

High Grade Ore in Montana

In the vicinity of Philipsburg, Mont., quantities of high grade ore are now being produced. The deposits are irregularly scattered but are all within a short wagon haul of the Northern Pacific railway. The deposits all seem to contain about the same percentage of manganese, and only a small proportion is exceptionally siliceous. In preparing the ores for shipment the waste is picked out by hand and the entire product is passed over screens to reduce the percentage of silica. The screenings from one of the larger mines contain 32 to 40 per cent manganese and 20 to 28 per cent silica, whereas the average content of the lump ore is 40.5 per cent manganese and 15 per cent silica. Most of the ore shipped from the district contains about 45 per cent manganese, less than 2½ per cent iron, and about 15 per cent silica, with low phosphorus. Material of this grade is worth about $30 a ton, f. o. b. Philipsburg.

Large Yields Predicted

Some of the larger ore bodies will probably yield from 10,000 to 40,000 tons each, and a few of them may yield more than 40,000 tons. It is also likely that a number of the small prospects will add considerable to the total production of the district. As the present development is meager, however, it is estimated by the survey that the Philipsburg deposits contain at least 135,000 tons of ore suitable for making ferromanganese, and perhaps as much as 350,000 or 400,000 tons.

Deposits of manganese ores have been found at Shumla, Texas, on the main line of the Southern Pacific railroad. Ore from various deposits analyzes from 12 to 45 per cent manganese, 3 to 4 per cent iron, and 10 to 15 per cent silica. The ore replacement is low in specific gravity, and consists principally of the mixture of oxides known as wad.

The historic mining district of Leadville, Colo., again is coming into prominence through the production of manganifcrous ores. About 500 tons of manganiferous iron ore is now being shipped every day from the Leadville district. The ore, which averages 20 to 25 per cent manganese, 24 to 30 per cent iron, and 10 to 15 per cent silica, is reduced to 33 per cent spiegeleisen and is now being used with excellent results in both the bessemer and open-hearth processes. Hand sorting is a considerable item in the cost of mining, as siliceous nodules are common and seams of clay traverse most of the ore bodies. In places ground is being reworked for the third or fourth time, and old timbers, waste dumped into abandoned stopes, and large areas of caved ground must be contended with. On the other hand, at every mine except one it is possible to dump the ore directly into the railroad cars. The large number of shafts available also serves to lower costs by reducing underground haulage to a minimum. The operators estimate that the present rate of production might be doubled and maintained for at least two years. This estimate would call for about 750,000 tons of ore of shipping grade. It is reported that the present price of ore does not encourage extensive development.

Red Cliff, Colo., on the main line of the Denver and Rio Grande railroad also has manganiferous iron ore deposits. The survey estimates that Red Cliff is capable of yielding 750,000 tons of ore containing 12 to 15 per cent manganese, 38 per cent iron, and 1 to 2 per cent silica.

Estimate of Manganese Ore and Manganiferous Iron Ore in Certain Western Mining Districts

District	Tons, probable	Tons, possible	No. of deposits in estimate	Approximate composition — Manganese	Iron	Silica
Philipsburg, Mont.	135,000	350,000	16	37–46	1.5–6	18
Shumla, Tex.	10,000?	100,000?	2	15–40	2–5	3–16
Leadville, Colo.	700,000	1,500,000	13	20–25	24–30	10–15
Silver City, N. Mex.	500,000	1,000,000	2	16	35	6
Red Cliff, Colo.	750,000	1,000,000	2	14	38	1–2
Pioche, Nev.	550,000	1,000,000	2	12	34	13

In only a few of the ores from these districts does the phosphorus exceed 0.1 per cent and many analyses show a content as low as 0.002.

Dealers Inquiries

Coming Out in Refractories—Pennsylvania Plants Not Closed

Dealers are making inquiries for refractories but producers are sold up and are not in a position to take care of additional requirements. Operations are being maintained at good capacity considering the transportation and fuel situation. Embargoes are hampering shipments, however, and hence cause difficulty in meeting demands of consumers for deliveries. Better supplies of coal are on hand at present at the plants of producers of refractories than was the case up to recently.

The Garfield shutdown order was interpreted in Illinois, Missouri and New Jersey as applying to plants making refractories and they were closed in those states during the five-day period covering the first effective dates of the order and on Monday of the present week. In Pennsylvania, the state fuel administrator held that the order did not apply to plants making refractories and in consequence they continued operations. Kilns of all plants were kept in operation because this is a continuous process that could not be suspended without doing injury to the products.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.	
(First Quality)	
Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00
FIRE CLAY BRICK	
(Second Quality)	
Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00
SILICA BRICK.	
Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00
MAGNESIA BRICK	
(Per Net Ton)	
9 x 4½ x 2½	$135.00 to 160.00
CHROME BRICK	
(Per Net Ton)	
9 x 4½ x 2½	$135.00 to 140.00
BAUXITE BRICK	
(Per Net Ton)	
55 per cent	$40.00 base
76 per cent	100.00 base

Plan Rolling Mill

Within the next four months, it is contemplated that a new rolling mill, with an initial daily capacity of 60 tons, to be built by the United Steel Co., Everett, Wash., recently organized in Seattle, will be in operation. Those interested include the following: J. Johnson, New Westminster, B. C., who for 25 years has been identified with iron and steel plants in British Columbia; W. E. Stillinger, Seattle, and A. Michelson, Bayside Iron Works; A. M. Robbins, L. L. Bair and others of Everett, among them being the owners of the Rainier Metal Mfg. Co., operating a steel window and sash plant at Seattle.

Steel Plant

On Pacific Coast May be Sponsored by British Columbia

Toronto, Jan. 26.—William Sloan, minister of mines for British Columbia, announced that Vancouver is likely to become the headquarters of a large electric steel plant and plate mill on the Pacific coast. For several months past the provincial government has been carrying on negotiations with eastern capitalists and electric smelter experts. The negotiations have now reached a point where the government has agreed to join with the Pacific Steel Co., Eburne, B. C., and the Aetna Iron & Steel Co., Port Moody, B. C., in which companies the Tudhope interests, of Orillia, Ont., and R. F. Trumbull, Welland, Ont., are interested parties in inviting an eminent outside metallurgist of international standing to visit Vancouver and make a final report on the proposals of establishing a steel plant in the city.

The department of marine and fisheries, announced that the Canadian government has received tentative offers from large American companies desiring to engage in the manufacture of steel for shipbuilding. These companies, however, require encouragement in the way of bonuses and concessions before taking up the manufacture of steel in Canada on a large scale.

The Canadian government railway department shortly will place orders for $7,000,000 worth of rolling stock. Contracts amounting to $4,000,000 for locomotives, cars, etc., were let a short time ago and deliveries are now being made. Last session the Canadian parliament voted $25,000,000 for additional equipment for Canadian government railways, and contracts are now being placed as rapidly as steel companies can handle them. Although the new rolling stock is primarily for use on the government roads they will be loaned to the Canadian Northern, Grand Trunk and other Canadian roads as occasion requires. The contracts to be placed will be for passenger cars amounting to $3,000,000 and $4,000,000 for box cars, locomotives, machinery, etc.

Sulphate Licenses

Being Granted on Prime Products—By-product Output Reduced

New York, Jan. 26.—Licenses for selling sulphate of ammonia have been granted by Dr. Charles W. Merrill, chief of the division of chemicals, of the food administration, Washington, to all producers, important dealers and brokers and to most of the manufacturers requiring them. Such licenses are required only by companies dealing in the prime products of ammonia. Dealers who sell secondary products of ammonia or the companies which manufacture secondary products, are not included in this class. The complexion of the market in sulphate of ammonia in the near future depends upon government requisitions. Some months ago contracts were closed which took up producers' output to May 1, 1918, and in some cases to the end of the year. Recently the government requisitioned large quantities which necessitated a curtailment in contract deliveries. Output also has been reduced due to the scarcity of fuel. The supply is very tight and undoubtedly will become much more so. A few spot sales have been made around $5 to $5.25 per 100 pounds at seaboard.

Production of all the coal-tar by-products has been restricted by the coal scarcity, so that the tone of prices generally is stronger. Buying is quiet, with the exception of benzol. Some fair-sized contracts were closed and numerous spot lots were sold at prices ranging from 35 to 40 cents per gallon. Some large spot inquiries are pending. None of the producers have any phenol to offer. Brokers are selling occasional spot lots at 53 to 55 cents per pound. Business is rather dull in solvent naphtha.

Coke Oven By-Products

Spot	
Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.53 to .55
Per 100 Pounds at Seaboard	
Sulhate of ammonia (nominal)	$5.00 to 5.25
Contract	
Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Labor To Dominate World

—SCHWAB

Bethlehem Steelmaster Perceives Revolutionary Social Movement Where Position Will Be Measured by Merit and Achievement

PROPHESYING a social renaissance following the present war, Charles M. Schwab, chairman of the Bethlehem Steel Corp., in speaking Jan. 24 at a meeting of the "Old Boys" of Grammar School No. 40, New York City, of which he is an honorary member, predicted that the workman without property, who labors with his hands, is going to be the man who will dominate the world. "We are facing another social situation," he said, "which we should be keenly alive to. Call it socialism, social revolution, Bolschevism, or what you will, it is a leveling process. It is going to be a great hardship to the owners of property, but like all revolutionary movements, it probably will work good. We must not fight this movement but we must educate it. The great effect of socialism will be the destruction of all aristocracies except the one of merit. The coming aristocracy is to be composed of men who have done something for their country and the world at large. The men who have worked for the good of mankind. Don't think I am anxious to give away my wealth and work with my hands. Indeed, there are few of us who like to do what is good for them, but we will find that we must eat the pill, sweet or bitter. Harsh changes are necessary, but they will be more than repaid, not only materially, but in happiness and contentment. Days are in store for the United States of commercial and social supremacy."

Deplores Indiscriminate Criticism

Mr. Schwab dwelt at length on the war situation. He decried recent criticism of officials at Washington. Honest comment will help, he said, but nothing is so injurious as promiscuous and ignorant criticism. Some mistakes, no doubt, have been made, but they are those that would have been made by anyone in similar circumstances. "The trouble with us," Mr. Schwab said, "has been that in many ways we have thought we were supermen in America, who were capable of anything, but now we have got to learn the size of the task before us, and realize that it is no easy job. Be sure, however, that ultimately, this great American people will rise superior to any situation.

"I feel fortunate," Mr. Schwab continued, "to have been born in an age that has witnessed the greatest material growth ever known. This is particularly true of my business, steel and iron, the most valuable natural resources that my country possesses. I feel happy to have under my control those assets which can be used so greatly for the welfare and benefit of my fellow countrymen. My good fortune is not the money which I have, but the fact that I am able to say that my possessions are for the good of my fellow citizens.

Great Destroyer Fleet Coming

"You cannot imagine the magnitude to which the steel works in this country have grown in the last year. The secretary of the navy asked for an enormous number, the exact size of which I cannot disclose, of torpedo boat destroyers, which seem to be the only vessels effective against the submarines. Without going into numbers, I can say that within the next 18 months, the United States will have more of these boats in service than exist at present in all the navies of the world together. In addition to operating all our old plants, we have been compelled to build five new ones, and to employ thousands of new workmen. In regard to ordnance, I can say that we are turning out at present at least 50 per cent more than any company in any unfriendly nation has ever been able to turn out. Our firm figures $750,000,000 will be spent upon marine construction in the near future.

"In addition to upholding the President and his officers, we must contribute our money as we never before have dreamed of. Let us borrow money if we must, and pay the taxes somehow. Above all, let us be optimistic, as hard as it is in strenuous times like these, but remember that the best thoughts come from a happy frame of mind."

Wants Seven Hour Day

As a substitution for the complete shutting down of industry for one day per week, Samuel Gompers, president of the American Federation of Labor, in his recent St. Louis speech, advocated a universal seven-hour day for duration of the war. This is receiving approval by trade bodies in different districts, and is considered labor's reply to Fuel Administrator Garfield.

Foundry Employes in New England on Strike

To obtain the standard of wages and working conditions prevailing on the Pacific coast, approximately 2500 molders, coremakers and patternmakers employed in about 75 foundries in eastern Massachusetts struck recently and union officials claim it is but the beginning of a concerted movement on the Atlantic coast. In spite of the fact that many of the plants affected are engaged on government work, the men demand a maximum increase of a dollar a day. The B. F. Sturtevant Co., Hyde Park, Mass., is the plant principally affected, since it has 365 molders out, who refused to accept its compromise offer of 50 cents. The American Tool & Machine Co. and the Stafford Mfg. Co., in the Boston district, each employing 150, as well as the Becker Milling Machine Co., employing 75 are likewise affected. At East Boston, 150 molders employed by the Gibby Foundry Co. struck Jan. 25, while at that company's Wakefield plant, 75 laid down their tools.

Increases Are Granted

Strikers at the plant of the Coxe Traveling Grate Co., Port Carbon, Pa., have been offered a 20 per cent increase; puddlers employed by the Reading Iron Co., Danville, Pa., have been increased from $11 to $11.60, the highest rate paid in the history of the iron industry in eastern Pennsylvania, while an increase of 25 cents a day, making an increase of $1.25 a day inside of a year, has been granted foundrymen in Worcester, Mass., which was a compromise on the recent demand for a 50-cent increase.

The new wage scale agreed upon at Atlantic City several days ago by the Stove Founders' Defense association and the Stove Molders' union provides for an increase of 15⅝ per cent for piece workers and 75 cents a day, or from $4.25 to $5, for day workers. Fifteen thousand men are affected by the scale, which becomes effective Jan. 1. The settlement—the twenty-eighth between employers and the union without a strike—was reached at a 10-day conference.

An increased force will be set to work by the American Wire Wheel Corp., East Springfield, Mass., to make shells for the government about Feb. 1. Three shifts will be maintained.

Obituaries

SAMUEL A. RICHARDS, who for many years was manager of the Struthers Furnace Co., Struthers, O., but who retired from active business in 1910, died suddenly at the home of his son, Jules G. Richards, in that city, Wednesday evening, Jan. 23. He had spent the day in Cleveland, attending the annual meeting of his company, where he was re-elected a director, and was stricken with heart trouble while conversing with his family. Born in Akron, O., July 9, 1844, he entered the employ of the Girard Iron Co. as a young man and later became a member of the blast furnace firm of William Richards' Sons, at Warren. After several years spent in Cleveland and West Virginia, in 1878 he was made manager of a blast furnace in Braddock, Pa., and later was appointed blast furnace superintendent of the Illinois Steel Co., Joliet. He took charge of a blast furnace at West Duluth, Minn., in 1892, where he remained for a year and then returned to Ohio. He, with W. C. Runyan, purchased the Struthers furnace in 1896, of which he took active management until 1910 when he retired from active business to remain connected as a director.

Peter Hay, who for many years was identified with the steel industry in Galt, Ont., and who founded the Peter Hay Knife Co., there, died recently at the age of 80. He had been for some time retired from active business.

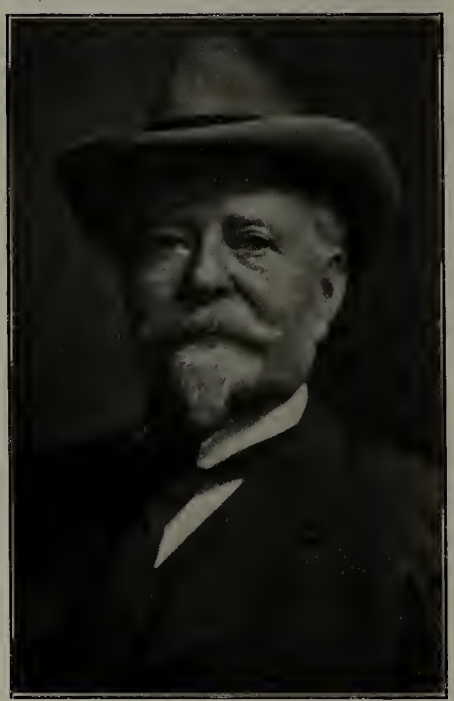
James H. Munroe, founder of the Munroe Wire Works and the Hero Mfg. Co., Winnipeg, Manitoba, died Jan. 21, following a stroke of apoplexy. He had been a resident of that city for 16 years and took a prominent part in civic affairs.

John T. Hanley, born in New York City 71 years ago, died at his home there recently. He was said to be the first man to smelt iron ore on Manhattan Island and before he retired was head of the concern bearing his name for 40 years.

Frederick A. Driver, one of the founders of the Driver-Harris Co., Harrison, N. J., manufacturer of electrical wire, who served as a director for many years, died recently from a stroke of apoplexy at the age of 82. He was born in England, and when still a young man, came to the United States. His son, Frank L. Driver, is president of the company.

Henry Morton Lovering, affiliated with several manufacturing enterprises in Massachusetts, who was president of the Taunton-New Bedford Copper Co., Taunton and New Bedford, Mass., died recently at his home in the former city at the age of 78.

Isaac Rothstein, president of the I. Rothstein Co., Eau Claire, Wis.,



SAMUEL ALLEN RICHARDS

scrap metal dealers since 1878, died at Los Angeles, Cal., recently at the age of 63. He went west recently to benefit his health. He was a native of Russia and was noted as a scholar and linguist.

Robert D. Miller, age 48, who for six years has been chemist in charge of the St. Louis Terminal Railway Laboratory, died at his home in St. Louis recently, after a brief illness. Prior to his affiliation with the terminal railway, he was superintendent of the Carondelet blast furnace at St. Louis.

Winfield Scott Sims, inventor of the Sims dynamite breech gun and many electrical appliances, died at Newark, N. J., Jan. 7, following a complication of diseases. Born in New York 74 years ago, he enlisted to serve in the civil war. He was made president of the New York Ordnance Co.

Frank R. Blaurock, senior member of the firm of Frank R. Blaurock & Son, Chicago, district sales agents for the Andrews Steel Co., Newport, Ky., died recently at his home in Chicago. He was 63 years old and had been connected with the iron and steel business in Milwaukee and Chicago for 40 years.

Edward Everett Roberts, inventor of the Roberts marine watertube boiler and who served as president of the Roberts Boiler Co., Redbank, N. J., died in Brooklyn, N. Y., recently at the age of 76. He was in the United States navy for many years and served in the civil war under Admirals Farragut and Porter.

Eugene St. Clair, who for many years was associated with his brothers in the operation of the Winthrop mine at Ishpeming, Mich., and subsequently was treasurer and cashier of the Oliver Mining Co., at its section 30 mine in the Cayuna district, died recently at his home in Duluth, Minn., aged 75.

William A. Merriman died recently at New York City, aged 75. For many years he served as vice president of the George A. Fuller Co., and vice president and general manager of the United States Realty & Improvement Co. Many modern steel buildings in Chicago and elsewhere were built by him.

Frank L. Brown, president of the Ransom Concrete Machinery Co., New York, born in Kenosha, Va., March 4, 1860, died recently of heart failure, at his home in New York City. He was manager at one time of the American Steel & Wire Co., San Francisco, Cal., and was one of the directors of the Panama-Pacific exposition.

Aaron B. Hambleton, who was a pioneer in Cleveland shipbuilding, died at the age of 88, Jan. 24, after an illness covering the period of one year. Upon locating in Cleveland, he became a partner in the Globe Iron Works Co., and served as superintendent of the boiler department. When this company was absorbed by the American Shipbuilding Co., he became identified with it and retired from active business in 1910.

Will Dedicate

New Dayton Engineers' Club on Saturday—Club Has 300 Members

The new Engineers' club at Dayton will be dedicated on Saturday afternoon and evening, Feb. 2. It is expected that several hundred representative enginers and business men from Ohio and neighboring states will attend the exercises. The new Engineers' club of Dayton, which is one of the finest structures of its kind in the middle west, was fully described and illustrated in THE IRON TRADE REVIEW, May 17, 1917, page 1089. At the present time the club has a membership of about 300. Col. E. A. Deeds, chief of the aircraft production board, is president. He is devoting his entire time to the war program. The other officers of the club are as follows: First vice president, C. F. Kettering, vice president, the Delco Co., Dayton, O.; second vice president, Orville Wright, consulting engineer, Dayton-Wright Aeroplane Co., Dayton; third vice president, H. M. Waite, city manager, Dayton; recording secretary, H. R. Schenk, architectural engineer, Dayton; treasurer, F. O. Clements, director, Dayton Research Laboratories, Dayton. The new club house is the gift of Col. E. A. Deeds and C. F. Kettering.

Foundry Foremen Elect

The Associated Foundry Foremen of New York, 355 West Twenty-sixth street, New York City, have elected the following officers for the ensuing year: President, Walter H. Hofmann, foundry superintendent, Richey, Brown & Donald Co., Maspeth, N. Y.; vice president, Robert Walker, foundry superintendent, Abendroth Bros., Port Chester, N. Y.; secretary-treasurer, Walter F. Kaine, president T. P. Kelly & Co., New York City. In addition, the following directors were elected: Charles Ashurst, superintendent Fuchs & Lang Mfg. Co., Rutherford, N. Y.; James Bolland, superintendent, E. W. Bliss Co., Brooklyn, N. Y.; A. W. Braun, president, Edgewater Foundry Co., Edgewater, N. J.; John J. Jung, treasurer, Charles A. Lefferts & Co., iron froundry, Brooklyn, N. Y.; Fred R. Powell, president, West Bergen Iron Foundry, Jersey City, N. J.; John A. Rylance, treasurer, Burr & Houston Co., Brooklyn, N. Y.; William S. Rutherland, superintendent, Lord & Burnham Co., Irvington, N. Y.; D. C. Wilson, superintendent, Aetna Foundry Co., Philadelphia; Walter H. Hofmann; Robert Walker, and Walter F. Kaine.

At the meeting at which the election of officers took place, George N. Moore, Robeson Process Co., 18 East Forty-first street, New York City, delivered an address on core binders.

Consider Shipyard Scales

Various officials of shipbuilding companies with yards along the Delaware river and representatives of workmen met for the first time recently in Philadelphia. Wages and working conditions were some of the items discussed. This conference was held at the request of the National shipbuilding labor adjustment board for the purpose of deciding the most satisfactory method of making wage payments, whether by hourly or piece rates. On the result of the conference, the adjustment board plans to base the wage scales for the Philadelphia district.

Coke Output of Last Year Exceeds 1916 Figures

The total output of coke in the United States in 1917, including both beehive and by-product, is estimated at 56,600,000 tons, as compared with 54,550,000 tons in 1916. According to the United States geological survey of this, beehive coke constituted 60 per cent and by-product 40 per cent.

The total beehive output for the completed year was 33,994,833 net tons, or 1,470,000 tons less than for 1916. The decrease, amounting to 4.3 per cent occurred simultaneously with an increase in the demand for coke, and is to be accounted for in part by the effect of car and labor shortage in limiting output, but chiefly by the successful competition of by-product coke. Preliminary estimates place the production of the latter at 22,600,000 tons, a gain of 3,531,000 tons over 1916, or 18.5 per cent. By-product ovens have thus not only supplied the additional consumption induced by the growth of industry, but have displaced nearly 1,500,000 tons formerly supplied by beehive ovens.

To build a tunnel under the Mogi straits, Japan, starting at Shimonoseki and ending at Dairi Fukuoka Prefecture, is the intention of influential citizens of Fukuoka, Kiusha, who will form a company with capital stock of $7,228,250. This tunnel will be connected with the railway trunk line at Kiushu and will be 17,700 feet long. It will extend for 4000 feet beneath the sea and will require five years to complete.

Advantages of Case Hardening

The following letter was recently received from Henry F. Taylor, Reading Screw Co., Norristown, Pa., in reference to certain statements made by E. F. Lake in an article entitled, "Limitations of the Carbonizing Process", published in the Dec. 27, 1917, issue of THE IRON TRADE REVIEW.

The writer read with interest the article entitled "Limitations of Carbonizing Process", in which he notes the writer does not seem favorably inclined towards the carbonizing process.

The fundamental objects to be attained in the case-hardening process are:

(1) A sufficient addition of carbon to the outside wall of the metal in order to adapt it, after the proper hardening and tempering treatments, to the class of work it has to perform.

(2) A tough and soft core which insures a long life to the piece treated.

Failures in case-hardening are largely due to the fact that the outer surfaces of the metal have not been treated consistently in regard to the strain to which the piece is subjected. The writer has obtained ideal results on pieces used in the manufacture of wood-screws by quenching the parts in an oil bath composed of fish and boiled linseed oil, and then drawing the temper from 350 to 450 degrees Fahr., as the case may require. This reheating always refines the grain and aids in eliminating a sharp line of demarcation between the carbonized zone and the core. For instance, take machine screws, such as used on automatic screw machines. * * * * They can be made from a low carbon steel and heat-treated to the proper consistency, as described above.

Duplicate machine parts can be cast as a commercial product from a composition of 40 to 50 carbon, and after being case-hardened properly, will hold up their end against parts made of alloy steel.

Without a doubt the case-hardening game is here to stay and is proving its worth.

(Signed) Henry F. Taylor.

Army to Use Metric Units

Announcement has been made by the war department that hereafter the metric system of measurement will be the standard for all artillery, machine guns and maps for the American overseas forces. The change was made upon the suggestion of the French government.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WALTER A. BARROWS JR., who was recently elected president of the Eastern Pig Iron association has been president and general manager of the Thomas Iron Co., Easton and Hokendauqua, Pa., since Sept. 1, 1916, when he succeeded Ralph W. Sweetser, resigned. Born in Cold Spring, N. J., in 1865, Mr. Barrows trained as a chemist at Rutgers college, New Brunswick, in that state and in 1886 became associated in that capacity with the Sharpsville Furnace Co., Sharpsville, Pa. He later held similar positions with the Clair Furnace Co., and Perkins & Co., Ltd., of that city. In 1897, he became superintendent of the blast furnace department of the Mahoning Valley Iron Co., Youngstown, O., and at the end of two years, assumed the duties of superintendent at the Everett furnace, Everett, Pa. For eight years from 1900 to 1908 he served as general manager for the Shenango Furnace Co., Sharpsville, Pa., and then became metallurgist for the Northern Pacific Railway Co., remaining there until the end of August, 1916, when he was appointed president of the Thomas Iron Co.

George E. Shaw has been elected a director of the Crucible Steel Co., of America, Pittsburgh.

E. Cooper Wills was recently appointed superintendent of the Rahway, N. J., plant of the Nagle Steel Co., Pottstown, Pa.

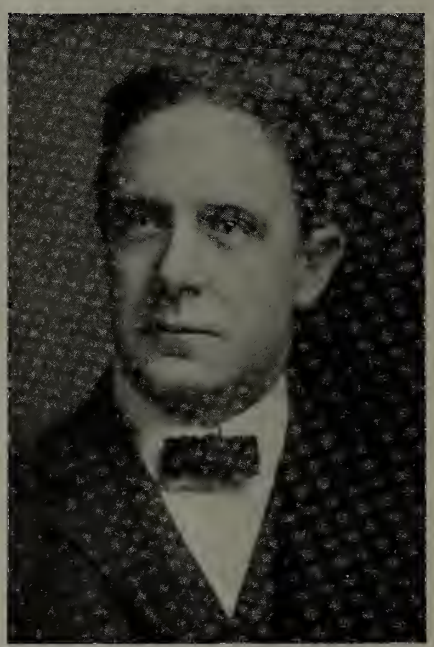
Frank Samuel, of the firm of Frank Samuel, Philadelphia, has been appointed a member of the subcommittee of ferroalloys of the American Iron and Steel institute.

J. H. Foster, affiliated with the Hydraulic Pressed Steel Co., Cleveland, has been named chairman of the war industries committee of the Cleveland chamber of commerce.

J. M. Horns, who has been manager of the export sales department of the Four Wheel Drive Automobile Co., Clintonville, Wis., resigned recently to become associated with his brother in the export business in New York City. C. S. Thompson of Chicago, has been appointed to succeed him.

Thomas B. Davies, formerly connected with the Carnegie and Pittsburgh steel companies, but more recently with the sales force of the Central Steel Co., Massillon, O., has been appointed district sales representative for that company in its recently opened branch office at Syracuse, N. Y., 621 University building.

Colonel Stanhope E. Blunt, who formerly was commandant of the United States armory, Springfield, Mass., has



WALTER ALMER BARROWS JR.

been made supervisor of manufacturing arsenals in the United States.

J. Funkhouser has been made assistant manager of the New Castle, Pa., works of the American Sheet & Tin Plate Co., from that company's plant at Gary, Ind.

C. E. Goodfellow, who recently resigned as assistant to the superintendent of the Donner Steel Co., Buffalo, is now in the government's service in the aviation squad at San Antonio, Tex.

Arthur Todd Kennedy, who for many years served as mining engineer for the Republic Iron & Steel Co., is now in France. He commands a company of the 23d engineer corps.

J. R. A. Hobson has been made vice president and director of the Tredegar Iron Works, Richmond, Va., and will move to that city in the near future. He has been general manager of the Southern Telephone Co., Evansville, Ind., for several years, moving to that city from Atlanta, Ga.

R. J. Morgan has been promoted from the position of supervisor of sales for the American Steel Export Co., Woolworth building, New York City, to that of assistant general manager of sales.

C. C. Smith, president of the Union Steel Casting Co., Pittsburgh, has received a commission as major in the ordnance bureau of the war department. He has reported for active duty at Detroit.

William R. McCulla is now affiliated with the aircraft division of the Willys-Overland Co., at Elmira, N. Y., and Toronto, Ont., having resigned as aircraft motor engineer of the Packard Motor Car Co., Detroit.

E. V. Douglass, who for the past five years has been secretary of the American Manufacturers' Export association with headquarters at 160 Broadway, New York, has resigned and will enter private business.

Captain Richard R. Trezona was recently tendered a banquet by friends and fellow-employes upon his retirement as general superintendent of the Fayal district for the Oliver Iron Mining Co., which position he has held for 17 years.

H. H. Barbour, who has been district sales manager for the Lackawanna Steel Co., at New York and who has been serving with the priorities committee of the war industries board of the council of national defense has been made chairman of the rating committee of the priorities division. His headquarters are in the Council of National Defense building at Washington.

William Pigott, president of the Seattle Car & Foundry Co., and vice president of the Pacific Coast Steel Co., since July, 1917, has been named by the United States shipping board to take charge of wooden shipbuilding at Seattle.

William J. Wood, naval architect, Chicago, has been appointed inspecting naval architect, division of wood

ship construction, United States Shipping Board Emergency Fleet Corp. Mr. Wood's office is at 1029 Munsey building, Washington, D. C.

Frank Bartholomew, who served as erecting engineer for the Shaw Electric Crane Co., for 20 years and who resigned in December, is now associated with N. B. Payne in the Havermeyer building, 25 Church street, New York, as a specialist in electric cranes.

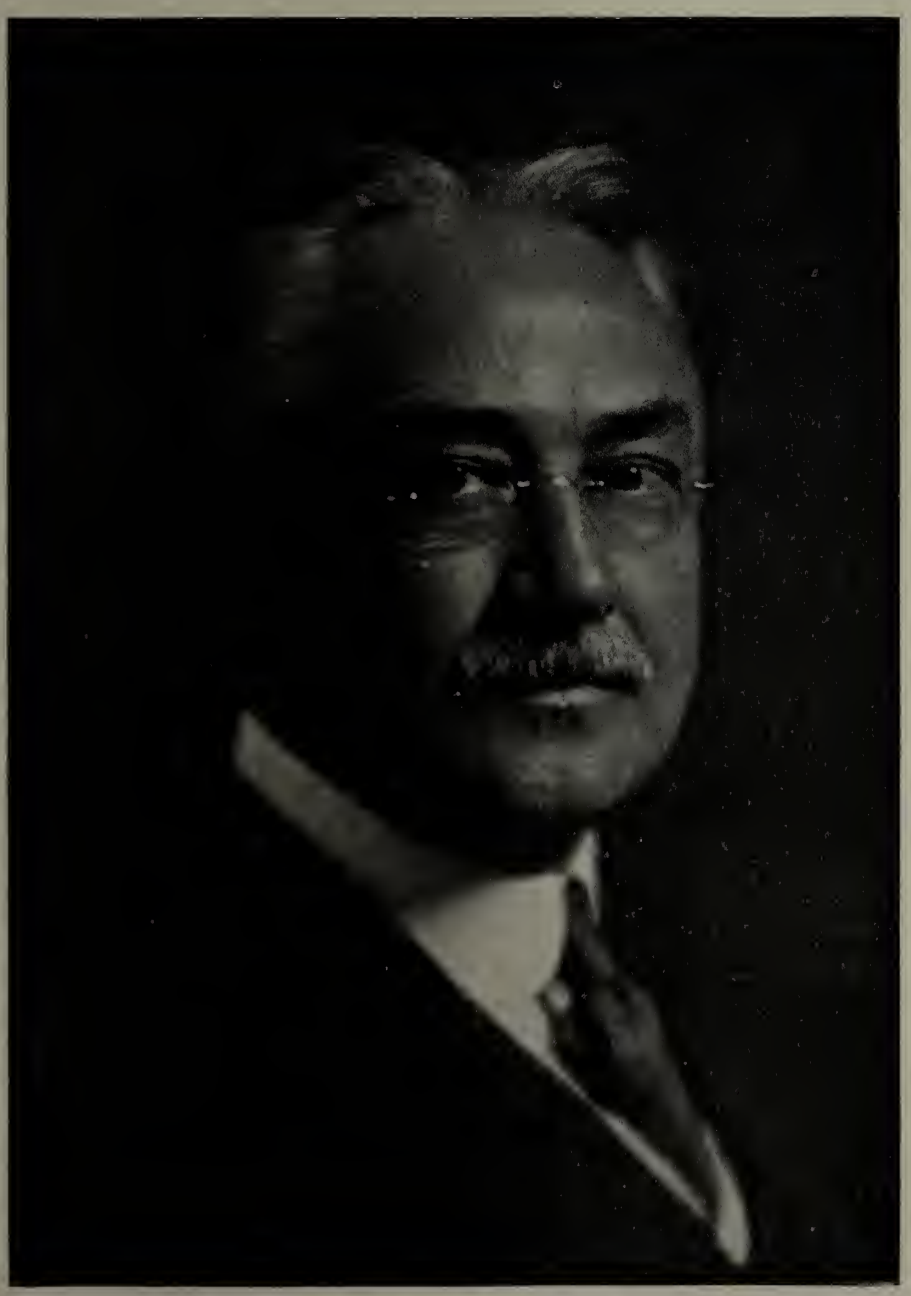
R. Sanford Riley, who is president of the Sanford Riley Stoker Co., Ltd., Worcester, Mass., and Detroit, and director of the Norton Co., and the Norton Grinding Co., Worcester, Mass., has been elected president of the chamber of commerce at Worcester, for the ensuing year.

W. I. Seigle was elected vice president of the H. W. Johns-Manville Co., New York City, at a recent meeting of the board of directors, which consists of the 1917 directors re-elected and Wm. T. Klauss was recently elected a director.

Edward R. Stettinius

Who Will Serve as Purchasing Agent for World's Greatest Buyer — the U. S. Army

EDWARD R. STETTINIUS, who was recently appointed surveyor general of supplies for the army by Secretary of War Baker, has had a more comprehensive experience perhaps for such a position, than any man in the United States at the present time. When J. Pierpont Morgan & Co., on Jan. 15, 1915, became purchasing agents for the allies in this country, they retained the president of the Diamond Match Co., Chicago, in an advisory capacity. Inside of a year, because of demonstrated ability, he was admitted as a partner, and was given direct charge of purchasing $3,000,000,000 worth of supplies for the allies. This multitudinous business was transacted with despatch and without friction. Born in St. Louis, Feb. 15, 1865, he located in Chicago in 1892. After a brief experience in the stock brokerage business, Mr. Stettinius became treasurer of the Stirling Co., boiler manufacturers. When hard times nearly forced that company on the rocks, he assumed the duties of general manager, collection manager and chief salesman and by his efforts, it won out. In 1905, the Stirling Co. was consolidated with the Babcock & Wilcox Co., Chicago. Here his energy and ability attracted the attention of Chicago capitalists who formed the Diamond Match Co., and they made him a member of the board. Later he was elected treasurer and in 1909 was made president. He held this office for a time after Morgan & Co. became official purchaser for the allies in this country. In explaining his success both as advisor to and partner of that firm, Mr. Stettinius characteristically states: "We considered that 97½ per cent of the efficiency of the plants lay in the men at their heads and only 2½ per cent in the bricks and machinery." By Secretary of War Baker's selection, Mr. Stettinius now has charge of procurement and production of all supplies required by the ordnance, quartermaster, signal, engineer and medical departments of the United States army. He will assume his new duties at once and will establish an office in Washington. While all his time will be given to government work, he will retain his partnership in J. P. Morgan & Co., New York City.



EDWARD R. STETTINIUS

Solving Housing Problem

How Seattle is Attacking Task of Providing Accommodations of Thousands of New Workmen for Government Shipbuilding

SEATTLE, Wash., Jan. 26.—Seattle is to turn out 600,000 tons of steel shipping and several hundred thousand tons of wooden shipping during 1918. In order to do this, some 15,000 or 20,000 skilled workers are to be added to the 15,000 now working in the yards. Through the instrumentality of the government these men will begin arriving in large numbers in February. The transportation of workers is an acute problem and one that is being worked out by experts at the present time. Following close upon this is the question of housing all these men who are coming, if they are to be kept in the city. If it should happen that adequate housing accommodations cannot be supplied, the men, particularly those with families, are likely to turn elsewhere.

While the government in a general way has taken cognizance of the necessity for housing in an adequate manner the workers who are flocking to the great shipbuilding centers, the problem insofar as it relates to Seattle requires immediate action. With this idea predominating, the same speed with which the transportation of workers to and from the yards was taken in hand is being shown by civic bodies, companies and individuals in the new problem which is to become pressing at once. In other words, it is being made a local issue.

The Seattle chamber of commerce and Commercial Club is taking an active part in securing such action as will meet the needs of the workers as they arrive. B. L. Lambuth is chairman of the permanent homes division of the general housing committee of this body. By permission of representatives of the United States department of labor and the United States shipping board, who are in Seattle to establish an emergency employment service to procure labor for shipyards and other war essential industries, Mr. Lambuth has given out a statement made by his division of the committee.

The summary of this statement is as follows:

"The permanent homes committee recently organized consists of representatives of every organization in Seattle having to do with the financing and erection of house. Master builders, architects, real estate men, mortgage loan men, investment bankers, engineers, lumbermen, labor representatives and public officials have all combined their efforts to solve the housing problem.

"Very satisfactory progress has been made. A building program greater than that for the entire year 1917 will be carried through within the next 90 days. This much is already certain. In the meantime, plans are being completed and will be presented to the property owners and the public within the month which will insure as much additional construction as may be required by the shipping board.

"Plans which are being prepared call for a high grade of construction and permanently satisfactory housing conditions. Forty-foot lots will be the prevailing standard. Four, five and six-room houses costing from $1400 to $2200 are favored. Complete with all street improvements these homes will sell on easy terms at from $2000 to $3000."

The problems of transportation, finding and construction are receiving attention. Tables of cost, demand and available sites are being prepared. The machinery for obtaining adequate supplies of labor and material for checking speculation is being completed.

Aside from the work being done by this committee, residence construction generally has been greatly stimulated and permits for residences are being issued in increasing numbers. The universal desire in the city to meet the necessity as it arises indicates that as the workers arrive adequate housing accommodations will be available and the industry will not be disturbed by the constant removal of men to other fields.

Open Drive for Thousands of Shipyard Workers

Washington, Jan. 28.—A coast-to-coast drive for shipbuilders commenced on Monday of this week, when 20,000 "four minute" men started a two weeks educational campaign to explain the importance of shipbuilding to our war program. On Feb. 11, "national shipbuilders' registration week" begins, and it is expected that at least 250,000 men will be enrolled in this public service reserve which the employment service of the United States department of labor will draw upon when calls for labor come from any shipyard in any section of the United States. Since in this effort, the United States shipping board, the council of national defense and organized labor will co-operate, all competition will be eliminated, independent efforts heretofore resulting in no small measure of demoralization.

During registration week, the several hundred thousand men enrolled will be interviewed by traveling examiners sent out by the United States employment service. The exact experience and fitness of each man will be ascertained. Each of the 48 states has been allotted a certain quota and in the northwest the direction of the campaign is in the hands of I. W. Litchfield, Boston, an associate director of the public service reserve. Sanford H. E. Freund, St. Paul, has charge of the middle west and the east and south is handled direct from Washington headquarters.

Dominion Output Drops

A slight falling off in tonnage production of the Dominion Steel Corp., for 1917, as compared with 1916, is shown by the following table:

	1917	1916
Pig iron	341,000	348,000
Steel ingots	353,000	376,000
Blooms, billets, etc.	154,000	150,000
Rails	16,000	17,495
Wire rods	100,000	112,400
Merchant bars	1,300	9,950
Wire and wire products	35,700	47,500
Iron ore	651,000	.....
Limestone	524,000	.....

During 1917, the reconstruction of a 400-ton blast furnace was undertaken, which will be ready for operation in March. It is anticipated that about the same time, the construction of 120 Kopper's by-product coke ovens will be completed. The work of improving the electrical power and water supply equipment of the plant will be pushed to completion as quickly as possible.

Will Repair Furnaces

With the payment of all back dividends, the Alabama Co., Birmingham, Ala., has commenced development plans. E. N. Rich, of Baltimore, the company's president, spent several days recently inspecting the properties. A furnace at Gadsden, Ala., will be rebuilt and another stack thoroughly repaired.

Institute Booklet Out

The American Iron and Steel institute has issued its official list of maximum prices on iron and steel products with differentials and extras. It is in the form of a 4 x 7-inch, 106-page

booklet which now is ready for distribution. One copy is being sent to each member of the institute and many members are receiving a number of copies each for office use, in accordance with requests made in response to the general circular recently sent out. Extra copies will be furnished to members at 50 cents each. The booklets may be obtained from the institute's headquarters at 61 Broadway, New York.

Doubles Car Output

To double its original tank car production capacity, the Standard Car Construction Co., operating a plant near Masury, O., has completed an extension to its plate shop, 122 x 200 feet, and has made the necessary machinery installations. Twenty cars is the daily capacity, but owing to labor and material shortage the output is limited to about 12 daily. The capital stock has been increased from $1,000,000 to $2,000,000, proceeds of the new issue being used for plant extensions and working capital.

Takes Tool Order

The Amalgamated Machinery Corp., Chicago, has been awarded a three-quarter million dollar order for gun-boring lathes, and a half-million dollar order for shell-boring machinery. Owing to the company's capacity of about ten of these tools daily, it will be able to fill the order within comparatively brief period.

New Engineering Firm

The engineering business of Thornton W. Price, New York, will be carried on under the name of the T. W. Price Engineering Co. Mr. Price, president of the company, is well known as a designer and constructor of steel plants and foundries. The work carried on under his supervision during the past few years includes many large steel plants and foundries. Among the former are a number of electric steel forging and rolling mill plants, including the Ludlum Steel Co., Watervliet, N. Y., and the Hammond Steel Co., Syracuse, N. Y. His organization has handled not only the laying out of these plants, but also the superintending of the construction, installation of machinery and development of new labor-saving devices. The main office of the company will be in New York City. The Philadelphia office has been enlarged and a new office has been opened in Chicago.

Dansk Staalindustri is the firm name of the recently combined companies: The Danske Staalvarefabrik at Lyngby, Denmark and Elektrostaal, the new steel works at Buddinge. The capital stock is $1,000,000 and Harald Plum is president.

Iron and Steel Furnishes Large Army Quota

From Provost Marshall General Crowder's Annual Report

	Industry	Population engaged in industry	No. of men registered	No. of men called	No. of men accepted	Ratio*	Claims**	Allowed	Ratio**	Still available for draft
1.	Agriculture	13,843,518	2,439,246	782,503	205,731	1.48	75,170	28,776	38.3	2,233,515
2.	Forestry	200,991	78,241	24,507	7,984	3.97	274	106	38.8	70,257
3.	Animal husbandry	227,325	76,646	15,642	4,570	2.01	1,602	540	33.7	42,076
4.	Coal mines	600,148	225,109	74,109	18,710	3.12	2,601	851	32.7	206,399
5.	Other mines (a)	275,561	92,062	35,553	10,377	3.77	540	218	40.6	81,684
6.	Oil, gas wells	51,223	33,040	10,610	3,026	5.91	367	147	39.9	30,014
7.	Building	2,878,792	700,790	231,835	57,970	2.01	3,256	1,495	45.9	642,820
8.	Explosives (b)	10,307	25,999	9,692	2,310	22.41	2,878	1,810	62.9	23,689
9.	Chemicals	80,331	24,946	7,986	1,926	2.40	700	389	55.6	23,020
10.	Clay, glass, stone	246,072	74,580	24,928	6,022	2.45	404	136	33.7	68,558
11.	Clothing	754,062	114,687	44,952	7,370	.98	574	176	30.7	107,317
12.	Food	396,519	160,709	50,929	11,687	2.95	2,021	657	32.5	149,022
13.	Iron and steel (c)	373,701	241,145	92,434	22,068	5.90	10,205	7,245	71.0	219,077
14.	Shipyards (d)	62,071	35,949	11,910	2,628	4.23	3,824	2,671	69.9	33,321
15.	Mfg. steel (e)	822,540	310,318	102,860	24,857	3.02	4,201	2,184	52.0	285,461
16.	Leather	343,805	81,575	24,663	5,063	1.47	538	168	31.2	76,512
17.	Liquors, all	89,190	17,669	5,752	1,472	1.65	55	9	15.4	16,197
18.	Lumber products	541,926	145,379	43,144	11,458	2.11	653	163	25.1	133,921
19.	Metals	268,537	123,992	46,480	10,182	3.79	2,376	1,395	58.7	113,810
20.	Paper and printing	507,986	101,750	30,711	6,745	1.33	379	74	19.1	95,005
21.	Textile	919,800	155,938	52,462	9,833	1.07	1,054	407	39.2	146,105
22.	Miscellaneous (f)	1,254,361	275,679	87,780	22,089	1.76	5,179	2,716	52.4	253,590
23.	Railroads	1,236,867	277,018	85,063	21,557	1.74	5,256	1,823	34.7	255,461
24.	Wire communic	297,067	66,119	20,128	4,955	1.67	1,925	1,032	53.6	61,164
25.	Other trans	1,297,132	400,513	128,262	34,565	2.67	1,619	583	35.8	365,948
26.	Gen. business (g)	4,708,908	364,151	111,541	24,892	.53	4,403	654	14.8	339,259
27.	Public service	529,315	335,053	106,068	23,606	4.46	1,255	368	29.3	311,447
28.	Professional	2,202,609	383,140	119,448	30,082	1.37	4,842	748	15.3	353,058
29.	Domestic (h)	4,208,862	977,853	297,348	78,221	1.86	1,839	476	26.0	899,632
30.	Laborers	4,053,385	1,277,213	403,649	114,955	2.84	902	219	24.3	1,162,258

*Accepted to population; **For exemption; ***Allowed to claims.

(a) Including iron and nonferrous ore mines; (b) disparity in population and registered figures due to estimate fallacy; (c) blast furnaces, steel rolling mills, iron foundries, military weapon factories; (d) included in report's iron and steel group; (e) agricultural implement, automobile, wagon and carriage factories, car and railroad shops, and other iron and steel factories; (f) includes coke and electrical appliance plants; (g) banking, brokerage, trading, general merchandise, etc.; (h) barbers, porters, waiters, bartenders, etc.

Industries 4 to 22 inclusive are classified as manufacturing industries.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Clear Up Obscure Points in Tax Forms

AT PRESENT the American public is beginning to have its first real taste of war taxation, for between now and March 1 all returns must be made of incomes for 1917. The new form 1040 prepared by the bureau of internal revenue at Washington is rather complex and has given rise to a number of questions. For the information and assistance of taxpayers, the bureau of internal revenue has prepared an "Income Tax Primer". This "primer" is arranged in question and answer style and is asserted to contain the government's full instructions on the income tax. A resolution adopted by the house of representatives on Jan. 10 ordered 38,910 copies to be printed. One section of interest relates to the difference between bonuses and Christmas remembrances. While bonuses are taxable, it is set forth that "Christmas remembrances, anniversary gifts, etc., from an employer to an employe do not constitute such items as are subject to the income tax."

Dividend Notices Perplex

Many stockholders of corporations have been perplexed by the receipt of notices reading something like this:

"You are advised that the dividend of $6 a share, paid to you on June 30, 1917, was declared out of surplus accumulated in the year 1915."

Or perhaps the notice read like this:

"You are hereby informed that the dividend of 7 per cent of this company, which was paid you on July 31, 1917, was a distribution of surplus accumulated as follows: 75 per cent in the years 1914 and 1915 and 25 per cent in 1916."

This procedure results from section 31 of the war revenue act of 1917, which taxes dividends declared out of surplus at the rate of tax prescribed for the year in which the surplus so distributed was acquired. Consequently such dividends are taxable only where the individual is in the surtax class; in other words, where his income exceeded $20,000 in the years 1913, 1914, 1915, 1916, or $5000 in 1917. Block F of form 1040 relates to this phase of income taxing.

Dividend Tax Explained

Collector Mark Eisner, of the third of upper Manhattan revenue district, New York City, has prepared a statement explaining taxes on dividends, in which he has incorporated some examples, one of which follows:

Assume an individual with a net income shown in Item, O., to be $25,000 in 1917. He received in 1917 as dividends $50,000, which were paid out of surplus accumulated as follows:

1913	1914	1915	1916	1917
$10,000	$13,000	$12,000	$15,000	*$25,000

*Net income.

Add the $15,000 of dividends of 1916 to the net income for 1917 and the result is $40,000. The rates of surtax for 1916 were 1 per cent on the net income over $20,000, and under $40,000, and 2 per cent over $40,000 and under $60,000.

Taking the $40,000 which was obtained by adding the 1916 dividend to the 1917 income, we find ourselves first in the surtax class of $20,000 to $40,000. Exempt the $25,000 income of 1917, there remains $15,000 taxable at 1 per cent, or a tax on the 1916 dividend of $150.

Now, the surtax rates for 1913, 1914, and 1915 are the same, so we can total the dividends for those years, which results in the sum of $35,000. Add this to the $25,000 net income for 1917, and the $15,000 dividend for 1916, and the result is $75,000. The surtax rates for 1913, 1914, and 1915 were 1 per cent on income between $25,000 and $50,000, and 2 per cent between $50,000 and $75,000.

Now, exempt the 1916 dividend of $15,000 and the net income of $25,000 for 1917, totalling $40,000, and we find remaining $10,000 taxable at 1 per cent, (surtax class of $25,000 to $50,000), or a tax of $100. Between $50,000 and $75,000 there still remains therefore to be taxed at 2 per cent (rate for surtax class $50,000 to $75,000), $25,000 of the 1913, 1914, 1915 dividends, making a tax of $500. The total tax paid, therefore, in this case is $750, made up of $150 on account of 1916 dividend and $300 on 1913, 1914, and 1915 dividends.

Extends Income Filing

Approval of a ruling extending the provisions of treasury decision 2615 of Dec. 13, 1917, which granted an extension of time in which to file returns of annual net income of certain corporations has been accorded by Secretary McAdoo. The text of the ruling follows:

"The provisions of treasury decision 2615, Dec. 13, 1917, extending the time to Feb. 1, 1918, to corporation filing returns for war income and war excess profits taxes, pursuant to the act of Oct. 3, 1917, on the basis of a fiscal year ended on the last day of some month during the year 1917 (except Dec. 31, 1917) are hereby amended so as to extend the time of filing such returns until March 1, 1918. This extension applies also to returns of annual net income of such corporations which were due subsequent to Oct. 16, 1917, the date of treasury decision 2561 (extending the time to Jan. 1, 1918), but prior to March 1, 1918."

Favorable Trade Balance is Increased Greatly

A gain of $100,000,000 in America's foreign trade in December over the previous month, brings the total for 1917 to the enormous sum of $9,178,000,000. In view of the generally assumed shortage of bottoms, this announcement by the government creates surprise. December's total was $598,000,000, as compared with $498,000,000 for November, and the official figures for the year show a gain of $1,300,000,000 over 1916. Exports for 1917 aggregated $6,226,000,000, while imports totaled $2,952,000,000, free imports forming 72 per cent of the total. For 1917, the balance of trade in favor of the United States nearly doubled the 1915 figure of $1,776,000,000, being $3,274,000,000.

Organize Ship Works

The Universal Shipbuilding Co., Sturgeon Bay, Wis., which recently was incorporated with an authorized capital stock of $1,500,000 to exercise an option taken by Gustav A. Huck on the business of Rieboldt & Wolter, shipbuilders, Sturgeon Bay, has per-

fected its organization by the election of the following officers: President, Philip Binzel, Oconomowoc, Wis.; vice president, Gustav A. Huck, Sturgeon Bay; second vice president, Hubert Riesen, Milwaukee; secretary, Louis Liebscher Jr., Milwaukee; treasurer, Herbert L. Peterson, Sturgeon Bay; directors, Max Grefig, Walter E. Pommer, Ignatz Wetzel and Theodore C. Froemming, all of Milwaukee. The Rieboldt & Wolter yard passes into the ownership of the new company on Feb. 1, but the present owners will complete the government transport, No. 61, now on the stocks. When this is launched, about May 1, the new owners will start to make extensive improvements, including the addition of several new and larger berths, new machine shops, and other construction.

Merchandise Exports and Imports Decrease

Both exports and imports of merchandise fell off a trifle in November, according to the bulletin issued by the bureau of foreign and domestic commerce. The total November exports were $488,240,626, while October's were $543,232,000. Imports were $220,533,575 for November as against $221,239,405 for October. Excess of exports over imports for the 12 months ending Nov. 30 continues to mount. In 1915 this excess was $1,719,576,308, in 1916 it was $2,960,080,031, while in 1917 it was $3,232,661,820. Total exports for the first eleven months of the three years were $3,195,364,485, $4,959,407,321 and $5,638,829,711, respectively, while imports in the same periods were $1,606,764,190, $2,186,801,147 and $2,724,567,483, respectively. The month of December, however, will add considerably to these totals, since the figures for the year ending Nov. 30, 1915, 1916 and 1917, respectively, are $3,440,997,043, $5,318,713,683 and $6,162,063,491 for exports and $1,721,420,735, $2,358,633,652 and $2,929,401,671, respectively, for imports.

Financial Crop Ends

To provide for the requirements of the rapid growth of the La Crosse Tractor Co., La Crosse, Wis., stockholders in its recent annual meeting voted to increase the capital stock to $2,500,000.

* * *

At a recent annual meeting of the Youngstown Foundry & Machine Co., Youngstown, O., the following officers were elected: W. J. Wallis, president; F. A. Williams, vice president and sales manager; B. G. Parker, secretary and treasurer. These with A. E. Adams, E. Hartzell, H. P. Parrock and S. K. Hine comprise the board of directors. This company is building a 10-inch bar mill for the Carnegie Steel Co., to be installed at McDonald as well as 8-inch and 10-inch mills for the Donner Steel Co., Buffalo.

* * *

The Stalnaker Steel Co., Farmers' Bank building, Pittsburgh, scrap dealer, has purchased the business of the Duquesne Iron & Metal Co., which operates a scrap yard on the North Side, Pittsburgh.

* * *

The Emergency Fleet corporation has taken from George W. Smith & Co., Inc., Philadelphia, a mortgage of $450,000 for financing the operation of a plant at Forty-ninth street and Botanic avenue, in that city.

* * *

Harrington & Richardson Arms Co., Worcester, Mass., elected these officers at its annual meeting, Jan. 22: Edwin C. Harrington, president; George F. Brooks, secretary and treasurer; the foregoing and John W. Harrington, directors.

* * *

Henry Fletcher and Joseph P. Burlingame, receivers for the Metal Products Corp., Providence, R. I., have sold their land and buildings on Blundell street, Thurbers avenue and Eddy street, in that city, to the E. M. Dart Mfg. Co., for $61,000, subject to mortgages, aggregating $39,000.

* * *

The Reed & Prince Mfg. Co., Worcester, Mass., machine screw products, at its annual meeting, elected the following officers for the ensuing year: Edward Reed, president; E. Howard Reed, vice president; William L. Ames, treasurer; Chester T. Reed, secretary and E. W. Reed, clerk.

* * *

The Portage Silica Co., Youngstown, O., elected the following officers at the recent annual meeting: J. G. Butler Jr., president and treasurer; E. E. Klooz, vice president and general manager, who with H. A. Butler, C. E. Hoffmeister, J. B. Chambers, F. R. Kanengeiser and Bruce Campbell serve on the board of directors.

* * *

R. V. Mattison Jr., Ambler, Pa., who purchased the Longmead Iron Works property in Conshohocken, Pa., some time ago, has sold a portion of it to Ford & Kendig, Philadelphia, manufacturer of iron pipe and steam specialties. The portion which will be occupied by Ford & Kendig, formerly was occupied by a tube works and puddle and skelp mills.

* * *

The Franklin Railway Supply Co., and the Economies Devices Corp., have been merged into the Franklin Railway Supply Co., Inc., New York. J. S. Coffin has been made chairman of the board of directors and S. G. Allen is vice president. The other officers follow: H. F. Ball, president; Walter H. Coyle, senior vice president; J. L. Randolph, vice president in charge of western territory; C. W. Floyd Coffin, vice president in charge of eastern and southern territory, and C. L. Winey, secretary and treasurer.

Foundry Capacity

Of Country to be Surveyed by War Committee of Industry

The war service committee of the American Foundrymen's association has appointed C. E. Hoyt, of Chicago, secretary and has established offices in the National Union building, 918 F street, N. W., Washington. From these headquarters will be directed all of the committee's activities in connection with co-operation with the government. Subcommittees on malleable and gray iron castings already have been named and a subcommittee on nonferrous castings is being selected. A questionnaire has been prepared and will be mailed out to all of the foundrymen of the United States and from the data thus obtained, a survey of the foundry trade of this country will be made. Information is being sought on the melting equipment, capacity, fuel capacity, etc., of all castings plants, and when compiled this information will be available to all of the purchasing agents of the different government

R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh, chairman of the American foundrymen's war service committee and a major in the officers' reserve corps, has resigned, having been called for active duty. He has been succeeded by H. D. Miles, vice chairman, Buffalo Foundry & Machine Co., Buffalo.

The malleable and gray iron subcommittees already appointed are constituted as follows:

Malleable Iron—Frank J. Lanahan, Fort Pitt Malleable Iron Co., Pittsburgh; H. F. Pope, National Malleable Castings Co., Cleveland; F. L. Sivyer, Northwestern Malleable Iron Co., Milwaukee; John E. Walker, Wilmington Malleable Iron Co., Wilmington, Del.; John C. Haswell, Dayton Malleable Iron Co., Dayton, O., who also is a member of the general committee representing the malleable cast iron industry.

Gray Iron—Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I.; W. D. Tynes, Hardie-Tynes Mfg. Co., Birmingham, Ala.; F. B. Whitlock, Interstate Foundry Co., Cleveland; W. P. Whelan, Western Foundry Co., Chicago.

Briggs & Turivas, scrap iron and steel dealers, Chicago, is sending out to the trade a gross and net ton equivalent price card which carries prices to $50.75. Inasmuch as previous cards of this sort have been computed only to $25, this new table will be of much convenience as the market now is at much higher levels.

Push Ordnance and Airplane Work

Government Aids Builders of Tools for War Work of Pressing Importance—Crane Awards Approximate 50 of Various Types—New England Shipbuilding Company to Buy Equipment Aggregating $700,000

AMERICA is preparing for the much-vaunted spring offensive of the Teutonic allies and the government is rushing immediate preparations which are calculated to stem the impetus of the thrust. In any event, considerable significance is attached to the order of the fuel administrator during the five-day period when the suspension of manufacturing activities in various industries was made mandatory, in that only machine tool builders engaged in the production of equipment for ordnance and airplane work were permitted to operate unhampered; the activities of those building tools for destroyer work or cargo ships being restricted. The recent huge inquiries from the government for planers, lathes, boring mills and other tools, may have a deterring influence on dealers' activities. Dealers' deliveries may be seriously affected and a consequent diminution of buying from makers of nonessentials may result.

Great activity prevails in the New York crane market. A New England shipbuilding company has been awarded a contract for 10 steel ships and has announced that approximately $700,000 will be spent for equipment. A New York interest is inquiring for several cranes for shipment to France, to be used there in shipyards. Contracts for approximately 50 cranes of various types have been awarded during the past week. Included among these awards was a contract for five overhead traveling cranes of five to 100 tons capacity for the Washington navy yard to a Cleveland crane builder; a contract for 20 locomotive cranes to another Ohio builder; an award of nine overhead traveling cranes to a Pennsylvania builder; two to a Milwaukee builder, and others.

Crane Allotments Increase in Size and Number

ALTHOUGH the production of machine tools for use in cargo shipbuilding was at first exempted from the closing order of the fuel administrator, this exemption was removed and departments devoted to such manufacture henceforth will be closed on the workless Mondays. However, manufacturing of machines needed for ordnance work is not to be interfered with; likewise manufacture of tools needed for airplane production is exempted from the closing rule. Strange to say, work on machines needed for the destroyer program is not exempted, although heretofore the destroyer program has received precedence over everything else.

Pushes Work on Projects Now Under Way

Few new developments of importance are appearing in the machinery markets. The government is more interested in pushing to completion the many undertakings already instituted than to begin anything new. The market is so well cleaned out of many needed machines that it is useless to issue long lists of machines needed. Prospective buyers are shopping around and picking up what they can here and there. The machinery section of the war industries board is appealing to manufacturers to sell, rent or loan to the government machines of various types now urgently needed for war work.

Fore River Corporation Buys 85 Lathes

The Fore River Shipbuilding Corp., Quincy, Mass., is reported to have awarded the contract for 85 precision lathes wanted for installation aboard destroyers. The E. W. Bliss Co., Brooklyn, last week inquired for 25 bench lathes. The navy department at Washington is inquiring for a power press, lathes and elevator truck for torpedo work at the Puget Sound navy yard. It is rumored that the government is planning to build a second ordnance base depot in France, to be a duplicate of the first one which now has been under way for some time. The Federal Shipbuilding Co., 54 Dey street, New York closed for about $100,000 worth of machines from the J. K. Stewart plant in Long Island, offered on the market by Carpenter & Woodward, 233 Broadway, New York.

Shipyard Growth Supplies Crane-Buying Stimulus

Crane builders at this time are devoting considerable attention to the requirements of the Atlantic Corp., Portsmouth, N. H., which recently received a contract from the government for the erection of 10 steel ships. The company has closed on a large quantity of miscellaneous equipment, but is understood to be contemplating the expenditure of $700,000 for additional machinery, including several cranes. The Groton Iron Works, which is equipping a yard at Alexandria, Va., has issued an inquiry for four 5-ton electric cranes, with 80-foot span, and will enter the market for additional equipment in the near future. The company is expected to close on its plate and angle ship requirements this week. Martens & Co., New York, exporters, are inquiring for several cranes for shipyards in France. The Worthington Pump & Machinery Corp., Holyoke, Mass., is in the market for a 10-ton electric crane. The government is asking bids on 25 1-ton triplex chain hoists for the American ordnance base depot in France. It also is inquiring for four 1-yard shell buckets for the Brooklyn navy yard. The government recently placed with the Cleveland Crane & Engineering Co. a contract for five overhead traveling cranes, ranging from five to 100 tons, for the Washington navy yard. The Cleveland company also is reported to have received a contract for two 50-ton overhead traveling cranes from the Federal Shipbuilding Co., which were included in the list of 11 cranes recently awarded. The remaining nine are reported to have been allotted to the Erie Steel Construction Co., and the Milwaukee Electric Crane & Mfg. Co. The contract of the American International Shipbuilding Corp., involving 28 cranes, which


Supremacy
It takes more than Capital, more than Determination, more than Aggressiveness, more than Advertising to make a new product leader of its kind inside of three years.
All these aids, powerful as they are would be unavailing to achieve such a record result *unless the product possessed superior merit.*
Superior merit alone has placed AGATHON ALLOY STEELS in the position of Supremacy they now enjoy for works of peace and war.
Agathon Steels will serve your purpose best.
THE CENTRAL STEEL COMPANY
MASSILLON, OHIO
Branch Offices:
Detroit Office: 326-27-28 Ford Bldg.
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Cleveland Office: Hickox Building.
The Hamill-Hickox Company, District Representatives.
Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd., C. H. Beach, District Sales Mgr.
Philadelphia Office: 603 Widener Building.
Frank Wallace, District Sales Mgr.
J. E. Dockendorff & Co., 20 Broad Street, New York.
General Export Agents.

was reported last week as being placed, went to the Ohio Locomotive Crane Co., Bucyrus, O., and the Industrial Works, Bay City, Mich., the former receiving 20 of the number required. The Portland Co., Portland, Me., which is erecting an addition to its machine shop for the handling of a new munition contract, has placed an order for a 15-ton overhead traveling crane.

Crane Builders Wait for Materials

Difficulties experienced in obtaining coal, coke and sand are serious as affecting crane builders in Cleveland. Many orders for charging cranes, manipulators, etc., are being filled, however, and the existing gas shortage in many directions has brought a number of orders for gas producers. Orders for special charging cranes from the Utah Iron & Steel Co., Salt Lake City, Utah; the Union Carbide Co., Niagara Falls, N. Y.; the Sargent Forge Co., Buffalo, and the Erie Forge Co., Erie, Pa., have been recently received by the Wellman-Seaver-Morgan Co., Cleveland.

Effect of Government's Tool Inquiry May Be Great

SOME apprehension exists among machine tool dealers in Cleveland as to the effect of the government's recent inquiry for machine tools, which was sent direct to builders. This government appeal may cut seriously into dealers' business, by acting as a deterring influence in the matter of deliveries and by diminishing further inquiry from manufacturers of nonessential products. Builders of automobiles, except those engaged on government work, are inactive at the present time and these latter are for the most part buying only to replace worn equipment. The contract for Rolls-Royce aviation motors which was awarded to the Stearns Motor Car Co., Cleveland, is being distributed in part by the Stearns company among many of the smaller shops of that city. The Studebaker Corp., South Bend, Ind., purchased equipment valued at $75,000 during the past week, consisting mostly of miscellaneous tools. The Morgan Engineering Co., Alliance, O., is buying heavy machinery. Owing to the difficulty which the company is experiencing in securing this type of machinery, it is thought that the government may find it necessary to resort to much commandeering. The American Multigraph Co., Cleveland, it is said, is negotiating for further war work. The Brierly Machine Co., Cleveland, will begin the production of airplane motor parts soon, a contract having recently been secured.

Transportation Now Troubles Builders

IN THE Pittsburgh district some builders are taking orders for machinery and machine tools with the understanding that deliveries are subject to the transportation situation. Railroad embargoes and congestion of traffic have made it impossible for manufacturers to make shipments at any specified time for domestic consumers and on account of this contingency it has been found necessary to put a clause in contracts relieving themselves of responsibility as to the time of delivery. There is considerable foreign inquiry being made for metal-working machinery, but makers are not taking much interest in this business because of the difficulty if not impossibility of shipping abroad. Among the countries seeking this class of equipment are Spain, Italy and France.

Market Recovers After Temporary Depression

ALTHOUGH some dealers in machine tools in the Chicago market find that business has been affected considerably by lack of transportation and difficulties of operation due to lack of fuel and railroad embargoes, there seems to be a fair volume of business from various sources. Users of machine tool equipment are in the market more actively than during the early part of January and sales are being made steadily, especially of equipment which can be furnished promptly. Indications are that considerable contracts have been placed in this vicinity recently for screw machine products, fuses and other small parts of shells. The Buda Co. has issued a third list for additional machine shop equipment; the two preceding lists are still pending. The Standard Steel Car Co., which is preparing to manufacture war materials at Hammond, Ind., has issued a further list calling for general equipment. The Otis Elevator Co., Chicago, is preparing to manufacture rifle parts.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The Western Motor Car Co. has been incorporated to make motor vehicles with $150,000 capital by E. M. Leavitt and Ernest L. McLean.

BATH, ME.—The Hyde Windlass Co. has let the contract for a brick, 1-story, 50 x 100-foot foundry building on Federal street.

BOOTHBAY HARBOR, ME.—The West Boothbay Harbor Shipbuilding Co. has been incorporated with $100,000 capital by L. A. Dunton, W. H. Reed and H. Chandler Reed.

PORTLAND, ME.—The American Oil & Graphite Co. has been incorporated to mill and smelt metals, minerals, etc., with $500,000 capital. Benjamin G. Ward and Frank N. Kazar are interested.

MANCHESTER, N. H.—The Lacene Mfg. Co., 671 Elm street, has obtained a permit to alter and enlarge a building to be equipped as a machine shop.

BOSTON.—The E. T. Ryan Iron Works, Inc., has been incorporated with $10,000 capital by Guy L. Harden, Adolf A. Lederhas, Cambridge, Mass., and H. Loewenberg.

BOSTON.—The Heath Grate Bar Co. has been incorporated with $10,000 capital by D. W. Allen, E. Roy Blaisdell, Watertown, Mass., and W. A. Chandler.

BURRAGE, MASS.—The Wheeler Reflector Co. has let the contract for a concrete block, 1-story, 50 x 55-foot addition to its factory.

GARDNER, MASS.—The Chair-Town Mfg. Co. has been incorporated to do a foundry, and machine shop business, with $25,000 capital. W. P. Shuffleton, Frank M. Favor and C. H. Hedstrom are incorporators.

GLOUCESTER, MASS.—The Mead-Morrison Mfg. Co., Boston, has let the contract to the New England Structural Co., Boston, for a steel frame and galvanized iron, 1-story, 84 x 240-foot forge shop to be built here.

LAWRENCE, MASS.—The Lenane Supply Co., Inc., has been incorporated as a maker of hardware, mill supplies, auto sundries, etc., with $25,000 capital by Frank E. Lenane, Daniel J. Lenane and H. V. Lenane.

NEWTON, MASS.—Bids close Jan. 25 for a reinforced concrete, 4-story, 80 x 200-foot

COAL TALKS WITH ROLLING MILL JIM



Don't get the blues, fellows, over this coal shut-down. If you've got Hubbard Rolls in the mill you can roll enough in the five days anyway.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

mill for the Shepherd Worsted Mills on California street.

PALMER, MASS.—The Wright Wire Co. has awarded the contract for the erection of a gas producer house and coal bunker to the Eastern Bridge Construction Co., 38 Crescent street, Worcester, Mass.

SOUTH BOSTON.—Bids will be received in a month for the erection of a $500,000 addition to the plant of the Gillette Safety Razor Co., 41 West First street. The proposed structure will be seven stories high, 300 x 375 feet. Charles T. Main, 201 Devonshire street, Boston, is engineer.

SPRINGFIELD, MASS.—E. J. Fleming, 164 Birnie avenue, has awarded the contract for a 2-story addition to his iron foundry, to cost about $6000.

SPRINGFIELD, MASS.—The Liberty Ignition Co. has purchased a factory at 10 Hayden street which it will equip for the manufacture of spark plugs and automobile specialties.

WALTHAM, MASS.—The Kampe-Robbins Co. has been incorporated to make jeweler's tools, supplies, etc., with $10,000 capital. Michael J. Lampert, Albert F. Robbins and J. E. Kampe are interested.

WORCESTER, MASS.—The Crompton & Knowles Loom Works has let the contract for a brick and steel, 1-story, 23 x 112-foot addition to its storage building and a brick, 1-story, 14 x 28-foot cinder mill and pit.

PAWTUCKET, R. I.—The Lebanon Mills Co. has let the contract for a mill construction, 3-story, 40 x 90-foot storehouse on Exchange street.

PROVIDENCE, R. I.—The plant of the Providence Dye Works, making munitions, was damaged by fire Jan. 18. Government machinery stored in a nearby plant was saved but the plant loss is estimated at $35,000.

PROVIDENCE, R. I.—The Patton-MacGuyer Co. has been incorporated to deal in metal products with $100,000 capital by Ralph C. Patton, Herman F. MacGuyer and Chas. R. Easton.

PROVIDENCE, R. I.—Plans are being drawn for a $25,000 addition to the factory of G. Del Rossi, 240 India street. One of the proposed buildings will be five stories, 49 x 79 feet, while the other will be one story high, 37 x 39 feet.

PROVIDENCE, R. I.—Contract for the construction of a $1,500,000 coal gas plant has been awarded by the Providence Gas Co. to the H. Koppers Co., Pittsburgh.

BRIDGEPORT, CONN.—The McCathron Boiler Works Co. has increased its capital from $5000 to $50,000 to provide for extensions to its plant.

FARMINGTON, CONN. — The Johnson-Campion Mfg. Co. has been incorporated to make machinery with $10,000 capital. Charles Johnson, John P. Campion and Frank Daily are interested.

HARTFORD, CONN.—The S. K. F. Ball Bearing Co. has awarded to the J. H. Crozier Co., 721 Main street, contract for the erection of a $100,000 plant addition, one and two stories.

HIGHWOOD, CONN. — The Rockwell-Marlin Corp. has let a contract to Fred T. Ley & Co., Inc., Springfield, Mass., for a 150 x 400-foot addition to the plant of the Mayo Radiator Co., to cost $3,000,000, including equipment. It will be used as a munitions plant.

TORRINGTON, CONN. — The Fitzgerald Mfg. Co. has increased its capital from $100,000 to $250,000 to provide for manufacture of hardware specialties.

WATERBURY, CONN.—The Scovill Mfg. Co., C. P. Goss, president and treasurer, has let to the Turner Construction Co., 242 Madison avenue, New York, contract for the construction of a $200,000 plant addition. The proposed building will be five stories, 70 x 218 feet, with ell, 20 x 73 feet.

WEST HARTFORD, CONN.—The Whitlock Coil Pipe Co. has increased its capital from $100,000 to $150,000 to provide for extensions.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Gregory-Bibbs Ordnance Co. has been chartered with $30,000 capital to manufacture fire-arms. The incorporators include E. Begni, J. Weil and Z. M. Delman, 126 Avenue C, New York.

BROOKLYN, N. Y.—Architects Shampan & Shampan, 772 Broadway, are drawing plans for an $8000 addition to the plant of Charles J. Obermeyer.

BROOKLYN, N. Y.—A $60,000 storage building extension will be erected here by Lehn & Fink, 120 William street, New York. Dushman & Kahn, 30 East Forty-second street, New York, are architects.

BUFFALO.—The Buffalo Forge Co., 490 Broadway, manufacturer of forges, fans, blowers, etc., has had plans prepared for a 2-story plant addition to be built at 493 Spring street.

BUFFALO.—F. N. Treevor plans to build a machine shop on Brace street.

BUFFALO.—The R. Ivey Co. has been organized by F. K. and E. F. Schutrum to engage in a business as machinist. The company is capitalized at $35,000.

DUNKIRK, N. Y.—The Chautauqua Wire Corp., maker of rods for precision drills, has leased the buildings formerly occupied by the Dunkirk Development Co., on Lucas avenue, which it will equip for the manufacture of its product. The company plans to spend about $250,000 in melting furnaces, rolling mills and hammers. The company has recently been organized with $250,000 capital.

FAIRPORT, N. Y.—A charter of incorporation has been granted to the Trescott Co., Inc., capitalized at $100,000. The company will manufacture agricultural machinery. Incorporators include W. A. Trescott, E. L. Trescott, and A. N. Leclear.

FRANKFORT, N. Y. — The Pratt Chuck Co., Main street, manufacturer of lathe chucks, has increased its capital from $550,000 to $950,000 to provide for enlarging its plant and installing additional equipment.

JAMESTOWN, N. Y.—The plant of the Curtis Machine Corp., 1300 East Second street, has been damaged by fire Jan. 2 with a loss of $50,000 to building and machinery.

JAMESTOWN, N. Y. — The Gurney Ball Bearing Co., 402 Chandler building, has awarded the contract for a 1-story, 20 x 256-foot addition to its plant. Cost is estimated at $20,000.

LONG ISLAND CITY, N. Y.—The Willard F. Meyers Machine Co., Hamilton avenue, has completed plans for a 1-story plant addition, 35 x 75 feet, to cost $7000.

NEW YORK.—Steven Ranson, marine repair, will erect a 5-story addition, 20 x 87 feet, to his new 4-story plant at 408-10 West street. Wharton Greene & Co. are in charge of the construction.

NEW YORK.—Plans are being drawn for a $50,000 warehouse for Edward Caterson, 17 Battery place. The proposed building will be 1-story high, 50 x 75 feet. Beverly S. King and S. Campbell, 103 Park avenue, are architects.

NIAGARA FALLS, N. Y.—The Elderfield-Hartshorn Hardware Co., 40 Falls street, has awarded a contract for a 2-story addition to be built on First street. The structure will be 50 x 100 feet, and will cost $25,000. The company manufactures hardware and sheet metal products.

ROCHESTER, N. Y.—The Atlantic Stamping Co., 180 Ames street, has awarded the contract for a 1-story addition to its plant for the manufacture of sheet metal products. Cost is estimated at $31,000.

ROCHESTER, N. Y.—The Selden Motor Vehicle Co., Probert street and East avenue, has awarded contract for a 2-story, 160 x 200-foot addition to its factory, to cost $100,000.

SYRACUSE, N. Y. — The Smith Wheel Co., Inc., 101 North Geddes avenue, manufacturer of automobile wheels, has increased its capital from $1,000,000 to $3,000,000 and will build a number of additions to its plant.

CLIFFTON HEIGHTS, PA. — The Kent Mfg. Co. will build a $50,000 power plant, 1-story high, 40 x 67 feet. F. E. Hahn, 1112 Chestnut street, Philadelphia, is architect and engineer.

HANOVER, PA. — The Bethlehem Steel Corp., First National Bank building, Pittsburgh, has purchased the Bittinger Stone Quarries and will install considerable new machinery and equipment.

HARRISBURG, PA. — The Harrisburg Pipe & Pipe Bending Co. has awarded the general contract for a $45,000, 1-story plant addition to Jos. Pomeraining, Kunkel building. This building will replace the one damaged by fire recently.

McKEESPORT, PA.—The National Tube Co., Frick building, Pittsburgh, has awarded the contract for a 1-story, 150 x 240-foot factory to cost $100,000.

MODENA, PA.—Bids were received Jan. 21 for a $15,000 plant addition for the Gerson Paper Stock Mill Co. L. Z. Slawter, Coatesville, Pa., is architect.

NORRISTOWN, PA. — The Summerhill Tubing Co., West Fourth street, is building an addition to its plant.

PHILADELPHIA.—It is reported that bids have been received for the erection of a warehouse at 235 Dock street for L. B. Fortner, 36 Strawberry street. Peuckert & Wunder, 310 Chestnut street, are architects and engineers.

PHILADELPHIA.—The plant of John M. Melloy's Sons, manufacturer of sheet steel products, 1419 Spring Garden street, has



Farrell Quality Small Steel Castings



Increase the factors of ***safety*** and ***durability*** in the construction of your Trucks, Tractors or Machine Tools by using castings which are especially made to withstand unusual strains or vibrations.

The wonderful fatigue resisting qualities of ***Farrell-Cheek Steel Castings*** will build up a reputation for *reliability* for your products which money could never buy.

Let us figure on your requirements.

We also make

Blank Gears, Carbonizing Boxes and **Case Hardening Boxes.**

Farrell-Cheek Steel Foundry Co.

SANDUSKY, OHIO

BRANCH OFFICES

NEW YORK PHILADELPHIA CHICAGO

been damaged by fire with a loss estimated at $50,000.

PITTSBURGH.—The Pittsburgh Crucible Steel Co., Frick building, has increased its capital to $5,000,000 and plans to enlarge its plant.

SOUTH BETHLEHEM, PA.—Fire caused by a defective electric connection damaged the gun forging heat treating plant of the Bethlehem Steel Co. Jan. 6. The loss sustained was about $10,000.

CAMDEN, N. J.—W. Webster & Co., manufacturer of stoves, heaters, etc., has increased its capital from $150,000 to $450,000 to provide for the erection of an addition to its plant.

CAMDEN, N. J.—The Austin Co., Bulletin building, Philadelphia, will erect a 1-story, brick and steel, 35 x 300-foot building for the New York Shipbuilding Co.

EAST ORANGE, N. J.—The A. P. Smith Mfg. Co., Norman street, manufacturer of water works machinery, has increased its capital from $600,000 to $1,000,000 to provide for plant expansion.

IRVINGTON, N. J.—The Reliable Tool Co., recently incorporated with $125,000 capital, plans to build a plant. C. Katzan is in charge.

JERSEY CITY, N. J.—The Snead Iron Works, 66-112 Pine street, is having plans drawn for a $16,000 plant addition, one story high 82 x 102 feet. The Guaranty Construction Co., 140 Cedar street, New York, is in charge.

NEWARK, N. J.—The Universal Compound Co., Mott street and Passaic avenue, will make extensions to its 4-story factory, to cost $6000.

NEWARK, N. J.—Work will start shortly on the construction of a $12,000 addition to the plant of the Butterworth-Judson Corp., 61 Broadway, New York City. The new addition will be two stories high, 58 x 103 feet. The company manufactures chemicals.

PASSAIC, N. J.—The Standard Wire Co. has been incorporated with $50,000 capital by J. W. Laffer, H. J. Laffer and L. E. Laffer, Patterson, N. J.

PATERSON, N. J.—P. Van Kirk, 85 Fulton street, has been awarded the contract for the construction of a 4-story, 60 x 130-foot addition to the mill of the Henry Doherty Silk Co.

PERTH AMBOY, N. J. — The government has let the contract for a shell loading plant to be built on a site of 1300 acres. Cost of the construction is estimated at $3,000,000.

POMPTON LAKES, N. J.—The E. I. du Pont de Nemours Co. has purchased a tract of ground for the extension of its plant.

BALTIMORE.—Contract for the construction of a $15,000 coal trestle has been awarded to the Price Construction Co., Maryland Trust building, by the Western Maryland Realty Co.

BALTIMORE.—The National Enameling & Stamping Co. has let the general contract for the erection of a $12,000 plant addition, 1-story, 31 x 71 feet, to the John Waters Building Co., 23 East Center street.

CURTIS BAY, MD.—The Austin Co., Bulletin building, Philadelphia, has received the general contract for erecting three plant additions, costing in all $100,000, for the Industrial Alcohol Co.

RICHMOND, VA.—The Richmond, Fredericksburg & Potomac railroad is having plans prepared for an addition to its engine house, to cost $20,000. W. D. Duke is general superintendent.

Activities in the Central States

APPLETON, WIS. — The Reliance Motor Truck Co. will award contracts for the erection of its new manufacturing plant about Jan. 28 and will break ground early in February. The first building will be 76 x 320 feet to contain a machine shop and assembling room. The company is now manufacturing trucks at Racine, Wis. Charles H. Piggins is vice president and general manager.

CLINTONVILLE, WIS. — The Topp-Stewart Tractor Co. has awarded the general contract to the C. R. Meyer & Sons Co., Oshkosh, Wis., for erecting a concrete dam and power house on the Embarrass river. An 800-horsepower hydro-electric installation is planned.

LA CROSSE, WIS.—Articles of incorporation have been filed by the McKenzie Mfg. Co. The capital stock is $25,000 and the incorporators are Charles E. Bentley, Ralph E. McKenzie and V. A. Bentley. The company will engage in the manufacture of farm implements.

LAKE GENEVA, WIS. — F. A. Briegel, city clerk, is taking sealed bids until Feb. 1 for the construction of a concrete bridge costing about $15,000 at the foot of Broad street.

MILWAUKEE.—The American Oil Motors Co. is being organized with $1,000,000 capital by A. C. Lingelbach, 309 Caswell block, to manufacture automobile truck and airplane engines.

MILWAUKEE.—The capital stock of the Clum Mfg. Co., 23-25 Erie street, maker of electrical and automobile specialties, has been increased from $50,000 to $100,000 to provide for plant expansion.

MILWAUKEE. — The Simplex Machinery & Tool Co. has been incorporated with $75,000 capital by Paul D. Durant and H. F. Friedrich, and will establish a plant to manufacture metal-working machinery.

RACINE, WIS.—The Hamilton & Beach Mfg. Co., manufacturer of electric motors, will build a 3-story addition 80 x 150 feet in size, to cost $80,000.

SHEBOYGAN, WIS.—Klug & Smith, Mack block, Milwaukee, consulting engineers, have been commissioned by the common council to prepare plans for the proposed new Fourteenth street bridge. Bids will not be asked before summer.

VESPER, WIS.—The Vesper Iron Works, which has been idle for about three years, is about to reopen for the production of malleable castings.

DETROIT.—The Lloyd Mfg. Co., Menominee, Mich., manufacturer of machinery, has increased its capital from $400,000 to $1,000,000 to provide for building a factory here. M. B. Lloyd is general manager of the company.

DETROIT.—The Russell Wheel & Foundry Co. plans to build a 1-story factory costing $75,000. John Russell, Chene street, and Belt Line railroad, is secretary.

PORT HURON, MICH. — The American Machine Corp. has increased its capital from $10,000 to $200,000 to provide for extensions to its plant.

BELLEVILLE, ILL.—The United States Smelting Furnace Co. has been incorporated with capital of $50,000 to manufacture smelting and melting furnaces and to smelt and melt ore and metals of all kinds.

BLUE ISLAND, ILL.—The American Wire Fabric Co., 208 South La Salle street, Chicago, will build a plant here, to cost $150,000.

CHICAGO.—L. Sparks, 320 West Grand avenue, will build a foundry 50 x 125 feet in size at 1723 Carroll avenue, to cost $5000.

CHICAGO.—Steffenson Bros., 5331 Warner avenue, automobile parts and screw machine products, will re-establish their business, having sold their former plant.

DUNDEE, ILL.—Bids will be received until Jan. 30 by the village clerk for a reinforced concrete bridge across Fox river at Main street. George W. Lamb, Geneva, Ill., is superintendent of highways.

KINCAID, ILL. — The Railway & Mine Supply Co., 332 South Michigan avenue, Chicago, has awarded contract for a $75,000 factory to be erected here.

ANDERSON, IND. — The Laurel Motors Co. will equip a factory to manufacture automobile cylinder heads.

HAMMOND, IND.—The United Boiler & Foundry Co., 185 Wilcox avenue, is building a plant 75 x 100 feet in size, to cost $5000.

INDIANAPOLIS. — The Victor Screw Works has been chartered with $50,000 capital by Roy C. Allshouse, E. C. Miller and H. G. Power.

AKRON, O.—The Bridgewater Machine Co. has awarded the general contract to the Carmichael Construction Co., Hamilton building, for a foundry addition to cost $60,000.

ALLIANCE, O.—A charter of incorporation has been granted to the Alliance Controller Co., organized with $10,000 capital by S. D. Lane, T. C. Uran, C. A. Lane and J. D. Brown.

BELLEFONTAINE, O.—The stone crusher plant of Frank Irwin and Roy Wood on East Liberty street has been seriously damaged by fire and will be rebuilt.

CANTON, O.—A charter of incorporation has been granted to the Canton Chapiet & Mfg. Co., capitalized at $10,000. The incorporators are A. R. Turnbull and G. S. Shaeffer.

CINCINNATI.—Bids are being received by Harry Hake, architect, for the construction of an addition to the plant of the Cisco Machine Tool Co., Elmore street, Northside. Plans call for a building 59 x 121 feet in size.

CLEVELAND.—Plans have been filed by Christian, Schwarzenberg & Gaede, engineers, 1900 Euclid avenue, for a 1-story foundry building, 90 x 100 feet in size, to be erected by the Monarch Brass Co., 4613 Payne avenue. Contract for the construction work has been awarded to the Sam W. Emerson Co., 1900 Euclid avenue.

EUCLID, O.—The Anchor Post Iron Works, Newark, N. J., has purchased a site of six acres on Bliss road and proposes to build a factory for the manufacture of iron fence.



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17 Ton Buckets,* capacity 1,250,000 tons per season; *15 Ton Buckets,* capacity 1,000,000 tons per season; *10 Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8 Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	26.00 to 26.50
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.00 to 29.25
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	27.50 to 28.00
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.00 to 19.50
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	21.50
Stove plate, Birmingham	19.50 to 21.50
Stove plate, Buffalo	25.00
Stove plate, eastern Pa	23.50 to 24.50
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$22.00 to 23.00
Boiler plate, cut, No. 1, St. L.	22.50 to 23.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago	22.00 to 23.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	30.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	17.50
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	19.00 to 19.50
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	34.50 to 35.00
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	24.00 to 25.00
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	21.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chgo.	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	34.50 to 35.00
R. R. wrgt. No. 1, Birming.	28.00 to 32.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 38.50
Angle bars, steel, St. Louis	31.50 to 32.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	39.00 to 40.00
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	25.50 to 26.00
Busheling, No. 2, Chicago	18.00 to 19.00
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.00 to 48.00
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	17.25 to 17.75
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	24.50 to 25.00
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	30.50 to 31.00

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	34.50 to 35.00
Steel car axles, St. Louis	43.00 to 43.50

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	20.00 to 25.00
Cast, No. 1, Birmingham	25.00 to 27.50
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo.	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	24.00 to 24.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00 to 32.00
Malleable railroad Chgo.	30.00
Malleable, agricultural, Chgo.	29.50 to 30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	24.50 to 25.00

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, February 7, 1918 *No. 6*

Production Loss Raises Problems

Readjustments Being Forced That Vital Business May Be Safeguarded—Navy Disregards Recommended Prices and Takes Competitive Bids on Steel —Doubt Overhanging Ore Contracts to be Lifted

PRODUCTION loss in iron and steel from violent storms and transportation blockades still is mounting. In its wake are pressing forward more insistently the inevitable problems of readjustment of output and distribution in order that urgent business may not suffer. The contraction of supplies promises to increase the difficulties of the nonessential consumer. Operations have recovered little of the ground lost in recent weeks. Blast furnaces, open hearth and coke oven activities in the Greater Pittsburgh and valley districts remain at 60 to 65 per cent. Eastern works are running at from 50 to 65 per cent. The deep cut in January's production is expressed by the monthly loss of 489,297 tons, or 16.5 per cent in pig iron. The January output of 2,396,083 tons was 802,514 tons less than in November. The shrinkage is emphasized by the 77,292 tons daily average in January against 93,077 tons in December and 106,620 tons in November.

War Needs Direct Iron

The recent slump of pig iron production has pointed more clearly the strong drift of distribution into channels dictated by war requirements. The position of consumers of nonessential lines gradually is being rendered more difficult. The growing shortage of purchasable steelmaking metal represents a more insistent problem. It is estimated in some quarters that sales of 500,000 tons of future basic could be made if the iron were to be had. A new northern Ohio steel plant has made arrangements to supply last half needs placed at about 50,000 tons. Much malleable inquiry also is unsatisfied. Selling for delivery after July 1 continues to go forward more briskly. The General Electric Co. has closed a round tonnage for foundry and malleable for third quarter. A Chicago large machinery interest wants 12,000 tons. The rigid phosphorus specifications of the government for ordnance castings conflict with the limited supply of standard low phosphorus iron. Some modification of standards to insure production is necessitated. The Bethlehem Steel Co., itself a producer of copper-bearing metal, is seeking 10,000 to 15,000 tons of standard grade.

To Clarify Ore Doubts

Contract deliveries beyond March 31 continue a subject of deep interest to the industry in view of the provision for price revision by authorized government agency stipulated by the President's declaration of Dec. 28. The uncertainty over the status of the usual 12-month contracts which has been disturbing the iron ore trade is expected to be dispelled soon by an interpretation of the President's statement which is to be put out through the general committee of the American Iron and Steel institute. This matter was considered at a conference of ore interests at New York the past week. The imperative necessity of stabilizing ore operations for the coming season as a foundation for all war preparations, is being given full weight. A new form of revision clause adopted by some of the pig iron makers provides that deliveries after March 31 shall be at the government price in effect at the time of shipment, but if federal price supervision ends before the contract is terminated, the unshipped balance shall revert to the original price. Southern furnaces are providing for a privilege of cancellation for themselves should the government price on future tonnage prove unsatisfactory to them.

Navy Ignores Fixed Prices

A new situation which may have an important bearing on the whole present system of federal price determination has been precipitated by the free lance action of the navy department. Competitive bids have been taken on a number of steel products and some quotations considerably under the maximum prices recommended on these lines by the committee on steel and steel products of the American Iron and Steel institute have been developed. Such a course of procedure may serve to bring to a clean cut issue the future functions of the war industries board on matters of price and distribution.

The Iron Trade Review

EDITORIAL

Sane Standards Become a Necessity

NOW that the nation fast is approaching the close of the first year of the war, evidence of the unpreparedness of the country and the clumsy, though sincere, efforts of the government to expand its war organization on the unprecedented scale required, constantly are coming to light. Critics are appearing and some genuinely constructive advice and suggestions are being advanced. Insofar as the prime essentials of the war are concerned, great efforts are being made to increase their output, and above all, to eliminate some of the absurd specifications which have been put forth by certain governmental departments.

Parts for engines or other government work are undergoing an unusually severe inspection. As an illustration, one company which has an order for nearly 100,000,000 parts for Liberty motors, has been obliged to cut its output of various screws and bolts for these motors from 8000 to 1500 per machine daily, in order that the variation in screw pitch be less than 0.001 inch. These limits also apply to the shoulders. As a result, the screws are finished almost to watch-works standards, the production is greatly restricted, the cost is increased and the finished article is given no added value for service. Severe requirements such as these are highly desirable for some motor parts, but the idea that every motor part should be finished to the same standard is nonsensical. It is estimated that after the great precision made necessary in cutting, over 25 per cent of the finished product is rejected in the final inspection at this plant.

Less attention to minor details and greater concentration on important features are more desirable. An incident occurred at the same plant which illustrates this point. Approximately $400,000 worth of steel screws were cut in various lengths according to government specifications. These requirements specified A. L. A. M. standard threads. The screws were cut and shipped but upon the arrival of the lot at its destination, it was found that a government official had erred and that the screws should have been cut according to metric standards. Obviously, this lot was almost an entire loss to the government as the screws were of odd lengths and could not be utilized for other purposes without recutting and rethreading.

One company in the United States which had approximately 200,000 English shells on hand that had failed to pass inspection found that the Lloyd George ministry differed from the old regime in that logical precision limits and inspection methods were introduced. These shells had been accurately finished on the circular rings that bear on the rifling of the gun, but were not finished within such close limits on the intervening shell body. The Lloyd George ministry recognized the uselessness of giving the unimportant parts of the shell more than a roughing cut, the shells were accepted, and the ministry made one of the first of its great steps in injecting engineering logic into the determination of shell specifications.

New standards modeled on this plan are sure to be formulated in time for government work in the United States. It is highly advisable, in view of the urgent need for war materials at present, that production be given the added impetus to be derived from sane standards for work of this kind, just as quickly as the mental or physical transformation can be brought about.

Give Attention to the Terminals

THE appeal for increased terminal facilities, which has become almost legendary in its origin, has been revised and brought up to date by a prominent New York shipper. In a recent letter to W. G. McAdoo, director general of railroads, he proposes a plan which, by virtue of its timeliness and application to present conditions, is worthy of the utmost consideration at Washington.

The plan in brief calls for the establishment of freight yards on all main lines, not more than one hour's freight distance from Atlantic terminals. Sheds, with railroad track on one side and wagon road on the other, would be built by cantonment camp builders. Whenever necessary, during labor shortage, soldiers would be detailed to load and unload, following the precedent of foreign countries. The two principal uses of the yards would be to receive all export freight, whenever ships would not be immediately available, and to handle whenever necessary, all nonperishable freight for domestic commercial consumption.

As has long been realized, terminal facilities have been inadequate, even in normal times. Their inability to cope with present demands created by war is reflected by the heavy congestion all along the Atlantic seaboard, which has been steadily working its way back through the west, threatening widespread disorganization of industry. Not-

withstanding more favorable weather conditions, this freight congestion with present facilities is likely to continue in greater or lesser degree, owing to the rapidly increasing production of munitions and supplies of all descriptions. Due chiefly to the financial expenditure involved in such expansion, the railroads have been able to do little to prepare for the handling of this business. Now, with the government in charge, the sorely needed attention to terminal betterments could be made expeditiously, and the cost involved in some such plan as that outlined would be trifling in comparison with the damage now being done to business and military efficiency.

Does Labor Play a Fair Game?

THE labor unions of this country, it is estimated, collect over $50,000,000 annually in monthly dues from their members. A small amount of money paid every 30 days by individual members is not much of a factor in itself and probably it works no hardship on the workingman. The aggregate, however, is an immense sum. What is done with this money? What benefit does the workingman gain and how much goes to pay high salaries to professional agitators, walking delegates and other officers, to say nothing of the sums expended in court actions including, as it has been proven, the defense of dynamiters and other offenders of the criminal law.

The federal government has in numerous instances forced manufacturers to disclose private information regarding receipts and disbursements. Why should not the labor unions be compelled to do likewise? Some of the workingman's hard-earned money may be and undoubtedly is being absorbed in plain out-and-out graft. Since publicity is the greatest corrective and preventative of graft, it should be able to perform a similar service for the workman as regards the inner workings of his labor organization.

The Supreme Court of the United States undoubtedly has the power to compel the unions to divulge this information. It is doubtful, however, whether steps ever will be taken along these lines because the lawmakers, as a class, fear the vote of labor, while the manufacturer, as far as political matters are concerned, is well-nigh helpless. The old adage that it is a poor rule that won't work both ways certainly is applicable to capital and labor.

War Function of Machine Dealer

LETTERS recently sent out by the machine tool section of the finished products division of the war industries board have aroused much interest in the machinery trade. These letters were sent out to dealers and brokers of machine tools who have been advertising lists of tools for sale in various trade papers and have enclosed to each seller his respective advertisement. The text of the communication follows:

"This department requires accurate information regarding available machine tools, in order to provide for the needs of the government. In order, therefore, to avoid confusion resulting from the duplicate listing of machines, you are requested to check on the enclosed copy of your advertisement all such machines as you actually own and have in stock for immediate delivery, and to advise where they can be inspected and price asked."

In other words, the machine tool section wants to deal directly with the owners of the machines advertised, perhaps to save time, possibly to avoid paying an extra profit. Some dealers never advertise machines which they do not own and these, of course, will not be affected in any way by this request. However, there are undoubtedly many duplications appearing in the advertising columns, occurring when two or more sellers may have knowledge of and a price quoted upon the same machine.

The machine tool section may be successful in eliminating some of these duplications by its present procedure, but in many cases the government probably will continue to deal through middlemen. Frequently machines are advertised by dealers who do not own them, but which they have located in some out-of-the-way place, where the holder has not thought it worth his while to offer his single machine on the market. For example, perhaps a dealer has learned of a boring mill in a small middle western town. He obtains a price on this machine from its owner and lists it among other machines he is advertising. He cannot check this item as the machine tool section requests. Yet if the government wants this tool urgently, it must come to him and pay him a commission. At a time when machine tools are of vital importance in the government's war preparations, in unearthing this machine the dealer thus has performed a unique service. He has assisted in mobilization of machine tools as truly as has any manufacturer.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 404

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern)	$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)	base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft)	base plus $1.50
Over 3.25 silicon	$34.50, plus $1.00 for each ½ per cent of silicon.
No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00 to 255.00
Spiegel, 20 per cent fur.	60.00
Spiegel, contracts, furnace	58.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	170.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.	

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	.30
Iron, 3½ to 4½ inches, c. l.	.12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh.	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products February 6, average for January 1918, average for November 1917, and average for February 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Feb. 6, 1918.	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	33.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	31.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	34.50
Malleable, Chicago	33.50	33.50	33.50	31.25
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	24.50
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	33.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	29.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	32.00
Ferro mang., delivered.....	250.00	250.00	247.00	265.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	62.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	62.50
Open hearth sheet bars, Pitts..	51.00	51.00	51.00	62.50
Open hearth billets, Pitts.....	47.50	47.50	51.00	62.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.00
Steel bars, Chicago.....	2.90	2.90	2.90	3.15
Iron bars, Philadelphia.....	3.50	3.648	4.335	3.259
Iron bars, Cleveland.....	3.64	3.64	4.00	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Feb. 6, 1918.	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Iron bars, Chicago mill.....	3.50	$3.50	$4.10	$3.00
Beams, Chicago.....	3.00	3.00	3.00	3.38
Beams, Pittsburgh	3.00	3.00	3.00	3.25
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.75
Tank plates, Chicago	3.25	3.25	3.25	3.94
Tank plates, Philadelphia ...	3.435	3.435	3.435	5.009
Sheets, blk., No. 28, Pitts....	5.00	5.00	5.30	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	4.60	4.37
Sheets, gal., No. 28, Pitts... ..	6.25	6.25	6.50	6.50
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.00
Connellsville fur. coke.....	6.00	6.00	6.00	8.00
Connellsville fdy. coke.....	7.00	7.00	6.60	6.50
Heavy melting steel, Pitts.....	30.00	30.00	29.60	21.87
Heavy melting steel, eastern Pa.	30.00	29.80	27.50	20.50
Heavy melting steel, Chicago.	30.00	29.70	28.50	21.65
No. 1 wrought, eastern Pa....	35.00	35.00	35.70	27.00
No. 1 wrought, Chicago.....	35.00	35.00	35.00	27.00
Rerolling rails, Chicago.....	35.00	35.30	35.70	25.63
Car wheels, Chicago.....	30.00	30.40	27.50	18.31

(For Additional Prices See Page 404)

Last Half Iron Selling More Active

Adoption of Various Forms of Contracts Covering Future Deliveries Subject to Price Revision Stimulates Business—Basic Shortage Becoming More Insistent Problem—War Needs More Closely Directing Distribution

Chicago, Feb. 5.—Almost all consumers of pig iron in the Chicago district are putting out inquiries and covering for their requirements for last half delivery. Some smaller producers have allotted practically all their production for that period and the principal interest has covered about half its tonnage for the last six months of the year. Indications are that practically its entire production for 1918 will be under contract before the end of February. One large machinery manufacturer has put out an inquiry for about 12,000 tons of various grades, including 2500 tons of malleable for first half, and the remainder for last half. Some consumers having plants in various parts of the country have met practical inability to obtain further iron in the east and have sought to cover their requirements from western furnaces. The latter are following the rule of caring for their regular customers in this territory and have no iron for distant shipments. Lake Superior charcoal-iron makers have not yet begun to sell freely for last half delivery, although there is considerable inquiry and probably these books will not be opened for some time. Low phosphorus pig iron is difficult to obtain, and inasmuch as the government requirement for this iron calls for phosphorus 0.035, the supply which will meet this analysis is not large. It is understood the Bethlehem Steel Co., itself a large producer of copper-bearing low phosphorus iron, is in the market for 10,000 to 15,000 tons of standard grade. Silveries are most difficult to obtain and one Jackson county interest reports that considerable of its output has been commandeered by the government, and it is unable to quote at present, because further requisitioning is expected. Some bessemer silicon of 10 to 12 per cent silicon content has been sold recently by one Jackson county producer.

Market Badly Upset

Boston, Feb. 4.—Business in pig iron continues on a pretty moderate scale in this territory. This condition cannot be charged to a lack of needs but rather to the many obstacles that block trading. In the first place there is the lack of production at the furnaces, because of insufficient coke supplies and makers are not inclined to take orders they cannot fill. Then there is the matter of the government price clause in contracts made for delivery after March 31. If there was a certainty that present prices would be maintained, the furnaces could go ahead in confidence. There are embargoes on all the railroads entering New England that shuts out iron to all except those plants engaged on government work and even in these instances deliveries are not all that could be desired. The coal situation is worse rather than better. Actually there probably never before was such a combination of circumstances leading to utter stagnation as now besets the local trade. But through all its perplexities the trade maintains a cheerful mien and is hopeful that eventually conditions are going to improve. Some inquiries are reported for second half iron but not much has been done except by the Buffalo makers, who withdrew from the market after booking all the business it wanted. Some business is reported

in coke for last half delivery, the New England Coal & Coke Co. having opened its books for half or all year contracts beginning July 1. The business is at the price fixed by the government for this territory.

More Second Half Selling

New York, Feb. 4.—Willingness to sell second half pig iron on the government price revision basis has been signified during the past week by several eastern Pennsylvania furnaces. The volume of such business, however, has been much smaller than in previous weeks, due to the withdrawal of an important producer not in this immediate district, who recently booked large second half tonnages. An Alabama furnace which booked several thousand tons practically now is out of the market. Most of the second half iron placed during the past week was taken by three eastern Pennsylvania and two western Pennsylvania furnaces which sold in this district an aggregate of 20,000 to 25,000 tons of foundry. This iron is to be billed at the government price prevailing at the time of shipment. In most cases, however, a clause was inserted in the contract that the sale is to be void in case the government price is made lower than the furnace's cost of production. At least 25,000 tons of foundry iron are involved in current inquiries. The major portion of this tonnage is for second half. Although practically all furnaces last year sold less than they figured on producing over the first half of 1918, few of them foresaw the obstacles to continuous production which the winter has brought about. As a result, eastern furnaces not only are unable to offer spot lots, but in most cases they are so far behind on deliveries that it will be well into the third quarter before they have completed these. The Worthington Pump & Machinery Corp. inquiry for 7500 tons for second half steel is open.

Much Basic is Wanted

Philadelphia, Feb. 5.—Selling of pig iron for delivery over the last half of 1918 continues to expand although not all the producers in eastern Pennsylvania yet are participating in this movement. The position of those who are holding off relates mainly to their uncertainty over contracts which carry deliveries after March 31. Sales of the week include some thousands of tons of second half foundry which were made by one or two eastern Pennsylvania and three western Pennsylvania furnaces. New inquiry in this territory has been showing some shrinkage except in basic. In this grade over 100,000 tons could be sold if the iron was to be had. Numerous sales of copper-bearing low phosphorus iron have been closed, some with consumers as far west as Chicago. This grade of iron is not so plentiful as has been the case recently. The General Electric Co. has been an inquirer in this territory for third quarter foundry and malleable for various plants and has placed considerable tonnage.

Production Still Hampered

Buffalo, Feb. 5.—Furnace men take a rather pessimistic view of the present situation in pig iron, because operating difficulties are so hampering production. Coke is extremely difficult to obtain. Traffic congestion militates against prompt shipment of iron as it does against prompt receipts of coke. Coupled with these drawbacks, cold weather has seriously interfered and most furnacemen believe the situation cannot clear until conditions moderate. One interest has been unable to obtain cars and is piling iron. Even foundries with war orders are unable to get sufficient iron to supply requirements. Little effort is being made to go after future business. Some third quarter and last half sales are noted with the proviso that the government price on the day of shipment is to govern, in all cases except where it has been specifically agreed that if the government price is lower than the present price, the remainder of the contract is to be cancelled. An interest representing a leading producer states that it dare not take on new business when already more iron has been sold for first half than can possibly be made. A third interest has slowed down three of its furnaces to half speed because of poor coke receipts.

Transportation Ruling Factor

Cincinnati, Feb. 4.—Both pig iron and coke are so dependent on transportation that a comprehensive report cannot be made just now without handling the two jointly. The slow shipment of furnace coke has caused a very marked reduction in the production of iron in nearly all districts. An exception may be noted of the south where ore and coke supplies do not require long hauls.

Buying Largely Extended

St. Louis, Feb. 2.—Purchasing of pig iron in this district has assumed formidable proportions. Consumers seem impressed with the view that if they do not cover, and cover soon, they will be left outside later. Agreement as to contract form and the government clause has lifted the last barrier. Inquiries, orders and actual future transactions indicate expectation of a record business in finished materials this year. Everyone who has iron to sell is besieged, and representatives of leading eastern and northern producers have for the most part disposed of their quotas and are endeavoring to induce their principals to allow them more.

Difficult to Fill Needs

Cleveland, Feb. 5.—Consumers of certain grades of pig iron, especially basic and in a lesser degree, malleable, continue to find it a difficult problem to provide for their future needs. The basic situation gives signs of becoming increasingly severe, as makers say it is impossible to provide for all wants now in sight. Various steelmakers who draw upon the northern Ohio and valley producing districts have been taking advantage of every means possible to fortify themselves. It is known that some arrangements for supplies have been made with certain furnaces not all of which have not been made public. This applies in the case of a new Lorain, O., consumer. It develops that the basic which this interest will receive from Chicago is for second quarter and not for last half, as previously reported. The last half needs approximating 50,000 tons practically all have been provided for with nearby furnaces. This buyer still wants second quarter tonnage as do various other steel plants in northern Ohio and surrounding districts. The uncovered needs are large especially for last half. It is reported a Massillon, O., user has arranged for additional tonnage. Large users of malleable have found some regular sources of supply closed through the switching of output and are trying to make new connections. One pending inquiry of this grade calls for 9000 tons. The General Electric Co. has been a large buyer of third quarter foundry and malleable for various plants. It is known to have placed around 10,000 tons and still is buying. The Westinghouse Electric & Mfg. Co. wants an indefinite tonnage for Nos. 1, 2 and 3 last half foundry for Cleveland. General inquiry remains large, but sales are being restricted by makers. Alabama sales of the week in this district were 3500 tons. One maker is shipping to Cleveland by way of St. Louis. Further allocations of government orders have been made. New inquiries include 400 tons of additional foundry for the Brooklyn navy yard, making 1300 tons in all; 300 tons of prompt foundry for Mare Island and 430 tons of February-April charcoal for St. Louis delivery. A Bay City, Mich., requirement of 1200 tons of foundry now is out in official government form. Furnace in-

terests are adopting various clauses to cover the condition of possible price revision in deliveries after March 31. An interesting form put into effect by one producer provides for invoicing at the government price at time of shipment, but if any unshipped tonnage should remain when federal market control ends, the price on this balance will be re-established at the original figure, most probably at the price of $33, furnace, base, under present conditions.

Large Tonnage for Last Half Sold

Pittsburgh, Feb. 5.—Merchant furnace interests are booking tonnages for last half shipment more freely. While it is the policy of most producers not to actively solicit business for this delivery, they are taking care of the requirements of regular customers as far as possible, and the commitments made in this district during the past week run into a large quantity. The form of contract adopted by one large producer provides that prices are subject to revision after March 31 by an authorized governmental agency. Another large producer is taking tonnages on a contract providing that in the event there is no government price or should federal regulation end, the levels to prevail shall be the maximum prices in effect at the time the contract was made. The severe weather does not offer any encouragement to blast furnace operations, which remain about the same today as they were one week ago. It is estimated that the output of pig iron in the greater Pittsburgh district is about 60 per cent of capacity. The coke supply has been almost entirely shut off by the storms and cold weather. Some furnace operations are virtually on a day-to-day basis. The Carnegie Steel Co. has added one stack to its active list so that it now has 31 out of 59 in operation. Inquiries for last half shipment are numerous. The Westinghouse Electric & Mfg. Co. has put out inquiries for this delivery for Nos. 1, 2 and 3 foundry iron and also for bessemer. Another consumer has taken 5000 tons of foundry iron for last half. Monthly averages of valley bessemer and basic in January were at the agreed levels, or $36.30 and $33, furnace, respectively, according to W. P. Snyder & Co. Only 2500 tons of bessemer iron were sold in Pittsburgh and the valleys during the entire month of January. This was to a Youngstown consumer. The only basic transaction of importance was the previously reported sale of 36,000 tons by a valley producer to an Erie, Pa., consumer.

Coke Situation Paralyzed

Continuing Severe Weather Ties Up Railroad Equipment in Connellsville Region— Frick Company Now Exchanging Fuel to Cut Hauls

Pittsburgh, Feb. 5.—Recurrence of severe weather conditions has completely shut off shipments of coke in the Connellsville region. The motive power has been crippled greatly, frogs and switches have become frozen and cars stuck to tracks. Laborers have been unable to withstand the extreme cold and this has reduced the output. The car supply was about 40 per cent yesterday and there were practically no available empty cars for loading today. Some loaded cars have been standing in the region for a week and even as long as 10 days. It has been impossible to move them on account of the weather situation. At Brownsville, and West Brownsville, Pa., there is an acute congestion of loaded cars which are being held up owing to the inability of the connecting line to make deliveries. The Pennsylvania lines east are not taking any coke shipments. Under these conditions little progress has been made in carrying out the plan to pool shipments. The H. C. Frick Coke Co. now is co-operating with the independents in exchanging coke in order that shipments may originate nearest the consuming point, but the expected beneficial effects of this plan must wait upon more settled weather conditions. So far as known, producers in the Connellsville region have not made contracts for last half shipment since government regulation became operative, Sept. 24, 1917. Coke production for the week ending Jan. 26 was 221,735 tons, as compared with 238,425 tons for the preceding week, according to *The Connellsville Courier.*

Sell Byproduct Coke

New York, Feb. 4.—Large sales of byproduct coke for delivery over the remainder of 1918 and also over the year beginning July 1 have been made recently by both the New England and New Jersey producers. The New England maker, which opened its books less than a week ago, has disposed of nearly 100,000 tons and sales by the New Jersey interest have been nearly as large. Most of the tonnage sold is for second quarter and last half, while considerable for the first half of 1919 also is called for in contracts for the year beginning July 1, 1918.

Floods Bar Shipments

Cincinnati, Feb. 4.—Just at a time when there was a promise of more favorable weather, heavy rains occurred in West Virginia and part of western Pennsylvania. Streams tributary to the Ohio river overflowed their banks, washed away railroad bridges and practically cut off shipments of coke from the Wise County and Pocahontas fields. New River was also affected, leaving only the Connellsville district to supply both furnace and foundry coke to consumers in this vicinity.

Demand Remains Urgent

St. Louis, Feb. 2.—Dealers report absolutely no change in the coke situation. The arrival of several trains early in the week helped out some, but consumers are experiencing difficulty in digging their consignments out of the terminal traffic congestion. The general demand continues urgent but offerings are virtually nil. Some of the most important eastern oven interests doing business in the St. Louis district have made arrangements with their representatives here by which they agree to take care of regular clients in 1918 to the extent of their 1917 consumption, but nothing more. In several notable instances these producers are allowing their representatives a commission out of the government price.

Production is Steady in South

Birmingham, Ala., Feb. 5.—Both coal and coke production is steady in the south and the prospects are that all needs of the furnace companies can be met promptly. There still is an acute shortage so far as coal is concerned. The agreement between operators and union miners and mine workers, as formulated by the federal fuel administrator at Washington, to prevent long-drawn-out contentions in Alabama, now is in effect, and the belief is there will be uninterrupted work on the part of the miners. Priority orders are being filled by the operators and instructions of the administrators are being carried out to the letter as far as possible. Nothing is being said about new contracts for coke beyond the assertion that government prices are being rigidly carried out. Shipments of coke from the district appear to be liberal. Byproduct coke ovens, almost to the oven, are in blast with the output good. The Birmingham Trussville Iron Co. is manufacturing coke in its own ovens, and is independent.

Scrap Market Unsettled

Transportation Conditions Still Effectually Block Trading in All Centers—New General Committee Appointed

FOR COMPLETE SCRAP PRICES SEE PAGE 404

New York, Feb. 6. (By wire.)—The new subcommittee on scrap to act with the general committee on steel and steel products of the American Iron and Steel institute has been appointed to replace the subcommittee recently resigned. The new subcommittee, of which Vernon Phillips of Philadelphia is chairman, liberally represents all branches interested in scrap. It consists of approximately 35 members. One or two acceptances still are to be received, after which the subcommittee will organize.

Chicago, Feb. 5.—Continuance of the deadlock in the scrap market, brought about by lack of shipping facilities and shortened consumption, seems to be having the effect of bringing some offerings on the market on the part of smaller dealers who must turn them into money. The effect of this has been to bring out some lower quotations on a few grades, but the general level of the market is unchanged. Consumers are not in need of material until the fuel supply is increased and production of scrap is somewhat lessened for the same reason. The weakness noted results from the necessities of some dealers to obtain money, causing them to offer material at a concession. The Missouri, Kansas & Texas offers 490 tons, the Chicago & North-Western 2500 tons, including 750 tons of long steel rails, and the Chicago, Burlington & Quincy 2220 tons.

Dealers' Trading Blocked

Boston, Feb. 4.—There is a fairly good demand for all kinds of scrap, but New England is rather far removed from the principal points of consumption and with the dealers of this section pretty thoroughly tied up as far as shipments are concerned by railroad embargoes, actual business is of pretty slim volume. No trouble is had in getting out nearby shipments but there are not many big users in and around Boston. The market maintains a firm tone. Wholesale dealers' paying prices per gross ton, f.o.b. shipping points, follow: Wrought No. 1 yard long, $30 to $31; horse shoes, $30 to $31; cotton ties, $21 to $22; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron, new specifications, $27 to $28; steel rails, $26 to $27; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $22; machine shop turnings, $13 to $16; cast borings, $16 to $17; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $35 to $37.

Business at Minimum

Philadelphia, Feb. 5.—A combination of intense cold and severe railroad congestion is keeping business in old material at a minimum in this district. Many consumers are receptive purchasers of scrap if they could obtain these supplies. Consumers are obliged to draw upon stock or material nearby to meet their needs which, however, have been greatly reduced because of curtailed operations.

May Allow Breakage Extra

New York, Feb. 4.—With no improvement in transportation facilities, the iron and steel scrap trade in this district continues to labor under a heavy handicap. Despite the various measures put into effect by authorities at Washington to relieve the railroad situation, continued cold weather and additional snowfall have tended to counteract any good that might have been accomplished. Although the futility of trying to obtain shipments has kept many consumers out of the market, a good volume of inquiry still appears. During the past week prices on machine shop turnings have advanced to $17, and city wrought, short stock, to a range of $27.50 to $28. All other descriptions are unchanged. A proposal is under advisement by the Iron and Steel institute at present which would allow sellers to charge several extra dollars for breaking cast scrap. This charge would be in line with that now allowed for preparing heavy melting steel for extra use.

Pittsburgh Market is Dull

Pittsburgh, Feb. 5.—Extreme dullness prevails in the market for old material. Railroad embargoes make it extremely difficult to ship scrap to consumers and for dealers to secure supplies. Permits to make shipment can be obtained only in rare instances and this apparently has caused some consumers to withdraw from the market. A large tonnage of heavy melting steel is being sought for delivery at Brackenridge, Pa. While stocks of most dealers are reported to be either low or entirely exhausted, it is claimed that some have considerable supplies on hand which have been accumulating gradually. In the event the traffic situation improves appreciably, dealers believe that shipments to consumers can be moved freely and demand satisfied. This has led some to express the view that the market will become easier. One factor which gives rise to the belief that the market would soften if the traffic situation were relieved is that consumption has fallen off greatly due to the curtailed operations of furnaces and mills.

Weather Again Blocks

Buffalo, Feb. 5.—The scrap market which had been tied up for weeks on account of the rail situation, and which showed some prospect of loosening up, has again been throttled down by adverse weather conditions in this district. The demand continues as healthy as ever. Stocks remain low. Three railroad lists closed during the week but tonnages were light. Within the next 30 days dealers believe the plants having government orders will begin the manufacture of shells and guns and the production of consequent scrap. This should bring large tonnages of turnings and shell ends into the market. This development is being eagerly awaited by consumers. Cast scrap and malleable apparently have entirely disappeared from the market, the supposition being that these two grades, prices of which are on a par with heavy melting steel, are being mixed with and shipped as the latter classification. Consumers of this district are hopeful that the government will soon take measures to adjust the prices of all grades of scrap so far left untouched. The strong demand for heavy melting steel has pushed up the price of all grades to practically $30. It is thought that the market would steady itself if the prices on all commodities should receive government attention.

Selling Opportunities Numerous

Cleveland, Feb. 5.—Iron and steel scrap dealers in this district complain that while they are in the position of not being able to buy, the opportunities to sell are many. Almost any grade of scrap would find a ready

market just now, with heavy melting steel the prime favorite, but producers are refusing to let go of tonnages or have none. One Chicago steel castings interest that has plants in many cities of the middle west is sounding out dealers here to the extent of their heavy melting steel stocks. Opinion of last week has been borne out only partially, for while congestion has eased up some the subzero wave that arrived the first of this week is expected to offset it. Permits for cars are more easily had, but permits and empty cars are not synonymous by any means. The trade here is anxiously awaiting word from New York that the American Iron and Steel institute has reorganized its subcommittee on iron and steel scrap.

Inbound Shipments Limited

Cincinnati, Feb. 4.—Dealers still have their hands tied and are unable to make shipments to the large consuming districts. Yard stocks are not increasing, as inbound shipments are few and far between, and only come from railroads who can make delivery from their own lines. The market does not seem to be strong, but the few transactions made are generally on the government's maximum price basis less the freight rate of $2.50 per gross ton to Pittsburgh, where a large part of scrap accumulated here is shipped. The local foundries are buying sparingly.

St. Louis Frozen Up

St. Louis, Feb. 2.—Embargoes and general railroad congestion continue to seriously affect activities in the local scrap market. The entire region is frozen tight and cars in transit are hopelessly delayed. Not much relief is looked for before well into March. A canvass of leading dealers elicited the information that some demand for scrap from consumers exists, but inquiries have been conducted in a quiet manner and not openly. It is next to impossible to move a car outside of the St. Louis switching district, and about the only ones moving are those from railroads having St. Louis terminals and consigned to mills in this district.

Embargoes Felt in South

Birmingham, Ala., Feb. 5.—The railroad situation and embargoes in particular are felt keenly by the scrap iron and steel trade in the south. The market in this section is still unsettled. Changes in quotations are of a nominal character. There is considerable stock on hand and dealers are able to bring in more than they can get cars to move out.

Steel Shortage is Severe

Idleness of Finishing Mills Still Forced By Lack of Supplies —Tin Mills Ordered Supplied

Pittsburgh, Feb. 5.—Production of billets and sheet bars in this district and the valleys is not more than half of rolling capacity, owing to insufficiency of pig iron and also to a scarcity of fuel. Shipments on contracts likewise are greatly curtailed as the result of railroad embargoes. This situation has forced some finishing plants to suspend operations temporarily. Freer movement of coal shipments during the past week has had a beneficial effect for some producers, however, and it is reported that the sheet bar output may be encouraged through an order from the railroad director general to supply tin plate mills engaged in producing tonnages for containers for perishable goods. There are no offerings of sheet bars or billets, except discard tonnages of the latter and these are not heavy. A great deal of the discard tonnage is being used by producing mills for scrap and for the manufacture of such products as light rails and material for the implement trade, including plow beams and points. A broker has put out an inquiry for between 300 and 500 tons of 4 to 5-inch discard billets to be sheared to 36 inches in length, which are offered by some mills at the government price of $47.50, Pittsburgh or Youngstown, for standard rerollers. It is probable, however, discards can be obtained below this figure. Demand for wire rods continues active and comes from both domestic and foreign buyers. Some makers are out of the market, while others have taken some business recently, part of it going to the Orient. This is said to have been closed at a level considerably higher than the government price of $57 for soft rods. Shortage of steel has cut rod production greatly.

Shipments are Hampered

Pittsburgh, Feb. 5.—Accumulation of tonnages which they have rolled but have not been able to ship has caused some makers of strip steel to further curtail production. Shortage of steel also has affected output. Fair demand is being made for cold rolled strip steel but comes chiefly from the government.

Western Makers Sell

Philadelphia, Feb. 5.—Practically all the semifinished steel recently sold in this territory has been by producers in the middle west as eastern mills have no tonnage to spare. Numerous lots of forging and rerolling billets and slabs have been sold, but except in every few instances they have not exceeded 20 tons in quantity.

Offerings Snapped Up

Cleveland, Feb. 5.—Sales of odd lots of burned-end sheet bars have been made in this district at the full price of $51, Pittsburgh, or Youngstown. Sheet makers have been the purchasers. Sellers have no trouble to dispose of several times over any misfit or irregular lot of sheet bars or plates they may be able to offer. This is due to the severe shortage of rerolling material of ordinary character.

Steel Makers Exempt on Fuel Oil Licenses

Washington, Feb. 5.—Steelmakers using fuel oil are among the 11 classes of consumers which are exempted from fuelless Mondays regardless of what may develop in the future as to continuing the coalless days. This was set forth in the presidential proclamation issued Monday requiring oil producers and dealers to be licensed. Railroads, ships, the American and allied navies, shipyards, navy yards, arsenals and food manufacturers lead in preference as consumers. This action of requiring the licensing of oil distributors was taken to help railroad traffic congestion, rather than to conserve such fuel of which plenty abounds, according to Fuel Administrator Garfield.

Trumbull's Gross Triples

Stockholders of the Trumbull Steel Co., Youngstown, at their annual meeting last week were advised that gross business for 1917 was $26,240,000, as compared with $9,200,000 for 1916. After paying dividends, and allowing for estimated income and excess profit taxes, depreciation, upkeep, etc., the earnings available for common stock, were at the rate of $83 per share. Approximately $2,000,000 was the company's surplus at the beginning of 1917. In 1917, 160,000 tons of finished material were shipped, of which 60,000 tons were tin plate. Sheets and strip steel made up the balance.

Bar Repudiations Waived

Nut Bolt and Rivet Manufacturers Finally Prevailed Upon to Take High-Priced Tonnage—100,000,000 Bolts Wanted

Philadelphia, Feb. 5.—Makers of steel bars report that in nearly all cases consumers have been prevailed upon to accept the high-speed tonnages which they recently repudiated. These repudiations came mainly from nut, bolt and rivet makers who set up the claim that all producers in their line were selling at the government prices fixed on their product and even were applying the latter level to old contracts which had been booked last summer on a higher basis. Consequently they objected to the taking out of tonnage on a basis exceeding the government-fixed maximum of 2.90c, Pittsburgh and Chicago.

Bolt Inquiries Tremendous

Cleveland, Feb. 5.—Local producers are expecting to receive allotments when inquiries for nuts and bolts of tremendous size for the navy department now in the market are distributed. These inquiries call for approximately 100,000,000 bolts. One of them for 55,000,000 bolts will represent approximately 10,000 tons and the other a smaller amount. It is understood these bolts are wanted for regular stock purposes for the various navy yards. Some of the steel bar makers who were disposed recently to sell for forward delivery now are less willing to enter into contracts. Demoralization of production by recent storm and transportation troubles apparently is a factor in this changing attitude. Some of the implement manufacturers are buying freely by specifications. Several lots of bars for war purposes remain in the market. Makers have put out a new spike card which conforms to government prices.

Specifications Come In

Pittsburgh, Feb. 5.—Requirements of domestic consumers for steel bar tonnages probably cannot be met fully and promptly, owing to the sharp restriction in the output, which is about 50 per cent of capacity, due to a shortage of coal and steel. Implement makers will be supplied, however, and specifications for early shipments are being sent in by them freely. Domestic demand generally is fair and producers are well booked for the first quarter. The demand for iron bars also is active, but makers are committed for the first quarter and are not seeking new business for that period. Makers of iron bars, being engaged on extremely important government work, were exempted from the Garfield shutdown order. Demand for reinforcing concrete bars is only moderate and by reason of the restricted building operations does not promise to become active in the near future. Warehouses are selling limited tonnages, but stocks are low because of difficulty in getting mill shipments. Trouble also is experienced by warehouses in making deliveries due to the present railroad situation.

Western Market Quiet

Chicago, Feb. 5.—Reduced operation of consuming plants as well as of steel mills has caused buyers of steel bars to remain quiet for the present and demand is not strong. Contracts are being booked for moderate tonnages for delivery at mill convenience by the leading interest, regular customers being cared for in this way, but there is no heavy buying. Government demand remains heavy and tonnages are being distributed constantly for this use. Full specification of 1917 contracts has been the rule and no cancellation of any importance has been done. Specifications on material are being received steadily and users seem inclined to take all the steel they can obtain under their contracts. Wagon builders are inquiring somewhat more freely for bar iron for wagon tires for second quarter and later delivery, probably for use on government vehicles. Other bar iron business is in small tonnages and for immediate delivery. Comparatively little tonnage has been booked for second quarter. Hard steel bars are not in demand and mills are working on reduced schedule, with comparatively little business in prospect.

Reinforcing Demand Better

Buffalo, Feb. 5.—Reinforcing bars have experienced a better demand and a better placement in this district during the past week. The inquiry is mostly for lots between 150 and 200 tons.

Government Buying Shafting

Pittsburgh, Feb. 5.—The principal demand for cold rolled shafting comes from the government. Domestic buying is extremely limited. Production of shafting has been cut sharply on account of shortage of steel and fuel.

Do Not Ask Contract Modification

Pittsburgh, Feb. 5.—Makers in this district of nuts, bolts and rivets are accepting tonnages of steel bars on contracts without seeking to have prices revised downward to the government level of 2.90c, Pittsburgh. Considerable trouble is being encountered in obtaining bar tonnages on account of railroad embargoes and it is almost impossible to ship finished product for a similar reason. Unless relief is forthcoming quickly, some makers say they will be compelled to suspend operations. Although the bulk of the business being taken by makers is for the government, there is some domestic buying at current prices for first quarter. Makers report they are not taking any business at prices which are subject to revision. The navy department last week opened bids for 3000 tons of rivets and it is reported this business will be distributed among various producers.

Hoop Steel in Demand

Pittsburgh, Feb. 5.—Fairly brisk demand continues to be made for hoops, which are being sold for first quarter shipment at the government price of 3.50c. Some producers are not selling bands, feeling that the steel bar price of 2.90c, Pittsburgh, applicable to band tonnage, is too low. Operations of hoop and bandmakers are at the rate of about half of capacity.

Manganese Ore

Stiffens After Sale—Brazilian Situation Unchanged—Alloys Firm

New York, Feb. 4.—About 1500 tons of Brazilian manganese ore, expected to arrive in this country in two to three months, has been sold at $1.30 per unit, delivered at tidewater. This price compares with $1.35 and $1.40 obtained for similar ore about two weeks ago. It is believed that the $1.30 price could not be duplicated. Some 1500 tons of Brazilian ore for delivery in two to three months now is being offered at $1.35 per unit. The embargo which the Central Railroad of Brazil recently announced against further shipments of manganese ore from the state of Minas to the seaboard, is understood still to be effective.

English Ferromanganese Offered

New York, Feb. 4.—Although one or two additional fair sized tonnages of English ferromanganese for first half delivery have been offered during the past 10 days, no sales resulted. The

buyers preferred to place their orders with domestic makers, in view of the difficult shipping situation. The offers of English metal were somewhat under $250, delivered, which appears to be the firm minimum on domestic metal.

The Andrews Steel Co., Newport, Ky., has not yet closed for 1000 tons of 50 per cent ferrosilicon for the remainder of the year. Other current inquiries for this metal mostly are for carload lots. The market continues to be quoted at $170 to $175, delivered, for contract shipment and at $175 to $180, delivered, for spot.

Current inquiries for spiegeleisen call for about 25,000 tons. This includes some 1500 tons which the Whitaker-Glessner Co. recently inquired for. The market on this metal is unchanged at $60 furnace for spot shipment and around $57.50 to $58 for contracts.

Although spot ferrochrome has been sold at 48 and 48½ cents in carload lots, these prices were exceptional and no longer appear obtainable. Holders who had been asking as high as 50 cents now will do 45 cents or lower, while on metal of which the analysis is below standard, 35 cents or lower can be done. The market on spot 60 to 70 per cent ferrochrome containing 4 to 6 per cent carbon, is quoted at 40 to 45 cents per pound, furnace, and contract ferrochrome of the same analysis at $31 to 34 cents.

Ferrotungsten is slightly stronger, due in part to the higher prices on tungsten concentrates. Seventy per cent ferrotungsten now may be quoted at $2.25 to $2.30 per pound, furnace, both for spot and contract, while 80 per cent is bringing $2.35 to $2.40.

Market Becomes Firmer

Pittsburgh, Feb. 5.—With the market for 80 per cent ferromanganese recovering from a recent softness, when it was quotable at $240, delivered, it is now firm at $250 and small lots have been sold in this district during the past week at the latter level. A consumer in Ohio has taken 1000 tons of 20 per cent spiegeleisen from a producer in this district at $60, furnace, for February-May delivery. There is some inquiry for 50 per cent ferrosilicon, which is quoted at $175 to $180, delivered, for prompt shipment and at $170 to $175 for contract.

Western Ferromanganese Strong

Chicago, Feb. 5.—Ferromanganese is scarce and strong at $2.50, furnace, with many indications that the price may go higher shortly. The ore situation is increasingly difficult, both as to foreign and domestic sources, and demand for this alloy is heavy.

Plate Output is Cut Down

Eastern Mills Running Only About 50 Per Cent of Capacity—Allot Boiler Material For Lake Vessels

Philadelphia, Feb. 5.—The Emergency Fleet corporation continues to place plate orders with eastern makers, some of which run to round tonnages. Many inquiries for plates are current from private consumers mostly for immediate specifications but the mills generally are forced to turn these away as their output will not permit them to accommodate these requests. Production of most of the eastern plate mills has been cut to less than 50 per cent by the coal shortage. Several of the mills now are shut down temporarily because of the unfavorable operating conditions. The steel industry generally is operating much below capacity in the east and the present intense cold spell appears to foreshadow even worse conditions. The Lukens Steel Co. is operating at less than 50 per cent of output and other eastern plants are in a corresponding position. Activities of the Bethlehem Steel Co. are about 65 per cent mill and ingot output. Shipyards are greatly handicapped by inability of workmen to stand the severe weather.

Car Builders Get Supplies

Pittsburgh, Feb. 5.—Car builders say that they have sufficient supplies of plates on hand and are having no difficulty in obtaining shipments when they are needed. The recent selling of accumulated supplies of plates by some mills appears to have come to an end. Production has been curtailed on account of lack of fuel and the transportation situation, and few offerings are being made to domestic consumers. The government continues to place large contracts and it has been reported the Emergency Fleet corporation is about ready to take approximately 420,000 to 500,000 tons.

Distribute Boiler Material

Cleveland, Feb. 5.—Further distribution of several thousand tons of boiler steel for vessels being built by lake yards for the Emergency Fleet corporation has been made to two makers. This tonnage is not for new contracts but represents unfilled requirements arising from vessel awards made some weeks ago. Practically nothing but war work is receiving the attention of producers. Local mills virtually are out of the market. Orders for about 350 tons for 40 or 50 portable boilers for the quartermaster general's department in France have been placed in this territory.

West Gets Ship Plates

Chicago, Feb. 5.—With the government the largest customer for plates and other ship material, the steel market in the west is taking on large tonnages, mostly for shipbuilders doing their own fabricating. There also is considerable tonnage current for shipment to fabricators making it up for the Emergency Fleet corporation. This tonnage is allotted by the American Iron and Steel institute for various shipbuilders and is specified out as needed by the latter. Commitments of this sort have been heavy the past few days and under present operating conditions its delivery is uncertain under the best conditions that can be hoped for in the near future. Other users of plates have little possibility of placing contracts or of receiving material of this class.

Wire Costs

Increased Greatly by Interruption of Operations—Demand Active

Pittsburgh, Feb. 5.—Demand for wire and wire nails is active, particularly for the latter. Mills are suffering greatly on account of the shortage of coal and steel and the railroad situation and some have been compelled to shut down altogether, while others are operating on a low schedule. Some have been forced to decline good-sized orders for wire and nails for prompt business on account of railroad embargoes or through having no tonnages on hand. Production costs of wire mills are understood to have increased considerably of late because of restricted operations and the relatively higher overhead charges resulting. This condition is said to have made it barely possible for fully integrated plants even to derive a profit at government levels. Wire mills are one of the few units in the iron and steel industry that are not engaged heavily on government work. Contracts taken by wire mills for second quarter business are made subject to revision April 1.

The Ludlum Electric Furnace Corp. has taken a contract from McCord & Co., Chicago, to install a 10-ton electric furnace.

Navy Develops Lower Steel Prices

Taking of Competitive Bids on Various Products on Which Maximum Prices Had Been Recommended, May Be Significant Test Leading to Important Changes in Present System of Market Regulation

WASHINGTON, Feb. 5.—The entire price-control fabric under which the iron and steel industry is operating today may be modified considerably as the result of a test now being completed by the navy department. Quotations received by the bureau of supplies and accounts in bids opened Jan. 25 demonstrate that some grades of steel can be bought at prices lower than those recommended to the industry. As a result of the navy's action in securing some competitive bids it is felt that the whole war industries board-munitions director muddle, partially cleared by the appointment of Edward R. Stettinius as surveyor general of army purchases, may be definitely settled.

Secretary Daniels and Rear Admiral Samuel McGowan, chief of the bureau, now are considering the results of this competitive bidding test. The bids were obtained on products the prices of which had been recommended to the trade by representatives of the industry itself. The bids will be compared with the prices fixed by the industry. As a result, the navy's policy may be extended to prices established by the President, and, thereby, bring about the upsetting of the system under which those prices are being enforced.

Fixed Prices Underbid

The test was made on requirements of several navy yards for rivets, alloy steel bars, semifinished rounds, heat-treated rounds, special carbon billets and wrought iron bars and a comparison of the quotations offered with the maximum prices recommended in these lines showed that many of the materials could be had at lower figures. On rivets, quotations as much as $30 a ton under the recommended price were made, while bids on other products came closer to the recommended figures and some even exceeded the maximum now in force.

The object of the navy in returning to competitive bids is to force the war industries board to accept all prices recommended and to obtain the President's approval of them or to limit itself to allocating orders of steel on which the chief executive actually has fixed the prices. Naval officers say they are not satisfied that the recommended prices are the best that can be obtained, but declare they will abide by them if the war industries board will say they are fair and just. The navy cannot understand why the board has refused to go into the matter of recommended prices.

This brings up again the point that the navy is going to do all it can to live up to the laws which say how and how not purchases shall be made. Secretaries Daniels and Baker have agreed to pay the prices fixed by the President, even though they are only maximum. What the army will do on products on which the President has not fixed prices likely will become known as soon as Mr. Stettinius gets into action.

Some of the prices fixed by the President were approved by the steel men before his action, while others were set by him. On the recommended prices no government sanction has been officially placed. It is argued by naval men that if their test shows conclusively that competitive bidding will bring lower prices on certain recommended quotations, similar results may be obtained if the same policy is followed with the fixed-price materials. In the event competitive bidding becomes general, then the fixed prices will serve only as limits by which purchasing officers will reject or accept bids.

How successful competitive bidding may become under fixed prices depends altogether on how mill capacities are being utilized and to what extent idle equipment may be employed. It created some surprise when the navy's bids were opened and the number of bidders was disclosed. There was an average of about three companies to each class under each schedule. Among the bidders were the Carpenter Steel Co., the Crucible Steel Co. of America, the United Alloy Steel Corp., the Bethlehem Steel Corp., the Apex Steel Corp., the Camden Forge Co., the Mesta Machine Co., the Sizer Forge Co., the Midvale Steel & Ordnance Co., and the Pollack Steel Co.

It is a fact, however, that bids were sought on products for which no emergency demand exists. This may explain the number of producers who submitted tenders.

As to the successor of the war industries board which everywhere seems to be admitted slated for the discard, the President again has declared against a director of munitions. It is said he has a new plan to offer in the reorganization of the board which will come with the announcement of the selection of the successor of Daniel Willard, former chairman. What this plan is, is a matter of conjecture. It is stated that if he reorganizes it to give one or more men, but fewer than in the board now, the responsibility for its entire ramifications and ask congress to give the reorganized institution some legal powers, he will, in a measure, meet the demand for a munitions director. It is said Mr. Stettinius is to have more power after the President has acted. Whatever the President may do, it is altogether likely he will keep the various government purchasing departments intact. After all, it is urged, as far as steel is concerned, the government departments' requirements are so varied that present individual systems will not be affected.

Admiral McGowan Praises Replogle

Any impression which may have arisen in decision of Admiral McGowan to make certain steel purchases under the competitive bidding plan, that he had a personal break with J. Leonard Replogle, director of steel supply is erroneous. Only the best of friendly relations exist between the admiral and the director, friends of both declare. When he was before the senate military affairs committee, Admiral McGowan, in reply to Senator McKellar, said:

"The prices on steel, for example, have been fixed by the raw products committee. Only yesterday I went in person with J. L. Replogle, of the steel committee, one of the best men I ever knew in my life, to the secretary of the navy, and we made a joint oral recommendation to Secretary Daniels with respect to a matter of about $7,000,000 worth of steel. The facts were so plain and Mr. Replogle made them so plain that it was my pleasure to go with him yesterday afternoon. In about five minutes the secretary of the navy saw it as I did and the matter was settled. Mr. Replogle found the facts, I saw them, and the secretary approved them. It was in the form of differentials on certain shapes, sizes and grades of steel."

January Loss in Pig Iron Heavy

Restrictive Operating Conditions Cause Reduction of 489,297 Tons in Total Output Which is Lowest Since June, 1915—Daily Average Shows Decided Slump—Outlook Not Encouraging

THE tonnage of pig iron produced by coke and anthracite blast furnaces during the first month of 1918 showed a decided slump, the total of 2,396,083 tons being the smallest recorded since June, 1915. The same factors which caused the December production to fall far behind the pace set in 1916 and 1917, were evident during the past month, and many blast furnaces were forced to bank or sharply curtail production due to lack of fuel and extreme weather conditions. The

AVERAGE DAILY PRODUCTION

	1918	1917	1916	1915	1914
Jan.	77,293	101,930	102,319	51,323	60,624
Feb.	.....	94,641	106,157	59,521	67,450
Mar.	.....	105,026	107,343	66,009	75,534
Apr.	.....	110,936	107,517	70,484	75,383
May	.....	110,119	108,535	72,747	67,646
June	.....	108,675	107,127	78,998	63,486
July	.....	107,659	103,907	82,687	63,075
Aug.	.....	104,483	103,156	89,510	64,403
Sept.	.....	104,691	106,935	94,478	62,757
Oct.	.....	106,332	113,167	100,656	57,007
Nov.	.....	106,620	110,593	101,174	50,042
Dec.	.....	93,077	102,715	103,278	48,236
Av'ge	77,293	104,562	106,610	81,022	62,934

January figure of 2,396,083 tons shows a loss of 489,297 tons, compared with the December total of 2,885,380 tons.

Both January and December being 31-day months, a comparison of the tonnage produced daily during these two months gives an accurate line on the tremendous loss in production. The daily average production for January amounted to 77,293 tons, a loss of 15,784 tons compared with the December daily average of 93,077 tons. In January a year ago the daily average was 101,930 tons, or 24,637 tons greater than that for last month.

Both steelmaking and merchant stacks suffered alike in production loss. The steelmaking or nonmerchant furnaces produced a total of 1,673,034 tons of pig iron in January, compared with 2,044,136 tons in December, a loss of 371,102 tons. The merchant total amounted to 692,214 tons, 109,994 tons less than the December figure of 802,208 tons.

In daily average production, the steelmaking furnaces showed a loss of 11,971 tons, the January daily average being 53,969 tons, compared with 65,940 tons in December. The merchant furnaces produced 22,329 tons daily in January and 25,878 tons daily in December, a loss of 3549 tons.

The only gain shown during the month of January was in the production of ferro. The blast furnaces of the country produced 22,824 tons of ferro during that month, or 226 tons more than in December, when the total was 22,598. In January only 8011 tons of spiegel were made, compared with 16,438 tons in December.

Because of the many stacks which were forced to bank and blow out during the month, the number active on Jan. 31 was the smallest since Dec. 31, 1915. Only 295 furnaces were in blast on the last day of January, compared with 321 on Dec. 31, a loss of 26.

Only one of the four furnaces of the Bethlehem Steel Co., Sparrows Point, Md., was in blast on Dec. 31. Furnace A has been banked since Dec. 14 on account of the coke shortage and both the B and C stacks have been blown out for relining.

Operating conditions among eastern blast furnaces are very bad. The situation is illustrated in the case of the Bethlehem Steel Co., which is blowing but one of seven furnaces at Sparrows Point, Md., two out of seven at Lebanon, Pa., three out of five at Steelton, Pa., and five out of seven at South Bethlehem.

MONTHLY PRODUCTION

	1918	1917	1916
Jan.	2,396,083	3,159,839	3,171,878
Feb.	.....	2,649,935	3,078,548
Mar.	.....	3,255,813	3,327,630
Apr.	.....	3,328,061	3,225,496
May	.....	3,413,677	3,364,584
June	.....	3,260,234	3,213,818
Total 1st half	.....	19,067,559	19,381,954
July	.....	3,337,442	3,221,127
Aug.	.....	3,238,970	3,197,838
Sep.	.....	3,140,742	3,208,041
Oct.	.....	3,296,286	3,508,180
Nov.	.....	3,198,597	3,317,805
Dec.	.....	2,885,380	3,184,178
Total 2d half	.....	19,097,417	19,637,169
Grand total	2,396,083	38,164,976	39,019,123

The Republic Iron & Steel Co., Youngstown, O., relighted its Hannah furnace on the morning of Feb. 2. This stack has been down since Oct. 10 for repairs, which included a complete new jacket. Its No. 1 Haselton furnace is banked and the company is preparing to start its Atlantic furnace at New Castle, Pa.

Operations at the A furnace of the Toledo plant of Pickands, Mather & Co., Cleveland, were suspended from Jan. 25 to Jan. 28, inclusive, because of a breakout.

Lorain furnace No. 5, of the National Tube Co., Pittsburgh, was idle 20 days in December, while the walls of the furnace were being cleaned. Slight repairs were also made at the Riverside, W. Va., No. 2 stack, causing a shut-down of six days.

The Birmingham-Trussville Iron Co., Birmingham, Ala., has placed in operation 120 of its new battery of 300 coke ovens which are to supply coke to its blast furnace. Coal for these ovens is being mined at the company's property at Labuco, Ala. A new 1500-ton coal washer is being installed at the mines and the electrical equipment is being put in shape as rapidly as possible. The furnace will be blown in as soon as a sufficient supply of coke for its operation is available.

JANUARY PIG IRON

States	No. of stacks.	No. in blast last day of month. Jan.	Dec.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— Jan.	Dec.
Pennsylvania	160	106	122	155,796	777,146	932,942	1,145,131
Ohio	79	53	61	144,921	397,727	542,648	589,846
Alabama	47	33	32	118,818	99,684	218,502	239,605
Virginia	21	14	15	40,576	.....	40,576	40,034
New York	27	19	21	77,892	91,465	169,357	177,099
New Jersey	6	5	5	17,823	.....	17,823	18,785
Illinois	24	17	17	39,136	91,081	130,217	227,405
Colorado	6	3	3				
Indiana	14	13	13				
Maryland	4	3	1	24,639	165,223	189,862	279,855
Wisconsin	6	4	4				
Kentucky	7	4	5				
West Virginia	4	3	3				
Tennessee	17	10	10	41,717	24,986	66,703	69,835
Washington	1	1	1				
Georgia	2	0	1				
Texas	3	0	0				
Minnesota	3	3	3	30,896	25,722	56,618	58,749
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						8,011	16,438
Ferro—All states....						22,824	22,598
Total	435	295	321	692,214	1,673,034	2,396,083	2,885,380

Will Clear Up Ore Doubts

Interpretation By Institute Committee of President's Announcement as to Future Contracts Expected After Conference with Lake Operators

New York, Feb. 5.—An interpretation soon to be announced by the committee on steel and steel products of the American Iron and Steel institute of President Wilson's declaration as to iron and steel contracts extending beyond March 31 is expected to clear up the uncertainties over the usual twelve-month contracts which have been disturbing the iron ore trade.

This development will be the outcome of a meeting in this city last week with members of the institute committee, by leading owners and representatives of lake ore properties. At this conference the situation was reviewed in all its aspects and the need of some official or formal guidance in this matter was emphasized. A heavy tonnage of ore has been arranged for by various consumers for the coming season, but the operators have been in doubt as to the effect of the President's restriction on contracts if these were converted into the usual full year commitments. The President's announcement provided that no iron and steel contracts should be concluded for delivery after March 31 which were not made subject to any revision of prices put in effect by accredited governmental agency subsequent to that date.

It is realized that in the case of ore definite contracts as to price and tonnage are essential in order that the operators may map out their plans in advance for producing and shipping, the season's requirements of this mineral. This is especially true, it is pointed out by the ore men in view of the fact that their mining and transportation costs have been increased by a considerable margin; and because of the factor of exhaustion of their supplies which must enter into the consideration. Some ore interests take the position that their product is entitled to some advance having not shared in the great rise of the iron and steel market up to the time of government supervision.

It developed at the meeting that no sales of ore whatever yet had been made for the approaching season and that all tonnage booked was in the form of reservations. There had been some reports current of scattered sales. Shipments of ore from docks to furnaces in January were far below January, 1917 because of transportation troubles.

Any announcement that Chairman Gary, of the institute committee, may make in interpretation of the President's statement as to contracts is expected to have important bearing on future contracts for other iron and steel products, as well as on iron ore.

Lift Embargo

On Tin Plate Sufficiently to Clear Up Overstocked Supply

Pittsburgh, Feb. 5.—As a result of a conference held last week in Washington between tin plate manufacturers and representatives of the food administration, the railroads have placed cars for the transportation of tin plate from Ohio river mills which are threatened by floods. These include the Steubenville, O., plant of the Phillips Sheet & Tin Plate Co., the Laughlin plant of the American Sheet & Tin Plate Co. and the Wheeling plant of the Whitaker-Glessner Co., and relief has been promised to others. The danger from water to the great quantities of tin plate which have been piled to the limit of storage capacities prompted the government to take steps to ship tonnages to canners making containers for perishable foods. The Baltimore & Ohio railroad has lifted its embargo on western shipments sufficiently to permit the sending of 182 carloads from the New Castle and Farrell, Pa., plants of the American Sheet & Tin Plate Co., to the Pacific coast for the salmon and condensed milk trade. Because of the shipments, some mills which had to suspend operations have resumed in part. Others are extremely short of steel and unless they receive sheet bars soon will have to close down. The food administration at Washington has been co-operating earnestly with tin plate makers in an effort to provide can manufacturers with sufficient tonnages for use in connection with the food conservation program.

Conditions Force Resales

Youngstown, O., Feb. 6.—Large tonnages of tin plate which were boxed by the leading valley producer for eastern consumers and could not be shipped on account of the existing embargoes, have been resold to a large Chicago packing house for meat containers. Other tonnages intended for eastern shipment have been diverted to the Pacific coast for export. Producers state they are able to buy enough pig tin to supply their needs and that the navy's commandeering of this metal in New York recently has not affected them to any noticeable extent.

Sheet Shipments Blocked

Obstructed Traffic Conditions Still Keep Production Low—12,000 Tons Wanted For France—More Second Quarter Inquiry

Youngstown, O., Feb. 6.—Few sheet mills in the valley are operating more than at 75 per cent of capacity on account of their inability to ship finished material to eastern points. Some mills have even been forced to cut their production to 50 per cent. Western shipments are being moved rather freely. On the other hand, many tonnages that were rolled for eastern consumers are being diverted westward. The mills are heavily booked with government business, but are unable to roll any of this on account of eastbound embargoes. The Baltimore & Ohio railroad lifted its embargoes on shipments east last week but were forced to clamp them on again after two days' tryout because of the enormous increase in traffic. The Pennsylvania railroad has annulled its embargoes between Pittsburgh and Cleveland and shipments are now being made between these points. Inquiry for all grades of sheets is heavy, although little business is being taken by the mills. Some time ago an inquiry came out from the government for 12,000 tons of galvanized sheets which were to be used for camp buildings in France but up to the present time none of this has been placed with valley mills. Practically no export business is being done. This is not because of lack of inquiry, but because so much time is required in obtaining export licenses. Traffic conditions are also a drawback to foreign business. One valley mill had a carload of sheets billed to a Canadian firm and on account of embargoes was forced to unload to save demurrage changes. The embargoes were annulled and restored repeatedly, during which time the sheets were reloaded and unloaded several

times. Finally, after the fourth loading, they were dispatched.

Inquiries are Increasing

Pittsburgh, Feb. 5.—Inquiries by domestic consumers for galvanized sheets for second quarter delivery are increasing. The leading interest has made no commitments for second quarter and so far as known none of the independents has. There is some anxiety shown by buyers as to when producers will begin to book the somewhat limited tonnage of galvanized sheets which will be available after the first quarter. While there is some inquiry for blue annealed and black sheets government buying is so heavy and promises to continue to be so, that it overshadows the domestic market.

Line Tonnages

Of Pipe Wanted by Oil and Gas Interests—Army Inquiries

Pittsburgh, Feb. 5.—Oil and gas producers are actively seeking tonnages of lap weld iron and steel pipe and jobbers are showing more interest in the market. Some makers are not soliciting this business, being committed far ahead. Another element restraining greater offerings is the fact that some mills have had to curtail their output considerably on account of fuel and steel shortage. One tentative inquiry calls for 200 miles of 8-inch lap weld steel pipe, involving approximately 10,000 tons, for delivery to a northwest Canadian province. There is also an inquiry for about 6000 tons of 6-inch pipe for shipment to Oklahoma.

Army Wants Tonnage

New York, Feb. 4.—An inquiry for 1000 tons of cast iron pipe for the ordnance department is the only single business of consequence now before eastern makers. This lot, involving 8, 10 and 14-inch pipe, is for use in the ammunition plant under construction at Kcesport, N. J. Bids on a similar-sized tonnage have been received by the City of Buffalo, but no allotment as yet has been made.

Cast Pipe Tonnage Larger

Chicago, Feb. 5.—Cities are beginning to enter the market for cast pipe to care for their extensions in 1918, though not to the usual extent. High prices and difficulty in obtaining labor for laying pipe impose obstacles to buying in normal volume. Minneapolis will open bids Feb. 8 on 1300 tons, St. Paul will take bids at once on 450 tons, and Toledo opens bids today on 500 tons.

Many Airplane Sheds Let

Government Distributes 87,500 Tons of Fabricated Material For 2500 Buildings in France—Stocks Being Replenished

New York, Feb. 5.—One of the largest tonnages of structural steel yet awarded approximating 87,500 tons, has been placed by the government, with various companies. This steel is for 2500 airplane shelters, each requiring about 35 tons, for use of the American expeditionary forces in France. Of this business, the McClintic-Marshall Co. received 500 shelters, or about 17,500 tons, and it is understood that the Belmont Iron Works was awarded a similar contract. The Blaw Steel Construction Co. and others are reported to have figured in the remainder. It is stated that still more of this business will come up shortly. The greater part, if not all of 3400 tons, has been placed by the ordnance department during the past few days for eight buildings in France, each requiring 425 tons. Plain structural shapes are in better demand in this district by fabricators, warehouses and other private buyers who desire to replenish their stocks for work which is expected to come up early in the spring. One leading eastern shape mill reports that it has booked something like 10,000 tons in this district during the past several weeks, practically all for delivery over the next two to four months. Of this total, some 1500 to 2000 tons are for export to allied countries. Single tonnages included in private domestic business, in no case are as large as usual. Several small projects have been revived in the district but no anxiety is shown to close them.

Domestic Market Extremely Quiet

Pittsburgh, Feb. 5.—Fabricators report that domestic business is extremely dull. There are virtually no inquiries from private buyers and operations are devoted principally to government work. Requirements aggregating heavy tonnages were placed during the past week with structural mills by different branches of the government. Plants of fabricators which are engaged on pressing war work, either directly or indirectly, have been exempted under the Garfield shutdown order. Structural material for such undertakings as by-product coke ovens has been extempted.

Big Tonnage Sought

Cleveland, Feb. 5.—Large requirements of fabricated material for government work have been receiving the attention of shops in this district. One of these matters which recently has been up for action involved 25,000 tons. Some buyers have been showing more interest in arranging for future supplies of shapes. A local jobber has been in the market for 1000 tons and a northwestern Ohio bridge shop for an equal amount.

Building Slack in West

Chicago, Feb. 5.—Occasional indications of building needs crop out but, as a rule, the west is postponing its construction program until conditions are better suited to activity. Shipbuilding needs are taking large tonnages to be fabricated for the Emergency Fleet corporation and this is keeping some shops busy where otherwise they would have little on their books. The steel for the new Butler Bros. warehouse in Chicago still is pending, about 9000 tons, although the general contract has been let. The Western Electric Co. has asked bids on about 3000 tons for three additions at Hawthorne, Chicago.

CONTRACTS AWARDED

Building for Morse Dry Dock & Repair Co., Brooklyn, 200 tons to American Bridge Company.

Airplane factory for the Glenn L. Martin Aeroplane Co., Cleveland, 300 tons to the Ferguson Steel & Iron Co. Crowell-Lundorff-Little Co., Cleveland, has general contract.

Addition to power plant of the Pennsylvania General Electric Co., Erie, Pa., 900 tons to the Ferguson Steel & Iron Co.

Primary crushing plant, Utah Copper Co., Arthur, Utah, 197 tons, to Kansas City Structural Steel Co.

Airplane shelters numbering 2500 in France, 87,500 tons divided by the government among the McClintic-Marshall Co., Belmont Iron Works, Blaw Steel Construction Co. and other shops.

Eight buildings in France for ordnance department, 3400 tons, placed with the Heddon Construction Co. and Belmont Iron Works.

Building for National Lead Co., Brooklyn, 700 tons, to Passaic Rolling Mill Co.

CONTRACTS PENDING

Three additional buildings, Western Electric Co., Chicago, Ill., 3000 tons.

Operation of the plant formerly run by the Marinette Iron Works, Marinette, Wis., has been resumed by the Northern Foundry Co., castings for tractors and other farm machinery for the J. I. Case Threshing Machine Co., Racine, Wis., are being made and this order will take the plant's output for an extended period.

Small Portion

Of Government Car Order Closed—Private Inquiries Numerous

New York, Feb. 4.—Of the 4500 cars of miscellaneous types recently inquired for by the government for shipment to France, 400 flat cars have been placed with the Gregg Car Co. This leaves more than 2000 box cars, 1750 gondolas and a number of tank cars yet to be acted upon. Among new car inquiries are 50 hoppers for the Copper Range railroad and 50 special cars for the Phelps Dodge Co. G. C. Peterson & Co., Chicago, are inquiring for 10 to 25 tank cars. The Midcontinent Tank Car Co., Coffeyville, Kans., wants 12 tank cars. The inquiry of the Seaboard Air Line for 1000 box cars continues before the market.

The E. I. du Pont de Nemours & Co. placed 35 flat, 14 box and 44 shell cars with the American Car & Foundry Co. The Brier Hill Iron & Steel Co. placed 40 hoppers and 10 gondolas, of 70 tons capacity, with the Pressed Steel Car Co., and 25 general service cars with the Clark Car Co. The Pressed Steel Car Co. also received 50 gondolas from the Republic Iron & Steel Co.

The American Locomotive Co. recently has received orders for 128 locomotives from various transportation companies. Included in this business are the following contracts: Chesapeake & Ohio, 25; Hocking Valley, 20; Miami Conservancy district, 13; Maine Central, 10; Missouri, Kansas & Texas, 20; and Minneapolis & St. Louis, 20.

The Norfolk & Western railroad has ordered 20 and the Chesapeake & Ohio 25 locomotives from the American Locomotive Co.

The Cumberland Valley railroad is inquiring for 3000 tons of rails. The Pennsylvania railroad has bought 1000 tons of tie plates. The Reading railroad is in the market for similar material.

Inquiries for Standard Spikes

Pittsburgh, Feb. 5.—Railroads have put out inquiries for small lots of standard spikes, the principal quantities being from 1000 to 2000 kegs. Some mills are unable to quote on this business because of the shortage of steel. Jobbers are asking for deliveries on contracts for small spikes, but embargoes have been holding up shipments. Producers are taking fair-sized tonnages of light rails at the government price of 3c a pound, mill, for sections 25 to 45 pounds. Inquiries for standard rails are limited and most makers are not quoting, as they are booked through 1918 and are not ready to quote on 1919 business. Small lots for early delivery have been sold by a nearby producer, bessemer rails commanding from $60 to $63, and open-hearth rails from $63 to $65, mill.

Small Buying of Rails

Chicago, Feb. 5.—Small additional tonnages of rails for 1918 are being taken in the west, to be filled if conditions will allow. These are supplemental to former contracts and do not produce a large total. Some inquiry continues for 1919 delivery and small bookings are being made.

Car buying is practically absent and no new inquiries have come out recently. No pending inquiries have been closed in the past week.

Business is Brisk

Boston, Feb. 4.—Local jobbers in steel and iron products have had a fairly good week, but still say there is room for improvement, especially in those things not going into war work. Where railroad embargoes do not interfere, there is a good movement to war plants, but it could be and probably will be better when the coal situation passes as a restrictive influence on the operation of industrial plants. The coal situation does not respond readily to the efforts being made by state and federal authorities and not a few plants, though exempt from observing the Monday closing down, still shut down because of the lack of fuel.

Steel Pensions Mount

Pensions paid in 1917 to 2933 retired employes of the United States Steel Corp. and its subsidiaries, from trust funds totaling $12,000,000 established seven years ago by Andrew Carnegie and the former Corporation, aggregated $712,506. This is slightly in excess of the amount paid in 1916, which was $711,130. The figure in 1915 was $659,389 and in 1914, $511,-767.50. The first year it was $281,-457.37. The average pension now paid is $21.10 per month over the amount in 1916 and the minimum and maximum amounts are $12 and $100 per month, respectively. With disbursements for 1917, the total sum distributed in the seven years is $3,658,-047.73. The Pittsburgh district in 1917 received $371,154.71; the Cleveland district, $83,724.97; the Chicago territory, $86,036.61; New England and the Atlantic seaboard, $89,434.21; and the Pacific coast, $2072.

Ship Contract

For United States Placed in Canada—Arrange for Steel

Toronto, Jan. 31.—The Canadian Car & Foundry Co. has been awarded a contract for the construction of steel ships for the United States to the value of $10,500,000, which will be filled at its plant at Fort William, Ont. An additional building, 200 x 220 feet, will be erected together with a marine railway and slip for launching the vessels. The furnishing of the material has been arranged for with the American government. The company will begin the work of shipbuilding in May, and will increase its force by about 1000 men.

Alexander Johnston, Canadian deputy minister of marine, and Charles Duguid, naval architect of the department, have been in Washington negotiating with the priority officials to secure from the United States a supply of ship plates and angles for the construction of the first vessels to be built by the Canadian government. It is announced that their mission has been successful, but so far no details have been published.

Acting under authority conferred upon them by Sir Henry Drayton, Canadian power controller, the local hydro-electric board of Hamilton, Ont., has decided that all industries regarded as nonessential must close down for one day each week in order to conserve power. The city has been divided into six districts, in each of which the order is being enforced in succession.

Washington Office Moved

The Washington office of THE IRON TRADE REVIEW and associated publications of The Penton Publishing Co., including *Daily Iron Trade and Metal Market Report, The Foundry, The Marine Review* and *Power Boating,* has been removed from 708 Metropolitan Bank building to 40 Metzerott building, 1110 F street N. Y. This change has been necessitated through the old offices having been given over to the government for the use of the federal reserve board, at the former's request. THE IRON TRADE REVIEW maintains a permanent editorial office in Washington, having been the first trade paper to station a resident member of its regular staff in the capital city.

The Miner-Morse Corp., Erie, Pa., was recently appointed sales agent for Erie, Buffalo and vicinity of "Electrite" uranium tool steel, manufactured by the Latrobe Electric Steel Co., Latrobe, Pa.

Auto Makers Are Still Buying Tools

In Spite of 40 Per Cent Cut in Car Output, New War Activities of Plants Necessitate Purchase of More Equipment—Adaptability of Industry Minimizes Loss

WHEN the automobile industry, now the third largest branch of manufacture in the United States, suddenly found its market restricted, its supply of materials limited and its shipments given last rather than first preference, a curtailment of production resulted that made itself quickly felt in several other industries. The prodigious size of the motor car industry in the United States may be gaged by the 1917 output of 1,300,000 cars having an approximate valuation of $1,000,000,000. Makers now hopefully estimate that the production for the current year will be between 50 and 60 per cent of this total. One automobile builder contends that this curtailment will be a healthy thing for the industry in that it will restrict over-production. This latter has been one of the evils that the industry has been forced to contend with practically since the invention of the gasoline-propelled vehicle.

Irrespective of the announcement made by the bureau of mines that less motor fuel will be available for domestic use in 1918 than during the preceding year, automobile builders point to the recent increases of individual incomes in many branches of industrial work, which may in part sustain the market of pre-war days. Since well over 90 per cent of the product of the automobile industry consists of pleasure vehicles, this theory proves to be of considerable weight. The automobile industry also points to the vast government expenditures of about $1,000,000,000 monthly; the present prosperity of the farmer, together with his inclination to regard the motor vehicle as a necessity rather than a luxury, and the increased importance of the automobile in every-day business as hopeful indications of a market which may be limited but not dormant.

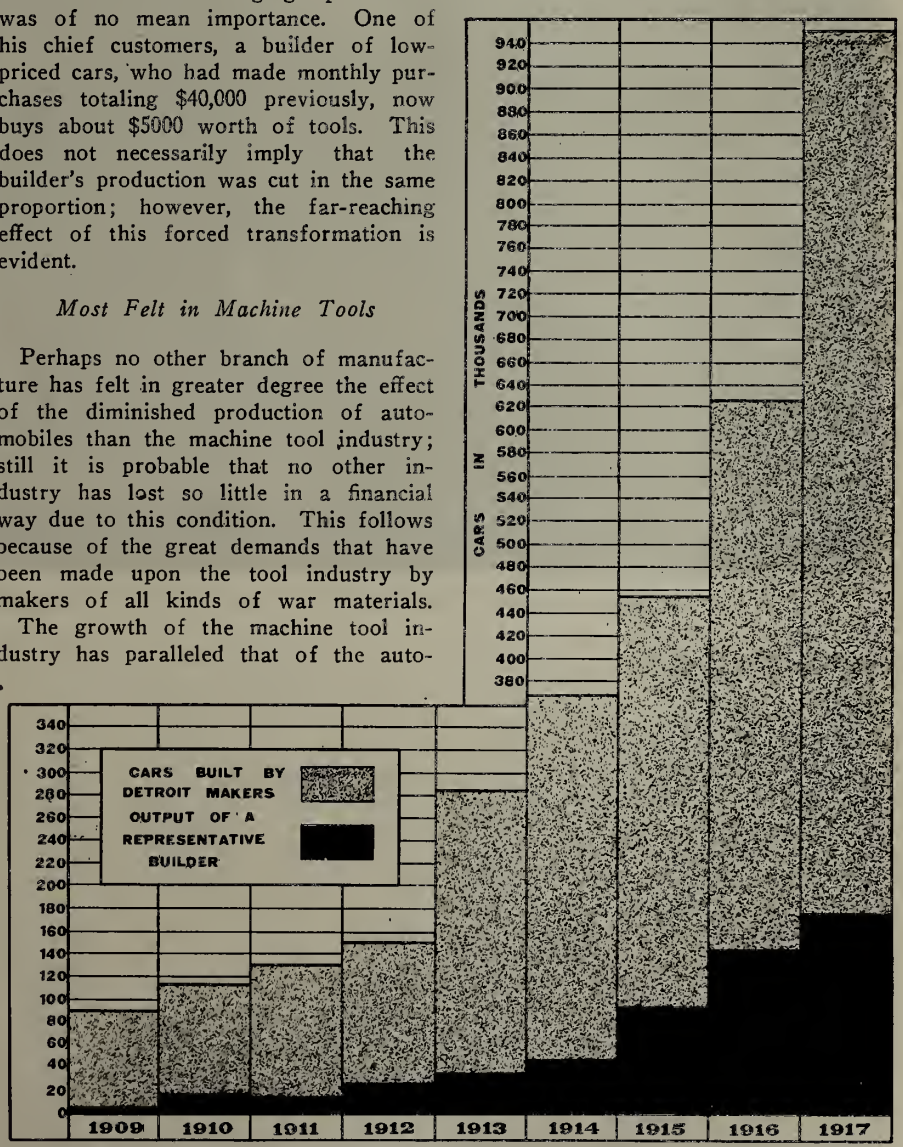
Interesting developments following the usual yearly car displays in various cities, have been observed. A decided increase in the demand for pleasure vehicles of the moderate-priced class has been manifested. Contrary to expectations, the demand for high-grade cars has been much smaller than has been looked for. An explanation in the first case is found in the higher earnings realized from war work, as compared with the pre-war standards.

Many efforts are being made to transform this highly adaptable industry into other fields of manufacturing more directly associated with work essential to the progress of the war. This diversion of the endeavors of the maker of automobiles from one line of activity to another has in nowise compensated for the losses occasioned other industries by this change. In one case a prominent maker of machine tools had been supplying many large motor car builders. Almost his entire plant was devoted to the production of tools for this special type of work. Among his customers were numbered builders of all grades of cars. When the pleasure vehicle production began to decline, he was able to pick up several lines of manufacture that he had not developed fully and to push these successfully, but his loss in changing production was of no mean importance. One of his chief customers, a builder of low-priced cars, who had made monthly purchases totaling $40,000 previously, now buys about $5000 worth of tools. This does not necessarily imply that the builder's production was cut in the same proportion; however, the far-reaching effect of this forced transformation is evident.

Most Felt in Machine Tools

Perhaps no other branch of manufacture has felt in greater degree the effect of the diminished production of automobiles than the machine tool industry; still it is probable that no other industry has lost so little in a financial way due to this condition. This follows because of the great demands that have been made upon the tool industry by makers of all kinds of war materials.

The growth of the machine tool industry has paralleled that of the automobile and has been dependent upon the latter largely for a market previous to the declaration of hostilities in Europe. After the outbreak of the European war, large numbers of tools were bought both for foreign and domestic use in connection with contracts of a military character. Upon the entrance of the United States into the world war, tools were bought in unprecedented numbers for destroyer, cargo ship and munition work. Most of these tools, however, are either single-purpose machines, or of the heavy type. A proportionately smaller number of light than heavy tools has been required for war work; consequently the production



LOCALIZED MOTOR CAR PRODUCTION RATE BY YEARS AND INCREMENTS OF 20,000 CARS

of light tools has been in excess of that which would have been expected.

The machine-tool capacity of the nation in the heavy types has been limited; furthermore the facilities for producing the lighter and some of the special designs required for automobile production, do not lend themselves readily to the manufacture of parts for heavy equipment; therefore the dropping off of automobile production exerted a temporarily depressing effect on many machine tool plants. Gradually this has been overcome due to the steady transformation of the machine tool industry in its endeavor to equalize the wide divergence between supply and demand of the heavy and light tool markets.

Due to the fact that many automobile makers are engaging in the construction of airplane motors, it was at first thought that these makers would issue inquiries for tools which would neutralize largely the shrunken demand from other makers. Numerous cancellations, however, were made by other makers not engaged in airplane motor work and these were of sufficient volume to ease the market for this type of equipment. Because many light tools may be used for airplane work and these may be obtained within reasonable delivery periods, and owing to the production capacity available, automobile builders readily have absorbed the orders released by the adoption of the government's extensive aviation program.

Automobile builders not engaged in war work are buying no equipment and many others who are doing work of that nature are purchasing only necessary additional equipment, or buying only to replace worn tools. If the production of automobiles is cut to less than 60 per cent of normal, obviously even the replacement requirements will be materially affected; but in view of the expansion now evident in other branches of industry it is thought that the shrunken demand on the one side will be more than equalized by the augmented necessities on the other. Owing to the present need for tools of all kinds, the diminished requirements from this source are not so plainly evident in the machine tool market.

Curtailment of the automobile production rate has also affected the pressed steel industry, and various authorities have estimated that makers of pressed steel parts are working at only 60 per cent of capacity. This is a logical result in view of the number of pressed steel parts which enter into the construction of an automobile. Makers of pressed steel parts of stampings and of drawn parts now are engrossed in developing other industrial fields. As a step in this direction an organization has been formed of practically all pressed steel makers and offices established in Washington. The organization has for its purposes the promotion of government work of this character, and the association of its members to meet any extreme emergencies that may arise. As a result of the smaller demand for metal stampings and similar parts, the demand for punching and shearing equipment has been diminished. In one city where the production of parts and accessories for automobiles increased 475 per cent in 10 years, the depression as affecting parts makers became serious.

Manufacturers of electrical equipment have been affected by lowered automobile production; rubber manufacturers now are concentrating on the production of motor truck tires rather than pneumatic tires; motor builders are entering upon the manufacture of airplane motors on an extensive scale; truck makers either are enlarging their capacities for the production of trucks, are developing new tractors or are going into munition work; body builders are readily branching off into the construction of airplane parts, and wheel makers are devoting their energies to the manufacture of wheels for motor trucks, and other military requirements. Restriction of the supply of alloy steel to the automobile industry insofar as the utilization of such material in pleasure vehicles is concerned, has tended to discourage the efforts of makers in this line to seek other markets for their product.

Although the domestic demand for cars may be much smaller during the next few years—depending upon the length of the conflict—export figures



MULTIPLE SPINDLE DRILL SECTION OF A PLANT EQUIPPED SOLELY FOR BUILDING MOTOR TRUCKS

show that there has been a gradual increase in shipments of pleasure vehicles to neutral countries during the past year. Exports of automobiles during the last fiscal year totaled $90,000,000. It is realized these markets, if they are not to be lost, must be fostered during the present emergency.

Because of the adaptability of a well-equipped automobile plant, little difficulty has been met with in changing from the production of pleasure cars to motor trucks, airplane engines, and tractors. No other industry requires so extensive a supply of equipment and none other, in the main, has a more complete metal-working plant incorporated under one roof. Almost every type of machine tool finds some application in the automobile plant; many plants, in addition, have facilities for molding and stamping metal, not to mention the many other departments requiring metal-working equipment which are essential to the operation of a plant building a car practically in its entirety.

In the proportion of munitions, the automobile industry is taking a leading part. Enormous quantities of war materials are being made in automobile factories largely because of the unusual adaptability of these plants, their efficient organizations and their capacity for quantity production. Many of the plants are working to capacity; their output having been divided between automobile production and munition making. A company in the central west which had specialized on trucks and pleasure vehicles before the war, furnishes a good illustration. With the gradual slackening of the pleasure car demand, the unused space and machines were rearranged and additional machinery installed, upon the receipt of small munition orders. Several large contracts were secured later and the company thereby practically insured itself against difficulties during the war. At the present time this plant is engaged mainly in producing munitions; 75 per cent of its capacity being used for this purpose, while the remainder is devoted mostly to the building of motor trucks, and a multiplicity of parts.

Under the generic term of "automotive," the automobile industry is branching out into almost every field where the internal combustion engine serves as a prime mover. The first critical period brought on by the war has been passed and makers are being urged to devote attention to every possible means of retrenchment. Builders have been asked to encourage the hauling of steel and other products by motor trucks; they have been prevailed upon to train women to take the places of men in their plants; they have been urged to avail themselves of the principle of labor dilution, and they have been acquainted with the necessity of substituting various materials, for those, which war's needs make it almost impossible to obtain. A compliance with these suggestions, it is maintained will strengthen the industry and fit it to enter the markets of the world on an efficient basis after the war.

"A Quarter Century of Progress" is the title of an attractive booklet issued by the Osborn Engineering Co., Cleveland. The booklet describes the growth of the company since its organization in 1892 and gives a partial list of buildings designed and erected by the Osborn organization. A page of interesting statistics is included which states that the company has built foundries, machine shops, rubber manufacturing plants, cement plants, base-ball parks, bridges and miscellaneous plants to the value of over $40,000,000.



PUNCH PRESS INSTALLATION TYPICAL OF THOSE THAT SUPPLY NEEDS OF THE AUTOMOBILE INDUSTRY

That the iron and steel industry in Japan is on the increase is reported by the *Weekly Bulletin* of the Canadian department of trade and commerce. Before the war Japan's annual production of iron was 260,000, or about one-half of its consumption. Since the war commenced many new companies have been formed to produce iron, and six companies with a combined capital of 40,000,000 yen have established new works. Three new steel companies have commenced operations and four new steel works have been established. Three new companies, with a combined capital of 2,300,000 yen, have been established for the manufacture of machinery.

Modern Gun Manufacturing Plant

How a Large Ordnance Plant Was Planned and Built in 90 Days for Manufacturing 75-Millimeter United States Field Guns—All Machine Tools Are Carefully Arranged to Insure the Maximum Output

WHEN the United States entered the war, the full power of the world's greatest manufacturing industries was ready to back up our ultimatum. Despite the delays imposed by departmental inefficiency, as disclosed in recent investigations, the government has been receiving from the manufacturers, in satisfactory volume, most of the materials required.

In the manufacture of heavy ordnance, however, the war practically demanded the creation of a new industry. Up until the first rush of war orders in 1915, heavy ordnance had been turned out largely at government arsenals. During the next two years, a few private manufacturers began to make ordnance for the allies. Their output, however, is far below that required now to supply the United States as well as our allies.

Heavy Ordnance Problem

How to increase the output of heavy ordnance was one of the most troublesome problems faced by the government. The testimony of General Crozier, chief of ordnance, before the investigating committee of the senate, while revealing the serious delays resulting from red-tape methods, showed clearly the difficulties involved in building an ordnance manufacturing industry from the ground up.

Building New Plants

New plants had to be built in a few months, workmen made experts in a few weeks and jigs and fixtures designed and made. In normal times, such a program would have required years to work out. Now huge plants must be built almost overnight and an efficient organization trained in an incredibly short time.

An illustration of the speed required in constructing a large ordnance plant is furnished by the record of the Symington-Anderson Co., Rochester, N. Y. This company's contract is for a large number of 75-millimeter guns which will be completed at a satisfactory rate of speed. Provision has been made, however, to increase the capacity of the plant 50 per cent if this becomes necessary. The guns will be complete with the exception of the recoil mechanism, carriage and caisson. A building with 157,000 square feet of floor space was started late in July, 1917, and finished on Nov. 1. The layout of machine tools in this plant is also interesting as showing the arrangement approved by engineers who were able to disregard every factor except that of properly equipping a plant for maximum output.

Two thousand men will be employed, working in three 8-hour shifts. A production of a baker's dozen of guns a day by 2000 men seems like a limited output to those not familiar with ordnance construction. However, a 75-millimeter field gun, without the recoil mechanism, carriage or caisson, weighs 750 pounds. These guns are made from solid forgings and many of the operations necessary in machining them are of an extremely intricate nature. Again, all machined dimensions must be within very close limits owing to the vital importance of the finished gun functioning properly at all times.

Departments to be Added

To the present factory will be added a completely equipped rough machining department and a heat treating plant. The rough machining department will be housed in a building 360 feet long and 110 feet wide. The heat treating plant will occupy a building 200 feet long and 100 feet wide. In the heat treating plant, all furnaces for handling the forgings will be electrically



FIG. 1—INTERIOR VIEW OF AN ORDNANCE PLANT BUILT AND EQUIPPED IN 90 DAYS



FIG. 2—A GROUP OF HIGH POWERED VERTICAL MILLERS
FIG. 3—A VERTICAL GRINDER AND A HORIZONTAL BORING MILL
FIG. 4—A GLIMPSE OF THE TOOLROOM
FIG. 5—A BATTERY OF HEAVY MILLING MACHINES
FIG. 6—THE SHRINKAGE PITS
FIG. 7—SUBSTANTIAL BENCHES FOR THE FITTERS
FIG. 8—A VIEW OF THE SHIPPING BAY
FIG. 9—A VERTICAL MILLER AND TWO GRINDERS

heated, a distinct departure from present day practice.

Immediately after the contract was closed, a subsidiary company began to design the jigs and special tools. This work was carefully organized so that the tool drafting department was able to supply the toolroom with an abundance of completed tool drawings two weeks after the initial layout was made. Work on the tools was begun during the latter part of July, 1917, and at the present time the tools are complete in every detail.

The building site as it appeared in July is illustrated in Fig. 12. Fig. 14 is a view of the building a few weeks later, while the finished structure is shown in Fig. 15. The building is substantially built; the necessity for speed not being permitted to lower the quality of the construction.

The office and finish machine shop are complete in one building, which is 700 feet long and 225 feet wide. Ample light is assured by the saw-tooth roof construction and by steel sash windows. Powerful electric lights with adequate reflectors are also provided.

The machine shop is built in six bays each 580 feet long and 37 feet wide. Each bay, with the exception of the one at the extreme west side, is commanded by two 15-ton traveling cranes. These cranes facilitate the transfer of material and the handling of heavy machine tools. Material is moved on the floor by electric trucks.

Machine Tool Layout

In the several bays the traveling cranes serve the following machine tools: First bay, 15 heavy type horizontal millers, 8 tube boring machines, 18 engine lathes, 3 cylindrical grinders and the shrinkage pits; second bay, sixteen 36-inch planers, 10 slotters, 8 vertical millers, 4 radial drills, 2 broaching machines, 10 engine lathes and 5 rifling machines; third bay, 11 slotters, 2 vertical turret lathes, 15 vertical millers, 16 engine lathes, 1 radial drill, 9 milling machines, 2 radial drills and 2 planers; fourth bay, 2 vertical turret lathes, 2 radial drills, 19 milling machines, 2 vertical grinders, 20 engine lathes, 1 heavy duty miller and 3 shapers; fifth bay, 7 milling machines; sixth bay, 42 benches, 2 shapers and 18 drilling machines.

A general plan of the machine shop is shown in Fig. 15. This building runs approximately north and south with the office at the southern end. At the northern end of the building is located the electrical repair shop, the office of the mechanical repair department, the receiving department, the storeroom and the shrinkage pits. A view of the shrinkage pits is shown in Fig. 6.

The size of the huge shop is clearly indicated in Fig. 1, which is a general view looking south. As shown in the illustration, the tools are not crowded together, an arrangement which permits the installation of more tools when increased capacity is required.

The machine tool layout was carefully worked out long before a single tool was placed in position. The tools are so arranged that the various pieces in process of machining travel in one direction through each department to the next. Before determining upon the position for each individual tool, every machining operation was carefully studied by the company's engineers in order to determine the best method of handling each piece.

The results of this intensive study are reflected in Fig. 3 which shows how a vertical grinder and a horizontal boring mill have been placed side by side. Fig. 9 shows how two high-powered surface grinders and a vertical miller have been similarly arranged. This arrangement is in striking contrast with the methods of a few years ago in which all tools of the same kind were grouped together, regardless of how the work was to be routed. In the Symington gun shop, each tool was installed with particular reference to the work required.

Efficiency tests have shown that certain operations can be done to best advantage on the planer while others are adapted particularly to the heavy duty type of horizontal miller. For this reason, both types of machines have been installed and their proper arrangement carefully determined. A battery of heavy milling machines is illustrated in Fig. 5. The vertical type of milling machine was also adopted for several important operations and a group of these machines is shown in Fig. 2.

While the factory will not begin operations until Feb. 1, a certain amount of experimental work is going on at the present time. Fig. 10 shows the operation of boring a breach ring on a vertical turret lathe while the milling of the under side of a jacket is shown in Fig. 11.

As an example of the thoroughness with which the work has been planned, a toolroom has been equipped for manufacturing such new tools as may be required from time to time and for repairing tools that become worn through use or are damaged by careless handling. The toolroom is located in the southwest corner of the shop. A view of the tool room is shown in Fig. 4.

Two tool cribs for the storage of small tools are conveniently arranged. As shown in Fig. 15, each tool crib is designed to serve approximately half of the shop. Through the use of two tool cribs instead of one larger crib, considerable economy is effected in the time spent by the workman in walking to and from the tool crib window.

The manufacture of ordnance calls for

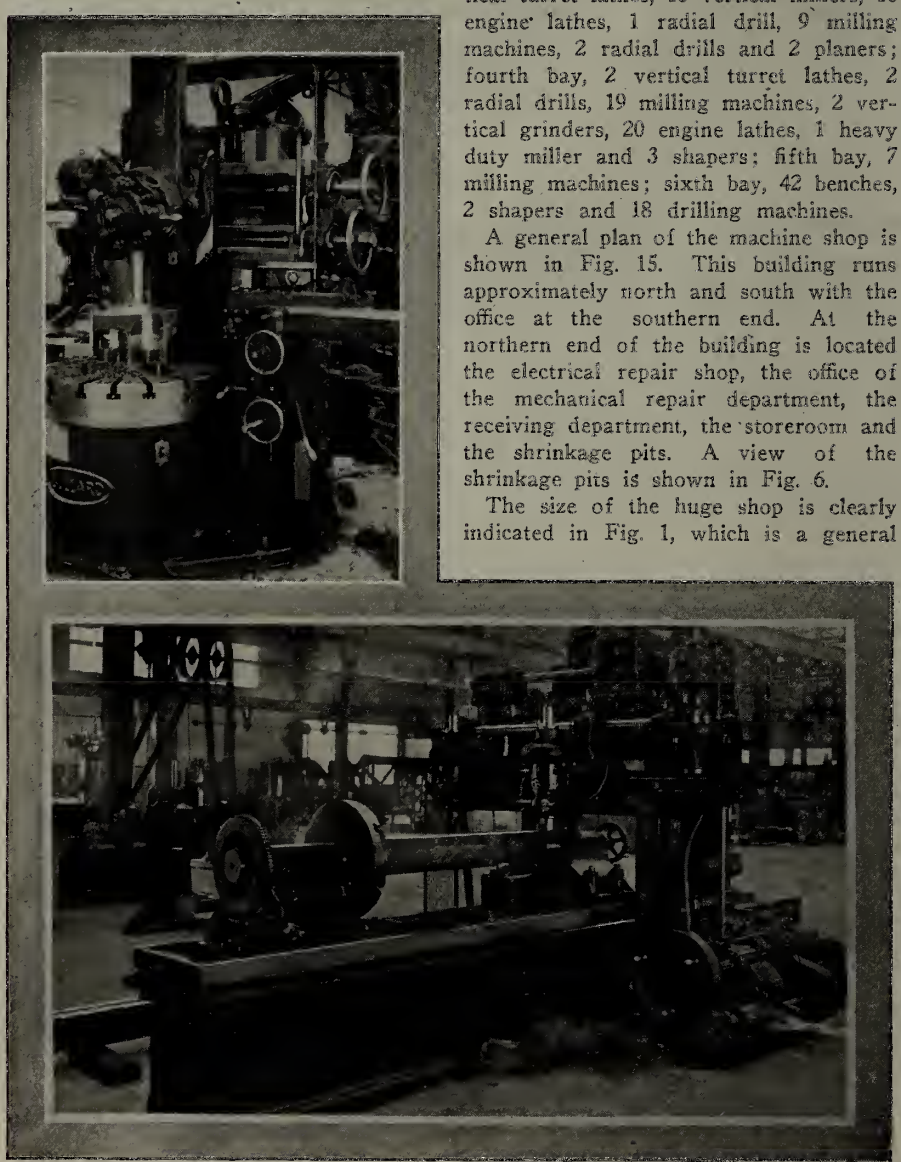


FIG. 10—BORING A BREECH RING ON A VERTICAL TURRET LATHE

FIG. 11—MILLING A GUN JACKET ON A HORIZONTAL MILLER

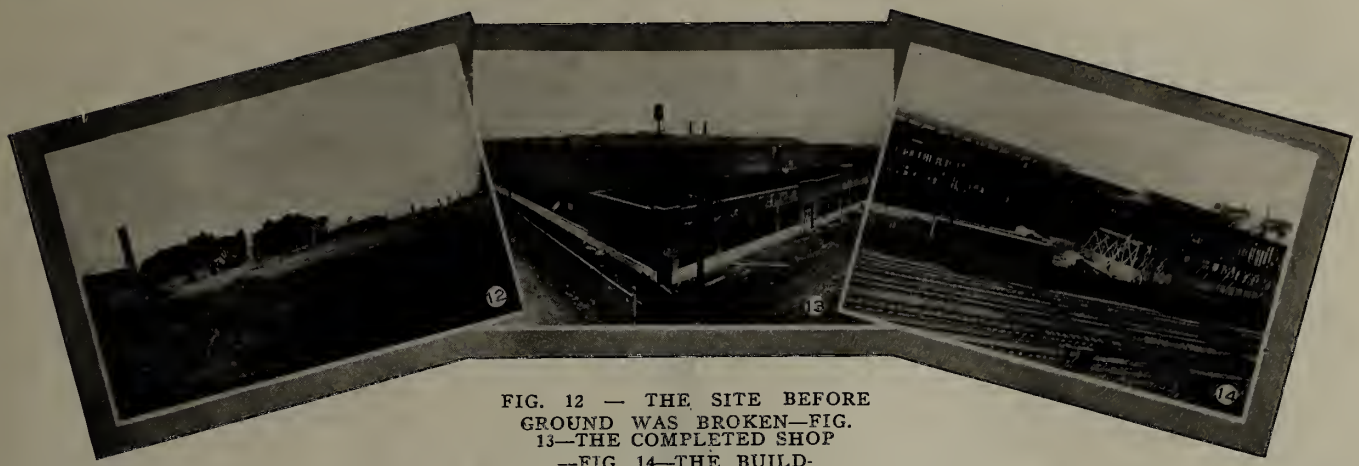


FIG. 12 — THE SITE BEFORE GROUND WAS BROKEN—FIG. 13—THE COMPLETED SHOP —FIG. 14—THE BUILDING PARTLY COMPLETED

a large amount of hand work such as filing, scraping and fitting. A department has been equipped with 42 vise benches of the type shown in Fig. 7. These benches are made of maple and are of rigid construction, being securely braced in every direction. A separate drawer equipped with a lock is provided for each workman.

Handling Shipments

The company has its own private railroad siding, two tracks running into the factory. These tracks are placed below the level of the shop floor, bringing the car floor level with the floor of the shop and facilitating the handling of incoming and outgoing shipments. This shipping bay is illustrated in Fig. 8. These tracks are also used to carry the rough forgings to and from the machine shop to the heat treating and rough machining departments.

The offices are well lighted, completely equipped and efficiently arranged. This factor of the business was given the same painstaking attention that was spent in planning the shop to the end that both departments could work at maximum efficiency. The office equipment includes many modern devices for expediting clerical work.

The principal parts of a United States field gun are the breech block, breech ring, jacket and tube, or barrel as the layman terms this part. These pieces are all made from machine steel forgings.

The forgings as received at the Symington factory first go to the rough-machining department where a large part of the superfluous metal is removed. They are then inspected for imperfections, such as laminations, that might not be noticed in the rough forgings. The forgings are then taken to the heat treating department, where the material is treated to meet the rigid specifications imposed by the government. The pieces are then transferred to the machine shop to be machined to proper dimensions.

The material for breech blocks goes to the west side of the shop, where milling, planing and boring operations are performed. The finished parts are then transferred to the assembling department.

Progressive Operations

The forgings for the breech rings are taken to the east side of the shop where they are turned and milled on the outside. The hole for fitting over the jacket is carefully bored on a vertical turret lathe and the aperture in which the breech block slides is machined on a slotter. A few minor operations are next completed after which these pieces are sent to the assembling department.

The material for the jackets goes first to the east side of the shop. The plane surfaces are finished on planer and millers after which the pieces travel to a group of lathes where parts of the jacket are turned and the hole for re-

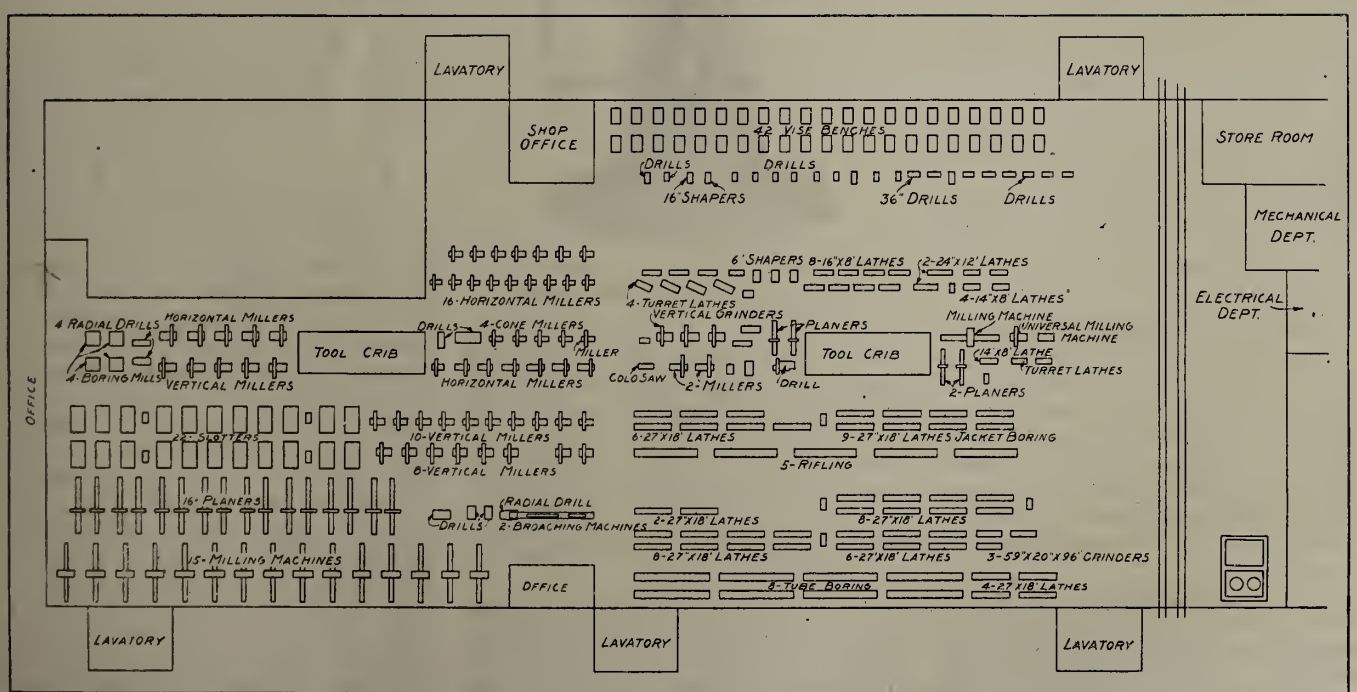


FIG. 15—ARRANGEMENT OF TOOLS IN THE NEW ROCHESTER GUN SHOP

ceiving the tube is accurately bored to the required size. The pieces are then transferred to the shrinkage pits.

The forgings for the tubes are also machined on the east side of the shop. The work consists of turning the outside and accurately boring a straight and uniformly sized hole the entire length of the piece. The outside portion which fits into the jacket is accurately ground to size on cylindrical grinding machines. The tubes are then taken to the shrinkage pits. Here the jackets are heated to a black heat, the tubes inserted and the two parts allowed to cool. As the jacket contracts, it grips the tube firmly, thus causing the two pieces to form practically an integral unit.

This unit is now returned to the machine shop where the tube is rifled. In this operation, rotary grooves are cut on the inside of the tube, the grooves imparting a rotary motion to the shell as it leaves the gun. This work is done on specially designed rifling machines. After this operation is completed, the tube and jacket are taken to the assembling department.

In this department, the breech ring is fitted to the jacket and the breech block fitted to the breech ring. The latter operation is an important one, as the breech block inserts the shell in the gun as well as ejecting it. Various minor parts, such as the breech block controling mechanism are now assembled and the gun is ready for government inspection.

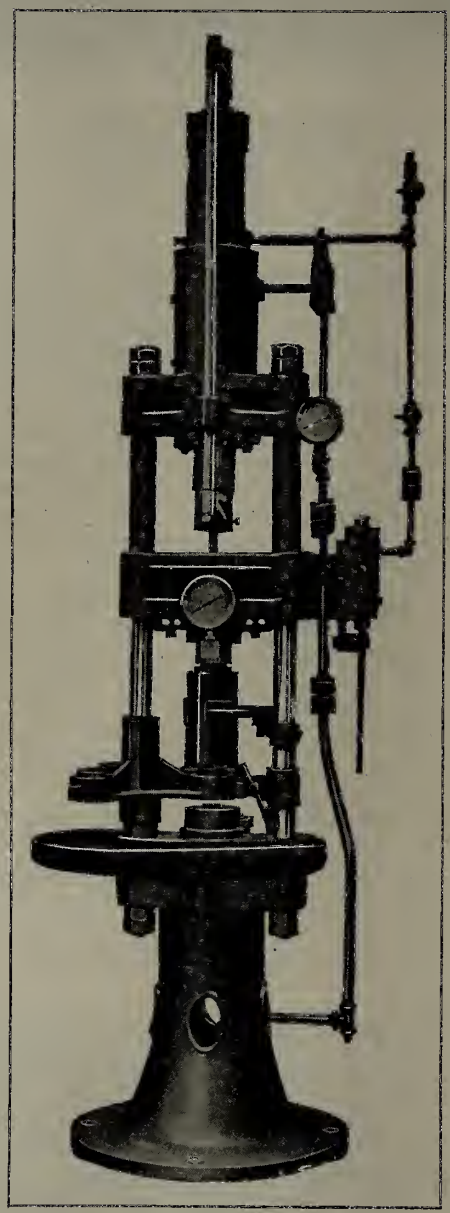
The Symington-Anderson Co. is a subsidiary company of the T. H. Symington Co., which in the latter part of 1915 organized the Symington Machine Corp. for the purpose of making shrapnel. A full account of this work was given in THE IRON TRADE REVIEW of Jan. 4, 1917, and subsequent issues. The principal officers of this company include T. H. Symington, Donald Symington and C. J. Symington, who are giving to the new gun shop the same expert attention which brought the shrapnel output of the Symington Machine Corp. from 27 in April, 1916, to 328,000 in November of the same year.

Shell Testing Machine

To meet the demands of the United States specifications for common steel shells, the Southwark Foundry & Machine Co., Philadelphia, has developed a hydrostatic shell testing press. The general arrangement of the machine is shown in the accompanying illustration.

Due to the fact that each type and size of shell requires a different test pressure, two basic designs were developed to which modifications have been made. The machine illustrated is for testing 75-millimeter or 3-inch shells.

The machine is purely hydraulic in its operation. It is of the two or three-column type, and has a revolving table suitably indexed, so that when one shell is being subjected to the hydrostatic test pressure (the maximum in the case of the 75-millimeter shell being 18,000 pounds) a second shell has been brought into position for inspection, while a third is being filled with water. The capacity of this machine, under ordinary working conditions is stated to be about 120 shells per hour. The testing operation is briefly described as follows:



SHELL TESTING MACHINE

The first movement of the single lever operating valve admits line pressure (1500 pounds) to the lower cylinder. This cylinder, moving upward, engages the slotted base plug in the revolving table and forces the open end of the shell nose into a patented sealing gland. When full pressure on the lower cylinder has been reached, line pressure is automatically admitted to the top cylinder, which is arranged with an intensifier ram projecting through a packed gland in the stationary cross-member into the open nose of the shell, which having been previously filed with water, acts as the high pressure intensifier cylinder. The pressure is instantly raised to the predetermined amount, and is read direct by a gage communicating with the chamber intervening between the circular shell nose and the intensifier ram. The high-pressure of test is developed only in the body of the shell, all other parts of the machine, including the operating valves, piping and cylinders, are not subjected to a higher pressure than 1500 pounds per square inch.

Magnet Salvages Pig Iron

A collision last March between a barge of the Arrow Transportation Co. and a pier near Paducah, Ky., dropped about 420 tons of pig iron into the Tennessee river. The insurance company paid about $10,000 to cover the loss and set about to recover its money. The company fitted a barge with a crane and a 43-inch lifting magnet purchased from the Cutler-Hammer Mfg. Co., Milwaukee, and dragged the river bed in the vicinity of the accident. About 400 tons of the iron were recovered and the increase in price netted a profit of about $2000 with all the recovery expenses paid.

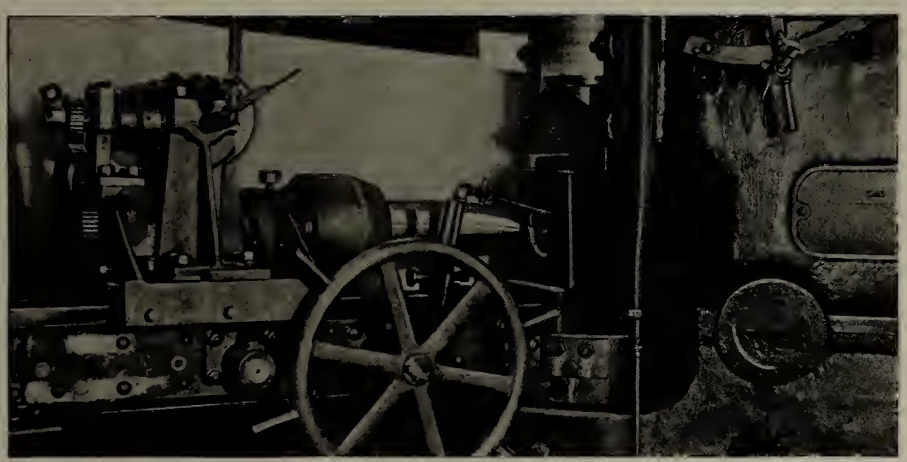
The standardization committee of the American Society of Mechanical Engineers reported at the annual meeting that its most important activity has been its work in connection with the creation of an American engineering standard committee. Active in this work were jointly the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Society for Testing Materials. Delegates from these societies created an executive committee consisting of one member from each and this committee reported a constitution and by-laws to the main joint committee, which latter accepted the report and caused it to be sent to the founder societies for their action.

A new 2-story welfare building, 50 x 150 feet, will be built by the American Smelting & Refining Co., Perth Amboy, N. J.

Conforming a Shop to Shell Making

Improvised Machines and Methods Necessary to Shell Production in a Small Machine Shop—How One Plant Met New Conditions —A New Method of Nosing Shells

GRIM necessity has always developed engines of war as needed, and in war times industry is inevitably goaded to intensive effort to plan the practical construction of machines, guns and munitions. Early in the present war a shell was a curio in this country, known only to those in the army or acquainted with army affairs. As Europe's needs increased, we received our elementary course in making guns and shells. This training was of the greatest value and has prepared the way for the present, and for that time when, if necessary, every small town machine shop may be a munition plant. The Elyria Machine Co., Elyria, O., entered the munition game early. The machine shop in Elyria soon proved inadequate to handle the orders which were received from Belgium, so a plant of the Buffalo Pitts Co., Buffalo, N. Y., was leased and rearranged. In this plant the Elyria company manufactured a variety of shells of the French type, that is shells with a longer taper than the British shell and of course designed according to metric measurements.



GENERAL ARRANGEMENT OF PATENTED SHELL-NOSING MACHINE

Special machinery was improvised to meet the numerous difficulties which arose. Gas furnaces were built to provide for heat treatment processes, and special types of these furnaces were designed to heat the ends of the shells for nosing, without placing the entire shell in the furnace. To accomplish this, the shells were shoved through circular openings in the door of the furnace. These openings were of a diameter just sufficient to admit the shell to the point where it had been machined ready for nosing.

A peculiar condition necessitated a change in the process of nosing these French type shells. Under ordinary practice the shell forging, after being centered and rough machined, is placed vertically, base down, under a hammer or press. A die, shaped to the measurements of the shell nose is forced down over the forging until the shell is compressed to the taper required. This might be called a swaging process. The force is applied vertically to the long axis of the shell.

This process is generally used in English shell-making practice, but objection was made to its application to manufacture under French specifications. An English shell of 6-inch diameter has ⅞-inch of metal at its thinnest section The 155-millimeter French shell which approximates 6.08 inches in diameter has only ⅝-inch in the corresponding section. It seemed probable that hammering along the long axis of the shell might cause a buckling along the plane of the weakest section or bourrelet. Or if this failure did not develop, it was feared that on firing, the tremendous impact on the base of the shell might cause it to spread due to weakness set up in nosing. This action might be compared to the opening of an umbrella when the end is struck or dropped to the pavement. This spreading would result in the shell's jamming in the gun and a probable explosion would ensue under action of the fuse.

To meet the difficulties in nosing, R. J. Wehland of the Elyria Machine Co., developed a machine for applying the force perpendicularly to instead of along the axis of the shell. This machine is shown in the accompanying illustration. It consists essentially of a steam hammer with two dies, and a movable carriage which feeds the shell between the dies and rotates it between strokes of the hammer. The lower die is rigid. The upper one is impelled against the shell with a 1-inch stroke at the rate of 125 times per minute. The machine is shown completing the tapering of a 155-millimeter shell.

The shell base is held in the block on the carriage or feeding machine. Rotation is induced by a compressed air motor working through the small pinion, *P*, to the large gear which rotates the clamping device by which the shell is held. This rotation is at a constant rate. The entire carriage is moved forward by means of a large hand wheel until the nosing attains the form desired. The hammering is perpendicular to the long axis of the shell and the only force delivered along the axis of the shell is that forward movement on the table by which the carriage is moved forward by the wheel when the shell is fed into the dies. This method of nosing proved successful and several similar machines are in use at the present time in this country and Canada.

The Elyria Machine Co. has received a contract for finishing a large number of French-type shells for American guns. The shells are to be made from forgings of 0.60 per cent carbon steel, which will be supplied. The blank weighs 162 pounds and after finishing the shell will weigh 75½ pounds. No heat treatment will be given.

A nosing machine similar to the one just described will be used, but instead of a steam hammer a forging press manufactured by the Toledo Steel Casting Co., Toledo, O., will be employed.

A 15-ton open-hearth furnace is being installed in the plant of the Atlas Crucible Steel Co., Dunkirk, N. Y., by Wellman-Seaver-Morgan Co., Cleveland.

A department for the handling of relaying rails and second-hand railway equipment, has been opened by the Ohio Iron & Metal Co., with offices in First National Bank building, Chicago.

How Erosion is Caused in Big Guns

A Discussion of the Major Factors That Destroy Gun Rifling—Among the Remedies Suggested Are the Use of Unsoftenable Steels and the Adoption of Removable Gun Liners

BY DR. HENRY M. HOWE

THIS paper is based in large part on the examination of two rings cut from an eroded 14-inch gun liner, and containing, according to Booth, Garrett and Blair: Carbon, 0.380 per cent; manganese, 0.655 per cent; nickel, 2.810 per cent; vanadium, 0; chromium, a few hundredths of 1 per cent; tungsten, 0; molybdenum, 0.

These rings were received by the author from Admiral Joseph Strauss, then chief of ordnance, United States navy, through the kindness of Hudson Maxim, chairman of the committee on ordnance and explosive, of the United States naval consulting board. The gun from which these rings were cut was 53 feet 6½ inches long over all, and had been worn out at the proving ground by firing 170 rounds. The rear ring was cut at the origin of rifling, the forward one at 207 inches from the breech face, or about one-third way from the breech to muzzle. I understand that these guns weigh 63 tons, and fire a shell weighing 1400 pounds with a muzzle velocity of 2600 feet per second and a muzzle energy of 65,000 foot tons. The erosion has been marked in the forward ring, while in the rear one it has erased the lands almost completely.

Destruction of Rifling

The rifling consists of a series of lands or spiral projections from the bore of the gun. The projectile, through its copper driving band, engages these projections and is thus set spinning clockwise about its axis.

Two strong agencies tend to erase these projections, and thus to erode the bore the scraping of the driving band and the rush of white-hot gases and perhaps liquids, and of incandescent and yet ungasified explosive. These may for our purpose be grouped together as the gases. The scraping effect of the driving band is due to its combination of extremely rapid motion with tangential pressure great enough to overcome the resistance of the projectile to receiving a rapid rotation. The seriousness of this scraping effect is easier to conceive than that of the rush of the gases. We may get some notion of this latter from the fact that its eroding effect is greater than that of the driving band.

That even fluids have great erosive power is shown by the strong cutting action of filtered water escaping from under great pressure, as at leaks in hydraulic apparatus. The thickness of the layer eroded in each round from a 12 or a 15-inch gun is about 0.0005 inch, according to Mr. Maxim.

Erosion must needs increase rapidly with the size of the gun and the weight and velocity of the projectile. The heating effect must increase with the length of the gun because this implies a longer exposure to the hot gases. To vary Sir Frederick Bramwell's illustration, to pass from a 6 to a 12-inch gun and to double all linear dimensions would increase the weight of the powder eight fold, while only doubling the inner circumference. The corresponding increase in the weight and velocity of the projectile would increase its torque greatly, and hence the total tangential pressure of the driving band on the lands, while only doubling the circumference available for lands. With even 7-inch muzzle-loading guns of 7 tons weight, with 30 pounds of powder and a 115-pound shell, erosion became serious.

Erosion is accompanied by the hardening and cracking of the face of the bore, the main cracks being longitudinal in the grooves and transverse on the lands.

Time Analysis

Let outer and inner, outside and inside, respectively, refer in every case and under all conditions to parts farther from the axis and nearer to it. Thus the outer face of the hardened layer is the face farther from the axis, and its inner face is that nearer the axis, the bore face.

If the velocity of the projectile through the 36 feet from the forward ring, which the author examined, to the muzzle was equal to the muzzle velocity of 2600 feet per second, then the length of time between its passing that ring and escaping into the air would be 0.014 second. But as there is very appreciable acceleration during this travel, this period may be taken as of the order of 0.02 second. This is in rough accord with the data of Mr. Maxim that the projectile stays in a 12-inch 45-caliber gun a total time of about 0.062 second, and of Admiral Earle that about half the time is occupied in moving forward the first caliber. The total time of travel for such a 12-inch gun is given by others as 0.0471 second.

Because the length of time increases

Save Our Guns

On the life of our big guns hangs victory or defeat. At this critical time in the world's history it is gratifying to know that our guns are as efficient as it is possible to make them and that no country whatsoever has yet produced guns that have shown longer life. As stated in THE IRON TRADE REVIEW, *March 1, 1917, it has been fashionable to emphasize our lack of naval preparedness by giving credence to stories to the effect that our high-power battleship guns are worn out and unfit for service. These stories are both absurd and erroneous. Many of our big guns, so states a prominent naval officer, have been fired 1.6 times the theoretical number of rounds with no diminution in range or accuracy.*

The average layman is aware of the fact that the life of a modern gun is comparatively short, owing to the erosion of the rifling lands caused by the passage of the projectile and burning gases. In THE IRON TRADE REVIEW *of Dec. 14, 1916, Henry Fay's paper on the erosion of guns was published. This paper was read at the February, 1917, meeting of the American institute of Mining Engineers, where it attracted much attention. The present paper by Prof. Howe treats of the same subject and he draws some interesting conclusions. Also, he offers suggestions for lessening erosion, among them being the adoption of a less erodible metal for gun linings.*

Abstracted from a paper to be presented at the February meeting of the American institute of Mining Engineers. The author, Henry M. Howe, one of the most widely known metallurgists in the world, is emeritus professor of metallurgy, Columbia University, and metallurgist attached to the bureau of ordnance, war department.

roughly with the caliber, these two estimates of the time of travel would correspond to 0.07 and 0.05 second, respectively, for a 14-inch gun.

The Hardening of the Bore

After even as few as five rounds have been fired, the surface of the bore is found to be hardened. At first this hardened layer is confined to the rear of the gun, where the heating has been longest and highest. As firing progresses, it thickens and extends further forward, decreasing in thickness from breech to muzzle, where in the early stages it may be confined to a very thin layer on the driving edge of the lands. The hardened layer is the light narrow band, about ⅛ inch wide.

While in the rear ring I examined it is an annulus of nearly uniform thickness, as would be inferred from the almost complete effacement of the lands, in the forward one it is greatly thickened at the salient angle of the driving edge, and thinned correspondingly at the re-entrant angle.

That this thin hardened layer consists of martensite has been reported independently by Belaiew and Rosenhain, and has been confirmed by Fay. This martensitization, of course, can come only from rapid cooling and is more likely to represent rapid cooling from a decidedly higher temperature. In the section cut from a 4.7-inch rapid-firing gun tube examined by Roberts-Austen and Osmond, the martensite could not be definitely identified, but Professor Fay's identification seems to be complete, first in that his hardened layer was changed into troostite on heating to 300 degrees, and second in that he detected the martensitic structure. Hence it certainly represents the heating of the surface of the bore, followed by a cooling so rapid as to catch the metal in the intermediate state of martensite, by denying the time necessary for the transformation in cooling to go farther. This is wholly concordant with the long-known fact that the transformation from the alpha or pearlitic to the gamma or austenitic state is extremely rapid, while the reverse transformation is relatively slow. It is quite parallel to the hardening of the surfaces of rails by the slip of the driving wheel, and to that of the surface of a rolling-mill roll which slips past the surface of a sticker. In each case a thin layer of surface is heated above Ac_1 and thus converted at least partly and probably completely into austenite, and is immediately re-cooled by conduction to the cold mass of outer metal too rapidly to permit the transformation from austenite back toward pearlite and ferrite to go beyond the martensite state.

Starting with the sorbite, or very intimate mixture of microscopic particles of ferrite with cementite, of which the gun lining consists initially, its hardening consists of two wholly distinct necessary steps. First, the individual particles of ferrite and cementite merge to form a single substance, austenite. It is only at high temperatures that this merging is possible. Second, during the rapid cooling this austenite transforms into martensite. This martensitization is the essence of hardening, and the hardened layer owes its hardness to its being martensite. Martensite can form only during the rapid cooling of austenite, so that the merging to form austenite is absolutely essential to the hardening. Hence, given the rapid cooling which inevitably occurs in the gun liner, it is only in that layer in which the ferrite and cementite have actually merged and formed austenite that hardening can occur.

It is only at the very contact between adjoining particles of ferrite and cementite that this union can begin, quite as a mixture of salt and water can unite only at the surface of the various grains of salt. The austenite layer thus formed about each grain immediately begins dissolving an additional layer from these same particles of ferrite and cementite, quite as the brine between the grains of a mixture of ice and salt begins dissolving both ice and salt at the surface of the various grains. In effect it is by entering the intervening brine that the salt and ice of the layer which is now dissolving from each grain reach each other and thus react on each other and bring each other to the liquid state.

Erosion is generally referred chiefly to the gases and only in minor degree to the scraping action of the driving band. This is reasonable in view of the facts, first that the metal at any given transverse section is exposed incomparably longer to the rush of the gases than to the driving band, and second that the steel is incomparably hotter during most of its exposure to the gases than during its contact with the driving band.

The relation between the erosion of the lands and that of the grooves tallies with this belief. If the driving band did most of the erosion, then the lands should erode incomparably faster than the grooves, because the driving band, in becoming engraved upon the rifling, must press much harder on land than on groove. Consider a round rubber cork pressed into the neck of a bottle, ribbed on its inside.

We should not go so far as to suppose that the copper of the driving band does not reach the grooves, because the copper network in them seems to disprove this. That on the lower side of the bore might indeed have run into the cracks in a molten state during the contraction period, but that on the upper side cannot readily be explained thus. But the actual excess of erosion of land over groove is about that which we should expect from a higher temperature of the land, and the stronger rush of the gases past it.

Remember, too, that, after a few rounds, because of the progressive decrease of erosion from breech toward muzzle, the space into which the driving band has to fit is in effect tapered chokingly in this same direction, and further that because this erosion is greater on land than on groove, the taper or gradient too is stronger on land than on groove. This stronger gradient of the land would tend continuously to keep the copper out of contact with the grooves, or at least to lessen the pressure at that contact.

Grooves Not Copper Filled

The copper mouthful hypothesis leads us to expect every crack to be filled flush with copper at each round. We saw that the copper filling of any given crack was not a single firmly coherent

Unsoftenable Steel Suggested

If steels which cannot be softened in order to facilitate machining, such as tungsten, molybdenum and manganese steels, should show great resistance to erosion in preliminary tests, a possible way of using them, Prof. Howe suggests, would be to restrict them to the rear part of the gun, where the erosion is most rapid, to cast the rifling in and to take a light finishing cut with a grinding wheel. If the life of great guns is as brief as we have sometimes been told, then if we had a substance far more resistant to erosion than our present gun steel, but very expensive to machine, it might be wiser to use it in the rear of the gun and machine it only roughly to dimensions, in view of the fact that in present practice the rifling retains its initial accuracy for only relatively few rounds, after which it degenerates greatly through erosion. The fact that the gun gives by far a greater part of its useful service after it has lost its initial accuracy of rifling proves that this accuracy is not essential to usefulness.

mass. This hardly surprises us. When a crack opens during the period of cooling and contraction, its present copper contents may well become coated with oxide, carbon, or ash, of which the thinnest layer will suffice to prevent it from becoming firmly attached to the copper mouthful next bitten off, great though the pressure is which forces them together in the immediately following expansion period. Again, the copper may well be prevented in the same way from becoming firmly attached to the steel walls of the crack. Moreover, the difference between the coefficients of contraction of steel and of copper might well tend to separate them during this contraction, and indeed the forcible opening of the jaws then detaches the copper from one face of its crack, and might weaken its hold on the other. Hence we are not surprised that certain cracks fail to retain their last mouthfuls of copper, which is all that is meant by their not being filled flush.

We naturally expect it to by increasing the heating up of the steel near the bore, by means of the heat of the gas which enters the cracks. I doubt whether it has an important effect in this respect, because the hardened layer does not follow down the sides of the cracks, as it would in case there was an important entry of hot gas into them.

Indeed, the longitudinal and transverse cracks should, in a sense, lessen the tangential and longitudinal stresses tending to burst the gun. In a material which does not crack, tensile stresses, both longitudinal and tangential, would remain at the end of the cooling, of such intensity that, if unopposed, they would now create cracks the width of which would represent the contraction in that cooling. These stresses in an uncracked tube, and the cracks in a cracked one, in effect lessen the sum of the tangential and longitudinal stresses, respectively, tending to burst the gun, because they take up the expansion which the bore face undergoes because of its heating, and to that extent prevent it from adding to the sum of the stresses developed by the gas-pressure.

Palliatives of Erosion

In view of the slowness with which such an isotherm can be induced to travel into a mass of steel which we heat in a furnace at, say, 1000 degrees, the temperature which the bore face itself must reach in order to induce so rapid an outward travel of this isotherm should be extremely high, because the rapidity of movement of an isotherm increases with the steepness of the thermal gradient behind it. It would be surprising if the temperature did not reach the solidus, about 1350 degrees for gun-liner steel, and it may well reach the liquidus, or even a much higher temperature.

The driving band exerts very great pressure, but this is before the face of the bore has been heated highly by the exposure to the hot gases. The temperature of the bore face continues to rise rapidly after the driving band has passed, because of the now direct exposure to the hot gases. Their velocity and pressure are so enormous that they probably scrape forward and detach not only the metal which is actually above the solidus, but also that which is at a temperature of great softness shortly below the solidus. The pulling away of each particle implies overcoming the cohesion which holds it to those left behind, and hence the resistance of the metal to erosion should increase with its cohesion, and hence with its hardness, which is simply the name which we give to a varied group of manifestations of cohesion. We set aside certain manifestations of the cohesion of the whole section of a test bar under such names as tensile strength, compressive, shearing, transverse, and torsional strength, and we group together most or all of the remaining manifestations of cohesion as hardness whether they are manifested in a scratching test such as that of Turner's sclerometer, or in a compressive ball test like Brinell's, or in a wear test, or in the rebound of a test hammer like Shore's, though these tests have little more in common with each other than they have with the determination of the tensile strength. It so happens that most of these manifestations of cohesion which we group together as hardness have to do chiefly with the superficial parts of the specimen, but this distinction is not applied consistently, as for instance when we say that an armor plate is hard from face to back. Hardness, then, is a heterogeneous collection of unselected manifestations of cohesion.

Erosion Resisted by Hardness

Because resistance to wear is a manifestation of cohesion and thus related to the other forms of hardness and strength, we naturally infer that white hardness should oppose erosion, which after all is only a special form of wear.

Because the rushing gases sweep forward not only the metal actually melted but also that which is erodibly soft, erosion is resisted not alone by a high melting point but also by what I venture to call "white-hardness," hardness at a white heat and even when near the solidus. White-hardness thus is a quality comparable with red-hardness.

It seems too much to hope that the velocity and pressure of the gas stream in the bore shall be great enough to give the projectile its enormous velocity in a trifling fraction of a second, and yet shall not be able to tear away some solid particles from the face of the bore. Add to these the enormous temperature developed, and our wonder rather is that the erosion is not greater.

The ways of lessening erosion are:

1.—To reduce the temperature by devising an explosive which shall deliver more of its energy in the form of pressure and less in the form of temperature. On this point the metallurgist may well hold his peace, especially because a large part of the present pressure must be a result of the high temperature.

2.—By lubrication, for instance with graphite, which should be affected but little even by this high temperature.

3.—By devising ready means of drawing and replacing the gun liner. To the layman this seems incomparably the most promising means. With electricity as a ready means of heating and expanding the body of the gun, and carbonic snow and liquid air as ready means of contracting the liner, and with graphite to lubricate it, surely our present mechanical engineers should be able to pull an old liner out and push a new one in, in view of the antiquity of the invention of shrinking a tire upon a wheel.

4.—By using a less erodible metal. This is the only palliative I would venture to discuss.

Because a high melting point is evidently of very great importance, we naturally turn to alloys of iron with metals more infusible than it. Of these there are only four, tungsten, molybdenum, vanadium, and titanium, which are to be had in quantity and at a price that makes them worth considering.

One of the most intelligent makers of high-speed tool steel informs me that tungsten raises the "pouring temperature" at the rate of about 11 degrees Cent. per 1 per cent of tungsten. This

Big Guns Erode Rapidly

Erosion must needs increase rapidly with the size of the gun and the weight and velocity of the projectile. The heating effect must increase with the length of the gun because this implies a longer exposure to the hot gases. To pass from a 6 to a 12-inch gun and to double all linear dimensions would increase the weight of the powder eight fold, while only doubling the inner circumference. The corresponding increase in the weight and velocity of the projectile would increase its torque greatly, and hence the total tangential pressure of the driving band on the lands, while only doubling the circumference available for lands. With even 7-inch muzzle-loading guns of seven tons weight, with 30 pounds of powder and a 115-pound shell, erosion became serious. With modern guns it is a tremendous problem.

does not necessarily conflict with the inference which Guertler draws that "the melting point of iron should be lowered little at the first by tungsten."

Guertler's "preliminary and hypothetical" diagram of the iron molybdenum alloys implies that even the liquidus is lowered by an addition of some 22 per cent of molybdenum to about 80 degrees Cent. below the melting point of pure iron, and that it is not till the molybdenum content reaches about 42 per cent that the liquidus again rises as high as the melting point of iron.

Titanium is even less encouraging, for additions of it up to 13 per cent lower the liquidus rapidly and the solidus extremely rapidly, bringing it down to 1300 degrees, or 230 degrees Cent. (446 degrees Fahr.) below that of pure iron, when the titanium content reaches 6 per cent. The solidus remains at this temperature at least till the titanium content reaches 19.90 per cent.

Vanadium, too, lowers the melting point of iron, though by no means so rapidly. A vanadium content of about 33 per cent is reported to lower both liquidus and solidus to about 1440 degrees.

Manganese steel has shown surprising endurance of conditions closely like those of the lands, in its use as a pipe ball in lapwelding tubes. Here the white-hot steel skelp under very great pressure is scraped very rapidly over the face of the ball, much as the white-hot gases of the gun rush past the surface of the land. In both cases we have rapid frictional motion under great pressure at a very high temperature.

Why manganese steel is so endurant under these specific conditions we do not know. Indeed, its relatively low thermal conductivity and specific heat might at first seem to work against its endurance, if we should forget that these properties as we determine them in other steels are those of the pearlitic state, and hence give little suggestion of what they are in the austenitic state in which erosion is resisted. Against manganese steel must be weighed its proneness to oxidize, and the very great cost of rifling it.

If any of these steels which cannot be softened in order to facilitate machining, tungsten, molybdenum, and manganese steels, should show great resistance to erosion in preliminary tests, a possible way of using them would be to restrict them to the rear part of the gun, where the erosion is most rapid, to cast the rifling in, and to take a very light finishing cut with a grinding wheel. If the life of great guns is as brief as we have sometimes been told, then if we had a substance far more resistant to erosion than our present gun steel, but very expensive to machine, it might be wise to use it in the rear of the gun, and machine it only roughly to dimensions, in view of the fact that in present practice the rifling retains its initial accuracy for only relatively few rounds, after which it degenerates greatly through erosion. The fact that the gun gives by far the greater part of its useful service after it has lost its initial accuracy of rifling proves that this accuracy is not essential to usefulness. Toward the muzzle of the gun the machining may be more accurate.

Ohio is the Leading Tool Builder

ACCORDING to statistics recently published by the bureau of the census, United States department of commerce, Ohio ranks first among the states of the nation in the production of machine tools. Rhode Island is second, and Connecticut and Massachusetts are third and fourth, respectively. The figures on which this listing is based appear in the accompanying table compiled from the census of manufactures for 1914. They are of especial interest because for the first time in the history of the census, the statistics of the machine tool industry have been shown separately. Heretofore the information regarding machinery has been incorporated under the heading, "Foundry and Machine Shop Products", a classification so broad that it had no significance to men of the machine tool industry.

Ohio, with a production of machine tools valued at $9.014,178, has produced almost one-third of the tools made in the United States. However, by grouping Rhode Island, Connecticut and Massachusetts under the classification "New England", the eastern community has an output of $10,003,-024, which is over 33 per cent of the total.

It is unfortunate that the early census reports did not contain statistics with which the possible figures could be compared. Such figures, if they existed, would serve as a basis for comparing the growth of the machine tool industry of the middle west with that of New England. However, even without the early statistics, the output of machine tool plants in Cincinnati, Cleveland, Toledo and Dayton, reached a point in 1914 slightly in advance of that of manufacturers in Providence, Hartford, Worcester and New Britain in New England's great toolmaking center.

Machine Tool Output in 1914

	Machine tools*	Metal working machinery†
Ohio	$9,014,178	$2,909,389
Rhode Island	3,679,190	174,490
Connecticut	3,280,940	2,407,987
Massachusetts	3,042,894	859,608
Pennsylvania	2,466,198	4,069,278
Illinois	1,935,861	1,902,651
New York	1,782,494	3,160,369
New Jersey	1,558,412	546,346
Michigan	1,179,761	280,564
Wisconsin	1,004,812	209,052
All other states	2,501,920	899,792
Total in U. S.	31,446,660	17,419,526

*Machines which employ a tool for working on metal.
†Other than machine tools.

Other items of machines, mentioned in the census report, include metal working machines, other than machine tools; air compressing, mining, pumping and woodworking machinery.

As shown in the accompanying table, Pennsylvania leads in the manufacture of metalworking machinery not classified as machine tools, and also in the manufacture of air compressing and mining machinery. Massachusetts leads in the manufacture of pumps and pumping machinery; and Wisconsin, presumably because of its Racine and Milwaukee industries, leads in the production of woodworking machinery.

Manufactures Supply Gages

When the ordnance department contracts for munitions it is customary for manufacturers to supply the gages necessary. The government furnishes a set of master gages to the manufacturer and to all inspectors. They are kept at the factory and are used for checking the inspection gages. The gage inspection work is assigned to Major L. A. Fischer who organized the gage inspection service at the time he was connected with the division of weights and measures.

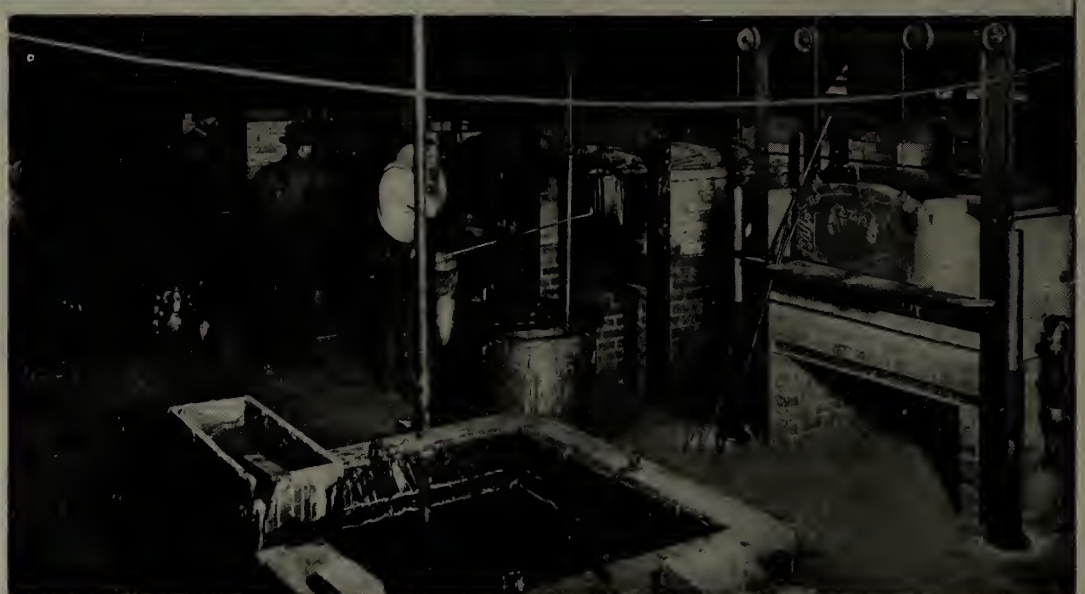
Great importance attaches to the prompt and adequate supply of gages as the speeding-up of all munition work is dependent upon this factor. This was brought out by Capt. Richard J. Durley of the imperial munitions board of Canada at the annual meeting of the American Society of Mechanical Engineers. Notable progress has been made since we entered the war in supplying these gages.

Tool Grouping Fosters Efficiency



Accompanying are Views Taken at the Cleveland Milling Machine Co., Cleveland, Maker of Machine Tools and Milling Cutters

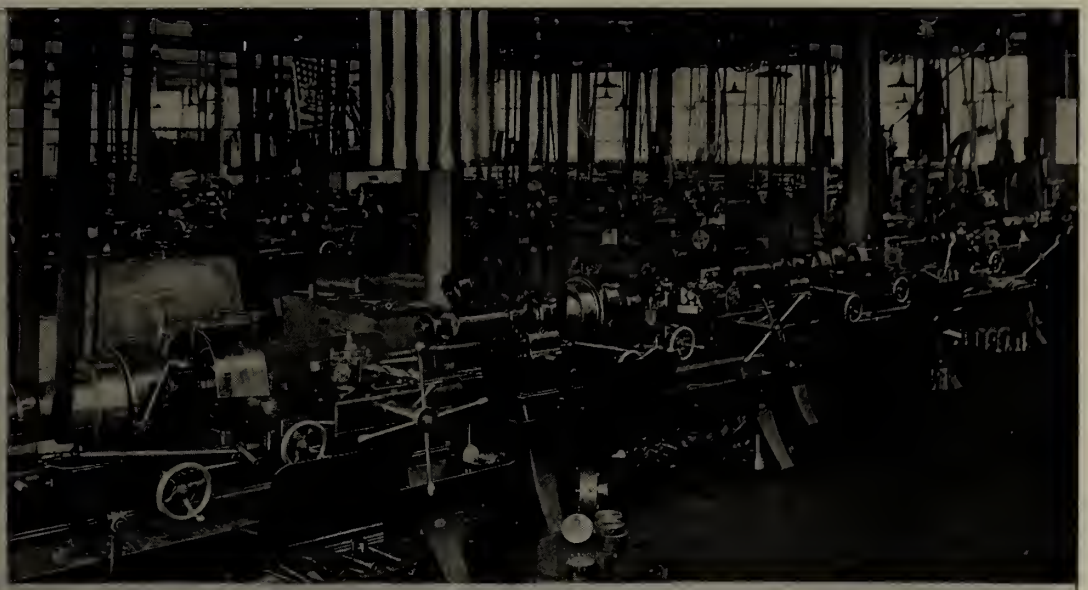
Above, Groups of Relieving Machines and Lathes for Rough Turning are Shown; at the Right, the Heat-Treating Department

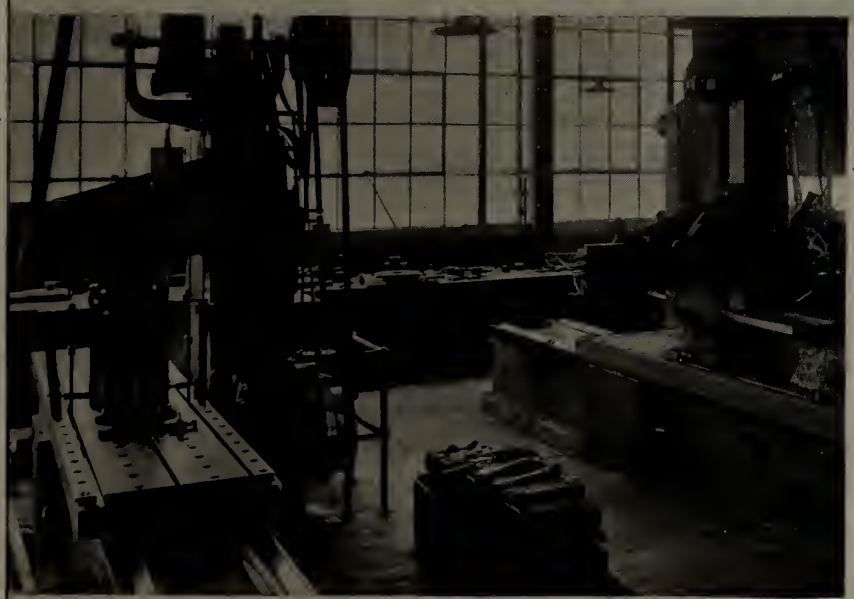




Wide Adaptability and Capacity for Taper and Miscellaneous Tool Grinding is Suggested by This View of the Grinder Section

Boring, the First Operation in Making Milling Cutters is Performed on the Turret Lathes Illustrated at the Right

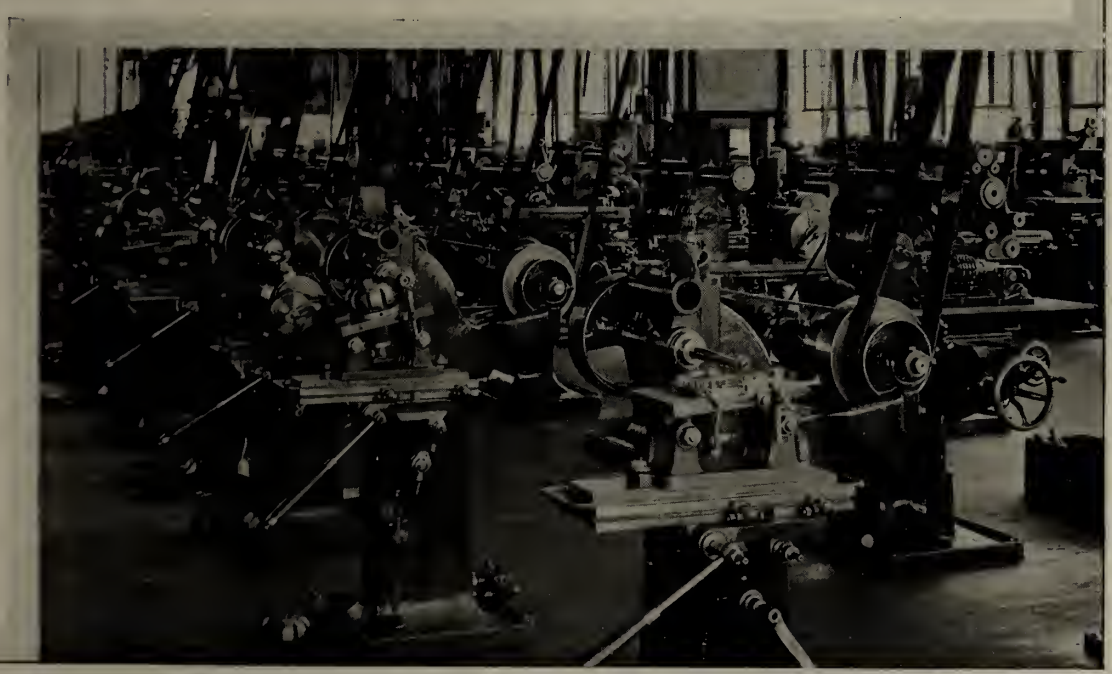






Heavy Planer Equipment that Permits Quantity Production of Milling and Relieving Machines

View of Hand and Power Feed Milling Machines Where Teeth are Gashed in Cutter Blanks, Preliminary to Relieving and Hardening



The Time Effect in Tempering Steel

A Uniformly Tempered Steel is Imperative in Rifle Barrels Owing to the Difficulty of the Barrel Drilling Operation—A Few Tests of Physical and Chemical Properties

BY A. E. BELLIS

THE time effect in reheating certain steels below the critical range is marked. The increased toughness, shock-resisting power, and machinability of steel subjected to a long, high drawing temperature has been thoroughly demonstrated and is of practical importance, particularly in the manufacture of "smokeless" rifle-barrel steel.

The time effect in tempering is most important when a maximum drawing effect is desired, in which case maximum physical properties as well as ease of machining are important considerations. These are the conditions in drilling a rifle barrel. A hole, 0.30 inch in diameter and 24 inches long for the Springfield rifle, and 30 inches long for the Russian military rifle, must be drilled in the heat-treated material. This barrel drilling operation is probably the most difficult one in rifle manufacture, and anyone who has been connected with rifle manufacture knows how seriously production is affected when "hard" or un-uniform steel for barrels is encountered.

The physical properties of two different lots of barrel steel are given below. The first lot, No. 1, gave serious trouble in the drilling operation. The second gave no trouble at all.

	No. 1	No. 2
Elastic limit, pounds per sq. in.	117,450	116,800
Tensile strength, pounds per sq. in.	132,500	131,750
Elongation, per cent	16.0	20.0
Reduction of area, per cent	42.1	51.0
Impact strength, ft.-pounds per sq. in.	450.0	520.0

This difference in machining and physical properties was due entirely to the time of reheating. The first lot was given a reheating time of 30 minutes, the second lot remained at the reheating temperature two hours. Both lots had been oil-quenched from 1500 degrees Fahr. and reheated to 1180 degrees Fahr. The time required in the reheating or drawing for the work to come to temperature was not counted. This time was approximately 20 to 30 minutes. The steel used had the following composition: Carbon, 0.54; sulphur, 0.050; manganese, 1.22; phosphorus, 0.065.

The physical properties when untreated were found to be as follows:

Elastic limit, pounds per sq. in.	69,800
Tensile strength, pounds per sq. in.	128,700
Elongation, per cent	15.0
Contraction, per cent	35.2

Further experiments established the fact that at least a 2-hour reheating is necessary in order to have satisfactory machinability. Steel which, after treatment, gave elongation of 20 per cent or over gave no trouble in the shops. These results were substantiated by hundreds of physical tests and production reports on thousands of barrels.

A similar test with different heat lots of steel indicates that greater increase in machinability, ductility, and resilience can be obtained by making the drawing time still longer. The results of this test with drawing periods of 1, 2 and 3 hours, together with the results of another test made with drawing periods of one-half hour and 12 hours are shown in Table I. The latter test was made with the idea of producing the maximum time effect.

It will be noted that there is a decrease in the elastic limit and tensile strength as the drawing time is increased. This decrease, however, is slight compared to the relatively great increase in ductility and impact strength. The decrease of elastic limit of less than 1 per cent is accompanied by an increase of 25 per cent in ductility as measured by elongation, and 13 per cent increase in impact strength.

In order to determine whether this effect was largely due to the high manganese content of the steels, an ordinary machining steel of the same carbon content was given a similar test. The steel analyzed: Carbon 0.53; sulphur, 0.036; manganese, 0.65; phosphorus, 0.049.

Four specimens were oil-quenched from 1500 degrees Fahr., and drawn at 1180 degrees Fahr. for periods of ½, 1, 2 and 4 hours, respectively. The results are shown in Table II.

In all of these experiments, the standard test specimens were prepared from the bar stock *after* the heat treatment. The original diameter of the stock was 1 1/32 inch. The heat treatment was carried on in large production furnaces, temperatures being controlled with carefully standardized Wilson-Maeulen pyrometers. The reheating time was not counted for the first 20 or 30 minutes necessary for the pieces to reach furnace temperature. A reheating time of one-half hour, therefore, means at least 50 minutes in the furnace.

Since our measurements of strength, ductility, and resilience are not absolute, and because of the inherent structural variations in steel, we cannot make exact conclusions from a few tests such as are given here. From daily contact, however, we acquire knowledge of these properties which we cannot easily record, but of which we are certain. I regard this knowledge from experience the best evidence that increasing the time of reheating increases the ductility, toughness, and machinability of the particular steels herein described, to a degree well illustrated in the above tests. The excellent physical properties that can be obtained by properly heat-treating a machinery steel containing 1 to 1½ per cent manganese are not realized.

Table I

Tests of High-Manganese Steel

	Reheating Time				
	1 hr.	2 hr.	3 hr.	½ hr.	12 hr.
Elastic limit, pounds per sq. in.	124,250	121,600	116,250	115,500	98,750
Tensile strength, pounds per sq. in.	137,000	135,600	125,900	135,400	116,500
Elongation, per cent	17.0	17.5	19.0	17.5	22.0
Reduction of area, per cent	42.2	45.4	47.6	52.7	57.2

Table II

Tests of Low-Manganese Steel

	Reheating time			
	½ hr.	1 hr.	2 hr.	4 hr.
Elastic limit, pounds per sq. in.	66,150	63,800	62,750	61,600
Tensile strength, pounds per sq. in.	101,250	98,250	97,250	96,600
Elongation, per cent	23.0	26.0	28.5	28.5
Reduction of area, per cent	60.8	67.5	65.0	65.8

From a paper to be presented at the February meeting of the American Institute of Mining Engineers, New York. The author, A. E. Bellis, is metallurgist, Springfield armory.

How to Keep Your Men Satisfied

A Symposium on Labor Problems to be Presented at February Meeting of American Institute of Mining Engineers Covers Wide Range—Human Element is Chief Factor

THAT labor in its various phases has become the predominant factor in industry today is reflected by the fact that at the 116th meeting of the American Institute of Mining Engineers, to be held in New York City, Feb. 18-21, practically an entire session will be given over to this subject. Day by day the human element enters more into consideration and voices are raised everywhere that labor is king. The Institute of Mining Engineers realizes the tendency of the times and the necessity for giving close study to what may develop into a serious situation for the country. It has given four men, each an expert in his respective line, an opportunity to present papers on various phases of the labor, employment and welfare problems. While in some cases, it would not be practicable for an enterprise to adopt all of the suggestions made in these papers, since they apply only to the larger corporations, modifications of the various plans proposed could be worked out to advantage. Each author treats of the human element in perhaps greater measure than has been before attempted. Some liberal extracts from these papers are given below.

In his paper on the problem of the reduction of labor turnover, Thomas T. Read, New Jersey Zinc Co., New York, says that the real solution lies in vesting an employment manager with sufficient official authority to handle such an important commodity as labor has come to be. It is no longer a question of purchasing labor, he says, but one of selling employment. Centralized hiring is advanced as the most effective means of reducing labor turnover costs. Comparatively little attention has been paid to the actual cost of labor turnover, but because efforts to eliminate excessive hiring and firing have been effective, the idea is spreading.

To make better men for the community as well as for work is the twentieth century evolution of the idea to make better workmen, and F. C. Stanford, Ishpeming, Mich., in another paper, shows how the Cleveland-Cliffs Iron Co. has overcome opposition and suspicion in giving employes an opportunity to fit themselves for positions higher up. Instruction is given in electrical installation together with training for positions of minor executive capacity such as shiftbosses and foremen.

Internal and external bodily cleanliness is the chief means toward conservation of life and health, according to Thomas Darlington of the American Iron and Steel institute, in his paper on Illness in Industry, Its Cost and Prevention. He states that records kept by those companies who give attention to the prevention side of workmen's compensation, show that the time lost by employes through illness ranges from four to ten times that lost as the result of industrial accidents.

That sociological work extending into the home life of the workman goes far toward bettering his attitude towards his work, and improves the feeling between employe and employer, is the contention of E. E. Bach, Ellsworth Collieries Co., Ellsworth, Pa., in his paper on social and religious organizations as factors in the labor problem. He states that ideas along this line should not be forced ready-made upon workmen, but seeds for their betterment should be planted in their minds and developments should be awaited with patience, even though the process may be slow.

Problem of Labor Turnover Reduction

BY THOMAS T. READ

LABOR turnover cost in industry is sufficiently large to justify the adoption of almost any means to bring about its reduction. Intensive study has revealed that faulty methods of hiring and discharging men is the most important factor of this problem. Complete control over the increase or decrease of working forces by a foreman is a relic of outgrown industrial conditions. Centralized hiring does not impair the foreman's authority and permits the work to be put on a scientific basis.

An employment manager, as a member of the modern industrial organization, has charge of the hiring of men for that entire organization. Recent growth of corporate industry where in some cases 20,000 to 50,000 men are hired in a year for one institution, has created the need for such specialists. Since labor represents more than half the cost of the finished product, it is more essential that labor shall be bought or, what is more pertinent, employment sold by a man having special knowledge, skill and aptitude than it is to have a purchasing department for raw materials. There are many other specific reasons why centralized hiring is desirable and profitable. In the first place, if hiring is done by foremen and the workmen are chiefly foreigners, it frequently transpires that the foreman is grafting on the men he employs, especially if labor is plentiful. It also builds up racial or religious cliques in a department that will make themselves felt in trouble later. This is inevitable, since the only source of supply a foreman has is through his friends and the friends of the men on his gang. There are too many foremen whose idea of discipline is essentially that of a slave-driver, and to allow such men to sell employment in their organization is little short of absurd.

An equally vital reason is that few

foremen make any systematic effort to fit a man to his job, although they would be the first to insist that a machine shop job cannot be well done with the wrong kind of tool. The foreman's chief duty is to keep up the output of his department and the hiring of men is merely an annoying necessity that he does not enjoy, so it is commonly performed in a perfunctory manner. If the applicant is a foreigner and does not speak English very well, asking him questions is productive of but little information about himself, for the chances are he only half-understands what is said to him and replies "yes" to every question, in the hope of making a good impression. So the foreman puts him on and "tries him out" with a lamentably low measure of success in most instances. Even if the man is not summarily fired, the foreman is seldom willing to devote much effort to teaching him. It should be mentioned here that many, perhaps most, cases in which a man is fired for disobedience to orders prove on careful investigation to be really a case of the man not understanding what he was told to do and taking a chance that he had guessed right rather than ask for more explicit directions.

The employment manager should have either at his own command, or among his assistants, all the languages spoken in the company working force, he should interview the applicants for work in circumstances and with surroundings that indicate to the man that he is going to get a "square deal", and by putting the man on at a simple job and transferring him he should be able to train the man up to higher grades of work.

Certain things are essential to success in centralized hiring of workmen. In the first place, the employment manager should be personally familiar with the work of the plant; if he has come up through the ranks, so much the better. He should be provided with rough specifications as to the kind of men desired for a given kind of work, since the foreman must be suited, and the foreman's ideas may differ from those of the employment manager. He should have notice as far in advance as practicable of the number of men desired so he can provide them when needed.

Description of Forms Used

The forms used in the successful conduct of an employment office are usually similar to the following: No. 1, requisition for help; No. 2, application for position; No. 3, medical examination card; No. 4, medical report; No. 5, hiring slip; No. 6, employes' record card; No. 7, employes' attendance card; No. 8, transfer card and No. 9, leaving slip. This last is taken to the employment office and another slip, No. 10, is issued before the man who is leaving or who has been discharged can secure his pay. In a modern organization no man is allowed to leave without a searching inquiry into his reasons for doing so, or until it is proved absolutely necessary.

Concerns who have conducted successful employment departments under employment managers include the following: The Saxon Motor Car Co., which reduced its labor turnover to 40 per cent of what it had been the first year of its operation; the Hayes Mfg. Co., Detroit, diminished its labor turnover one-half the first year and another half the second year, while the output per man increased 30 per cent; the Solvay companies, Detroit, reduced their labor turnover from 10 per cent per month in May, 1916, to 2.4 per cent per month in December, 1916. Other concerns who have tried the plan are unable to show results since no record was kept of what the turnover was costing them previously. The figures are truly amazing. For example, in such an organization as the Bethlehem Steel Co., labor turnover probably costs at least $3,000,000 per year.

The employment manager must be given sufficient rank, otherwise he cannot work effectively. In one case the employment manager reports directly to the vice president in charge of operations. In the case of the Jeffrey Mfg. Co., the employment manager is assistant secretary of the company, while with Fayette R. Plumb, Inc., he is assistant superintendent of the plant. A high type of man is required and the saving he is able to make justifies the cost of securing such a man.

Training Workmen for Higher Positions

BY F. C. STANFORD

HERETOFORE the engineer has concerned himself chiefly with physical forces and inanimate objects. He now has secured a truly marvelous degree of control over them. The great problem of the present age is to secure a like degree of knowledge and control of the human factor. The average of knowledge is not equal to the average needs of the present time and continually fails to keep pace with it. It has been aptly said that the really essential need of the period is for more brains; if we only had sufficient knowledge and sagacity we could not only solve all difficulties, but prevent them from arising.

This generalization holds good for an industrial organization. The most vital need of the management is for more brains. The logical course for an engineer in charge of an industrial organization is, therefore, to direct the forces at his command toward the development, training and guiding of all the brains in his organization. This is easier said than done, for it involves the carrying on toward two objectives, the maximum of productive work and the development of the individuals who perform it. On the other hand, if the aim is merely for maximum production from an organization, without offering opportunity for development, the final outcome will necessarily be like that of a plant that is driven at full capacity without stopping for repairs or improvements; it eventually becomes so run down that either a complete rebuilding is necessary or else it has to be abandoned.

If the best results are to be obtained, provision for the development of the individuals comprising an industrial organization must be made. With a small concern this is made easy by the opportunities for personal contract, but as the organization grows the problem becomes increasingly difficult.

A recognition of these general facts led the Cleveland-Cliffs Iron Co. to institute a definite provision for the training of its men to a higher level of mental capacity and efficiency. In February, 1912, an opportunity was given every man who so desired to take up a course of study which was then being prepared. Classes were formed in various subjects appertaining to the mining industry. The men applying were of many nationalities, very unequal in ability to master the work undertaken, and it was found impossible to form groups that could work along together in a satisfactory and successful manner. Two plans for training were finally adopted. The first was in the mechanical depart-

ment, for the purpose of training men to care for the electrical installation. The instructors were trained engineers connected with the department, who cheerfully gave their own time to this while carrying on their regular work.

The course in practical electricity and elementary mechanics covered a period of approximately two years, with class meetings one or two evenings each week during about eight months of the year. This class period usually lasted about 2½ hours each evening and, on account of the enthusiasm of the students in the work, it was frequently necessary to send the students home after the lapse of this time. About 40 students were enrolled in the first class of whom 28 were given diplomas. A considerable number came into the class so late that they were not able to finish the work, and these were carried into the second class. Many subjects were covered in the class work, including magnetism, electricity in motion, D. C. and A. C. generators and motors, wiring, etc. Several informal lectures were delivered on subjects closely identified with the work in hand.

No pressure was brought to bear in securing students other than presenting the idea that the best trained men will always be the ones to secure the best positions whether with this company or with other companies. Now we now have not one mine electrician, district foreman, or general foreman who has not taken the class work, and the effectiveness of the training given is clearly shown by the high class of work done and the minimum amount of trouble that occurs. It makes the men reliable in an emergency, because they know what to do and how to do it; also, they have measured their executive superior and feel that they can depend upon him for full support and help.

The second plan was for training mining men for positions of minor executive capacity such as shiftbosses and foremen. The instructor for this was employed for this specific purpose and while engaged in this work devoted his entire time to preparation and instruction.

When the second method of training was undertaken, it was necessary to select the right group, and it was finally decided to deal with English-speaking men only, who were recommended by their superintendents or mining captains for their ability and mining aptitude. The purpose of their training was to fit them to become shiftbosses or other minor executives. The first class consisted of 38 men, of an average age of 32 years, with an average of 4.3 years of schooling. It was thought best to teach one subject at a time, as being less confusing to the men than carrying on a number of subjects simultaneously. The following courses were taught in the order named: Arithmetic, elementary drawing, geometrical drawing, mechanical drawing, geology, construction and use of mine maps, first-aid to the injured, timekeeping, mine sampling, mine methods and business correspondence. All the class work was done on the miners' own time, for which they received no remuneration. In order to provide for changing shifts, there were afternoon and evening classes, and the men attended whichever was practicable twice a week, the periods being 1½ hours each for 1½ years. Of the 38 men who began, 33 finished the course successfully. Probably this measure of success was due to the avoidance of the formal atmosphere of an ordinary classroom and the cultivation of a personal friendship between the instructor and students. This is essential in this kind of work.

Illness Prevention in Industry

BY THOMAS DARLINGTON

THE obligation of an employer to the state requires certain things of him as matters of good citizenship: for instance, that his workmen shall have a living wage, that child labor shall not be employed, that injuries from accidents shall not make workmen a charge upon the state, etc. Affairs of this kind are not taken up as philanthropy, for the officials of a corporation or a large manufacturing concern may not feel at liberty to spend the funds of their company as prompted simply by motives of kindliness; but they may spend company money on such matters because it is good business.

For years the poisonous effects of lead, phosphorus and dust have been emphasized, and their elimination has been urged; but the more important and every day physiology of the workman himself has been neglected.

Importance of Health to Workmen

Some measure of the importance of health in industry can be gained by the knowledge that the records kept by those companies which now make this the subject of careful inquiry shows that the time lost by employes, through illness, ranges from 4 to 10 times that lost as the result of industrial accidents. As a matter of fact, illness in industry already has an effect on operating costs that is far from being generally realized. Whenever a man is absent from his work because of illness, it is essential to have a substitute who is unavoidably a less efficient workman; he makes a smaller output for the day's wages, he spoils more raw material and requires more supervision from the foreman. Many other items enter here into this question of costs so that the illness of the workman is not, therefore, a matter which concerns himself only, but is a source of direct loss to his employer. The cost of health supervision is not large, as is shown by the comparison of the cost of health supervision in 99 industrial establishments, employing altogether 495,544 men, made recently by M. W. Alexander, for the Conference Board of Physicians in Industrial Practice. The figures vary rather widely, since some plants reported only the medical cost while the majority included the cost of clerical assistants and even of janitor, and scrubwomen. The average cost per man per year for the half million employes was $2.50.

If, then, health is so important to industry, we must know the conditions under which it may be enjoyed. We may consider the subject under three heads, namely: Personal hygiene, or care of themselves by employes; care of employes by employers, and care by federal, state or municipal authorities in the making and enforcing of laws.

Fatigue Should Be Avoided

Under the first head, the principal factor leading to a high conception of personal hygiene is bodily comfort which, to a great extent, means the avoidance of abnormal fatigue. Fatigue is caused by anything that interferes with the carrying of oxygen to the tissues. This may be a diminished amount of oxygen in the atmosphere, of carrying power in the blood, of lung capacity, or interference with the circulation of the blood. The two factors which relate especially to diminished amounts of oxygen in the atmosphere are bad ventilation and altitude. The main effect of bad

ventilation, especially where there are a number of people in the room, is to increase the humidity. Anything that interferes with the general circulation of the blood, such as heart disease, tight clothing or the condition of the body, causes fatigue. The third great cause of fatigue is poisoning by accumulated waste in the muscles or poisoning by toxic substances.

Importance of Personal Hygiene

With disease so easily acquired from soiled hands, workers should have facilities for washing after going to the toilet. The mouth, too, is a harbor for diseasee germs and proper attention should be given to mouth cleanliness.

Much has been done in the installation of basins and showers and in the erection of dry-houses. In many places these have had the widest use, a large percentage of the employes bathing daily. Here again we cannot adequately estimate the good derived. But we do know that such facilities enhance one's self-respect and the respect of others. Shower baths affect the circulation of the blood, not only in the skin but in the whole body. Cold showers increase capacity for muscular work.

The cooling of work-places in summer is now being considered in many plants, and much is being done to make heated work places more comfortable, thus preventing heat stroke.

Ventilation Systems Improved

Thirty years ago, according to English statistics, nearly all who breathed dust from grinding steel and stone, died sooner or later from tuberculosis. Such dust has been entirely eliminated from certain mills in the industry. Air conditions have been much improved by the elimination of hydrocarbon series and other gases produced by open fires when combustion is incomplete.

Social and Religious Labor Factors

BY E. E. BACH

THE administration of industrial organization today embraces more than the cost of production and selling prices. Competition is deeper seated than mechanical devices, overhead charges and a shrewd manipulation of the markets. Despite latest equipment and a most efficient organization it is evident that capacity production will be an unknown quantity until the workman is considered as a producer, in relation to his home, as he is now considered in relation to industry. His attitude toward his work each morning is determined, to a large degree by his home environment. Whether this attitude obtains through the day depends upon whether or not the corporation which employs him differentiates between the mechanical factor and the human factor in industry.

To be more specific, sociological work should influence the life of a workman in such a manner as to establish a co-operative interest in his work, foster within him a spirit of contentment in his home, lead him to so employ his leisure time that he will not lower his efficiency as a workman, destroy his domestic happiness, or endanger his standing in the community as a citizen.

Any effort attempted must be nonsectarian, institutional and of such importance as to command the respect of the community.

It is the purpose of this paper to throw as much light upon this subject from the practical side as is possible. We all know of experiments here and there over the country, where the human factor in industry has been given consideration, but in order to be more specific it would seem permissible to cite the work attempted by the Ellsworth Colleries Co. at Ellsworth and Cokeburg, Pa., in the heart of the great Pittsburgh coal district. The combined population of the two towns is about 5000 people; the employes number between 2200 and 2500 and the school children number 1200. The company has always maintained a standardized style of architecture; the houses are electrically lighted and comfortable. Work is plentiful, the daily production being about 9000 tons of coal and 1000 tons of coke. The Protestants and Catholics each support a pastor, and worship in beautifully designed edifices. No drinking club, licensed saloon or "speak-easy" can be found in either town. With 163 Slovak families, 93 Russian, 79 American and 69 Italian, as well as representatives of almost every other race represented in the remainder, the problem was a typical one in industry at the present time.

It may be stated, fundamentally, that it is quite impossible to work out any scheme of helpfulness on the part of the employer unless the employe himself sees the need of it and feels that he is really the projector of the plan. There is no use in starting a machine-made organization with the idea of forcing it upon the men. It is far better to plant the ideas of betterment in the minds of the employes and await development, although this may be a slow process.

An opportunity is given employed girls to train themselves in the science of home making. This work has been made as practical in character as is possible. These classes have been composed mostly of the daughters of non-English-speaking parents. It is necessary to impress upon them the American methods of cooking and approved sanitary household practices. Lessons in the packing of dinner pails and luncheons were included in the course. Sanitary conditions in the homes, the "open window" in the bed room, and the inadvisability of "herding" a number of boarders in a home, have all formed a part of the necessary instruction.

Classes for adult foreign workmen have been conducted for the past five years for the purpose of giving them instruction in English in order that they might be able to understand the directions given them while at work.

The problem of just how far a corporation should go in assuming leadership in the matter of community athletics has been one of wide speculation. At first, it was thought best for the company to purchase the uniforms and all materials used, with the result that the participants felt no responsibility, and the season closed with differences between them and a large deficit to be paid by the company. A later plan adopted was that of encouraging athletics in every way possible, but having those interested assume all responsibility, even financially, and as a consequence the results have been more satisfactory.

It is a well known fact that in every man's life there are three dominating factors: namely, his home, his occupation, and his leisure time. It is an accepted fact that the manner in which an individual spends his leisure time determines his habits, his efficiency at his work, and his attitude toward his home. He can be more easily approached, he can be more easily influenced, and he will give his most hearty support to that which will afford him the greatest pleasure during leisure moments.

Rigid Specifications Bar Munitions

Low Phosphorus Limit Required by Government in Acid Castings Impossible to be Met on Quantity Basis Demanded Because of Limited Supply of Raw Material Say Manufacturers—Pig Iron Short

WASHINGTON, Feb. 5.—Inability to meet the rigid specifications of the ordnance department, particularly as relating to the maximum phosphorus limit, is delaying the placing of contracts for thousands of tons of steel castings and manufacturers are demanding that the government make a slight concession in its mandate that phosphorus should not exceed 0.05 per cent. This request it is pointed out, is not prompted by the inability of producers to meet this requirement, since it is representative of their practice in normal times. However, operating under the restraint of the present disjointed conditions, they say it is almost impossible for them to secure the necessary raw materials to meet specifications so rigidly drawn.

The foundries affected are those operating acid-lined open-hearth steel furnaces and side-blow converters. The bulk of the tonnage of steel castings that is to be machined is made from acid steel and this metal also is used almost exclusively for medium and small work. Basic steel, on the other hand, enters largely into railroad work, although castings for locomotives and tenders largely are acid.

Low Phosphorus Iron Short

A pronounced shortage in the supply of low phosphorus pig iron and scrap has brought about the present situation and since there is no immediate prospect of its increase, the demand for a less rigid limit on phosphorus content has been made to the ordnance department. Within the past three years the low-phosphorus pig iron producing capacity has been increased 80,000 to 100,000 tons annually by the Delaware River Steel Co., Chester, Pa., and the Thomas Furnace Co., Milwaukee. However, this tonnage, representing the most notable addition to the low-phosphorus pig iron production of the country in a decade, has not kept pace with the growth of consumptive needs. The greater part of the new steel foundry capacity that has become available since the beginning of the war, in the summer of 1914, is acid and many of the electric furnaces installed are drawing upon the limited supply of low phosphorus pig and scrap.

From Jan. 1, 1914, to Dec. 3, 1916. the production of low-phosphorus pig iron increased nearly 200,000 tons. The output for 1914 was 306,569 tons, as compared with 501,213 tons in 1916. Unfortunately, figures for 1917 have not yet been compiled, but it is doubtful if they will show much of a gain over those of the previous year. The actual gain in low-phosphorus pig iron production for 1914 to 1916 was 194,644 tons. During this same period the production of acid and converter steel castings increased 377,673 tons, or nearly twice the gain in the low-phosphorus pig iron output. Steel casting manufacturers present these facts as their best argument for more lenient phosphorus limits, and it seems almost inevitable that their demands must be met if the government is going to obtain the large tonnage of steel castings so essential to the speedy prosecution of its war program.

In 1914 the production of steel castings by the acid open-hearth process was only 270,173 tons and during that year 65,882 tons of converter steel were poured, a total of 336,055. In 1916 the acid steel output of open-hearth foundries was 570,937 tons and that of side-blow converter plants, 142,791 tons, or a total of 713,728 tons. It is reasonably certain that the production of the acid steel casting plants in 1917 was greater than that of the previous year and with low-phosphorus pig iron output practically stationary, the cause for the present acute shortage of raw material for acid steel castings readily becomes apparent. In addition to the foregoing, the demand for low-phosphorus melting stock for electric furnaces has increased tremendously. In 1914 only 8551 tons of electric steel castings were produced as compared with 42,870 tons in 1916. Last year the electric steel casting output made a tremendous gain owing to the large number of furnaces installed, although the figures have not yet been compiled. Electric furnaces, of course, may use basic pig, high phosphorus scrap or bessemer or open-hearth metal and they are not so restricted in their choice of raw materials as the acid open-hearth and the converter steel foundries.

In the figures giving the annual production of low-phosphorus pig iron, that made from copper-bearing ore is included, thereby further restricting the supply of copper-free, low-phosphorus pig iron for acid steel castings for ordnance purposes. The low phosphorus scrap tonnage also is limited owing to the increased use of home scrap by the mills due to the general pig iron shortage. Latterly, the supply of this material has been cut off almost entirely by the car shortage and other transportation difficulties. In the readjustment of pig iron prices, the biggest reductions were made in low-phosphorus pig iron and it is the prevailing opinion that if the government price had not been made, it would now be quoted at $200 per ton.

Ordnance experts contend that the maintenance of low-phosphorus limits are absolutely essential owing to the low factor of safety on all parts entering into the construction of field implements of war. These must be constructed as light as possible and some sections have a safety factor as low as one, which must be contrasted with factors of safety of 5 and 10 to 1 in industrial operations.

Owing to the country's limited low-phosphorus bearing ore resources, supplying the needs of the acid steel casting plants it is apparent will become increasingly difficult. The one solution to the problem that will afford immediate relief is that sugested by them say the steel casting manufacturers. It provides for raising the phosphorus limit on government specifications. If greater leniency is allowed on ordnance work, it is believed that industrial users will fall into line and the proportion of low-phosphorus pig iron in the charges may be slightly reduced thereby conserving the limited supply to this extent.

Saving Tin and Ammonia

Washington, Feb. 5.—The food administration, in a letter to Congressman Sydney Anderson, requests further legal power to make enforcements for the conservation of tin and ammonia, among other things. Administrator Hoover would like authority to force use of glass, paper and other containers in place of tin in certain food, toilet and other commodities. He also seeks power to regulate the use of ammonia. His letter says a shortage of 60,000,000 pounds a year is caused by consumption of 150,000,000 pounds annually by the army and navy for munition purposes and of 40,000,000 in cold storage warehouses. Last year the production reached only 130,000,000 pounds.

Control Over Exports is Tightened

War Trade Board Formulates New System for Issuing of Licenses to Ship Abroad—Data Required Are Very Comprehensive—Special Form Required for Tin Plate—Regulations for Iron and Steel

WASHINGTON, Feb. 5.—Adjustment of the operations of the war trade board's export bureau to conform with the customs regulations and to harmonize both with the trading-with-the-enemy and the espionage acts, has led to establishment of a new system in the matter of applying for export license. New forms have been made effective by the war trade board, under agreement with the customs bureau, the treasury department, and the department of commerce.

Complete Data Required

All applications for export license, regardless of the character of the commodity, must be made on Form X. On this form must be given the names of the applicant of the consignor, and of the consignee; the name of the purchaser abroad, of the person to whom the license is to be sent, and, if the articles for which the license is sought is to be re-exported the name of the person to whom it will be consigned. This form also requires full description and specific name of the product to be exported; the number and kind of packages, whether crate, bag, barrel, box, case, etc., the net weight, and the value. In addition, the proposed routing with the name, if possible, of the railroad, steamship line or vessel must be set forth, as well as the flag under which the vessel is registered, as Norwegian, Spanish, Japanese, etc.

Application must be made for each commodity. Failure on the part of the applicant to take reasonable precaution as to the distribution of goods, or the granting of an export license based upon the statements contained in this application will not relieve the consignor from any responsibility to which he may be liable.

The date the goods will be ready for shipment and the date of the contract must be given. In case the goods have to be specially manufactured, applicants are required to send in their applications before starting work. In all cases applications are to be made two weeks or earlier in advance of the proposed date of ocean shipment. Licenses ordinarily are good for 60 days, but in cases of special manufacture, will be made for a longer period. If licenses expire before use, they must be extended and application made for the extension on proper forms.

Practically all iron and steel products and articles produced in allied industries, which are affected by the proclamations of the President and the rulings of the war trade board, cannot have license for export unless the application on Form X is accompanied by Form X-2, which must be pasted on the back of Form X. This supplementary form must state whether the goods are for the actual needs of the United States and its allies; whether they contribute directly to the war needs; whether they are urgently needed abroad, in which case affidavit from the government of the country of destination is essential.

Special instructions on Form X-2 require, in the case of graphite electrodes, a statement whether they are to be used for electrometallurgical work, and if so, the exact nature of the steel or other products to be manufactured and in what country the steel or other products will be consumed. As to ferromanganese and other ferroalloys, it is imperative that evidence be furnished showing that the article mentioned is to be used for essential munition purposes of the allies. If coal or coke is to be exported, the number of tons already under license, which have not been shipped to the same consignee, the points of origin, the name of the steamship line if it is to be used for bunkering purposes, and whether any other fuel may be used must be stated.

Special Form for Tin Plate

In the case of tin plate and goods containing tin, Form X-4 must be pasted on the back of Form X. This supplementary form must show the name of the tin plate manufacturer, from whom the tin plate was purchased, the date of purchase or contract of purchase, where the plate is at the time application is made, full description of the plate, such as size, weight, number of sheets per package, number of packages, the equivalent of base boxes, and the total weight, net, in pounds; what the plate is to be used for, if for food containers the nature of the food and the country in which it is to be consumed; details of the contract and a guarantee that the goods of which license is sought will be used as stated and that the receipt of the shipment by the consignee will not release from stock any similar material.

Form X-1 applies to foodstuffs, Form X-3 to leather or hides, and Form X-5 for articles containing wool, etc. Shippers' export declaration, customs catalog, No. 7525, must be filed with the collector of customs at the port from which the goods are to be shipped before clearance will be granted. This declaration must be correct. From it the export statistics are compiled.

When the exporter's application is for direct trading with an "enemy" or an "ally of enemy" or any one believed to be either, Form ET-6 must be attached to Form X. This form must show the proposed method by which payment is to be made, with the names of banks and agencies involved and the reason why license should be granted. All documents which the applicant desires to exhibit in connection with the application must be submitted with the latter.

Transcontinental Iron and Steel Rates Raised

Washington, Feb. 5.—Decision of the interstate commerce commission on transcontinental commodity rates last week increased from 32.5 cents to 47.5 cents per 100 pounds the export rate on iron and steel articles from Chicago and other eastern points to Pacific coast ports for export to Asiatic, Australian and Latin American ports. The rate on anchor rods, angles, etc., is increased from 40 cents to 55 cents, cast iron pipe connections 45 to 60 cents, railway equipment 50 to 65 cents, and machinery 55 to 75 cents. From fewer points in the same territory the rate, Chicago basis, on agricultural implements is established at $1.25. On road-making machinery and implements the rate is increased from $1 to $1.25; on dredging machinery $1 to $1.25, and on vehicles $1.10 to $1.25.

Authority was given carriers to file increased carload commodity rates from eastern points to Pacific coast and intermediate destinations and was refused on application to cancel all less than carload commodity rates from and to those points.

WAR TRADE BOARD
BUREAU OF EXPORTS

FORM X

APPLICATION FOR EXPORT LICENSE.

THIS FORM IS TO BE USED IN APPLYING FOR EXPORT LICENSE TO SHIP ALL COMMODITIES TO ANY COUNTRY, IN ACCORDANCE WITH INSTRUCTIONS CONTAINED ON THE BACK HEREOF, WHICH MUST BE CAREFULLY FOLLOWED. ANSWERS MUST BE WRITTEN LEGIBLY, OR TYPEWRITTEN IF POSSIBLE.

App. No. .....
Disposition .....
Date .....
Expiration date .....
Drawn by .....
Checked by .....

(SPACE ABOVE THIS LINE FOR OFFICIAL USE ONLY.)

WAR TRADE BOARD,
BUREAU OF EXPORTS,
Washington, D. C.

(Country of destination must be stated here.)

I / We hereby apply for a license to export the merchandise named herein.

(1) Date ..... (2) Applicant's Reference No. .....

(3) Applicant (signed) ..... Nationality .....
By ..... Year established .....
Address ..... Nature of business .....
Acting as .....
(State whether principal or acting as agent, broker, or factor in this transaction, and if so, give name and address of the person or firm for whom so acting.)

(4) Consignee's
Name .....
Address ..... Nationality .....
Nature of business ..... Year established .....
Acting as .....
(State whether principal or acting as agent, broker, or factor in this transaction, and if so, give name and address of the person or firm for whom so acting.)

(5) Number and kind of packages, e. g., 10 crates, 40 barrels, 60 cases, 75 bags, 80 barrels, etc.	(6) Commodity. Describe article fully, as canned pork, printed cotton cloth, hemp rope, brass tubes, printing presses. General terms, such as metals, chemicals, provisions, dry goods, etc., or trade names will not be accepted.	(7) Quantity (net weight only). State in standard export units, as lbs., tons (of 2,240 lbs.), gallons, bushels, barrels, etc.	For official use only	(8) Value In whole dollars only at time and place of shipment.

(9) Goods will be ready for shipment..... (10) Date of contract .....

(11) Consignee's.....
Name .....
Address ..... Nationality .....
Nature of business ..... Year established .....
Acting as .....
(State whether principal or acting as agent, broker, or factor in this transaction, and if so, give name and address of the person or firm for whom so acting.)

(12) Purchaser abroad
Name .....
Address ..... Nationality .....
Nature of business ..... Year established .....
Acting as .....
(State whether principal or acting as agent, broker, or factor in this transaction, and if so, give name and address of the person or firm for whom so acting.)

(13) License to be sent to—
Name .....
Address .....

(14) State whether or not goods are to be reexported, and if so, to whom.
Goods are ..... to be reexported to
Name .....
Address ..... Nationality .....
Nature of business ..... Year established .....
Acting as .....
(State whether principal or acting as agent, broker or factor in this transaction, and if so, give name and address of the person or firm for whom so acting.)

(15) Indicate proposed routing, giving, if possible, name of railroad and name of steamship line and / or vessel .....

(16) Under what flag is vessel registered? .....

(17) Has any other application been filed for license to cover this shipment? If so, state by whom .....

(18) How long have you been doing business with the Consignee or the person for whom he is acting? .....

THE ABOVE QUESTIONS MUST BE ANSWERED IN *all* CASES. SEE INSTRUCTIONS ON REVERSE SIDE HEREOF.

Form WTB 1a.

FORM X-2
Dec. 20, 1917.

SUPPLEMENTAL INFORMATION SHEET.

TO BE USED IN APPLYING FOR LICENSE TO EXPORT CERTAIN ARTICLES ON CONSERVATION LIST AS NOTED IN THE "JOURNAL OF THE WAR TRADE BOARD." NOTE ALSO INSTRUCTIONS ON REVERSE SIDE HEREOF FOR ADDITIONAL QUESTIONS TO BE ANSWERED FOR CERTAIN COMMODITIES. FILL OUT COMPLETELY AND PASTE SECURELY ON BACK OF APPLICATION FORM X, WHICH ALSO SHOULD BE FULLY FILLED OUT IN ACCORDANCE WITH INSTRUCTIONS STATED THEREON.

1. State whether goods are—
(a) For the actual war needs of the United States or of the nations at war with Germany or her allies. Answer.....
and/or (b) To contribute directly to such war needs. Answer .....
and/or (c) Necessary to the immediate production of important commodities required by the United States. Answer.....
and/or (d) Urgently required abroad, the application for which is supported by the Government of the country of destination. Answer.....
and/or (e) Such, that shipment of same, in limited quantities, will not seriously impair the resources of the United States. Answer .....
and/or (f) Necessary for purely medicinal or pharmaceutical purposes. Answer .....
2. State name and address of person or firm by whom the material or stores will be used, and whether engaged on Government work, and if so, of what kind and to what extent, and for what Government.
.....
.....
3. State the specific purpose for which the material is required, and describe the urgency of the requirement.
.....
.....
4. How long will the supply now asked for last the consignee? .....
5. What is the normal consumption by the consignee for the period mentioned in your reply to No. 4? .....
6. What stocks, if any, of the goods asked for do you now hold? .....
7. What stocks, if any, of the goods asked for does consignee now hold? .....
8. Has the consignee any stores or material of the description referred to in this application now under indent order or supply from you? If so, what is the quantity? .....
9. Give the name and address of United States manufacturer of the goods referred to in this application.
.....
10. Is material required for immediate consumption or to replenish depleted stocks? .....

RECOMMENDATION OF REPRESENTATIVE OF THE GOVERNMENT OF DESTINATION.
(Obtaining this indorsement will facilitate the consideration of application.)

I hereby support this application and recommend to the War Trade Board that license be granted, as the goods applied for are properly included in Class ....., as stated by the applicant above

.....

SEE SPECIAL INSTRUCTIONS FOR DIFFERENT COMMODITIES ON THE BACK HEREOF.

NOTE.—If there is not sufficient space above to describe the material facts in detail, or to answer specific questions asked on the reverse side hereof, use space below for this purpose.

(Signed) .....
By .....
Date .....
(Applicant's address.)

FORM X-4
Dec. 20, 1917.

SUPPLEMENTAL INFORMATION SHEET
FOR TIN PLATE OR ARTICLES CONTAINING TIN.

TO BE USED IN APPLYING FOR LICENSE TO EXPORT TIN PLATE AND GOODS CONTAINING TIN, OTHER THAN TIN PLATE. FILL OUT COMPLETELY AND PASTE SECURELY ON BACK OF APPLICATION FORM X, WHICH ALSO SHOULD BE FULLY FILLED OUT IN ACCORDANCE WITH INSTRUCTIONS THEREON.

TIN PLATE.

1. Name of manufacturer of tin plate .....
2. I / We purchased the tin plate from ..... (Shipper.) (Address.)
3. Date of purchase ....., or contract for purchase .....
4. The plate is at present at ..... (Give present position of plate, i. e., at factory or at seaboard covered by bill of lading dated .....)
5. Full description of the plate:

Year of plate	Basis weight.	Number of sheets per package.	Number of packages.	Equivalent of base boxes.	Total net weight in pounds.

6. The plate is to be used for: ..... (Give full details.)
7. If it is for food containers, state in detail the exact nature of the food to be packed and the country in which the food will be consumed .....
8. The goods in the production of which the tin plate is to be used are contracted for by..... (Give details of contract.)
9. We have a firm order for the tin plate from ..... (Give name and country.)
under date of .....

GOODS CONTAINING TIN, OTHER THAN TIN PLATE.

1. Name of manufacturer of the goods ..
2. I / We purchased the goods from.... (Shipper.) (Address.)
3. Date of purchase..... ..., or contract for purchase .....
4. The goods are at present at..... (Give present position of goods.)
5. Full description of goods..... (Give details, composition, and total net weight in pounds.)

	Total net weight in pounds.	Percentage of tin content.

6. The goods are to be used for. (Give full details.)
7. I / We have a firm order for the goods from ..... (Give name and country.)
under date of .....

STATEMENT (7) TO BE EXECUTED WHEN EITHER OR BOTH ABOVE FORMS ARE USED.

I / We guarantee that when the goods referred to reach their destination their distribution will be so controlled that they will not be used for any other purposes whatever than those stated above; and that their receipt by the consignee or ultimate consumer will not be made the occasion for selling free for export, or for other uses than those stated, other goods of the same sort which the consignee or ultimate consumer may already have in stock.

(Signed) .....
By .....
Date .....
(Applicant's address.)

NOTE.—If there is not sufficient space above to describe the material facts in detail, use space below for this purpose.

Form WTB 1c.

APPLICATION FORM ET-6.

WAR TRADE BOARD
BUREAU OF ENEMY TRADE
WASHINGTON

This form is to be used wherever the *exportation* of the article or merchandise is restricted under Title VII of the Espionage Act and involves trading directly or indirectly with or on behalf of an "enemy" or "ally of enemy," or with or on behalf of a person acting on behalf of or for the benefit of an "enemy" or "ally of enemy," unless a general license so to trade has been obtained.

FILL OUT AND ATTACH TO EXPORT APPLICATION FORM X.

App. No. .....
Disposition .....
Date .....
Drawn by .....
Checked by .....
License No. .....
Expiration date .....

(SPACE ABOVE THIS LINE FOR OFFICIAL USE ONLY.)

Instructions on the back of this sheet should be carefully read before this application is filled in. Answers must be written legibly or typewritten, if possible

EXPORT: APPLICATION FOR LICENSE TO TRADE WITH AN "ENEMY" OR "ALLY OF ENEMY" BY EXPORTATION OF AN ARTICLE RESTRICTED UNDER TITLE VII OF THE ESPIONAGE ACT.

Applicant's Reference No. ..... *Date* .....

WAR TRADE BOARD,
BUREAU OF ENEMY TRADE,
Washington, D. C.

I / We hereby apply for a license to trade with or on behalf of such "enemy" or "ally of enemy," or person acting on behalf of or for the benefit of an "enemy" or "ally of enemy," as is named below, by the exportation of the merchandise described in Form X attached hereto.

1. Consignor:
Name ..... Address .....
Nationality ..... Nature of business .....

2. Give accompanying particulars as to any person interested in this exportation who there is reasonable cause to believe is an "enemy" or "ally of enemy," or person acting on behalf of, or for the benefit of, an "enemy" or "ally of enemy":
Name ..... Address .....
Nationality ..... Nature of business .....

3. Relation of such person to the proposed transaction.

4. State the facts upon which applicant bases his knowledge, belief, or reasonable cause to believe that such person is an "enemy" or "ally of enemy," or is acting on behalf of, or for the benefit of, an "enemy" or "ally of enemy."

5. State fully the proposed method by which payment will be made, giving names of banks or other agencies through which it is proposed to deal.

6. State any reasons peculiar to this particular case why a license should be granted.

I / We hereby declare that to the best of my / our knowledge and belief, the foregoing particulars are correctly stated, and I / we undertake that if this license is granted it will be used solely for the purposes stated in this application.

(Signed) .....
By .....
Status of signatory .....
License to be sent to .....
Address .....

VARIOUS FORMS USED IN NEW EXPORT LICENSING SYSTEM PUT IN EFFECT BY WAR TRADE BOARD

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Steel Company Earnings Are Increased

EARNINGS of the Inland Steel Co., Chicago, for 1917, total $21,240,783, after deducting for maintenance and repairs, or practically twice those for 1916, which were of $11,241,046. After setting aside $8,500,000 for income and war excess profits taxes, with an allowance of $1,457,866 for depreciation, $10,535,000 remain for the present capital stock of $25,000,000, equivalent to 42.12 per cent. Earnings per share in 1916 amounted to over 100 per cent on $10,000,000 capital stock. Dividends at the rate of 8 per cent were paid during 1917, leaving a surplus of $8,535,246, making a total surplus of $9,894,656, as compared with $16,359,409, the surplus at the end of 1916, which was largely absorbed when the capital stock was increased by approximately $15,000,000. The income account for the past year, as compared with 1916, is as follows:

	1917	1916
Net earnings after replacements and maintenance, etc.	$21,240,783	$11,241,046
Plant depreciation	1,457,866	400,000
Mineral exhaustion	311,300	139,241
Bond interest	436,549	375,450
Total deductions	2,205,716	914,691
Net profits for year	19,035,066	10,450,786
Federal taxes	8,500,000	.....
Dividends paid	1,999,820	799,908
Surplus for year	8,535,246	9,650,878
Previous surplus	1,359,410	6,708,531
Total surplus	9,894,656	16,359,409

Assets were augmented in 1917 by the addition of $8,125,791 to the item of lands, plants, etc., as shown in the balance sheet inventories were increased from $4,848,586 to $9,720,002 since 1916, and Liberty bonds and treasury certificates totaling $7,500,000 are held by the company. The total assets for 1917 are $57,413,890 as against $36,252,599 in 1916.

How the War Tax on Steel Freights is Charged

THE IRON TRADE REVIEW, on page 230 in the issue of Jan. 17, 1918, referred erroneously to methods pursued by the leading steel mills in disposing of the federal war tax on freight charges. The situation with regard to the war tax on freight rate charges is as follows: Where the steel has been sold on a mill or Pittsburgh basis, the custom of the mills universally is to leave the war tax to be paid by the buyer. Where the steel has been sold on a delivered basis, however, the practice varies in accordance with the terms of the original contract of sale. In transactions where the sale is made on a delivered basis and where the contract states that the freight is "allowed", a majority of the mills charge the war tax to the customer on the ground that the war tax cannot be regarded as a part of the freight rate. Where sales have been made on a straight delivered basis, the general custom is for the mills to pay the tax.

Earnings of Thomas Iron Co. Grow Greatly

For its sixty-fourth year, net earnings for the Thomas Iron Co., Hokendauqua, Pa., were $319,624, for the fiscal year ended Dec. 31, 1917, as compared with $72,512 for the fiscal year ended June 30, 1916. At a meeting held in September last, the stockholders voted to change the ending of the fiscal year from June 30 to Dec. 31. Dividends declared during the year totalled $124,996, making the surplus $194,628. Total surplus now is $2,233,554. Income and excess profits taxes set aside totalled $58,210, and $126,045 was charged to depreciation and depletion. Other deductions are $131,535, to restore depleted extraordinary repairs, renewals and development reserves as of Jan. 1, 1917; $250,684 for extraordinary repairs, renewals and development accounts, and expended in 1917, and $110,131 for obsolete equipment. Gross revenue amounted to $3,785,984, and there is an absence of the item of loss from sale of product in 1917, which in 1916 amounted to $99,372 and in 1915 to $122,858.

The company's cash position was improved nearly three-fold in 1917, with a total of $206,822, as compared with $76,968 in 1916. Total current assets, including $725,326 total cash and receivables, and an inventory of $814,169, amount to $1,539,496, against total current assets of $997,205 in the preceding year.

In his statement to the stockholders, President W. A. Barrows Jr., said that curtailed fuel supply, general labor conditions and repairs to furnaces restricted production and at the Richard mine only 53,175 tons of ore were produced in 1917.

Bethlehem Earns Less on Government Orders

Much smaller profits are being realized by the Bethlehem Steel Corp. from its work for the United States government than was the case when that producer was filling munition contracts for foreign powers, according to the annual report covering 1917. This statement shows that last year's net profits were equivalent to but 9.25 per cent on gross sales as against 20.16 per cent in 1916. On gross sales of $296,000,000 as shown by the accompanying table, $52,651,431 was earned after deductions for taxes, repairs and maintenance. In 1916 a net of $61,717,309 was earned on sales aggregating $216,284,555. Net profits last year, after all charges were deducted before dividends, amounted to $27,320,736 as against $43,593,968 in 1916.

	1917	1916
Total net earnings after taxes, etc.	$52,651,431	$61,717,309
Less int. on subsid. bonds and notes	7,419,053	3,772,555
	$45,232,378	$57,944,754
Deprec. and depletion	17,911,640	14,350,785
Net income	$27,320,738	$43,593,969
Gross sales	$296,000,000	$216,284,555
Percentage net income on gross sales	9.25%	20.16%
Orders on hand	450,500,000	193,374,248

Charles M. Schwab, chairman, recently stated that the company had not published and would not do so, the exact amount of federal and war income and excess profits taxes for the period of 1917, since practically all business was furnished by the government.

The value of orders on hand Dec.

31, 1917, was estimated at $450,500,000, against $193,374,248 in 1916, and $175,432,000 the year previous. As indicative of the way the war entered into Bethlehem's operations, the unfilled orders on hand Dec. 31, 1914, totaled $46,513,000 and a year before that they were only about half that or $24,865,000. In 1912, the total was $29,282,000 and in 1911, $15,885,000. After dividends on 7 per cent preferred stock, the balance available for $59,448,000 common stock outstanding amounted to $44.20 per share.

Buys Furnace

At Lowellville and Sharon Steel Hoop Plans Extensions

The Sharon Steel Hoop Co., Sharon, Pa., has acquired the blast furnace of the Ohio Iron & Steel Co. at Lowellville, O., with 200 surrounding acres, 130 of which are available for industrial uses. Extensions are contemplated, including by-product coke ovens, a blast furnace, open-hearth mixer, finishing mills and the development of a model town on an adjoining 60-acre site, which will involve a large expenditure. The consideration is given as $3,000,000 and it is understood the Sharon company will increase its capital from $10,000,000 to $15,000,000 to cover the payment, since the Ohio Iron & Steel did not desire cash. Arrangements are being made by S. P. Ker, president of the Sharon Steel Hoop Co., to reside in Youngstown, and it is expected that the corporation's headquarters will be established there as well. Robert Bentley, president of the Ohio Iron & Steel Co., who organized it 39 years ago, will be given a place on the Sharon Steel Hoop Co.'s board of directors.

At the Youngstown plant, the Sharon Steel Hoop Co. has four open-hearth furnaces, and is building two more to give it a daily capacity of 900 tons. At the Sharon plant, its daily capacity is about 500 tons. Finishing capacity of the corporation consists of nine sheet mills with an annual capacity of about 75,000 tons, a 72-inch plate mill at the Haselton, O., plant and a 40-inch universal plate mill, a three-high blooming mill and a Morgan continuous sheet bar mill under construction at the Lowellville plant. It is expected that finishing capacity ultimately will be assembled at Lowellville, leaving the Haselton property to the subsidiary, the Youngstown Pressed Steel Products Co.

Shipbuilders Increased

With a total of $6,960,000 capitalization for shipbuilding companies incorporated in December, the total for 1917 is brought to $271,503,000. This breaks all records. The peak was reached in June, when the aggregate capital was $84,025,000. May was likewise one of the large months, with $47,490,000. May and June had nearly half the year's total. Other months' figures follow: January, $2,475,000; February, $30,525,000; March, $12,975,000; April, $29,395,000; July, $19,020,000; August, $19,038,000; September, $5,100,000; October $9,650,000; and November, $4,850,000.

Financial Crop Ends

The Eddy Machinery Co., Providence, R. I., has purchased the Winthrop Mfg. Co., Attleboro, Mass., of its owners, William J. Doyle, Attleboro, and Thomas McGrath, Providence.

* * *

Locomotive sales by the Baldwin Locomotive Works, Philadelphia, for the year ended Dec. 31, 1917, aggregated nearly $100,000,000. Orders are carried over which will represent practically another year's business.

* * *

The John Swaine Iron Works Co., Inc., Springfield, Mass., has been petitioned into bankruptcy in Boston, by five creditors. The company was incorporated in 1912, with $15,000 capital, John W. Swaine being president and John Swaine, treasurer.

* * *

The Goldschmidt Detinning Co. and the Goldschmidt Thermit Co. have been amalgamated and hereafter will be known as the Metal & Thermit Corp. The new company will continue the business of the old companies and the only change will be in the dropping of the old corporate names. Headquarters will be continued at 120 Broadway.

* * *

One-half of $250,000 of its new issue of 7 per cent preferred stock is being offered by the John Lauson Mfg. Co., New Holstein, Wis., gas engines, tractors and farm machinery. By this sale, the company's normal output of 4000 tractors annually will be doubled. The capital stock was recently increased from $500,000 to $1,000,000.

* * *

The Stanley Rule & Level Co., New Britain, Conn., elected the following officers at the annual stockholders' meeting, Jan. 22: A. W. Stanley, president; R. N. Peck, vice president; C. B. Stanley, secretary and treasurer; C. W. Nichols, assistant secretary; A. W. Stanley, C. B. Stanley, H. S. Walter, Meigs H. Whaples, George P. Hart, W. J. P. Moore, F. G. Platt, J. M. Burdick and R. N. Peck, directors.

* * *

The Hopkins & Allen Machine Gun Co., Boston, was recently petitioned into bankruptcy in the United States district court in that city by the Baush Machine Tool Co., Springfield, Mass., and other creditors. This company is a subsidiary of the Hopkins & Allen Arms Co., Norwich, Conn., a $3,000,000 corporation, which was recently sold by the receivers to the Belgium government under a foreclosure of a mortgage.

Short Supply

Of Ammonium Sulphate Precludes Effect from License System

New York, Feb. 2.—Business in sulphate of ammonia now is being conducted in accordance with the system recently outlined by the food administration. All sellers and buyers of the primary product, except those using it exclusively for manufacture into secondary products, have been provided with government licenses. The application of the license system has not materially affected the market, due to the scarcity of the supply. Current contracts call for practically all of the sulphate of ammonia which normally would be produced up until May 1. Owing to the decreased production during the past few months, however, and to the quantities commandeered by the government, it is almost certain these contracts will take up practically the entire output to July 1. It is exceedingly difficult to squeeze out spot lots and sales therefore involve only an odd carload here and there. Prices on such business are ascending and the market on spot now may be quoted at $5.10 to $5.35 per 100 pounds at tidewater.

Sales of benzol during the past week were normal, involving a few hundred thousand gallons both for spot and contract. These were on the same price basis of recent weeks, 35 to 40 cents per gallon. Phenol is unchanged. Supplies are almost impossible to obtain due to the contract deliveries and the extent to which the decreased production is holding these up. Current business comprises only odd spot lots at 53 to 55 cents per pound. In solvent naphtha, the current volume of business is small. The market continues firm.

Coke Oven By-Products

Spot	
Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.53 to .55
Per 100 Pounds at Seaboard	
Sulhate of ammonia (nominal)	$5.10 to 5.35
Contract	
Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ALEXANDER C. BROWN, who was selected chairman of the crane committee of the war industries board a short time ago, is vice president and general manager of the Brown Hoisting Machinery Co., Cleveland. Mr. Brown is a grandson of the late Fayette Brown, who organized the company in 1880, and a son of the late Alexander E. Brown, who was vice president and general manager of the company for many years. He was born in Cleveland May 6, 1885. After graduating from Yale university with the degree of B. A., in 1907, he took a special course in mechanical engineering at Case School of Applied Science, Cleveland. In 1909 he entered the Brown Hoisting Machinery Co., working in different departments until 1911, when he was elected vice president of the company. Upon the resignation of Richard B. Sheridan, who left, in April, 1916, to take a position with the American International Corp., New York, Mr. Brown was chosen general manager.

C. M. Robertson has opened a sales office in Machinery Hall, Clinton and Washington streets, Chicago. He will represent the Colburn Machine Tool Co., Franklin, Pa., and other interests.

John C. Wilson was chosen president and treasurer, and Robert H. Schutz, vice president and secretary of the Smyth Mfg. Co., Hartford, Conn., at its annual meeting Jan. 28.

David F. Noble has taken a position with the David W. Wright Machinery & Equipment Co., Chicago. Mr. Noble formerly was associated with the E. L. Essley Machinery Co., Chicago.

Robert L. Arms has been made sales manager of the Monarch Machinery Co., 300 North Third street, Philadelphia. Mr. Arms formerly was in the sales department of Manning, Maxwell & Moore, Inc., and later with the Sherritt & Stoer Co., in a similar capacity.

E. L. Nolan has been named district representative of the Crown Die & Tool Co., Chicago, with headquarters in Cincinnati. C. J. Weller, who recently was appointed eastern representative, has opened offices in Newark, N. J.

C. E. Conkling, who has been associated with the Mesta Machine Co., Pittsburgh, has been commissioned a captain in the army and is attached to the steel production division of the ordnance bureau of the war department.



ALEXANDER C. BROWN

T. R. Burke, for many years Pacific coast representative of the Sloan Valve Co., Chicago, has been named assistant sales manager of the company. He will be succeeded by E. C. Whalen, who will have headquarters in the Wells-Fargo building, San Francisco.

J. H. Hammill, vice president and treasurer of the Strong-Scott Mfg. Co., Minneapolis, manufacturer of flour mill machinery, has joined the food administration as manager of the new mechanical department in connection with its milling division. The purpose of this division, which is located at 74 Broadway, New York, where Mr. Hammill will have his office, is to assist millers along technical lines in converting or setting up mills for grinding barley, rye and corn, and to assist in the movement for wheat saving in the United States.

Milton Rupert, who has been affiliated with the R. D. Nuttall Co., Pittsburgh, manufacturer of gears, pinions and trolleys, since 1893, was recently elected to the position of vice president and assistant treasurer, in charge of sales and manufacturing activities. During this almost a quarter-century connection, Mr. Rupert has held various important positions, and prior to his recent promotion he was assistant to the president as well as general manager.

Arthur J. Wallace, secretary and treasurer of the Economic Machinery Co., Worcester, Mass., has resigned to enter general war relief work. Edward B. Moor has succeeded Mr. Wallace as secretary and treasurer of the company. Leonard W. Howell, until recently in charge of the office, has been made sales manager. Daniel W. Gurnett, Boston, was elected president, and Herman Stake, Worcester, vice president and general manager at the annual meeting of the company recently.

William A. Carrell, formerly general superintendent of the motor plant of the International Harvester Corp.'s Milwaukee works, has accepted the position of chief engineer and works manager of the Erd Motor Co., Saginaw, Mich., manufacturer of kerosene tractor engines. Mr. Carrell at one time was general superintendent of the Beaver Mfg. Co., Milwaukee, and prior to that he was designing and production engineer of the Wisconsin Motor Mfg. Co., of that city.

R. S. Cooper, vice president of the Independent Pneumatic Tool Co., Chicago, who for many years was the manager of the company's New York branch office has assumed the duties of general sales manager in addition to those he already holds as vice president. Mr. Cooper has headquarters at the general offices of the company in the Thor building, Chicago. R. T. Scott, formerly Pittsburgh office manager, has been named manager of the New York branch office, with headquarters at 170 Broadway. H. F. Finney has been placed in charge of the Pittsburgh office.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

CAMERON C. SMITH, who on Jan. 15, was appointed major, ordnance reserve corps and was assigned to the production department, carriage division of the ordnance department of the United States army, with headquarters at Washington, D. C., was elected chairman of the board of directors of the Union Steel Casting Co., at its annual meeting Jan. 26. He served as president of the company for 18 years. Born in Clinton township, Butler county, Pa., April 2, 1861, Mr. Smith after receiving a business education, accepted a position as stenographer in the office of Wilson Walker & Co., Pittsburgh, iron and steel manufacturers. He remained there 10 years during which time the company was merged into Carnegie, Phipps & Co., and then into the Carnegie Steel Co. In 1893, he became affiliated with the Reliance Steel Casting Co., Pittsburgh but six years later withdrew to organize the Union Steel Casting Co., in that city. For one year his official title was secretary and general manager but in 1900 he was elected president. Other officers elected at the annual meeting of the company are: J. P. Allen, president, who formerly was vice president; S. H. Church, vice president; G. W. Eisenbeis, treasurer; W. C. Eichenlaub, secretary and J. B. Henry, general superintendent. The board of directors is made up of Messrs. Smith, Allen, Church, Eisenbeis and Henry and W. P. Potter.

M. H. Beary was recently elected secretary of the Bethlehem Motors Co., Allentown, Pa.

L. G. Kibbe was recently tendered a farewell banquet by department heads upon the occasion of his resignation as president of the Turner & Seymour Mfg. Co., Torrington, Conn.

Theodore E. Ferris recently resigned as chief ship designer for the Emergency Fleet corporation, according to an announcement by Chairman Hurley of the shipping board.

Harold Wesson, vice president and superintendent of the Smith & Wesson Associates, Springfield, Mass., maker of revolvers, has received a lieutenant's commission in the naval aviation division and will report for service in the near future.

S. S. French, vice president and general manager of the General Fireproofing Co., Youngstown, O., was recently elected a member of the board of directors.

H. H. Elmer becomes the New York representative of Frank Samuel, Philadelphia, dealer in iron and steel scrap and ore, to succeed H. L. Warner, who has joined the National army at Camp Upton.

George E. Price, who has been affiliated with the sales force in the



CAMERON C. SMITH

Pittsburgh office of the Youngstown Sheet & Tube Co., has been transferred to the Chicago office, with which he will be associated temporarily.

H. C. Hequemborg, formerly purchasing agent for the American Locomotive Co., Dunkirk, N. Y., has been appointed major in the ordnance reserve, under Adjutant General McCain at Washington.

Ben D. Christian and D. B. Craze now represent the Crocker-Wheeler Co., New York City, in the Cleveland district, with headquarters in the Guardian building. They succeed Howard Dingle and W. W. Clark.

Herbert A. Johnson, formerly general superintendent of the North & Judd Mfg. Co., New Britain, Conn., who resigned to receive a captain's commission in the ordnance department, was recently promoted to the rank of major.

George O. Hollenbaugh, formerly assistant superintendent of blast furnaces for the McKinney Steel Co., Cleveland, has been made superintendent to succeed Charles E. Ash, who recently resigned.

Charles D. Lehmkuhl, formerly of the Thomas-Detroit and Chalmers motor companies, has been made secretary and director of the Air-O-Flex Automobile Corp., Detroit, to succeed G. L. Nadel.

A. H. Preston, formerly general storekeeper for the Upson Nut Co., Cleveland, was promoted on Feb. 1 to the position of purchasing agent. He succeeds C. E. Hill, who has been transferred to the treasury department.

F. P. Welton, formerly with the Naugatuck Valley Crucible Co., Derby, Conn., has become affiliated with the Jonathan Bartley Crucible Co., Trenton, N. J., and will represent them in the sale of crucibles throughout New England and Canada.

W. C. Wright of the National Founders association addressed the Newark Foundrymen's association, Newark, N. J., Feb. 6, on methods of molding and the production of castings at minimum cost as reflected by practice at typical western plants.

A. E. Wells, superintendent of the bureau of mines' experiment station at Salt Lake City, has been assigned to the war industries board to assist in connection with sulphuric acid matters, since he has made a special study of that commodity.

Charles S. Bilyeu, who early in 1917 left Hildreth & Co., engineers, New York City, to become an inspecting engineer for Gulick-Henderson Co., New York, has been made assistant to Henry Gulick, the latter company's president.

R. T. McCloskey, formerly superintendent of the Leetsdale, Pa., plant of the Riter-Conley Mfg. Co., has been appointed superintendent of the Wheatland, Pa., plant of the Blaw-Knox Co., to succeed G. Morrison, resigned.

Steel Contracts

Practically Made an Open Price Basis Under Revision Clause

Chicago, Feb. 5.—Steel contracts now being made contain a clause subjecting prices to revision on all material shipped after March 31, in conformity with the government announcement made in December, when present prices were fixed for the first quarter. Quotations are also being made with a clause giving notice that the prices named are subject to this revision.

An important steel manufacturer includes the following clause in all its quotations: "The prices quoted for the materials named herein are subject to revision to a basis that may be fixed by the proper United States Government Agency, by agreement or otherwise, as the public or market price for such materials at the time of shipment, for any portion that may be unshipped as at March 31, 1918."

Contracts now being made contain the following clause, stating the same condition: "The prices to be paid by the purchaser for any of the materials named herein, which are shipped under this contract after March 31, 1918, shall be the price fixed by the proper United States Government Agency, by agreement or otherwise, as the public or market price for such materials at the time of shipment, instead of the price herein named."

Inasmuch as little material now being contracted will be delivered during the first quarter the effect of this provision is to make all contracts at an unknown price, subject to the government announcement at the end of the current quarter or any subsequent date before delivery is made. This provision applies to practically everything except standard steel rails, on which no price has been fixed.

Convention Date Decided

For its 1918 annual convention, the Association of Iron and Steel Electrical Engineers has selected Baltimore. It will be held Sept. 9-13. The Pittsburgh section will hold a meeting at the Hotel Chatham, Feb. 16. A paper on alternating current and direct current skip hoists will be presented by Mr. Lindquist, of the Otis Elevator Co. Officers for the ensuing year were elected at the 1917 annual meeting as follows: C. A. Menk, Carnegie Steel Co., Munhall, Pa., president; D. M. Petty, Bethlehem Steel Co., South Bethlehem, Pa., first vice president; B. W. Gilson, Carnegie Steel Co., Youngstown, O., second vice president; J. F. Kelly, National Tube Co., McKeesport, Pa., secretary, and James Farrington, La Belle Iron Works, Steubenville, O., treasurer. F. D. Egan, Pittsburgh Iron and Steel Foundries Co., Midland, Pa., served as president in 1917 and W. T. Snyder, National Tube Co., McKeesport, Pa., in 1916.

Chairmen of the respective committees for 1918 are as follows: W. T. Synder, National Tube Co., McKeesport, Pa., standardization committee; W. O. Oschman, Oliver Iron & Steel Co., Pittsburgh, power committee; A. H. Swartz, Westinghouse Electric & Mfg. Co., publicity and promotion, as well as convention committees; K. H. Cedarland, Duquesne Steel Works of the Carnegie Steel Co., Duquesne, Pa., electric furnace committee; J. F. Kelly, National Tube Co., McKeesport, Pa., membership committee; Walter Greenwood, Carnegie Steel Co., Youngstown, O., safety committee; B. W. Gilson, Carnegie Steel Co., Youngstown, O., educational committee; E. Friedlander, Carnegie Steel Co., Braddock, Pa., editing committee; W. C. Kennedy, Standard Seamless Tube Co., Ambridge, Pa., electrical development committee, and F. D. Egan, Pittsburgh Iron & Steel Foundries Co., Midland, Pa., finance committee.

Five years after the Association of Iron and Steel Electrical Engineers was organized in 1908 with James Farrington as president, the national safety council developed from one of its committees.

Obituaries

THOMAS FAWCUS, president of the Fawcus Machine Co., Pittsburgh, manufacturer of herringbone gears, died recently at Mercy hospital, Pittsburgh, aged 51, after an illness of about three weeks.



THOMAS FAWCUS

Mr. Fawcus was born in England, and came to this country in 1888 and located in Birmingham, Ala. Later he became connected with enterprises in Chattanooga, Tenn. Coming to Pittsburgh, he was associated in turn with the Westinghouse Electric & Mfg. Co., Anderson-Dupuy Co. and the R. D. Nuttall Co. In 1900 he organized the Fawcus Machine Co. for the manufacture of gears and special machinery. The company started business in a one-story building at 2820 Smallman street. Under the management of Mr. Fawcus the growth of the business was so rapid that in 1910 the plant at Ford City, Pa., was purchased. Mr. Fawcus was endowed with great executive ability and a keen inventive brain. Among his many mechanical inventions, the most notable are the machines for cutting herringbone gears. Mr. Fawcus was a member of the American Society of Mechanical Engineers, and the Society of Engineers of Western Pennsylvania.

John G. Rehfuss, age 44, died recently in Wilmington, Del. He had served as superintendent for the George W. Baker Machine Co., Wilmington, for a number of years.

C. C. Williams, who was president and general manager of the G. H. Williams Co., Erie, Pa., manufacturer of grab buckets and conveying equipment, was killed recently when his automobile was struck by a street car.

Herbert B. Knox, president and treasurer of the Charles McCaul Co., Philadelphia, contractor, with which he was connected for 20 years died recently at his home in Philadelphia. He was one of the country's best known structural and architectural engineers. A project that gave him considerable prestige was the building of the Philadelphia mint.

Central West Receives War Orders

Munition Contracts Are Liberally Distributed Among Inland Manufacturers—Fuel Order and Traffic Troubles Hamper Tool Industry—Government Asks for Used Equipment—Navy Department Awards Contract for 60 Locomotive Cranes

PLACING of many contracts for ordnance, shells and other munitions, among manufacturers in the middle west, was reflected by relatively greater buying activity in that territory than in the east, during January. Traffic congestion in the Atlantic states and the vast number of orders already placed with eastern plants have caused an extension of the government's war order efforts to an increasing number of plants all over the country, most of which are undertaking this form of work for the first time and consequently need much new equipment. On the Pacific coast, demand for machine tools has been limited almost exclusively to machines needed for the shipbuilding and destroyer programs, as required by machine shops having subcontracts from the shipyards. The fuel situation seriously affected operations of machine tool builders. Many plants, especially in New England, were on a hand-to-mouth basis in respect to coal, during January, while some had to resort to wood to continue operating. While the fuel administration's closing order at first affected nearly all builders, most of the larger builders of machines received exemptions on much of their work during the latter part of the month and thr were enabled to operate on urgent government work on the more recent "workless" days. Prices did not change much during January. In some instances slightly lower quotations were made by manufacturers, who have used up their stocks of higher priced steel and now are obtaining supplies at the government price.

Government's Requirements Are Large

It is estimated that fully 95 per cent of the machine tools being turned out today are being taken into direct or indirect government work. The output of builders is sold up from several months, in the case of some types, to more than a year in others. Much used equipment is being sold and rented for government purposes. The machine tool section of the war industries board during the month made an appeal to dealers, builders and users of tools for assistance in obtaining about 565 planers, 300 radial drills, several hundred engine lathes, about 100 horizontal boring and milling machines, wanted by the ordnance department of the army for delivery by April 1.

Shell Contracts Predominate in Awards

Among the buyers of machine tools during the month were the arsenals at Rock Island, Ill., and Watervliet, N. Y. The Fore River Shipbuilding Corp. closed for about 85 precision lathes, for installation aboard destroyers. The following companies bought equipment for use in making shells: The Hyatt Roller Bearing Co., Newark, N. J., for making 1.7-pound smoke shells; the Crucible Steel Co. of America, for making 30,000 six-inch common projectiles; the John Thomson Press Co., New York, manufacturer of printing presses; the Thurlow Steel Co., for 4.7 shells; the Metropolitan Engine Co., for making 1,100,000 trench mortar shells; Winslow Bros., Chicago, for 155-millimeter shells; the Moon Motor Car Co., St. Louis, for 155-millimeter shells; the Gorham Mfg. Co., Providence, R. I., bought tools for manufacturing 3,000,000 hand grenades. The following companies entered the market for machines needed for fuse contracts: The Stenotype Co., Indianapolis; Indiana Brass Co., Frankfort, Ind.; Frost Mfg. Co., Hall Lamp Co., Kenosha, Wis.; E. W. Bliss Co., Brooklyn; Neptune Meter Co., Long Island City, N. Y.; H. Mueller Mfg. Co., Chicago, which inquired for 100 turret lathes. Ordnance makers in the middle west contributed a large portion of the activity in the machine tool market. Among those buying was the Morgan Engineering Co., Alliance, O., which purchased several hundred machines. The Studebaker Co., Detroit, the Standard Steel Car Co., Hammond, Ind., and Dodge Bros., Detroit, were heavy buyers. Companies receiving miscellaneous war contracts included the following: The F. W. Spacke Machine Co., Indianapolis; Arbuckle & Co., Rushville, Ind.; Wagner Axle Co., Anderson, Ind.; American Standard Metals Co., Paulsboro, N. J.; and Slocum, Avram & Slocum, Inc., New York. The Federal Shipbuilding Co. inquired for 30 to 40 lathes. The Air Nitrates Co. inquired for equipment needed for a machine shop for the government nitrogen plant at Mussel Shoals, Ala.

Award of 60 Locomotive Cranes is Feature

Demand for cranes, as in the preceding month, came mainly from the government and the various shipyards. A feature of last month's business was the placing of 60 locomotive cranes by the bureau of yards and docks, navy department. These cranes, the bulk of which were 15 to 20 tons capacity, were apportioned among various builders. Another large order for locomotive cranes was that of the American International Shipbuilding Corp., involving 28 cranes for its yard at Hog Island, Philadelphia. Twenty of this lot went to the Ohio Locomotive Crane Co., Bucyrus, O., while the remainder went to the Industrial Works, Bay City, Mich. A contract of particular interest was that received by the McMyler-Interstate Co., Cleveland, calling for a 350-ton outfitting crane for the Brooklyn navy yard. This was the largest crane ever awarded. Included in other business placed last month were 15 electric cranes for the Air Nitrates Co., New York, which is building a plant for the government at Mussel Shoals, Ala. The greater portion of this lot went to the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. Another sizable contract involved 11 electric cranes for the Federal Shipbuilding Co., New York. The Cleveland Crane & Engineering Co., Cleveland, received two 50-ton cranes, and the Milwaukee Electric Crane & Mfg. Co., Milwaukee, and the Erie Steel Construction Co., Erie, Pa., shared the remainder of the order. The Cleveland Crane & Engineering Co. also booked five overhead traveling cranes, ranging from 5 to 100 tons, for the Washington navy yard.

Voice Disapproval of Tool Appeal

Dealers Believe That Government Inquiry for Equipment Now in Operation Will Stifle Business in Used Tools—Fuel Difficulties Border on Solution—Traveling Cranes for Washington Navy Yard to Cost $600,000

INSTANCES of disapproval of the recent request made by the machine tool section of the war industries board that machine tool builders and manufacturers rearrange their manufacturing facilities so as to release machinery for government work and sell or lend these tool to the government, are numerous, not only among the 350 dealers in used machine tools throughout the United States, but among manufacturers as well. Several tools of the types specified, it is maintained, are available from dealers for early delivery. Dealers also assert that many tools in the sizes named have been offered during the past few months, but that the government, apparently, had entertained little thought of a possible need for these tools at the time, as no effort was made to secure them. Obviously, the dealer of used machinery is vitally affected by this government request, in that his field for tools and selling activities will be limited.

Confusion still exists among machine tool builders in regard to the exact interpretation of the fuel order; some frankly state that they do not know whether the rule permits them to operate or not. The order is not interfering with government work, at least as far as machine tools are concerned. With the early removal of the ban, which is not a remote possibility, the industry will be enabled to assimilate its large orders.

Inquiries, except from scattered sources, have dwindled in both the machine tool and crane markets. The outstanding feature of the latter market is the government's inquiry for traveling cranes to cost approximately $600,000 and to be installed at the Washington navy yard. In the machine tool market the distribution of about $100,000 worth of equipment for the Watervliet arsenal is conspicuous.

Markets Have Respite From Large Inquiries

ALTHOUGH builders of machine tools were seriously affected by the closing order of the fuel administration during the earlier days of the workless edict, an increasing number of exemptions has been granted to companies engaged in essential government work, until now many plants are running almost to capacity on the fuelless days. Considerable confusion still exists, some companies not knowing whether or not the rules allow them to operate, while others have found it difficult to run part of their plants on essential government work and to shut down part. But, all in all, the workless days no longer are seriously interfering with the government's war program as related to the machinery industry.

Watervliet Arsenal Distributes Orders

Machine tool dealers report a good volume of business, principally for government work, in lots of one to a few tools each. The capacity of manufacturers is so far taken up that it is perceived to be futile to issue long lists with any hope of getting results. The most important buying in the east last week was done by the Watervliet arsenal, which distributed orders for about $80,000 to $100,000 worth of machines, including lathes, drills and boring mills. In general, however, in the states of New York and New Jersey, and in New England, a lull is apparent in large-scale new buying. Reports received in New York from Pittsburgh offices indicate that the lull also is present there. Further west, however, some large buying is being done, principally for plants having ordnance and gun mount contracts. These include the Standard Steel Car Co., Hammond, Ind.; the Studebaker Co., Detroit, and Dodge Bros., Detroit.

Recent activities in the east include the following: The High Speed Hammer Co., Rochester, New York, will enlarge its plant; the Bethlehem Steel Co., it is reported, will erect a large shell-loading plant at Mays Landing, N. J.; the Niles-Bement-Pond Co. will erect a 60 x 200-foot forge shop at Plainfield, N. J.; the navy department has asked for estimates on a boiler shop at Washington; the Eastern Connecticut Power Co., New London, Conn., has drawn plans for a $1,000,000 power plant at Thamesville, Conn., and will purchase two 10,000-kilowatt generators, among other equipment; the Reading railway has begun the construction of a $200,000 roundhouse and a $100,000 machine shop at Philadelphia; the Milton Mfg. Co. will build a machine shop.

Business in Conveying Machinery Slackens

Actual consummation of business in conveying machinery was relatively small last week. The Atlantic Corp., Portsmouth, N. H., in placing several locomotive cranes with the Brown Hoisting Machinery Co., awarded the largest contract reported in the crane market. It was understood that this company would also purchase several overhead traveling cranes; however, it now develops that the company will not buy equipment of this description, but will use hoists instead. The Atlantic Corp. is expanding its plant at Portsmouth, N. H., to erect 10 steel ships for the government. The Lockwood, Greene Engineering Co., Boston, is in charge of the construction. The American Brake Shoe & Foundry Co. is inquiring for two 5-ton electric cranes for Mahwah, N. J. The Worthington Pump & Machinery Corp. continues in the market for a 10-ton electric crane for Holyoke, Mass. The inquiry of the Groton Iron Works, Groton, Conn., for four 5-ton electric cranes for its new shipyard at Alexandria, Va., remains pending. The Newport News Shipbuilding & Dry Dock Co. has placed a contract for two 7½-ton gantry cranes with the Alliance Machine Co., Alliance, O.

Business Drops Off in January

TRANSPORTATION conditions have had a decided effect on machine tool business in the Chicago district and it is distinctly slower than was the case late



AGATHON
ALLOY STEELS

But three years ago, AGATHON Alloys were unknown. This wonderful plant was just nearing completion.

Today, AGATHON is the accepted standard for alloy steels and this great plant, augmented by numerous additions, must work day and night to supply the demand for steels of AGATHON quality.

Intrinsic merit, nothing else, has won them this place of supreme leadership. AGATHON Alloys will serve your purpose best.

AGATHON Chrome Steel
AGATHON Nickel Steels
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AGATHON Vanadium
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Cleveland Office—Hickox Bldg.,
The Hamill-Hickox Co., District Representative.
Chicago Office—1370 Peoples Gas Bldg., 122 S. Mich. Blvd.
C. H. Beach, District Representative.
Philadelphia Office—603 Widener Bldg.,
Frank Wallace, District Sales Manager.
Syracuse Office—601 University Block.
T. B. Davies, District Sales Manager.
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last year. Business for January was much less than during the few preceding months, but same sellers have found it about equal to the average for 1917. Were it not for the heavy buying during some months of last year, January would have stood out more or less prominently. Little business of importance is now pending, and most inquiries are for single tools or smaller lots. This is in marked contrast to the larger requirements recently put forth. Embargoes by railroads are relieved somewhat and some machinery is being shipped from Cincinnati, after a period during which nothing was moved from that city. As an indication of the slow movement of freight, a machine shipped from Chicago to a user 16 miles distant was loaded Jan. 2 and has not yet been received. Some buying is being done for the Rock Island arsenal but no large inquiries are now pending for that purpose. The Wagner Electric Co., St. Louis, has completed six frame buildings of dimensions, 60 x 2000 feet, and contemplates doubling this capacity within 60 days. The United Mfg. & Distributing Co., Chicago, has taken a government contract for fuses and has bought part of its equipment. The Franklin Mfg. Co., Chicago, is preparing to build a factory. The Standard Steel Castings Co. is about to erect a large addition to its plant at Clearing, Ill. The Townsend Mfg. Co., at Janesville, Wis., will build two additional shops. The Lake Superior & Ishpeming railroad will build new shops this year at Marquette, Mich., including a machine shop, blacksmith shop and car repair shops. The Texas Steel Co. has begun to repair and re-equip its blast furnace and pipe foundry at Rusk, Tex., recently bought from the state. Waterworks improvements are being undertaken with the nearer approach of spring weather. Marshalltown, Ia., will add three boilers at its waterworks, and Sioux City, Ia., will install nine air lift pumps, a booster pump, air compressors and engines. Wellington, Kans., will add five electric low-pressure pumps to its waterworks system.

Receive Large Airplane Parts Contracts

GOVERNMENT work on airplane motor parts, huge contracts for which have been let to Cleveland manufacturers, may explain the recent establishment of the offices of the production division of the aviation section of the signal corps in the Union building, Cleveland. Major Frank E. Smith will supervise the work of the division. The enormity of these contracts is made apparent in one instance, that of the National Acme Mfg. Co., Cleveland, which has received contracts covering 95,000,000 parts for liberty motors. Dealers in the Cleveland district report that the inquiries of the past week have come mostly from makers of airplanes or airplane parts and that the inquiries from shipbuilders have been dwindling in size and number. Before the entrance of the nation into war, rubber companies took many machine tools to supplement or replace their equipment. Lately these inquiries have been unusually small and its effect has been perceptible in the Cleveland market owing to its nearness to Akron, the center of the rubber industry. Sales of the past week have not been of spectacular size, but have covered small lots of tools, delivery of which, for the most part, can be made in from 30 to 90 days. The slackening of the automobile production rate is causing a lethargic movement of special machinery and equipment. The National Tube Co., Lorain, O., is in the market for additional equipment including a planer, a boring mill and three lathes. Purchases of new equipment which are being made by the Cleveland Tractor Co., Cleveland, appear to be part of a continuous process rather than in the way of specific inquiries. New contracts acquired by the Recording & Computing Machine Co., Dayton, O., following a recent trip of officials to Washington, have been productive of new inquiries for machine tools from that company.

To Build Second 150-Ton Pontoon Crane

Additional exemptions from the Monday closing order are permitting a number of northern Ohio crane manufacturers to push work on government crane contracts. The Wellman-Seaver-Morgan Co., Cleveland, has received an order for a duplicate of the 150-ton revolving pontoon crane, which it built for the Norfolk navy yard, Norfolk, Va. This one is to be completed the latter part of 1918 and will be installed in the Mare Island navy yard, San Francisco. Orders for charging cranes likewise are being filled by this company for government arsenals at Watertown, N. Y., and Charleston, W. Va. Government orders continue to receive the major portion of attention.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Vandyke Smelting & Refining Works has been chartered with $300,000 capital. Incorporators include A. J. C. Weimer, M. Mulstein and E. Strauss, 392 Thirtieth street.

BROOKLYN, N. Y.—A charter of incorporation has been granted to the Eastern Foundry Corp., capitalized at $20,000. Incorporators are H. Jacobson, G. A. Weldon and W. Lowenthal, 35 Nassau street.

BROOKLYN, N. Y.—Contracts for the erection of a power house addition and an awarded to the Structural Construction Co., electrical gallery to cost $500,000 have been Dayton, O., by a concern whose name is withheld. W. Weissenberger Jr., 32 Union square, New York, is architect.

BUFFALO.—Plans are being prepared by the Kellogg Products Co., 98 Delaware avenue, for a 2-story, 30 x 64-foot transformer house, 2-story, 30 x 112-foot boiler house and a 1-story, 50 x 57-foot boiler house addition. Total cost is estimated at $40,000. R. J. Reidpath is the contractor in charge.

BUFFALO.—The Barcalo Mfg. Co., 225 Louisiana avenue, is having plans prepared by Kidd & Hopkins, architects, Franklin street, for a 1-story, 40 x 100-foot factory addition to cost about $6000.

BUFFALO.—Deck Bros., Inc., recently organized with a capital of $35,000, plans to build a foundry and machine shop. B. L. Lempenau is in charge.

GLENDALE, L. I., N. Y.—A $25,000 plant will be erected by William Greilich. Louis Allmendinger, 20 Palmetto street, Brooklyn, N. Y., is architect.

NEW YORK.—The Cary Spring Works, 242 West Twenty-ninth street, has leased a site



DELAWARE RIVER STEEL COMPANY

MANUFACTURERS OF PIG IRON

CHESTER, PENNSYLVANIA

LOW PHOS

To Pig Iron Consumers:

An even hundred words concerning "Delaware" Low Phosphorus Pig Iron. We desire to place this iron in the works of every consumer of low phos iron. Those who have used it are sending us repeat orders. Every one should try it. Now is the time. Your regular supply is not dependable. The shortage in all grades is appalling and the situation is becoming more acute. "Delaware" contracts will be completed. We are in a position to keep our promises. "Delaware" Iron is copper bearing. It is the best of its kind. Buy "Delaware" and learn to depend upon "Delaware" Pig.

DELAWARE RIVER STEEL CO.



adjoining its present plant, on which it plans to build extensions.

NEW YORK.—The Wedge Joint Corp. has been organized with $100,000 capital to manufacture engines, boilers and heavy hardware. The incorporators are T. E. Vandorn, E. S. Merrill and J. A. Twichell, 316 West Seventy-ninth street.

NEW YORK.—The C. H. Radiator & Mfg. Co. has been organized with a capital of $5000. The incorporators are C. H. and A. H. Lavaty, 1427 Avenue A.

NEW YORK.—The Puritan Steel Co., recently incorporated with a capital of $50,000, plans to erect a factory. W. J. Miller, 60 Wall street, is in charge.

ROCHESTER, N. Y.—The Rochester Melting Works has been incorporated with $50,000 capital. G. J. Skivington, G. M. Schmidt and G. Baxter are interested.

ROCHESTER, N. Y.—Booth Bros., manufacturers of shoe machinery, plan to rebuild their plant, recently damaged by fire.

ROCHESTER, N. Y.—The plant of the Eureka Foundry Co., 108 Browns Race, has been damaged by fire with a loss of $45,000.

SCHENECTADY, N. Y.—J. C. Aitkin, 216 South Centre street, manufacturer of storage batteries, plans to build a 1-story, 50 x 80-foot plant addition.

SYRACUSE, N. Y.—The Caldwell & Ward Brass Co. contemplates repairs to its foundry, to cost $10,000. The plant was recently damaged by fire. L. F. Meagley, 103 Decker street, is in charge.

AMBRIDGE, PA.—The Asbestos Protected Metal Co., Pittsburgh, has had plans prepared for a 40 x 200-foot factory. H. H. Robertson is interested.

BUTLER, PA.—Plans are being drawn for a 1 and 3-story, 170 x 250-foot addition to the plant of Spang & Co., Etna street. Cost will be about $150,000.

MILLERSBURG, PA.—A machine shop to be erected by Brubaker Bros., will be 1-story, 75 x 100 feet. Thomas Hamilton, 11 North Sacken street, is architect.

PHILADELPHIA.—The Hero Mfg. Co. is having plans drawn for a 3-story factory building to cost $30,000. The Austin Co. is the contractor.

PHILADELPHIA. — The Lutz Co., 3111 Grays Ferry avenue, manufacturer of machinery, has purchased a site at Bambrey and Morris streets on which it plans to build a 60 x 200-foot factory.

PHILADELPHIA.—C. V. Roberts, Church street, plans to erect a $10,000 addition to his machine shop.

WILLIAMSPORT, PA. — The National Foundry Mfg. & Supply Co., whose plant has been severely damaged by fire recently, plans to rebuild at once. The company, of which G. D. Gingrich is manager, has been working on government orders.

WILLIAMSPORT, PA.—A $15,000 addition will be erected at the plant of the Valley Iron Works. Bids probably will be taken in the spring.

CAMDEN, N. J.—Fire of incendiary origin has recently caused a loss estimated at $500,000 to the plants of the Van Austin Casting Pattern Co., Wedmore & Co., wire workers, the William Gravers Machine Co. and the George Meyers Machine Co. The last named concern manufactures gaskets for airplanes.

ELIZABETH, N. J.—The Duesenberg Motors Corp. contemplates the erection of large additions to its present plant.

NEWARK, N. J.—John Campbell & Co., Plum Point lane, has awarded a contract to Enstice Bros. for a 1-story plant addition to cost $5800.

PATERSON, N. J.—William Jessop, manufacturer of tool steels, has awarded a contract for the rebuilding of a 4-story structure at his plant.

ROCKAWAY, N. J.—The factory of the Rockaway-MacKinnon Axe Co. has recently been damaged by fire. Edward Snook, an official of the concern, says a larger plant will be built on the site.

WILMINGTON, DEL.—A charter of incorporation has been granted to the Universal Iron Products Co., capitalized at $1,200,000, to manufacture iron bars, steel rails, culverts, etc. Incorporators include William F. O'Keefe, M. Gehrman and E. E. Wright.

BALTIMORE.—Contract for a $10,000 addition to the machine shop of the Autogenous Welding & Equipment Co. has been awarded to Henry Momberger, general contractor.

BALTIMORE.—The Cawman Building Co. will erect a $100,000 distributing station, three stories, 66 x 90 feet, for the Consolidated Gas, Electric Light & Power Co.

CURTIS BAY, MD.—Bids soon will be taken by the R. C. Hoffman Co. for the erection of a $130,000 steel plant. Address Continental building, Baltimore.

EDGEWOOD, MD.—The contract for the erection of a $3,000,000 chemical plant at this place has been awarded by the government to Mellon & Stewart, Pittsburgh.

NORFOLK, VA.—The Empire Machinery & Hardware Corp., 36 Commercial place, has increased its capital from $100,000 to $125,000 and plans to build an addition to its plant.

ROANOKE, VA. — The Republic Motor Truck Co., Alma, Mich., plans to build an assembling plant here.

Activities in the Central States

APPLETON, WIS.—T. M. Purtell, secretary, Reliance Motor Truck Co., 821 College avenue, will receive bids until Feb. 1 for the construction of a factory building, 76 x 300 feet, of reinforced concrete, steel and brick, with sawtooth roof. The estimated cost is $30,000. A. Arthur Guilbert, Racine, Wis., is architect and engineer.

GREEN BAY, WIS. — The Green Bay Barker Co. has awarded a contract to V. Derenne, 1211 Day street, for erecting a 1-story brick and concrete machine shop addition, 60 x 120 feet. The company manufactures sawmill and paper mill machinery and equipment.

HARTFORD, WIS.—Bids will be received until Feb. 19 by the city for a deep well pump and a motor. A. Martin, city engineer, is in charge.

JANESVILLE, WIS.—The Townsend Mfg. Co., manufacturer of internal combustion engines and tractors will build two shops, 60 x 100 feet and 20 x 40 feet in size, respectively.

JANESVILLE, WIS.—Bids will be received until Feb. 10 by the board of public works for an addition to the pumping station and the installation of a pumping engine. C. V. Keich is city engineer.

MILWAUKEE.—The Trico Fuse Mfg. Co. has been incorporated with $100,000 capital to conduct the business of the Arrow Fuse & Mfg. Co., 2416 North avenue, manufacturer of fuses and electric supplies. The incorporators are F. C. Geiler, Oscar H. Jung and Arnold Reuss.

MILWAUKEE.—D. & M. Karger, proprietors of the Eagle Knitting Mills, 382 Broadway, are having plans prepared by Martin Tullgren & Sons, architect, for a 2-story fireproof knitting mill, to be operated by electric power, and cost about $35,000 complete. The area will be 30 x 125 feet.

NEW HOLSTEIN, WIS.—The John Lauson Mfg. Co., manufacturer of gas engines, tractors and farm machinery, will enlarge its plant. The capital stock has recently been increased from $500,000 to $1,000,000, as large orders for tractors have been received from government and private sources which will require the purchase of additional machinery and tools as well as the erection of shop additions.

SHEBOYGAN, WIS.— Bids will be received by the county highway commissioner until Feb. 1 for the construction of a steel truss bridge over the Pigeon river near Sheboygan Falls. The structure will be 85 feet long and have a 16-foot roadway. Jerry Donohue is consulting engineer.

SUPERIOR, WIS.—Edward Kaner plans to maintain a scrap yard at Banks avenue and North Fourth street, and will require crane, magnet, and shearing equipment.

DETROIT.—The Hinkley Motors Corp. has awarded the contract for a 1-story brick and steel factory addition to be erected on Fort street at Twenty-third street.

DETROIT.—The T. C. Mahon Co., sheet metal manufacturer, is building a 1-story addition, 40 x 93 feet in size, to cost $5000.

FLINT, MICH.—Bonds for $128,000 have been voted to build a waterworks system. E. C. Shoecraft is city engineer.

GRAND RAPIDS, MICH. — The J. G. White Engineering Corp. has obtained a permit to build a 1-story brick and steel factory to cost $200,000.

GRAND RAPIDS, MICH.—The Truman M. Smith Co. has been incorporated with $60,000 capital to manufacture machinery and foundry equipment. I. T. Wright, C. N. Smith and Gerald McCoy are interested.

LANSING, MICH.—The city council contemplates authorization of the building of a municipal gas plant to cost about $1,500,000.

MARQUETTE, MICH.—The Lake Superior & Ishpeming, and the Munising, Marquette & Southeastern railroads, H. R. Harris, general manager, will shortly begin construction of new shops, at the ore docks of the former road, to cost $425,000, and to include a round-house with boiler room, an 80-foot steel turntable, a machine and work shop 115 x 143 feet, blacksmith shop 42 x 82 feet, oil house coaling station, car repair shop, steel shop 21 x 41 feet and other buildings.

MUSKEGON, MICH. — The Linderman

OHIO STEEL CASTINGS

OUT in the wheat fields of the Great Northwest, where they harvest the Nation's grain, time is just as important as in the busiest factory.

Plowing, planting, reaping, threshing must be done on Nature's schedule. Mistakes or loss of time can never be made up. It is imperative that every machine and implement used be absolutely reliable.

The fact that Ohio Steel Castings are sought for use in tractors and other types of farm machinery, is proof of their quality.

Quality PLUS Service

The Ohio Steel Foundry Co.

Plants:

Springfield, Ohio Lima, Ohio Bucyrus, Ohio



Steel & Machinery Co., 1075 Lake street, is building a 75 x 400-foot addition to its plant.

SAGINAW, MICH.—The Erd Motor Co. has increased its capital from $150,000 to $200,000 and will build an addition 90 x 240 feet in size. The company manufactures kerosene motors for tractors.

CHICAGO.—The Franklin Mfg. Co., Carl Malmberg, manager, 20 East Jackson boulevard, will build a factory and office building to cost $50,000 at Clybourn avenue and Chester street.

CHICAGO. — The Western Brass & Mfg. Co., 2007 Marshall boulevard, has had plans prepared by L. Novy, architect, 3223 West Twenty-second street, for a 1-story addition.

CHICAGO.—The Roth Mfg. Co., manufacturer of car heating apparatus, 118 South Clinton street, has bought a tract of land at Sixteenth street and Kilbourn avenue on which it will build a 1-story plant to cost $60,000.

CHICAGO. — The Republic Flow Meters Co., 565 West Washington boulevard, has increased its capital from $25,000 to $50,000 to provide for plant extensions.

CLEARING, ILL. — The Standard Steel Castings Co. will build a 1-story plant addition, 126 x 402 feet in size, to cost $100,000. Davidson & Weiss, 53 West Jackson boulevard, Chicago, are architects.

EAST ST. LOUIS, ILL.—The Durbin Automatic Train Connector Co. has begun the construction of a 2-story foundry to cost $25,000, on Bond avenue. Main offices are in the Pontiac building, St. Louis, Mo.

ROCK ISLAND, ILL. — The Western Pump Co. has been incorporated with $30,000 capital by G. A. Scheling, J. F. Harper, and B. Mulhausen.

CONNERSVILLE, IND.—The Rex Mfg. Co., C. C. Hull, president, will build a 1-story power plant 68 x 120 feet in size.

BRISTOE, IND. — The Harms Motor Co. has been incorporated with $100,000 capital to manufacture automobiles by N. I. Harms.

INDIANAPOLIS.—The Ideal Tool Works has been incorporated with $20,000 capital to manufacture automobile parts and tools. Jesse W. Titus, E. L. Crum and Edward L. Klingholtz are interested.

INDIANAPOLIS.—The J. Edward Harrison Mfg. Co. has been incorporated with $500,000 capital to manufacture machinery. Incorporators are M. C. Harrison, George C. Harrison and J. Edward Harrison.

INDIANAPOLIS. — The Victor Screw Works of Indiana has been incorporated with $50,000 capital by E. C. Miller, G. H. Power and Roy C. Allshouse.

INDIANAPOLIS. — The Weidely Motors Co. has increased its capital from $100,000 to $500,000 and will enlarge its plant and buy new equipment. The company manufactures airplane and tractor motors.

MUNCIE, IND.—The Warner Gear Co. will build a 1-story addition 139 x 450 feet, for which bids will be taken about Feb. 15.

PERU, IND.—The Model Gas Engine Co. will build additions to cost $50,000.

TERRE HAUTE, IND.—The Larsh Road Machinery Co. has been incorporated with $5000 capital stock by Thomas R. Woodburn, Thomas Ferguson and John M. Larsh.

UNION CITY, IND.—The Titan Engineering Co., recently incorporated with $50,000 capital, will engage in the manufacture of starting, lighting and ignition equipment, and will take over the plant formerly operated by the Tritt Electric Co.

VINCENNES, IND.—The Vincennes Galvanizing Iron Works has been incorporated with $10,000 capital. Incorporators include John H., M. O., and Peter R. McCarty.

AKRON, O.—The plant of the Ohio Wire Goods Mfg. Co., North Case avenue, has been damaged by fire with a loss of about $175,000. A. H. Nosh, chairman of the board of directors, announces that the company will rebuild shortly, as it has undertaken orders for war materials from the government.

CANTON, O.—The Berger Mfg. Co., 1038 Belden street, manufacturer of steel bins, shelving, etc., plans to build ten steel mills, aggregate cost to be about $5,000,000.

CINCINNATI.—The Cisco Machine Tool Co. is building an addition which will double the capacity of its plant, and is in the market for a large boring mill. G. Mil. Horton is general manager of the company.

CLEVELAND. — A contract has been awarded to the George A. Rutherford Co., 2160 East Eighteenth street, for a heat treating plant for the Perfection Spring works of the Standard Parts Co. F. E. Borton is in charge.

CLEVELAND.—The Rubay Co. has leased a site at 1328 West Seventy-eighth street on which it proposes to build a factory.

CLEVELAND. — The Peerless Pattern Works Co. has been incorporated with $10,000 capital by Neil Brogan and M. D. Bracken.

COLUMBUS, O. — The American Water Motor Co., 108 West Spring street, has purchased a site on which it plans to build a factory. L. Lewis is president.

CONNEAUT, O. — The Conneaut Metal Works plans to increase its capital from $40,000 to $100,000 to provide for building plant extensions. The company has recently received extensive government contracts.

DAYTON, O.—The plant of the Dayton Fan & Motor Co., Ludlow road and Bayard street, has been damaged by fire with a loss of $30,000. W. F. Phelps, president of the company, announces that plans for rebuilding will be considered at once.

DAYTON, O.—The Dayton Bronze Bearing, which has recently increased its capital from $10,000 to $30,000, plans to build a 50 x 150-foot brick and concrete factory addition. The company will also install considerable new equipment for the manufacture of brass, bronze and aluminum castings.

HUNTINGTON, W. VA.—Plans are being drawn for a factory to be built at Huntington by the Jeffrey-Dewitt Co., Butler street and Grand Trunk railroad, Detroit. Cost is estimated at $100,000.

Western and Intermountain Territory

HIBBING, MINN.—The village will build a municipal coal and gas plant to cost $182,000, and to include two buildings and a gas holder. J. P. Murphy is in charge.

BURLINGTON, IOWA.—The Northwestern Stamping Co., A. L. Bilkin, vice president, will build a 1-story factory 100 x 300 feet in size.

DES MOINES, IOWA. — The Whitnell Mfg. Co., Kingsley, Iowa, manufacturer of window sash, plans to remove its plant to this city, and will build a new factory as soon as a suitable site can be found. Charles Whitnell is president.

DES MOINES, IOWA.—The city plans a new waterworks plant, changing the source of supply to the Des Moines river. K. Kastberg is city engineer.

MARSHALLTOWN, IOWA.—Bids will be opened soon for three boilers to be installed at the waterworks pumping station. W H. Steiner is city engineer.

SIOUX CITY, IOWA.—Bids will be taken soon by the city for nine air lift pumps, air compressors, booster pump and engines to cost $50,000. T. H. Johnson is city engineer.

KANSAS CITY, MO.—The American Machine Works Co. has been incorporated with a nominal capital of $5000. Michael Nester and Warren H. Turner are interested.

WELLSVILLE, MO. — The Chicago Fire Brick Co. contemplates the erection of a plant to cost $1,000,000.

CORSICANA, TEX.—The city plans to issue $400,000 in bonds to build a waterworks system.

HOUSTON, TEX.—The Hannah Conveyor Co. has been incorporated with $15,000 capital by Edward Hannah, J. G. Bilton and Robert Kornbeck.

ORANGE, TEX.—The Orange Co. Irrigation Canal Co. contemplates building a pumping plant to cost $25,000.

RUSK, TEX.—The Texas Steel Co., L. P Featherstone, president, Beaumont, Texas, has begun to repair and improve the blast furnace and pipe foundry recently bought from the state of Texas. New equipment will be required.

SAN ANTONIO, TEX.—The Alamo Iron Works is constructing a 4-story reinforced concrete mill supply warehouse, together with an addition to its machine shop. The latter will be 24 x 60 feet and a number of new machine tools will be installed. The Alamo Iron Works operates a gray iron foundry, machine shop and boiler plant for the manufacture of agricultural, plantation and oil well machinery.

OKLAHOMA CITY, OKLA.—The Midland Motor Car & Truck Co., J. Y. Aydelotte, manager, 1118 East Twelfth street, will build a 1-story plant 80 x 500 feet, to cost $125,000.

WELLINGTON, KANS.—The city plans to install five low pressure pumps and electrical equipment. J. R. Murphy is superintendent.

FREMONT, NEBR.—The city plans to erect a new pumping station to cost between $20,000 and $35,000. L. M. Roessler is city engineer.

DENVER, COLO.—The Union Iron Products Co., 1719 Stout street, contemplates erecting a factory for the manufacture of corrugated and sheet iron products, including culvert pipes.

WILLIAMS, ARIZ.—The city plans to build a waterworks system costing $55,000.



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While they're devastating Europe— America is building up her industries

BOTH continents are involved in the World War, but America is not suffering the destruction of her industries by bombardment as in Europe. Instead, there is a forced demand for construction to furnish facilities needed to produce more than ever before.

The industrial concerns are feeling this pressure as much as the railroads. The work of enlarging and increasing their facilities is very urgent. The scarcity of men and materials makes it difficult for them to undertake and supervise the work of expanding their plants, but they can engage the services of specialists already organized and equipped for that purpose.

The Arnold Company has engineers experienced in analyzing industrial problems and making reports and recommendations. It has the necessary facilities available for performing engineering and construction work, and rearranges equipment for economical operation.

This is the kind of work The Arnold Company has been doing for over 20 years. Being industrial plant specialists, it can save you money in reconstructing, enlarging or rearranging your present plants as well as in building new.

The Arnold Company

ENGINEERS — CONSTRUCTORS

ELECTRICAL — CIVIL — MECHANICAL

105 South La Salle Street
CHICAGO

Commercial Activities Cover Extensive Field

THE Pittsburgh Export Co. has removed to the twelfth floor of the First National Bank building, Fifth avenue and Wood street, Pittsburgh. Special accommodations have been provided for the entertainment of visitors from out of the city.

Offices have been opened by the Unity Connellsville Coke Co., in the First National Bank building, Latrobe, Pa. The offices formerly were located at the plant.

A change in corporate title is announced by Trimble, Mudge & Co., Pittsburgh, to that of the H. N. Trimble Steel Co.

J. J. Nordman & Co., Pittsburgh, purchasing agents for foreign account, announce their removal to larger quarters, suite 2211-2212 Farmers Bank building.

Benstock & Rosenberg, dealers in old metals, have removed their headquarters to 22-52 Benders place, Buffalo.

A sales office has been opened by the Sizer Forge Co., Buffalo, at 908 First National Bank building, Pittsburgh. D. A. Stuart has been made district manager of sales.

The Chicago warehouse of the Bridgeport Chain Co., Bridgeport, Conn., has been removed from 204 North Wabash avenue to 119 South Jefferson street.

The Vandyck Churchill Co. has moved its Philadelphia office from The Bourse to 734 Widener building. C. H. Hamersley is manager.

The name of the Philadelphia Steel & Forge Co., New York, has been changed to that of the Tacony Steel Co. No change in the personnel of the organization has been made.

The Worcester Flexible Tubing Co., Worcester, Mass., has removed to Whitman, Mass., where it will be consolidated with the Special Tool Co.

The offices of George M. Demorest, consulting engineer, have been removed from the Dollar Savings & Trust building to 907 and 959 Union Arcade building, Pittsburgh.

The United Steel & Metal Corp. has removed from 90 West street, New York, to larger quarters in the Park Row building.

An office has been opened by the Mesta Machine Co., Pittsburgh, at 312 Munsey building, Washington.

Removal of the offices of the High Speed Tools Corp., New York, to 43 Exchange place, has been effected.

Permanent offices have been established by the Walter A. Zelnicker Supply Co., St. Louis, at 627, Plymouth building, Minneapolis. Richard K. Papin has been made district manager.

New Trade Publications

LATHES.—David A. Wright, Chicago, has recently acquired the rights of the old George B. Fifield lathes, which were originally built at Dexter, Me., and is proceeding with their manufacture. They are being made in sizes from 24-inch to 96-inch swing. They are described in a catalog now being distributed.

SHOP ACCESSORIES. — The Western Tool & Mfg. Co., Springfield, O., has issued a 96-page catalog describing lathe tools, clamps, dogs, expanding mandrels, wrenches, shop stands, trucks, shop boxes, grinders, power hack saws, vises, etc. The catalog is well illustrated and specifications of each article are given.

DRILLING AND TAPPING MACHINES —A 20-page folder has recently been issued by the Langelier Mfg. Co., Providence, R. I., describing a line of drilling and tapping machines. These include precision belt-driven pedestal type drills, bench drills, floor type gang drills, bench type gang drills and a single spindle, vertical tapping machine furnished in both floor and bench types. These tools are supplied for both belt and motor drive.

BRASS CASTING.—"Every brass or bronze casting represents a multiplicity of foundry operations. Only when each one of these is performed as if it were the whole job and everything depended on doing it right, will the finished work measure up to its possibilities." These are the opening sentences of a folder recently published by the Aluminum Castings Co., Cleveland, in which that company endeavors to show brass foundrymen the virtues of the overhead telpher system in making uniform castings. A specially alloyed bronze manufactured by the Aluminum Castings Co. is briefly described.

TIN PLATE.—The American Steel Co., manufacturer of wire nails and tin mill products, with general offices in the Park building, Pittsburgh, and plants at Waynesburg and Ellwood City, Pa., has just issued its latest catalog. It is an exceptionally well compiled brochure, printed on high grade paper and neatly bound. The catalog in addition to supplying concisely prices and illustrations of products produced by the company also includes illustrations of its plants and their equipment, and carries a fund of data showing the method of manufacturing tin plate, as well as instructions for ordering and handling.

HEATER UNITS. — The Cutler-Hammer Mfg. Co., Milwaukee, recently published a short folder illustrating and describing a standardized electric space heater unit. This unit may be used in crane cabs, pump and instrument houses, watch or signal towers and for many other purposes. The number of units required depends upon the service for which the heater is to be used and such other conditions as temperature, size of room, etc. They are rated at 500 watts and may be connected to any direct or alternating current lighting or power circuit of 115, 230 or 250 volts pressure. The units are about the size of an ordinary 2-foot ruler, the thickness being only $\frac{3}{16}$ of an inch.

LINE PIPE. — The National Tube Co., Pittsburgh, recently issued a folder devoted to pipe. A remarkable example of the ductility of the pipe manufactured by this company is shown in a torsional test illustrated in the folder. A twisting force of 713,000 inch pounds was subjected to an 8-inch pipe. Although the pipe was twisted more than once around it did not crack. The wall thickness of the pipe is only $\frac{1}{4}$-inch and it weighs about 28 pounds to the foot. The entire folder is designed to present clearly the flexibility of the pipe. An interesting example is shown in a halftone illustration which shows 26 lengths of pipe connected together tangled up on the ground. The pipe was blown out of a well by the force of gas without breaking a single joint in its entire length.

FOUNDRY PANS.—An unusually attractive booklet of 24 pages, partly illustrated with colorplates and devoted to clay machinery such as grinding pans, is being distributed by the American Clay Machinery Co., Bucyrus, O. These pans, designed for mixing sand for foundry purposes are built in four sizes, 5, 7, 8 and 9 feet in diameter. The pans of these machines are held in place by two heavy A-shaped frames, across the top of which is bolted a heavy supporting frame. The last mentioned frame holds the vertical shaft and the bevel gear and pinion. The mullers are supported on steel shafts, independently of each other. The ends of these shafts are provided with shoes which move in guides in the frame and in the shroud encircling the vertical shaft. The mullers are equipped with tires which are readily removed when worn. The space between the muller and muller plates may be adjusted as desired.



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17 Ton Buckets,* capacity 1,250,000 tons per season; *15 Ton Buckets,* capacity 1,000,000 tons per season; *10 Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8 Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company
Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo	7.70c
No. 28 galv. sheets, Cleve	7.60c
No. 28 galv. sheets, Cinci	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.00 to 29.25
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	27.50 to 28.00
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.00 to 19.50
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	21.50
Stove plate, Birmingham	19.00 to 20.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa	23.00 to 24.00
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$22.00 to 23.00
Boiler plate, cut, No. 1, St. L.	22.50 to 23.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	38.50 to 39.00
Stove plate, Chicago	22.00 to 23.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	30.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	28.00 to 29.00
Cast borings, New York	17.50
Cast borings, eastern Pa	20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo	19.00 to 19.50
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	34.50 to 35.00
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa	27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	21.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	17.00
Machine turnings, Pitts	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chgo	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	34.50 to 35.00
R. R. wrgt. No. 1, Birming.	29.00 to 33.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 38.50
Angle bars, steel, St. Louis	31.50 to 32.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	39.00 to 40.00
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	25.50 to 26.00
Busheling, No. 2, Chicago	18.00 to 19.00
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.50
Machine turnings, Cinci	13.00 to 13.50
Machine turnings, St. L.	17.25 to 17.75
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	24.50 to 25.00
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	30.50 to 31.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa	47.50
Steel car axles, Chgo	47.50

(Net Tons)

Shafting, St. Louis	34.50 to 35.00
Steel car axles, St. Louis	43.00 to 43.50

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts	$30.00
Car wheels, (steel), Pitts	33.00 to 35.00
Car wheels, eastern Pa	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming	21.00 to 25.00
Cast, No. 1, Birmingham	26.00 to 27.00
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	24.00 to 24.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00
Malleable railroad Chgo	30.00
Malleable, agricultural, Chgo.	29.50 to 30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	24.50 to 25.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	32.00 to 33.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, February 14, 1918 *No. 7*

Weather Brings Better Operations

Pittsburgh and Valley Open-Hearth Operations Raised to 84 Per Cent—Blast Furnace Recovery Slow—Great Tonnage of Unshipped Product in Mill Yards is Market Factor—Iron Shortage More Threatening

A FEW days of moderate weather conditions have done more to recoup iron and steel production than any drastic exercise of governmental authority. An appreciable improvement in operations is reported from practically all important districts. In the Pittsburgh and valley zone, this recovery has amounted to from 10 to 25 per cent. Open-hearth operations in that territory last week were at 84 per cent, compared with 59 per cent in the storm period. Blast furnaces are regaining ground more slowly, their output having been 69 per cent against 66 per cent previously. Bessemer plants ran 61 per cent full, and by-product coke works at 90 per cent, compared with 66 per cent the preceding week. Conditions in the Connellsville coke region, where car supply has come back to 70 and 75 per cent, are pronounced to be the best in two months. Flood dangers at Pittsburgh and other river points serve to becloud the otherwise hopeful prospects. High waters already have forced two works to suspend in the Cincinnati district.

That the recurrence of the recent heavy shrinkage of iron and steel output is not to be risked under present conditions of national stress, is shown by the preventative steps being taken at Washington. A proposal is receiving consideration from Director of Railroads McAdoo to exempt raw and finished iron and steel materials from all railroad embargoes in the future. What the recent interruptions of production have meant may be drawn from the steel ingot loss in January, which was at the annual rate of over 7,000,000 tons compared with December, and over 12,000,000 tons against November, according to official tabulations of the American Iron and Steel institute.

Iron Shortage is Growing

Events of the pig iron market show a steady trend toward a condition of serious shortage. The problem of how all requirements of steelmaking iron are to be satisfied is likely to become acute not long after the works get down to normal operations again. The recent sharp slump in production has aggravated the situation and many producers in selling now are obliged to take into account the first half tonnage they must carry over into the last six months. Some furnace interests already are prorating tonnage to regular customers for the last half in anticipation of heavy government demands. These allocations are growing weekly as consumers filling war contracts find it more difficult to buy for themselves. A new lot just distributed calls for 4500 tons for the American Shipbuilding Co. Various producers are insisting that the situation has got beyond their control and that it will be incumbent upon the government to exercise a more vigorous regulation of buying and distribution. Important consumers are facing difficulty because of stacks being kept exclusively on basic, which had been supplying foundry and malleable grades in the past.

Steel Buying is Blocked

Buying of finished materials has been pushed aside recently by the exigencies of plant operations. With several hundred thousand tons of finished product piled in yards or on cars awaiting shipment in the Pittsburgh and valley districts alone, it is clear why new sales have been negligible. At Youngstown, 42,900 tons of steel have been piled, while there are 65,000 tons at one leading plant at Pittsburgh. Mill stocks of tin plate have been forced up to over 3,000,000 boxes. An echo of the better outlook for the automobile industry is the lifting by the mills of suspension of unspecified tonnage under contracts expiring Jan. 1. Orders on mill books originally entered for commercial purposes more and more are being converted into war uses. Government tonnage is being maintained heavily.

Chicago mills have a new order for 20,000 tons of ship steel for the Pacific coast. The Emergency Fleet corporation, it is estimated, will need 45,000 tons of steel chain for its vessel program as at present laid out. Steel is being bought for 4500 army truck trailers just distributed.

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Definite Price Clause Needed

WHEN President Wilson reaffirmed iron and and steel prices on Dec. 28, for the period of three months ending March 31, he introduced a new factor into the field of government regulation which since has assumed a position of first importance. This expression of the President related to deliveries on new contracts which would antedate March 31. It was provided that in all such contracts no price should be specified unless it was coupled with the clause making it subject to revision by any authorized government agency to the basis of the maximum fixed price then in effect.

This ruling has given rise to various complications and probably no phase of the government market regulation has brought about such deep and careful study on the part of producers. Many buyers following their usual custom have insisted on being allowed to make contracts for deliveries subsequent to the first quarter of this year. It has been a vital question for both buyers and sellers what phraseology should be employed in the revision clause which would meet all the varied contingencies and not reduce the contract to a mere piece of paper with no more legal force or value.

The iron ore producers especially have been in a dilemma since the nature of their business requires that they shall make their sales for a 12-month period. An interpretation of the President's declaration to be made through the war industries board and the American Iron and Steel institute, as recently noted, is expected to clear the situation materially. The steel trade has been less acutely affected by the uncertainties of the compulsory revision because of the notorious record of the producers on the subject of the nonenforcement of positive contracts in the past.

Pig iron consumers and producers who have been active in buying and selling for shipment throughout the present year have been most concerned by the contract problem. Seeking the same end, the clauses covering price revision adopted by various producers have been framed apparently with considerable divergence of viewpoint. Southern producers have provided for themselves the privilege of cancellation should the future price be unsatisfactory to them. One large producer in the Chicago district has adopted the following phraseology:

"The prices to be paid by the purchaser for any of the materials named herein, which are shipped under this contract after March 31, 1918, shall be the price fixed for that time by proper U. S. government agency by agreement or otherwise, as the public or market price for such material, instead of the price herein named."

An important furnace interest in the central west has met the situation with the following insertion:

"The price herein named, involving material shipped hereunder after March 31, 1918, shall be changed to the maximum price, at the time of shipment permitted by law or proper United States government order. If no price is fixed by law or government order for the period in which the shipment on this contract is made, the price for such shipment shall be $33 per ton, f.o.b. cars furnace."

An advantageous feature of this clause is that it provides a definite price basis for the undelivered portion of the contract should government regulation cease. This is especially important to consumers who must base their own sales contracts such as castings upon a definite pig iron price.

The dissimilar attempts which are being made to meet the problem over future deliveries strongly suggest the need of a definitely-phrased clause carrying official weight which will subscribe to the President's wishes and meet all contingencies of the ordinary iron and steel transaction. It is to be hoped that the American Iron and Steel institute in interpreting the President's declaration in behalf of the iron ore trade, will make an announcement which will be equally applicable to all branches of the industry.

Duty of Service is Paramount

AMERICAN industry, and that means the nation in the present war situation, is utterly dependent on the railroads. This has been shown in the past few weeks when snows have blocked transportation and industry has been partially paralyzed and greatly reduced in output. Never before has a time existed when so much depends on railroads or, in turn, have the railroads depended so much on their officers and employes. The quantity of material that can be produced is exactly parallel with the efficiency of transportation. This begins with coal and other raw materials and ends with the carriage of the finished product to seaboard or other destination. When the railroads failed through stress of storm, industry shut down. Continuance of drastic curtailment of production will cause economic disaster and as a result may affect military effectiveness to a large degree.

With weather conditions better, allowing rail-

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roads to resume something like normal operation, the task will be to increase efficiency. This can be done by cutting out useless transportation and by localizing consumption of materials as far as possible, in an effort to lift such of the burden from the carriers as can be done without harm. It is essential that the most be made of equipment now available. Just how much can be done in this line remains to be seen, but plans now under way doubtless will accomplish much.

The situation makes of the railroad employe a unit as important as a soldier at the front. If he increases his efficiency, the soldier will be better served and able to do more for the good of the nation. If the railroad employe fails, the soldier will be handicapped. It is up to every railroad worker to do his utmost. Now that men are scarce, the old fear that added achievement on his part would reduce the number of employes no longer holds.

Maximum Loads Are Imperative

THE serious handicap which the iron and steel industry has been compelled to suffer because of the inadequacy of the transportation system has not been entirely devoid of beneficial results. For one thing, it has taught the necessity of conserving car space. In the past shipments were loaded without sufficient regard to this important matter. Today it is different. Manufacturers, realizing the shortage of cars, and the difficulty of getting them, are making the best use possible of those placed at their disposal. They are being loaded to the maximum.

It used to be a common thing for cars to carry consignments weighing less or but little more than "marked capacity". Now they exceed that point and loads weighing 10 per cent over "marked capacity" are not uncommon in the case of products which readily lend themselves to this practice. The tonnage represented by this margin beyond the ordinary loading, in the aggregate, mounts into a large total. It means that much more car space for other shipping and transportation, both on land and on sea, which is the biggest problem today in connection with the successful prosecution of the war.

The custom is one that should be made permanent. It shares prominently in a scheme of economics that helps both the carriers and the shippers.

Regulation in a Business-Like Way

WHEN it became apparent that regulation of the importation of ferroalloys and kindred ores and metals had become a necessity, those commercially interested in this traffic were quick to avail themselves of an opportunity extended to them. At a meeting in New York, Dec. 16, called at the request of Frederick P. Peterson, director of the bureau of imports of the war trade board, they unanimously designated the American Iron and Steel institute to act as the instrumentality through which such regulation should be applied. The work accordingly was given into the hands of a subcommittee on ferroalloys consisting of leading importers, dealers and consumers.

The license system which this committee has formulated is described in detail in this issue of THE IRON TRADE REVIEW. It was designed to meet the desire for effective import regulation and in this respect it has been approved by the war trade board. The feature upon which all importers, dealers and consumers have cause for deep gratification, however, is that the system also was designed to fit the trade. Pains have been taken to provide machinery for the expeditious handling of imports under the regulations and to guard against delays and mistakes. Already competent men have been established by the institute at New York and San Francisco, clothed with the necessary custom house power of attorney for the endorsement of bills of lading.

The fortunate thing, however, is that the system is to be enforced by men who are thoroughly conversant with ferromanganese and the other metals and ores involved. They know the customs of the trade, the requirements of industry, the sources of supply, the transportation situation and all the surrounding conditions. While the method thus evolved is not a precedent, it is an example of a variety of government regulation which still is somewhat unusual—that is, regulation by men who know absolutely what they are regulating. The war trade board in effecting control of these articles in this manner has taken a decidedly forward step and one well calculated to co-ordinate national necessities with prevailing methods of doing business. In addition, the delegating of duties of this kind to manufacturers and experienced men has the effect of convincing other business men that the government proposes to do things in a businesslike way which they can understand and approve.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 460

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern) .....$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern).....base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft) .....base plus $1.50
Over 3.25 silicon ..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Spiegel, contracts, furnace	58.00 to 60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	170.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.80c to 4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts 8.00c
Sheet piling, base, Pitts. 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts. $7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l. 30
Iron, 3½ to 4½ inches, c. l. 12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products February 13, average for January 1918, average for November 1917, and average for February 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Feb. 13, 1918.	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	33.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	31.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	34.50
Malleable, Chicago	33.50	33.50	33.50	31.25
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	24.50
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	33.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	29.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	32.00
Ferro mang., delivered.....	250.00	250.00	247.00	265.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	62.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	62.50
Open hearth sheet bars, Pitts..	51.00	51.00	51.00	62.50
Open hearth billets, Pitts.....	47.50	47.50	51.00	62.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.00
Steel bars, Chicago.....	2.90	2.90	2.90	3.15
Iron bars, Philadelphia.....	3.50	3.648	4.335	3.259
Iron bars, Cleveland.....	3.64	3.64	4.00	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Feb. 13, 1918.	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Iron bars, Chicago mill.....	3.50	$3.50	$4.10	$3.00
Beams, Chicago.....	3.00	3.00	3.00	3.38
Beams, Pittsburgh	3.00	3.00	3.00	3.25
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.75
Tank plates, Chicago	3.25	3.25	3.25	3.94
Tank plates, Philadelphia ...	3.435	3.435	3.435	5.009
Sheets, blk., No. 28, Pitts....	5.00	5.00	5.30	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	4.60	4.37
Sheets, gal., No. 28, Pitts... ..	6.25	6.25	6.50	6.50
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.00
Connellsville fur. coke.....	6.00	6.00	6.00	8.00
Connellsville fdy. coke.....	7.00	7.00	6.60	6.50
Heavy melting steel, Pitts.....	30.00	30.00	29.60	21.87
Heavy melting steel, eastern Pa.	30.00	29.80	27.50	20.50
Heavy melting steel, Chicago.	30.00	29.70	28.50	21.65
No. 1 wrought, eastern Pa....	35.00	35.00	35.70	27.00
No. 1 wrought, Chicago.....	35.00	35.00	35.00	27.00
Rerolling rails, Chicago.....	35.00	35.30	35.70	25.63
Car wheels, Chicago.....	30.00	30.40	27.50	18.31

(For Additional Prices See Page 460)

Iron Supply Problem More Pressing

Recent Loss of Production Aggravates Difficulties of Makers in Filling Demands—Growing Government Allocations Become More Important Factor—Much First Half Tonnage to be Carried Over—Prorate Sales

Cleveland, Feb. 12.—How the many pig iron consumers who are coming into the market steadily are going to be fully satisfied, is the question that is arising for constantly graver consideration. The increasing tonnage being allocated by the government on top of the recent losses of production which have aggravated an already short supply, makes it impossible for the furnaces to meet more than a fraction of present inquiries. Makers have been obliged to cut their acceptances to only a third or a quarter of the face amount of inquiries in many cases. Only regular customers are being accommodated and those with war work are receiving preference. There is a growing insistence that the government will be obliged to exercise stricter control over purchases and distribution if the furnaces are to meet all essential needs. Some consumers of other than steelmaking grades in this district also are facing a problem because certain local furnaces from which they draw their supplies are running exclusively on basic for war requirements. It is generally understood these furnaces have made additional heavy bookings of basic recently which will absorb their full output for months. Many basic buyers still are hunting tonnage and there has been one important addition to this list in a valley consumer. A Marion, O., plant wants 3850 tons of basic and 650 tons of foundry for first and second half; a Wheeling foundry interest is out for 5500 tons of foundry and 2500 tons of low phosphorus for second quarter and last half. The Westinghouse inquiry remains unsettled. Government representatives have allocated a new requirement of 4200 tons of foundry and 300 tons of charcoal for March-June shipment to the American Shipbuilding Co., and 1200 tons of foundry for Bay City, Mich., delivery. For the navy, 200 tons of charcoal additional has been placed. A local maker is a more active seller of last half foundry and malleable in this territory. Furnace operations are less erratic.

New England Inquiry Less

Boston, Feb. 11.—The past week has developed no improvement in the local pig iron situation. If anything, matters are worse than they have been, for hitherto there has been no lack of inquiry and a considerable tonnage might have been placed if there were makers who would take it. During the past week, however, the inquiry has tapered down, for buyers have come to the conclusion that it is futile to put out requests for tonnage. Between the fact that current production is far below normal and deliveries on existing contracts are seriously hampered by the lack of anything remotely approaching normal transportation facilities, the impression is gaining ground that the furnaces will have to carry much first half business over into the last half and that the amount of iron available for second half will be reduced by that amount. Shipments to this territory are described as "something fierce", and not much improvement is looked for until the weather breaks the railroad blockade which now exists. The railroad situation actually governs the iron market at present and the weather controls the railroad situation. The trade naturally is hop-

ing for an early spring, to clear the tracks and at the same time expedite the movement to this section of the iron owed local users on contract. There is a good business being done in coke for delivery after July 1, with a considerable tonnage already booked for six months and a year. The business is in local by-product oven coke, for no Connellsville is offered at present.

Selling Slows Down

New York, Feb. 9.—Most of the furnaces which recently were selling foundry iron for second half have withdrawn, their booking being as large as they feel justified in taking on at this time. Production has been interfered with to so marked an extent by the shortage of coke during recent months that all makers are far behind in deliveries and of necessity will carry a large first half tonnage into the second half. It is understood the Worthington Pump & Machinery Corp. recently closed for 7500 tons of foundry, charcoal and silvery iron for second half delivery to its various plants. The only sales now being made are occasional small tonnages of off-iron. Demand is fairly active, but the tonnage wanted and the number of inquiries are not as large as has been usual of late. This change appears to be due entirely to a realization by consumers that the iron is not to be had. Not only is it most difficult to sustain blast furnace operations due to inability to ship coke but it is even more difficult to get iron through to consuming points. Only occasional small shipments for which the consumers have secured government permits are being taken by the railroads. In various eastern industrial centers, consumers are helping each other out on raw materials. It is not unusual for one melter to borrow 10 to 15 tons from another to take him through a day's heat. Export inquiries which involve large tonnages continue to come out but they are not taken seriously due not only to the lack of iron but to inability to secure government permits. Some moderate tonnages of southern iron which have been held at southern ports for several months, are prevented from being sold due to impossibility to get government permits. This iron originally was sold to Sweden but could not be shipped. Inasmuch as it was shipped to tidewater at export freight rates, the railroads refuse to release it for anything except foreign destinations. Therefore, it is impossible to move it in any direction. The interstate commerce commission has been requested to release this iron for domestic sale.

Sold Up for Last Half

Pittsburgh, Feb. 12.—Some large merchant furnace interests have completed their bookings for last half shipment and have withdrawn from the market. They confined their commitments to their regular trade and were compelled to decline much business from other sources. Other producers continue to take tonnages from old customers, but are not actively seeking business. A Wheeling consumer is out for 8000 tons of foundry and low phosphorus. The Westinghouse Electric & Mfg. Co. has not closed on its last half inquiry for Nos. 1, 2 and 3 foundry and bessemer iron. Basic remains in great demand but all these requests cannot be met. A valley steelmaker has been sounding the market. Blast furnace operations have shown but little improvement in this district and probably do not exceed 50 per cent of capacity. Coke is moving more freely, however, and provided the present favorable weather conditions continue, a quick and marked betterment appears to be certain. The Carnegie Steel Co. is operating 33 of its 59 furnaces.

Operations Little Improved

Buffalo, Feb. 12.—Operating problems, not sales augmentation, continues to engross the attention of blast furnace interests throughout this district. The situation is not changed a great deal in its more general aspect from a week ago, though operators admit a little more freedom in the way of coke and raw material shipments. From present indications it would not appear that February would be very strongly in contrast to January, and some operators go so far as to predict a still more serious fuel situation in the near future. They point out that due to poor handling of cars and other adverse conditions at the ovens, there was a period of three or four days, a while back, in which no coke was loaded. This break in the continuity of loading is going to hit local furnaces soon, though supplies for the very immediate future may loosen somewhat, through the medium of warmer weather and better car movements. Some of the largest producers still are compelled to pile iron because of the lack of cars. There are large accumulations of iron at the furnaces and steel at the mills which cannot be shipped because of car shortage and embargoes. There are only a few points to which iron can be forwarded. One producer describes the situation as at "a chaotic standstill". There is a constant flow of inquiry for all grades but sales have been light. Basic has been inquired for in good tonnages but has gone unsatisfied. One interest reports a sale of 1000 tons of foundry for first quarter. Another interest will take care of certain customers who will run out of iron during the first half. In this particular case first half delivery will take in the first part and probably the entire month of September. There is quite a scramble for last half material but buyers now are commencing to realize what the producers have been telling them for a long time—that there is a real shortage of pig iron.

Chicago Buying Heavily

Chicago, Feb. 12.—Selling of pig iron for last half delivery is being carried on steadily by local makers and probably more than 50 per cent of last half production already has been covered. Inquiry is being made by practically all melters and producers are booking tonnage in proportion to former purchases in the effort to make last half production cover as much ground as possible. It is believed from present indications that all this iron will be under contract by the end of this month. Southern iron seems scarce and a number of producers are selling their iron largely in the south. Receipts of iron from the south are unusually light at present on account of embargoes at almost all Ohio river crossings. What iron does come through is being taken in spite of embargoes by the Illinois Central railroad at Evansville and the Frisco railroad at St. Louis. Most foundries are having difficulty in obtaining sufficient iron as the rule is that furnaces are much behind on contract deliveries. Silvery iron is almost impossible to obtain. A northern Illinois sewing machine manufacturer is inquiring for a moderate tonnage for second and third quarter delivery. A Chicago machinery manufacturer, mentioned last week as inquiring for a round tonnage of various grades, has bought some malleable for second quarter and last half but has not yet covered its entire requirements.

Southern Makers Sell

Cincinnati, Feb. 11.—A report is in circulation that a southern Ohio furnace has sold some bessemer ferrosilicon for second half shipment. The tonnage is unknown, but it is understood that only two or three sales were made, all the iron carrying 10 per cent silicon. It is also a matter of conjecture as to whether this maker has any

more to offer for last half delivery. Ohio silvery iron still is unobtainable. Southern foundry iron continues to be sold for last half shipment, and several lots of No. 3 and gray forge have been disposed of for shipment in both the second and third quarters. The last half tonnage of southern sold last week was considerable. The inquiry for southern iron is showing some improvement, but the bulk of the iron wanted is strictly No. 2 foundry based on the old grading of 2.25 to 2.75 silicon, which carries an advance of 50 cents a ton over the base price set by the government on a silicon content of 1.75 to 2.25 per cent. Off grade coke makes the production of strictly No. 2, according to the former grading, a difficult matter, and there is none to be had for nearby shipment.

Eastern Inquiry Drops

Philadelphia, Feb. 12.—Demand for second half pig iron in this district has slumped and inquiry has settled down to small scattered lots. The additional holiday this week has been a factor in this inactivity. Efforts of consumers now are being devoted largely to obtaining material held up by embargoes, and these have been stimulated by the improved weather conditions and the three days' respite in trading. A few odd lots of pipe iron have been sold, the largest of which will go to a Virginia consumer. Several hundred tons of 8 per cent silveries were closed, chiefly by a New York electrical manufacturer.

Heavy Inquiry at St. Louis

St. Louis, Feb. 9.—Sales of fairly liberal tonnages of southern iron for second half were closed the past week. One of the main producers in Alabama reported business for the first week of this month on a parity with the same week in January, which was one of its heaviest months in this particular district. Northern furnaces are offering nothing, and makers in other sections are entirely out of the market. The general inquiry is excellent, even urgent. Including all grades, it is safe to say that current inquiries easily would aggregate 50,000 tons.

Production is Improving

Birmingham, Ala., Feb. 12.—Practically the make of pig iron is being sold steadily in the south, although some of the furnaces have not as yet, opened their books for the last half of the year. Transportation is a little improved this week, though embargoes and congestion still prevail in several directions. Production is improving owing to the favorable weather conditions.

Coke Situation Improving

Movement of Shipments Best in Many Weeks—Furnace Supplies More Ample—Consumers Oppose Pooling Plan

Pittsburgh, Feb. 12.—Due to the moderated weather coke shipments are moving much more freely than they were one week ago. Some furnaces yesterday succeeded in obtaining 100 per cent of their supplies, although this is far from being typical of the general situation. The traffic congestion in the Connellsville region is being cleared up rapidly. Considerable headway is being made in delivering cars which have been tied up at junction points. The tracks of the Pittsburgh & Lake Erie railroad are in an exceptionally good condition and that road today placed 100 per cent car supply at Jacob's creek and Dickerson's run districts and a 50 per cent supply in the Newell district for delivery to the Monongahela railroad. The car supply yesterday in the region was about 65 per cent, while the general average today was only 30 per cent and a like average is estimated for tomorrow. The reason for the reduced averages appears to be due to the lack of motive power and to a shortage of railroad labor, together with the fact that large consignments have been moved forward, and empty cars will not become available until they are unloaded and returned. The congestion on the Pennsylvania lines continues to be rather severe but present weather conditions are described as being ideal for the moving of traffic and the situation in the Connellsville region will be cleared up greatly in a short time if bad weather does not intervene. Railroad operators held a meeting yesterday in Washington with the fuel administration and discussed plans looking to the pooling of shipments of coke. Blast furnace interests generally are opposed to this plan, claiming that it would interfere with the shipment of the regular grades of coke conforming to their usual practice. Low phosphorus coke, however, would not be included in the pooling system if it were adopted. Production during the week ending Feb. 2 was 214,758 tons, as compared with 221,735 tons during the preceding week according to the *Connellsville Courier.*

By-product Shows Disparity

New York, Feb. 9.—Considerable disparity, from a geographical standpoint, separates the prices for by-product coke which are being obtained by the two eastern producers. The New England maker is entitled by the ruling of the fuel administrator to a maximum selling price of $13.94, ovens, or $7, base Connellsville, plus $3.65, freight from the Connellsville district and the rail and water freight on coal from Virginia. The full maximum so far has not been asked by this producer; all of its business so far has been at $13.45, ovens, or 49 cents less. The maximum selling price allowed the New Jersey producer by the fuel administration is $9.25, which is obtained by adding $2.25, the freight on coal from Latrobe, Pa., to the ovens, to the $7 base. Inasmuch as the freight between the two producing points is less than $3, the Boston delivered price of the New Jersey by-product coke would be less than $12.25, compared with $13.45, ovens, at which the New England producer has booked well over 100,000 tons for New England delivery. Both of these producers continue to keep their books open for contracts for delivery over the remainder of this year and over the year beginning July 1. Eastern consumers now are pretty well covered ahead, so that the volume of business during the past week has not been much less than recently.

Relief Still Deferred

Cincinnati, Feb. 11.—According to reports from all of the producing districts, no relief has been experienced in transportation delays. The car supply is short, and even when coke is loaded it is hard to get it moved. Labor is also still giving much trouble. Although little foundry coke has been received locally within the past few days, foundrymen are operating their plants.

Some Encouragement Felt

St. Louis, Feb. 9.—Milder weather and some loosening up of the railroad situation have raised hopes of consumers of coke to some extent, but a scarcity causing keen apprehension still remains. Inquiries continue vastly greater in volume than available supplies. Deliveries on contract, while still woefully backward, were a bit more encouraging this week. Several plants reported arrivals equal to 75 per cent of engagements. Eastern ovens are offering nothing for any delivery. Their stock reply to all inquiries is that they are making sufficient coke only to fill contracts.

Shell Scrap Coming Out

Output of Munition Works Now Appearing Expected to be Market Factor—Small Betterment in Trading

FOR COMPLETE PRICES SEE PAGE 460

Cleveland, Feb. 12.—Some dealers in iron and steel scrap in this district are laying their lines to capture the defective shell and shell turning business, shellmaking being scheduled to be in full blast in about 30 days. Considerable quantities of both grades are expected to be on the market. Open weather has brought about some improvement in traffic conditions, but the full benefit is not expected for another week or 10 days. While no tonnages are being handled, some carload lots are changing hands. The sag in prices that has been noted in some other cities has not made its appearance in this district. Permits for shipment are somewhat easier to obtain, but are not so greatly in demand since government price-fixing has tended all along to localize the scrap business and producers are not in the market. No change in prices has occurred in the past week.

Catch Up On Orders

New York, Feb. 13.—Moderated weather and an additional holiday tended to work at cross purposes in the New York scrap market during the past week. Virtually all the yards, however, allowed nothing to interfere with the handling of shipments and the practical cessation of business from Saturday noon until Wednesday allowed them in a measure to catch up with their orders. Prices during the past week have been unchanged. Nothing yet has developed in the matter of further price rulings by the American Iron and Steel institute, but the first meeting of the new subcommittee on scrap has been called for Feb. 14 in this city.

Await Clearing of Embargoes

Boston, Feb. 11.—The railroad situation continues restrictive to business in steel and iron scrap, but the demand remains and a big tonnage of business is promised once the tracks are clear and there are no embargoes to interfere with shipments. Most of the New England foundries being bound to observe the fuel conservation order by shutting down on Mondays are not as heavy buyers as they would be if they were running the full week. The consequent slight falling off in the local demand is thought to be only a temporary condition. Meanwhile, prices hold very firm in all lines, for supplies are anything but burdensome. Wholesale dealers' paying price per gross f.o.b. shipping points, follow: Wrought No. 1, yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $21 to $22; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $27 to $28; steel rails, $26 to $27; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $15 to $16; cast borings, $16 to $17; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $35 to $37.

Little Business Moving

Pittsburgh, Feb. 12.—Sales of scrap in this district have been almost entirely lacking. Severe weather conditions which prevailed part of that period intensified the dullness of a market that has been stagnant for a long time. Traffic movement having improved as the result of the comparatively mild temperature of the past few days, it is believed that scrap will move more freely soon. While the demand, made quietly, has exceeded the supply, it has been restricted considerably on account of the curtailed consuming operations which now are increasing after a protracted siege of shutdowns.

Can't Move Material

Buffalo, Feb. 12.—Transactions for the week have been very limited due to the fact that nothing can be moved if it is sold. There has been no improvement in conditions notwithstanding the moderating of weather conditions. It is impossible to make any shipments except by means of a special permit which takes days to secure. Scrap men hope that the new scrap committee, recently appointed, will be able to evolve some improvement which will more clearly define classification of grades hitherto untouched by the government. Present prices are holding firm and there is a well-defined scarcity of heavy melting steel, cast scrap, malleable and car wheels. The production of some shell factories is beginning to make itself felt, though faintly as yet. Turnings and low phosphorus shell ends are beginning to come out. Larger tonnages should soon be available.

Chicago Market Dull

Chicago, Feb. 12.—Trading in iron and steel scrap is at a minimum in this district due to a number of reasons. Movement of cars by railroads is slow and a large tonnage of materials is in transit, delayed for weeks by storms and blockades. Consumption is cut down to a low mark by inability of users to operate at anything like capacity. In the same degree the production of new scrap is limited by lessened activity of manufacturing processes. Another factor is found on the financial side, most dealers finding it difficult to obtain sufficient funds to operate under the circumstances without lessening the volume of their trading. Some buying is being done steadily but material moves slowly to consumers at best. It is believed that as soon as transportation becomes more active and fuel more plentiful, a heavy demand for scrap will develop as reserve stocks are low and demand for finished material is heavy. Prices are a shade weaker in some grades, though most of the list has resisted the downward pressure brought by smaller dealers offering a concession to move their accumulations. The Union Pacific offers 4400 tons including 800 tons of steel rails and 1400 tons of car wheels. The latter is the largest tonnage of wheels on the western market in several months. The Wabash offers 1425 tons, the Monon 950 tons, the Chicago & Eastern Illinois 500 tons and the Chicago, Milwaukee & St. Paul 300 tons.

Consumers Show More Interest

St. Louis, Feb. 9.—The market for iron and steel scrap continues dull and uninteresting. However, a hopeful element was injected into the situation by a little more show of interest on the part of consumers than was the case during the preceding week. Depleted stocks, it is said, will soon compel certain important melters to purchase. Difficulty in obtaining cars and labor, and the inactivity of capital tied up in delayed shipments all make dealers and brokers loath to push matters. The mild weather of the past few days, if it endures, will relieve the badly congested railroad condition. Railroad offerings are in a little better volume. Unless a large tonnage of scrap tied up in transit, however, soon reaches its destination, consumers are likely to be brought soon to a realization that there is an acute shortage of material throughout the country. Offerings from the car-

riers this week were as follows: Wabash, 3000 tons; Pere Marquette, 1400 tons; Seaboard Air Line, 1400 tons; Texas & Pacific, 700 tons; Chicago & Eastern Illinois, 600 tons, and Mobile & Ohio, 300 tons.

Market is Nominal

Cincinnati, Feb. 11.—Although the weather conditions are more favorable, no new scrap transactions have been made lately. In the absence of any definite transactions, no proper gage of prices can be established. Whether firm offers would be accepted at prices much below the government's schedule is a matter that cannot now be determined. There is a large amount of scrap due on contracts with mills in the Cleveland and Pittsburgh districts, but none of it can be moved. As soon as the railroad embargoes are raised, dealers state there will be heavy buying for future shipment, but at the moment, melters are not committing themselves ahead. One reason for this is the knowledge that nothing higher than government prices can be made, and the only advantage in purchasing ahead would be to guarantee a full supply of scrap.

South Shows Weakness

Birmingham, Ala., Feb. 12.—Some weakness is shown in the scrap market in the south, though but little change is noted in quotations. Embargoes and scarcity of railroad cars still are present. It remains a difficult matter to get transportation in practically all directions and nothing at all to the north and east. Southern consumers are paying a little better price for heavy melting steel. Quotations largely are nominal that if purchases were to be made there might be some concessions obtained. Current supplies are a little better. There is hesitation on the part of dealers as to buying in quantity.

Building Contract Data

Statistics of building and engineering operations compiled by the F. W. Dodge Co. and based on the valuation of contracts awarded show that in the district east of the Missouri and north of the Ohio rivers, contracts awarded during 1917 totaled $1,618,157,000. In 1916 the valuation of similar contracts was $1,356,989,397 and in 1915, $940,089,334. Data compiled for the districts of western Pennsylvania, West Virginia and Ohio, give the value of contracts let for similar operations in 1917 as $212,220,000; in 1916, as $165,180,000, and in 1915, as $100,341,000.

Sheet Bar Lack Extensive

Unfilled Requirements of 50,000 Tons in Northern Ohio—No Open-Hearth Offered and Bessemer Output Reduced

Cleveland, Feb. 12.—A tremendous unsatisfied demand for sheet bars remains in the market and it is estimated that 50,000 tons could be placed immediately in Cleveland and surrounding territory. Sheet producers have informed the steelmakers they will take all bars of whatever character they may have to offer. Some of them have been even suggested a willingness to pay premiums if this would bring forth material. Such offers have not been entertained. A divergent case as to steel shortage refers to one northern Ohio sheet mill with its own open-hearth plant. This mill is piling ingots and not rolling them into sheet bars because it is unable to ship its finished product, by reason of traffic congestion.

Production Shows Increase

Pittsburgh, Feb. 12.—The sharp reduction in the output of billets and sheet bars, partly due to the transportation situation, has been overcome somewhat by reason of the mild weather but mills still are suffering from a shortage of pig iron and fuel. Inquiries from domestic consumers are limited, although tonnages are greatly needed but it is realized that they are not obtainable. The output of tin plate and sheet mills, particularly the latter, has been curtailed greatly on account of their inability to obtain sufficient supplies of sheet bars. Small inquiries for discard billets are being made, principally by brokers, some of whom have succeeded in selling small tonnages. Fairly active demand exists for wire rods but some makers in this district are out of the market on account of the scarcity of steel. They are committed fully for several months. Export demand for rods is active and sales have been made to Canada, Italy and the orient.

Suppy is Cut Down

Youngstown, O., Feb. 13.—Sheet bar supply is greatly reduced, although the valley finishing mills have not as yet felt any pinch. Most of the mills have a fair-sized tonnage in stock. Government requirements for shell steel and plates are so heavy that practically no open-hearth stock is available for other purposes. One maker of sheet bars states that his finishing mills are being supplied solely with bessemer steel on this account and at times even this grade is limited to such an extent that the bar mill operates at reduced capacity. Where 2000 tons were supplied previously weekly, only 1000 tons now are available, due to the decreased production of the bessemer converters arising from weather and transportation difficulties.

Strip Buying Still Withheld

Pittsburgh, Feb. 12.—Domestic consumers are still withholding inquiries for cold rolled strip steel. Some producers are of the opinion that automobile and other interests will not actively enter the market until after April 1, when prices are subject to revision, although improved weather and traffic conditions may develop increased business in these lines sooner than that date.

Ferro Strong

And Sales Reported Above $250—Ore Uncertainty Continues

Pittsburgh, Feb. 12.—The market for ferroalloys is strong. Small tonnages of 80 per cent ferromanganese have been sold during the past week at $250, delivered, for spot shipment, and this figure appears to represent the market, although there are unverified reports that tonnages have gone at $255, delivered. Demand for 50 per cent ferrosilicon is active and comes principally from small consumers who have not covered their requirements. One sale, involving a limited lot, was made in this district last week at $185, delivered, for March shipment and another, calling for only a few tons, went at $200, for spot delivery. The market appears to be quotable at $180, delivered. Demand for the lower grades of bessemer ferrosilicon also is active but makers generally are making no offering, being committed for the first quarter and unwilling to quote beyond that period. Small tonnages of 20 per cent spiegeleisen have been sold at $60, furnace, for spot delivery.

Chicago Ferro Unchanged

Chicago, Feb. 12.—Ferromanganese from the local stack continues to be quoted at $250, furnace, but comparatively little is being sold and the maker is unwilling to obligate himself until the ore situation becomes more settled.

Need Heavy Chain Tonnage

Fleet Corporation to Require 45,000 Tons—Buying Bars for War Vehicles—Lift Contract Suspensions to Auto Trade

Pittsburgh, Feb. 12.—Chain makers in this district have large orders booked and one producer who has enough business to insure capacity operations for two years is under a schedule calling for operations up till next December. Preference in tonnages is given to the government and to railroads, both of which are buying freely. The Columbus, O., plant of the American Chain Co. is making material up to 3 inches for the government and is building a plant at Norfolk, Va., where it will produce 1⅞-inch stub link for the government. It is estimated that the Emergency Fleet corporation will require 45,000 tons of 2½-inch stub link chain for 1000 boats building or to be built. This is based on the estimate that each boat will require 1620 feet of this size of chain, there being about 60 pounds in each foot of 2½-inch stub link.

Bar Tonnage Light

Chicago, Feb. 12.—Mill operation is much below normal with production and shipments correspondingly small. The leading interest has less than 50 per cent of capacity active, due to lack of fuel and shortage of cars. Other producers are almost as much hampered but in some cases are somewhat more fortunately situated. Fair inquiry is current for soft steel bars, with light tonnage being booked from private consumers. Specifications are being filed fully on contracts now on books, consumers apparently desiring all the material they can obtain. Practically all consumers in this territory have material coming on their 1917 contracts and are receiving some tonnage to meet their more pressing needs. Bar iron is quiet, with most mills working against bookings sufficient for first quarter operation and some tonnage for later delivery. An attractive inquiry for 35,000 pieces of iron for wagon tires, about 600 tons, probably for government vehicles, has not yet been placed. This is thought to be for 7000 to 8000 wagons. Hard steel bars are quiet and mills are working only part time. Lack of fuel is the greatest drawback, though tonnage booked is not heavy.

Operations Increase Somewhat

Pittsburgh, Feb. 12.—Operations of bar mills have increased somewhat during the past week and are estimated at about 60 per cent of capacity. There continues to be an acute scarcity of steel and fuel, however, though these supplies are moving in greater volume to mills since milder weather set in and traffic congestion is being relieved gradually. Implement makers are specifying freely for second quarter delivery and are making inquiries for second half needs. Producers are well booked for the first quarter and are making no offering for that shipment. Makers of iron bars are operating heavily on government work and cannot take tonnages for spot delivery from domestic buyers. Some of them are not quoting on second quarter business. Small demand for reinforcing bars exists. Limited tonnages are being taken from warehouses where shipments can be made.

Buying Steel for Trucks

Cleveland, Feb. 12.—Steel now is being purchased for the new award of 4500 trailers for motor trucks for the army, which has been distributed among various builders. One plant in this city will build 1500 of these vehicles. Some hard steel bars are being bought for this requirement. The automobile situation continues to clear up, as the builders, because of recent sales, are able to lay out definite manufacturing policies. This betterment of the outlook has been communicated to the parts manufacturers who are expected to take up the question of future steel needs more actively in the near future. Suspensions of unspecified portions of contracts expiring Jan. 1, which were allowed to these consumers by certain large steelmakers, now have been lifted in view of the better-defined prospects. Bids have been taken from the manufacturers on the large government inquiries for bolts recently noted, but no awards yet have been made. It develops that 55,000,000 of these bolts are wanted for the engineers' depot and 20,000,000 to 30,000,000 for the quartermaster's department.

Hoop Market Unchanged

Pittsburgh, Feb. 12.—The market for hoops and bands remains unchanged. Production is at about 50 per cent of capacity. Demand for hoop steel for first quarter shipment is fairly active and sales are being made at the government price of 3.50c, Pittsburgh. The market for bands is dull.

Market is Quiet

Pittsburgh, Feb. 12.—The domestic market for cold rolled shafting remain quiet. Considerable tonnage is being produced for the government.

Government Buys Heavily

Pittsburgh, Feb. 12.—The government is a heavy buyer of nuts, bolts and rivets. So far as known the government has not yet distributed tonnages in connection with inquiries recently put out for 100,000,000 bolts. Makers in this district say that the market is firm and that no sales are being made at prices below levels established by the government. They say they have no knowledge of bids for rivets said to have been opened last week by the bureau of supplies and accounts, navy department, when it is stated some quotations ran as much as $30 a ton under the regular government levels. Makers claim it would be impossible to purchase steel bars at the government price of 2.90c, Pittsburgh, or $58 per ton, and to produce rivets at a profit through this reduction or any cut even approaching it. They point out that present prices of $4.75 per 100 pounds for structural rivets and $4.65 per 100 pounds for cone head rivets, Pittsburgh, leaves only a narrow margin of profit. Some producers whose plants were on the verge of being closed down on account of traffic congestion in their yards report the railroad situation is much improved and they are again able to obtain steel bars and to make shipments of their finished products without much difficulty.

Government Orders

In Pipe May Help Dragging Demand —Southern Output Droops

New York, Feb. 11.—Increased demand from the government is the outstanding feature of the cast iron pipe market in this district. Among the larger projects now under construction for the government, requiring quantities of cast iron pipe, are the two powder mills being erected by the Thompson-Starrett Co. and the Du Pont interests. The foundries are well booked with orders for the special castings and smaller sized pipe, but would find demand for the larger sizes particularly desirable. Owing to the tight money market, many cities are covering for only urgent needs. Export buying continues small. Nevertheless, it is believed that as the

needs for cast iron pipe abroad become more and more urgent, there will be a greater tendency on the part of export buyers to meet the demands of American sellers. These latter interests are willing to sell material for delivery at tidewater, but refuse to accept the responsibility of obtaining ships.

Oil Country Goods Wanted

Pittsburgh, Feb. 12.—Inquiries are being made by oil country interests for iron and steel lap weld pipe and some producers are understood to be about ready to take sizable tonnages. Others are out of the market and are far behind on shipments. Provided there is no interference by the government, the oil trade is expected to see the most active year of its history in 1918 and will require great quantities of pipe, perhaps mostly of 8-inch size.

Mill Production Reduced

Youngstown, O., Feb. 13.—Production of pipe in this district has been curtailed. This is due to the shortage of pig iron arising from the shortage of coke and present traffic conditions. The leading pipemaker states that two of his blast furnaces still are banked, and the output of the active stacks is being used for other products. Demand has fallen off considerably. While the government is not buying pipe directly, fair-sized tonnages continue to be consigned to consumers turning out government work.

Cities Slow to Buy

Chicago, Feb. 12.—Though some activity in the cast iron pipe market has been manifested in inquiries received recently it has not resulted in tonnage being placed as cities are slow to contract at present prices, compared with what was paid a year ago. Bids on 500 tons at Toledo, O., have been rejected. Figures were opened last week at St. Paul on 438 tons and at Minneapolis on 1400 tons, but no award has been made. Bids will be opened Feb. 16 at Milwaukee on 900 tons.

New Business Still Lags

Birmingham, Ala., Feb. 12.—The cast iron pipe trade in the south still lags. Considerable has been heard recently of expected new inquiries for pipe, but there has been no realization. The melt is off as compared to what was on a few months ago. Soil pipe plants are down entirely, but there is some selling from stock. Negotiations continue for cast iron pipe for Central and South America.

Embargoes Block Sheets

Continuing Ban on Eastern Shipments Keeps Production Low—Government Still Buying—Galvanized Grades in Demand

Youngstown, O., Feb. 13.—Embargoes on all shipments east still are in effect and as a result a majority of the sheet mills continue to operate below normal. The intermittent operation of valley blast furnaces has also affected their production to a considerable extent. Practically no open-hearth sheet bars are obtainable due to the heavy requirements of the government for this grade of steel. One valley interest has not rolled sheet bars of any kind for over two weeks. Bessemer plants in this and nearby districts have operated nowhere near normal for the past month and what tonnages they did blow were diverted to the finishing mills. Sheet mills not self-contained are even finding it difficult to obtain bessemer bars and are drawing heavily on stocks. Inquiries are coming out freely, nevertheless. Most of them are for black and galvanized grades. Medium size orders have been accepted from buyers who are not clamoring for immediate delivery but are satisfied to receive the product in from 10 to 12 weeks.

Government Still Buys

Pittsburgh, Feb. 12.—Requirements of the government for sheets continue to be placed with mills in liberal volume, the demand being for galvanized and blue annealed grades principally. Producers are not taking any tonnages from domestic consumers, having allotted their output for galvanized sheets for the first quarter and for blue annealed and black for the second half. The demand from commercial interests for galvanized sheets for the second quarter continues to be persistent but it is not known when mills will open their books for this business. The government requirements are great at present with no prospect of diminishing at an early date and this makes it uncertain as to the position manufacturers will be in to take care of domestic consumers. Operations continue to be low on account of a scarcity of sheet bars and the railroad situation and perhaps do not exceed 40 per cent in this district.

Suffer Oil Shortage

Because efforts have been concentrated upon the movement of coal, coke and food, many tank cars containing fuel oil have been side-tracked and there have been comparatively few arrivals from the oil fields, particularly in northern Ohio. As a result, several forge shops, nut, bolt and rivet factories, etc., are experiencing a serious shortage. While others have been and are facing and experiencing a coal and coke dearth, these shops are facing daily a forced shutdown. One large Cleveland forging and machine company which was exceptionally well supplied with oil, has diverted several of its cars to help out others in that territory. Many of these shops are turning out material for government work.

Wire Mills

Resuming After Several Weeks' Shutdown—Jobbers Are Buying Nails

Cleveland, Feb. 12.—After having lost from four to five weeks' production, wire and nail mills of the American Steel & Wire Co. in this district are resuming this week. Loss of output in this line has been heavy. Suspension of the nail and wire mills has been due to the lack of semifinished material caused by forced shut-down of steel works. Apart from buying of nails by jobbers for the next 60 days delivery, there is little market activity. Despite their reduced output, makers are not being pressed for deliveries by consumers, since the requirements of the latter have been equally cut down by recent operating difficulties.

Jobbers Taking Nails

Pittsburgh, Feb. 12.—Jobbers are buying nails for second quarter shipment rather freely and government requirements are large. Demand for wire is only fairly active. Some mills, whose loss of tonnages has been extremely great on account of suspended operations, have been compelled to defer shipments on contracts. Numerous inquiries for spot tonnages have gone unsatisfied both because of a shortage of steel and on account of railroad embargoes.

The Canadian commission of conservation estimates the total possible water-power resources of the Dominion at 18,803,000 horsepower, while the developed water-power is but 1,813,210 horsepower.

Radio Towers Are Awarded

Pittsburgh Interest to Supply 4000 Tons for France—Official Orders for 2500 Airplane Shelters Still Awaited

Pittsburgh, Feb. 12.—The Pittsburgh Des Moines Steel Co. has been awarded a contract by the navy department for approximately 4000 tons of structural material for seven 820-foot radio towers which are to be erected in France. Anchor materials are to be delivered in 30 days, for bar portals in 60 days and the complete shipment of the entire tonnage is to be made within 75 days. It is understood that after the war these towers will be sold by the United States to the French government. Inquiries for structural material from private sources are extremely limited and it is probable the commercial market will continue to be dull for some time. The National Association of Builders' Exchange at its seventh annual meeting here last week went on record against encouraging the building of any homes that were not essential. The convention is endeavoring to federalize the industry in order to establish closer co-operation with the government for the supplying of labor and materials in connection with the war.

Await Final Shelter Awards

New York, Feb. 13.—Practically all of the attention of fabricators at this time continues to be centered on work directly or indirectly connected with the government's war program. The allotment of 2500 airplane shelters for use of the American expeditionary forces in France, recently reported, apparently has not been decided upon definitely due to the difficulty of some of the shops in obtaining raw material for these contracts in specified time. However, it is understood that the original allotment remains tentatively unchanged, with the leading awards as follows: McClintic-Marshall Co., 500 shelters; Fort Pitt Bridge Works, 500; and Belmont Iron Works, 500. Among the smaller contracts are 100 shelters to Levering & Garrigues, 36 to the Ferguson Steel & Iron Co., and 60 to L. F. Shoemaker & Co. Each of these buildings call for 35 tons of structural steel. Commercial business in this market continues negligible.

Some Building Comes Out

Chicago, Feb. 12.—Although construction work is at a low ebb and demand for structural steel for this purpose is small, occasional contracts are being closed. The office building of the Western Union Telegraph Co., this city, 2400 tons, has been awarded to the South Halsted Street Iron Works. It will be principally Bethlehem sections. The steel for the Butler Bros. warehouse has not yet been awarded. Various projects connected with the new Union station in Chicago are assuming form, freight warehouses being under construction adjacent to the station site. The John Griffith & Sons Co. has been given the general contract for the Chicago, Burlington & Quincy freight warehouse and is at work also on the warehouse the Union Station Co. will erect for Butler Bros.

CONTRACTS AWARDED

Additions to plant of Atlas Crucible Steel Co., Dunkirk, N. Y., 400 tons, to Pittsburgh Bridge & Iron Co.

Roundhouse for Louisville & Nashville railroad, Nashville, Tenn., 275 tons, to Snead Architectural Iron Works.

Two government alcohol plants in Pennsylvania, 1000 tons, to the Hay Foundry & Iron Works.

Building for Western Union Telegraph Co., Chicago, 2400 tons, to South Halsted Street Iron Works. (Bethlehem sections.)

Seven radio towers for navy department for erection in France, 4000 tons, to Pittsburgh-Des Moines Steel Co.

Uniform Types

Of Railroad Equipment are Contemplated by Director McAdoo

New York, Feb. 12.—Standardization of railroad equipment is contemplated by Director General of Railroads McAdoo, according to Washington advices. The division of finance and purchases of the railroad administration, headed by John Skelton Williams, will plan such reforms as are needed, in co-operation with railroad executives and manufacturers. Mr. Williams soon is to enlist railroad purchasing agents in one association to be supervised by the administration, in order to co-ordinate efforts and to eliminate much competion in railroad buying. Director McAdoo yesterday took over the commission on car service of the American Railway association and created a car service section of the division of transportation with W. C. Kendall as manager. Recently the director general sent letters to leading roads, asking for complete information as to new equipment, additions, betterments, etc., already contracted for or which are considered necessary this year.

Car builders are in a much better position as to supplies of raw material and are able to take on considerable new business. The largest car order to be reported is for 1000 ventilator cars by the Atlantic Coast line, which went to the Standard Steel Car Co. Construction of 6500 box cars for the Russian commission, which had been placed with the American Car & Foundry Co., has been indefinitely postponed.

According to a published report, the purchases of railroad equipment for the American expeditionary force in France to date call for several hundred locomotives, 12,000 box cars, 600 ballast cars, 100,000 tons of rails, 500,000 ties, 600 miles of telephone wire and apparatus and miscellaneous supplies.

Jobbers Put Out Inquiries

Pittsburgh, Feb. 12.—Increased inquiries for small spikes are being made by jobbers. Sales being made are limited. Producers who have booked good sized tonnages find themselves unable to ship on account of railroad embargoes and some have withdrawn from the market. Railroads are not showing much interest in the market for standard spikes but some have inquired for lots ranging from 1000 to 2000 kegs. Makers are not actively seeking business owing to a shortage of steel, which has forced some to decline to quote. The market for standard rails continues to be dull. Fair sized tonnages of light rails are being sold at the government figure of 3c, mill, for sections 25 to 45 feet.

Rail Price About $60 Now

Chicago, Feb. 12.—Standard steel rails are continuing to sell at $60 per ton and higher since this product has not been made subject to government regulation. Not much selling of rails was done from a period shortly after the old $40 price was established, until recently. Some tonnages, all small, have been booked and it is understood the price is about $60 per ton. Eastern mills are understood to have taken tonnage at even higher prices. Inquiry continues and small tonnages are being booked to fill out requirements of roads which bought some time ago. No general inquiries by important roads for 1919 delivery have come out yet and it is a problem what price would prevail on such business.

The only activity in car buying is found in the placing by the government of about 4400 cars for use in France. The Pullman Co. has been

given 500 of these and it is understood the Haskell & Barker Car Co. has been given an equal number. Indications are that announced maximum prices on track bolts and spikes are not holding, some business being understood to have been booked at concessions of $1 to $2 per ton.

Small Tonnage

Of Ore Shipped From Docks in January—Quantity in Store

Cleveland, Feb. 12.—The extremely congested condition of the railroads is reflected in the small tonnage of ore shipped from Lake Erie docks during the month of January. Reports of the Lake Superior Iron Ore association show that only 199,091 tons were moved from docks in January, 1918, or less than one-third of the January, 1917, total of 686,227 tons. This leaves a balance of 10,069,592 tons on Lake Erie docks on Feb. 1, 1918, while on the same date last year the tonnage was 9,113,926.

Shipments for the season to date have amounted to 36,029,167 tons, compared with a total for the corresponding period in 1917 of 37,599,227 tons.

The following table shows the balance on docks at Lake Erie ports, Feb. 1, 1918 and 1917:

	Feb. 1, 1918	Feb. 1, 1917
Buffalo and Tonawanda	444,706	409,451
Erie	525,839	614,791
Conneaut	1,503,511	1,170,546
Ashtabula	3,283,864	2,951,828
Fairport	515,214	402,605
Cleveland	1,849,931	1,750,332
Lorain	1,011,100	954,041
Huron	547,502	527,293
Toledo	393,925	338,049

Steel Corporation Orders Increase Slightly

Unfilled bookings of the United States Steel Corp. made a further gain last month, the report as of Jan. 31 indicating an increase of 96,135 tons, or 1.02 per cent. Booked orders aggregated 9,477,853 tons on that date. A factor of importance in the increase was the difficulty in making shipments due to freight congestion. A comparative statement follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Allot More Ship Plates

Chicago Mills to Furnish 20,000 Tons of Steel Additional to Pacific Coast—Car Builders Get Better Supplies

Pittsburgh, Feb. 12.—The Pressed Steel Car Co. has been awarded 500 box cars as a part of the 4500 cars of miscellaneous types for which the government recently inquired and which are to be shipped to France. The oil trade expects to have the best year in its history in 1918 and in such an event heavy tonnages of skelp will be required for rolling into pipe, mostly of 8-inch size. Small mills are making limited offerings of plates but no large tonnages are available. Car builders report that they are able to obtain sufficient tonnages of plates but have difficulty in making outgoing shipments. Most plate mills in this district are operating heavily, although production has been curtailed somewhat during the period of the recent severe weather.

Ship Tonnage Heavy

Chicago, Feb. 12.—Heavy tonnages of ship material, about 60 per cent of which is plates, continue to be apportioned by the government. One representative tonnage recently awarded involved 20,000 tons for use by Pacific coast shipyards. This is plain material for the builders to fabricate. There also is considerable tonnage in small lots of material for fabricating shops which are filling orders for the Emergency Fleet corporation. The aggregate of this sort of business is large though made up of many small orders. Private buyers of plates continue to seek tonnages but have little opportunity to place their business as the earliest delivery on the part of some makers is third quarter, while others could look for second quarter, contingent on the demands of the government. In any case delivery is uncertain and prompt material is not available.

Jobbers Are Short

Boston, Feb. 11.—Local jobbers report a big demand, but only a moderate turnover, owing to their inability to get sufficient supplies. With the steel mills, especially in the Pittsburgh district, badly hampered in their operations by the lack of coal, not to mention the crippled transportation facilities, local jobbers are not getting very generous receipts and actually are short of not a few lines, among which are beams, angles and channels. Building operations still are on a moderate scale and the best local demand comes from those plants working directly or on subcontracts for the government.

Quick Relief

Needed by Tin Plate Mills to Prevent Further Curtailment

Pittsburgh, Feb. 12.—Nothing has been done during the past week by the government to give further relief to the tin plate industry in order to enable it to increase operations and shipments. Unless help is forthcoming at once in the way of priority movements the output, which does not exceed 50 per cent of capacity, will have to be further curtailed. The stock in all tin mills is in excess of 3,000,000 boxes which are stored awaiting shipment to apply on orders which are urgently needed for the condensed milk and salmon trade. Some relief was obtained by the placing of cars at the disposal of plants along the river which have been threatened by floods but the car capacity was not so great as had been expected. It seems apparent the food conservation program will suffer unless the traffic is so arranged that the tin plate can be moved much more freely than at present. Mills are also in need of greater supplies of sheet bars.

Seller May Cancel

Southern makers of pig iron in inserting in contracts a clause covering price revision on deliveries subsequent to March 31, have provided for cancellation at their option if the maximum legal price fixed at any time is not satisfactory to them. This clause, as adopted by the Woodward Iron Co. for its contracts is as follows:

"Above price is subject to change in government schedule, it being agreed that the price per ton on each delivery shall be the maximum price at time of delivery authorized or fixed by the United States government, or agency of government, buyer to pay any advance or receive benefit of any decrease in price on each delivery; provided, however, that the seller, at its option, may terminate this contract as to all, or any part of unshipped tonnage if maximum legal price fixed or allowed is not satisfactory to seller."

Great Loss

In Steel Output Prolonged by January's Operating Conditions

The decided falling off in production of steel which was noted in December, continued to an even greater extent in January. Lack of fuel, poor transportation facilities and unfavorable weather caused a sharp curtailment in the production of ingots and reduced the total output of that month to a low mark. The figures of the American Iron and Steel institute show that 2,203,845 tons of steel ingots were made in January, a loss of 529,877 tons compared with December with a total of 2,733,722 tons and 962,412 tons less than the November total of 3,166,257 tons. These figures are compiled from reports received from 29 companies, which in 1916 produced 88.14 per cent of the total steel ingot output. The January figure was 895,099 tons below the average monthly production for the year 1917.

Considered on a daily average basis, the loss in production for January, compared with December, was 17,093 tons. The 29 companies reporting produced on an average of 71,092 tons daily in January, and 88,185 tons daily in December. In comparison with November, the loss was 34,451 tons, the daily average for that month being 105,542 tons.

Production of steel ingots in gross tons by grades, as reported by the institute, is shown in the following table:

Months	Open hearth	Bessemer	All other	Total
June, 1917	2,265,772	809,552	8,605	3.083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
September	2 195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195 832	524,084	13,806	2,733,722
Jan., 1918	1,763,356	429,588	10,901	2,203,845

Engineers to Meet

The regular monthly meeting of the Pittsburgh section of the Association of Iron and Steel Electrical Engineers will be held at the Hotel Chatam, Pittsburgh, Saturday, Feb. 16. Mr. Lindquist, of the Otis Elevator Co., will present a paper entitled "A. C. and D. C. Skip Hoists". This paper will discuss some of the methods of hoisting ore by alternating and direct current and will direct attention to points where economy and simplicity have been obtained in this field. The next regular meeting of the Philadelphia section will be held on March 1, at the Majestic hotel, Philadelphia, when J. S. Rowan, of the Rowan Controller Co., Baltimore, will present an illustrated paper on "Standardized Mill Table Controllers". The Cleveland district section will meet at the Hotel Statler, Cleveland, Feb. 23, when B. W. Gilson, Carnegie Steel Co., Youngstown, O., will deliver a paper on "Generation, Distribution and Consumption of Power". The joint technical session of the American Institute of Electrical Engineers and the Cleveland district section of the Association of Iron and Steel Electrical Engineers will be held on the evening of March 8.

Navy Takes Shell Bids

Bids on a large number of projectiles for the navy have been received by the chief of the bureau of ordnance, navy department, Washington. The Raleigh Iron Works, Raleigh, N. C., on 25,000 6-inch projectiles, bid $16.50 each; on 20,000 projectiles, $16.75 each; on 10,000 projectiles, $17.25 each; deliveries to commence in 155 days. A bid made by the Tredegar Co., Richmond, Va., covering the same items, was $14.22 each for the entire lot. The Tredegar Co. proposed to begin deliveries in 130 days.

Heads Machine Company

Eliot A. Kebler has been made president of the Fawcus Machine Co., Pittsburgh, succeeding the late Thomas Fawcus. He will also act as secretary. Mr. Kebler had been secretary and treasurer of the company. This change will necessitate his taking up his residence at Pittsburgh, but it will not affect his connections with the Matthew Addy Co., Cincinnati, with which he has been associated for practically the past 20 years. A. F. Cooke, works manager, has been made manager, a post which had also been filled by Mr. Fawcus. A. H. Newell, formerly engineer and assistant works manager, has been made works manager. George C. Shaw, of the firm of Reed, Smith, Shaw & Beal, will continue as vice president, W. C. Bates as sales agent, and F. W. Beitler as purchasing agent

Texas Stack to Go In

Repair work on the Sam Lanham furnace, Rusk, Tex., which recently was purchased by the Texas Steel Co., Beaumont, Tex., is well under way. Practically all arrangements have been made for the neccssary materials and the company expects to have the stack ready for operation about April 1. It is planned to ship the pig iron produced at Rusk to Beaumont, where it will be converted into steel plates for shipbuilding for the government.

Life Chairmanship

Given J. G. Butler Jr. by Pig Iron Men—Dyer President

In recognition of his long and able service to the American pig iron industry, Joseph G. Butler Jr. was made life chairman of the American Pig Iron association at its third annual meeting held in the William Penn hotel, Pittsburgh, Feb. 7. Mr. Butler retired as president of the association and was succeeded by C. D. Dyer, Pittsburgh, vice president of the Shenango Furnace Co. Frank B. Richards, Cleveland, of M. A. Hanna & Co., was elected treasurer and John A. Penton, Cleveland, secretary. The district vice presidents are to be elected by each district. Charles L. Doyle, Pittsburgh, was continued in his present position in looking after traffic matters for members of the association.

The pig iron industry of the United States was fully represented at the meeting, some of those attending not being members of the association. A class of associate members was created and additions were made to the active list. This action was taken to mobilize the entire industry and to get at facts regarding costs, conditions of trade and tonnages available, in order that the association might co-operate more closely with the goverment during the war. The purpose in view is the strengthening of the function of the general steel committee of the American Iron and Steel institute and to insure intelligent discussion of pig iron prices with the government.

Numerous tributes were paid to Mr. Butler. Among those that made remarks were Mr. Dyer and D. T. Croxton president of the Cleveland Furnace Co. They refered to the long and devoted attention given by him to the interest of the pig iron industry, and because of this it was felt to be fitting that he should be made chairman for life of the association. The association felt it was scarcely fair to Mr. Butler that he should set aside other matters of great importance, especially under war conditions to give his time so largely to its affairs. As chairman he will continue to lend the association the benefit of his advice and experience without the arduous duty of a regular officer.

Recently 40 students, representing the major portion of the senior engineering class at Cornell university, went to Wilmington, Del., to continue their final studies in a practical way, working at their professions at the Harlan plant of the Bethlehem Shipbuilding Corp.

Large Profits

Are Netted by Youngstown Sheet & Tube Co. in 1917

At $30,554,313, net profits of the Youngstown Sheet & Tube Co., Youngstown, O., in 1917 were nearly double what they were in 1916, $16,741,502. At the company's annual meeting held on Tuesday, President James A. Campbell reported that the surplus at the end of 1917 was $55,897,274, compared with between $21,000,000 and $22,000,000 a year ago. Gross business in 1917 at $89,313,064 showed an increase over 1916 of $32,393,796, while gross profits in 1917 totaled $38,168,122.

Of the total cash assets on Dec. 31, 1917, of $20,848,100, more than half, or $14,103,100, is represented by United States government securities. Reservation of between $13,000,000 and $15,000,000 was made for income and excess profits taxes, and during the year $9,874,407 was expended for plant extensions. In order to complete the projects now under way, $7,500,000 additional will be required. President Campbell stated that at present attorneys are working out a plan to increase the common stock that the long deferred stock dividend may be paid. The company's total assets are placed at $97,078,066.

In April, the operation of a mine with a daily capacity of 6000 tons will be commenced in Greene county, Pennsylvania, where 7565 acres of coal land are owned.

Pig iron production in 1917 totaled 988,478 tons, compared with 1,032,771 tons the previous year; shipments of finished and semifinished materials, 1,006,053 tons, against 908,000 tons in 1916; steel ingot output, 1,311,179 tons, against 1,216,003 tons in 1916. By-product coke production in 1917 was 877,079 tons, while shipments of 14,880 tons of sulphate of ammonia, 7,378,810 gallons of tar, 2,340,295 gallons of benzol and 452,818 gallons of toluol were made during the year.

Augmentation of iron ore reserves to the extent of 9,000,000 tons was made during 1917, and by May of this year it is hoped 102 by-product coke ovens, making a total of 306, with a daily capacity of 4000 tons will make the company self contained on coke. The company's tandem plate mill, with a monthly capacity of 15,000 tons, will be ready to operate July 1.

Membership is Enlarged

The board of directors of the American Iron and Steel institute has increased the list of active members from 1250 to 1400, while the number of associate members has been increased from 250 to 400. This action was taken owing to the gradual increase in the waiting list to more than 200. The increase in the limited number of members leaves some margin for the present, but the demand for membership is so great that it is expected there soon will be another waiting list.

Scrap Committee

Named to Represent All Branches of Industry in Price Matters

A new sub-committee on scrap iron and steel, of which W. Vernon Phillips is chairman, has been appointed by the committee on steel and steel products of the American Iron and Steel institute. Mr. Phillips has resigned from active connection with the firm of Perry Buxton & Doane, Inc., Philadelphia and Boston in that in his official capacity with the sub-committee, he may occupy a neutral position in all matters that may come up for its consideration. The full membership of the reorganized sub-committee, which replaces the sub-committee recently resigned, follows:

Chairman: W. Vernon Phillips, 1009 Pennsylvania building, Philadelphia, Pa.

Representing scrap dealers: Charles Dreifus, Charles Dreifus Co., Pittsburgh, Pa.; Joseph Michaels, Hyman-Michaels Co., Chicago, Ill.; Eli Joseph, Joseph Joseph & Bros., New York City; C. A. Barnes, chief of the bureau of iron and steel scrap, Widener building, Philadelphia, Pa.

Representing open-hearth furnaces and blast furnaces: H. B. Spackman, Lukens Steel Co., Coatesville, Pa.; W. M. Tobias, Bethlehem Steel Co., South Bethlehem, Pa.; Charles E. McKillop, Carnegie Steel Co., Pittsburgh, Pa.

Representing iron bar manufacturers: John C. Brown, Lebanon Valley Iron & Steel Co., Lebanon, Pa.; Walter C. Ely, Highland Iron & Steel Co., Terre Haute, Ind.

Representing rail rerollers: D. C. Schonthal, West Virginia Rail Co., Huntington, W. Va.; Arthur S. Hook, Calumet Steel Co., Chicago, Ill.

Representing steel foundries and electric furnaces: Theodore E. Moritz, American Steel Foundries Co., Chicago, Ill.; Rodney Thayer, Penn Marine & Ordnance Castings Co., Philadelphia, Pa.

Representing crucible steelmakers: J. S. Pendleton, Carpenter Steel Co., Reading, Pa.

Representing gray iron and malleable foundries: Benjamin D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland, O.

Small Saving

From Coalless Days Compared to Losses, Statisticians Figure

Washington, Feb. 12.—Suspension of the fuel administration's order for fuelless days is expected in time to allow all industries to operate next Monday. Continued fair weather, following release last week of eight southern states from the order of Jan. 17, has reduced coal consumption and has enabled the railroads to make better progress in clearing up congested traffic.

While the administration has not been able to compile satisfactory estimates of the amount of fuel saved through observance of the order, statisticians under Railroad Director McAdoo have estimated that in 18 principal manufacturing cities $138,285,589 worth of fuel was saved at a loss of $3,122,917,000 in manufactures and $1,221,715,000 in wages. How nearly accurate this may be, it is merely conjecture at best.

All the cities for which the estimate was made are in the section of the country north of North Carolina and Tennessee and east of the Mississippi river. It is in this region that the next release is expected. South of this district the states released last week were Alabama, Georgia, Florida, Louisiana, Mississippi, North and South Carolina, and Tennessee. All states west of the Mississippi never have been affected by the order.

While there is some doubt as to what benefit the fuelless days have had on the country generally, it is conceded that in bunkering ships at seaboard considerable progress was made in clearing some of the tidewater terminals and in rushing supplies and men to Europe. That alone is worth the sacrifice, government officials feel. Intermittent spells of bad weather offset the general benefit expected to fall to the railroads.

Foundrymen Elect

The Chicago Foundrymen's club held its annual meeting Saturday evening at the City club, a feature being an address by Frank D. Chase, industrial engineer, on efficient foundries for modern foundrymen, illustrated by stereopticon slides. R. T. Martin of the McCormick works of the International Harvester Co., was elected president; A. W. Lemme of the Chicago Bearing Metal Co., vice president, and Geo. H. Manlove of the Penton Publishing Co., secretary and treasurer. Directors for two years were elected as follows: Charles Slavin, Charles L. Larsen, C. E. McArthur and Oliver Goldsmith.

Better Output

Shown in Valley and Pittsburgh District—Much Steel Piled

Youngstown, O., Feb. 13.—Reports on iron and steel plant operations in the valley and Greater Pittsburgh districts show a decided improvement over last week. Coke plants operated at 90 per cent capacity as compared with 66 per cent reported last week; open hearths at 84 per cent compared with 59 per cent; blast furnaces at 69 per cent compared with 66 per cent; and bessemer plants at 61 per cent. These figures are based on the five-day production ending last Saturday.

Embargoes still are in effect although present reports indicate that railroads are making vast inroads in the congested yards east of this city. In spite of this, it is officially estimated that 42,900 tons of steel is piled in the yards of the various steel mills in this district. A large per cent of this accumulated material is government tonnage and mill managers realize that something must be done to move it before any embargoes are lifted.

Traffic managers in this district believe the railroads should take from the valley mills a certain number of cars daily billed for eastern points before any embargoes are lifted. Even 100 cars weekly would help, they say. Otherwise the moment the embargoes are nullified they point out there would be such a vast number of cars turned over to the rairoads that they will be completely swamped within 24 hours and will not have remedied traffic conditions. The Baltimore & Ohio railroad had such an experience last week.

To Begin New Mill

Progress is being made in carrying out the plans of the United Steel Co., which will erect a rolling mill at Everett, Wash., the first unit of which will have a capacity of from 60 to 100 tons a day. W. E. Stillinger, 405 White building, Seattle, is chairman of the board and J. Johnson at the same address is secretary. This also serves as the present address of the company. All of the technical and construction work of the plant will be under the direction of Secretary Johnson, who has been connected the past 15 years with iron and steel plants in British Columbia. All the details have been agreed upon and the first unit will be housed in a 60 x 200-foot building. This unit will include a 12-inch mill with two reheating furnaces and one electric furnace. Negotiations practically are closed for the site and it is the intention to begin construction work in about 10 days and have the mill in operation in four months. The financing will be mainly done by the citizens and financial interests of Everett. The commercial bodies of the city have guaranteed $40,000 of the stock of the concern and citizens recently subscribed $12,000 additional. Scrap iron and ore contracts have been made and ore will be obtained from both the state of Washington and British Columbia. Arrangements are being made to bring skilled men from the east and Secretary Johnson will leave at once to make final arrangements in this respect.

Acquires Mesabi Mine

The Cleveland-Cliffs Iron Co., Cleveland, has purchased the Helmer mine in the Kinney district on the Mesabi range. The property was purchased from Swallow & Hopkins, which firm has operated it since 1909, and have produced nearly 935,000 tons of ore.

Buys Steel Company

The Laclede Steel Co., St. Louis, which operates plants at Alton, Ill., and Madison, Ill., for the production of billets, bars, hoops, bands, strip steel and small shapes, has purchased the Valley Steel Co., East St. Louis, Ill.

Building New Stack

The Seaboard Steel & Manganese Co., Temple, Pa., is erecting an 11 x 18 x 80-foot skip-filled stack. To round out this new stack with the required equipment, an additional stove, 20 x 70 feet, has been built and a new blowing engine installed. The present furnace, which is producing spiegeleisen, is 18 by 80 feet.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Feb. 11.—The market for nonferrous metals is reflecting the increasing dislocation of the nonessential industries, due to fuel scarcity, railroad embargoes and other unfavorable conditions of this hard winter. The requirements of the government for copper, lead, spelter, aluminum and other minor metals produced in this country are supplied directly by the producers, in most cases under arrangements made between producers and the war industries board. The task of supplying the nonessential industry with lead and spelter has fallen in part to the New York metal trade, which includes dealers and brokers. Such has been the diminution of demand from the nonessentials that their task has become very light and trading is accordingly limited. They are still permitted some freedom of action in such imported metals as tin and antimony, but tin has been removed from the speculative class, while antimony is in very little demand. Consequently the metal trade is facing the hardest times it has experienced in years. Some brokers and dealers are taking on new side lines, while some of the smaller ones are going out of business.

Commandeering by the government of 500 tons of Banca tin which recently arrived on steamers from the far east set the tin trade in a furor a few weeks ago. It later has developed, however, that much of the tin which was owned by consumers and needed for essential work will be released, while that owned by importers and dealers will be held subject to requisition. The owners of the tin do not know what payment will be provided for such tin as is held. Spot supplies of all grades of tin continue extremely scarce and command almost any price the holders care to ask. From now on the requirements of American consumers will be filled from the far east, Straits being bought in Singapore, Banca in Batavia and Chinese 99 per cent in Hong Kong. As deliveries from those primary sources to New York take at least 90 days, it may be several months until American consumers experience real relief from the tin famine.

The copper situation changes little from week to week, distribution going forward smoothly at the fixed prices of 23.50c for carloads and 24.67½c for less than carloads. Some anxiety was expressed during the recent traffic congestion lest refinery production suffer through inability to get through shipments of matte and blister copper from smelters in the west but some special copper trains have been arranged for by the railroads and with the moderation in the weather this anxiety has been dispelled.

The government, which seems to be about the only noteworthy buyer of lead at present, secured its January requirements of lead at 6.684c, St. Louis, which was the average price of all sales for the month as quoted in the *Engineering and Mining Journal*. Spot lead in the east continues quoted about 7c, New York, while prompt and February shipment from the west is quoted about 6.85c to 6.90c, New York.

Practically no new business is being reported at present in the market for prime western spelter. Prices are unchanged at 7 75c, St. Louis, for prompt, February and March shipment. Higher grades are in somewhat better demand, high grade spelter being in a particularly strong position as the result of heavy government requisitions. No official announcement has yet been made as to new fixed prices for spelter or sheet zinc.

The antimony market is dull and unchanged at 13.75c duty paid, New York, for spot metal.

Waste Prevention in Power Plants

Installation of Recording Instruments and Economizers Essential to Efficiency—Advantages Gained by Using Treated Feed Water—Preheating of Furnace Air is Advocated—Co-operation a Prime Requisite

BY VICTOR J. AZBE

EFFICIENCY in an up-to-date power plant is a matter subjected to daily investigations. Improvements are possible in thousands of plants that supply power for small factories, office buildings, and various institutions, since these are by far the most prevalent and also the most uneconomical. While conditions are much better than they were years ago, there is still an enormous quantity of fuel wasted, and this waste is increasing as more power plants come into existence. Reduction of this waste of national wealth is imperative. The coal resources are not inexhaustible (diminution in the supply of anthracite coal is being felt now), and even if they were, it still is the duty of the mechanical-engineering profession to conserve the financial power of the commercial public, for use in the betterment of humanity.

There are unlimited possibilities abroad for American-made goods; but to compete with foreign manufacturers we must make and sell our goods as cheaply as they do. One of the elements in the final cost of an article is the cost of power and fuel, which, ordinarily, is quite a large percentage, and a difference in its magnitude of 30 per cent plus or minus might mean the loss or profit of the manufacturer.

In 1915, about 600,000,000 tons of coal were mined in the United States, and the output is steadily increasing. Suppose the average cost of coal delivered at the power plant is $1.80 per ton, then the total cost will be $1,080,000,000. Conditions as shown in Fig. 1 exist in the ordinary power plant. The shaded areas, excluding the one marked "Indicated Energy", represent the preventable losses, aggregating about 30 per cent. This makes our total expenditure for coal about $324,000,000 each year, to say nothing of the natural gas and crude oil produced, burned and wasted, without the cost of handling and firing, and investment in unnecessary boilers, machinery and labor. If everything could be computed, the total loss would exceed half a billion dollars. This is probably due to man's inefficiency, which includes the lack of foresight and business ability, improper design and management, and inefficient operation.

Often when a power-plant installation is planned, the owner fails to consult a competent designing engineer; ill advice from incompetent persons, prejudice and fear of investing needless money do the rest. The owner is not an engineer and cannot be expected to know where a greater initial expenditure for more economical power-generating equipment will pay. Therefore, every power-plant owner should have a consulting engineer proficient in economical power-plant design and operation, and every such consulting engineer should have a staff capable of examining power plants in regard to their proper upkeep and operation and of instructing the operating force thereupon. The time spent by such specialists in a plant will depend upon the condition and size of the plant, but every plant should be examined at regular intervals, and the cost of such examinations will be amply rewarded by the savings to greater efficiency.

Average Cost of Economizer Installation

Boiler horsepower developed	Cost in dollars Economizer surface per horsepower 3 sq. ft.	5 sq. ft.
250	1,100	1,800
500	1,800	2,850
700	2,300	3,600
1,000	3,000	4,500
1,500	4,500	6,600
2,000	6,000	8,600
4,000	11,500	16,800
6,000	17,000	25,000
10,000	26,700	42,000

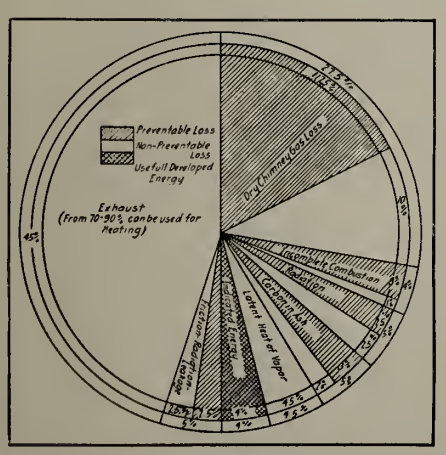


FIG. 1—AVERAGE DISTRIBUTION OF HEAT LOSSES IN NONCONDENSING POWER PLANTS

The investor, ordinarily, knows little about power-plant economics, and when contemplating purchasing new apparatus may not consult an impartial, competent engineer, but deal directly with the manufacturer, who, however honest, cannot give unbiased recommendations. Often the plant operator has the first word, and although thoroughly knowing the old plant, ordinarily is not competent, from lack of experience, to make large changes and design new plants. Therefore, owners are as much in need of education in power-plant economics as their employes.

It is pointed out that by a more efficient operation, a reduction from 10 to 30 per cent in fuel consumption is possible; the installation of proper equipment will give about three times the amount of power from the same amount of fuel; the proper investments made in the power plant will bring from 10 to 100 per cent interest; and that to obtain the foregoing results, specialists on economical power-plant operation and design should be consulted.

Next in importance is the proper planning and designing of power plants. There are large and small power plants in operation today that are monuments of folly and are wasting enormous amounts of money, chiefly due to lack of foresight when designing the plant. No important change should be made in any power plant and no new power plant should be built without advice from a consulting engineer.

Instruments to show whether a plant is operated efficiently are generally wanting. In boiler rooms from 10 to 20 per cent of the fuel, and more in some of them, is wasted chiefly from lack of indicating devices to detect losses. Every boiler should have a draft gage and, if possible, a steam-flow meter. No boiler room should be without some form of gas-analysis instrument and flue-gas thermometer or pyrometer. Too much guessing is done in the average power plant, which is, in part, responsible for the miserable results obtained. Few plants pay particular attention to obtaining economic combustion; many

From a paper presented at the New York meeting of the American Society of Mechanical Engineers.

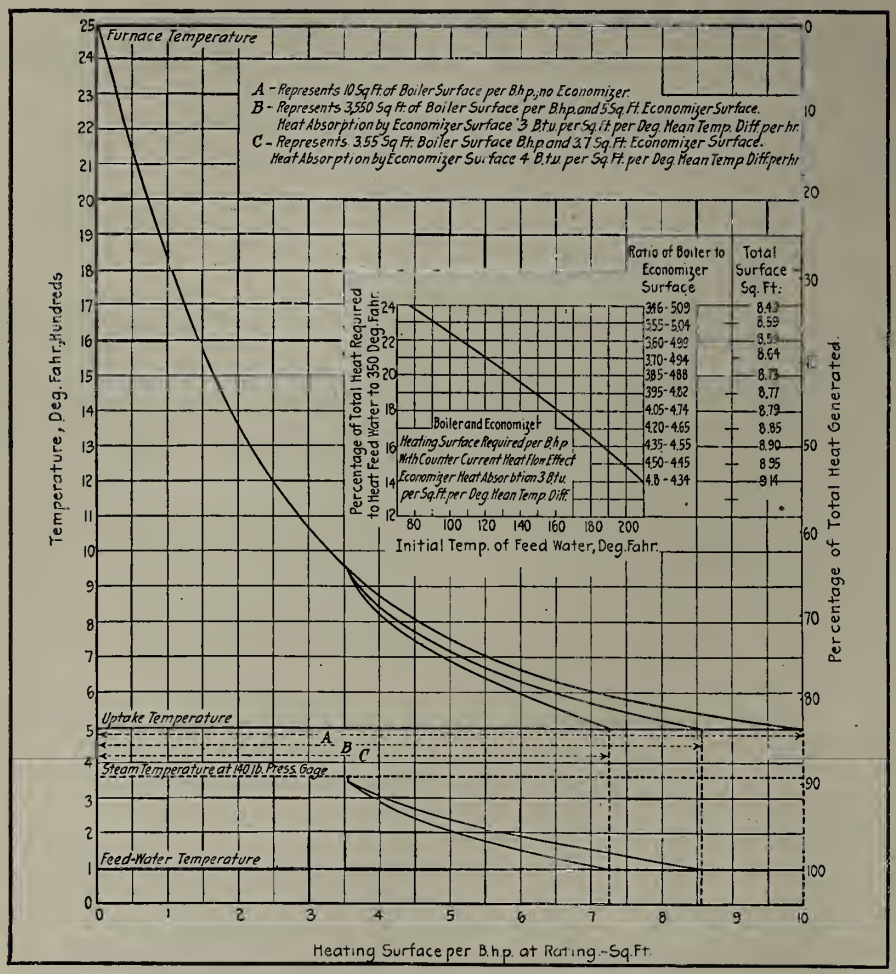


FIG. 2—EFFECT OF ESTABLISHING COUNTER-CURRENT HEAT FLOW ADDING ECONOMIZER SURFACE

operators have no idea what high CO_2, low CO, and other such expressions mean. Hence it is not surprising that there are boilers operated nowadays at only 40 per cent efficiency.

An automatic CO_2 recorder has a great moral effect upon the fireman, and numerous boiler plants can thank this apparatus for a large saving in fuel consumption. While it is of great value in any boiler plant, plants having a variable load with hand-fired boilers, and those having chain grates, Murphy and Roney stokers, etc., especially need this apparatus, since in them CO_2, ordinarily, is found the lowest.

The steam-flow meter on each boiler in connection with proper interpretation of the pressure drops through boiler gas passages, is also of great value and, with intelligent, trained men in charge, even preferred to the CO_2 recorder.

The common differential draft gage is also important, for, when properly connected, it will tell whether the boiler is being operated below or above rating; and whether the fuel bed is too thick, or dirty, or full of air holes. But the draft readings must be intelligently interpreted, and they seldom are. Few operating engineers know the real value of the draft gage.

Flow-meters are quite important in testing reciprocating pumps for their displacement efficiency, and centrifugal pumps for decrease of efficiency from wear of internal parts. When a plant is installed, provision should be made in various steam, water, and air lines for connecting a flow-meter, and if none is put up permanently, a test-meter should be kept to check the performance of various departments or single units of power machinery and the keeping up of the output to input ratio.

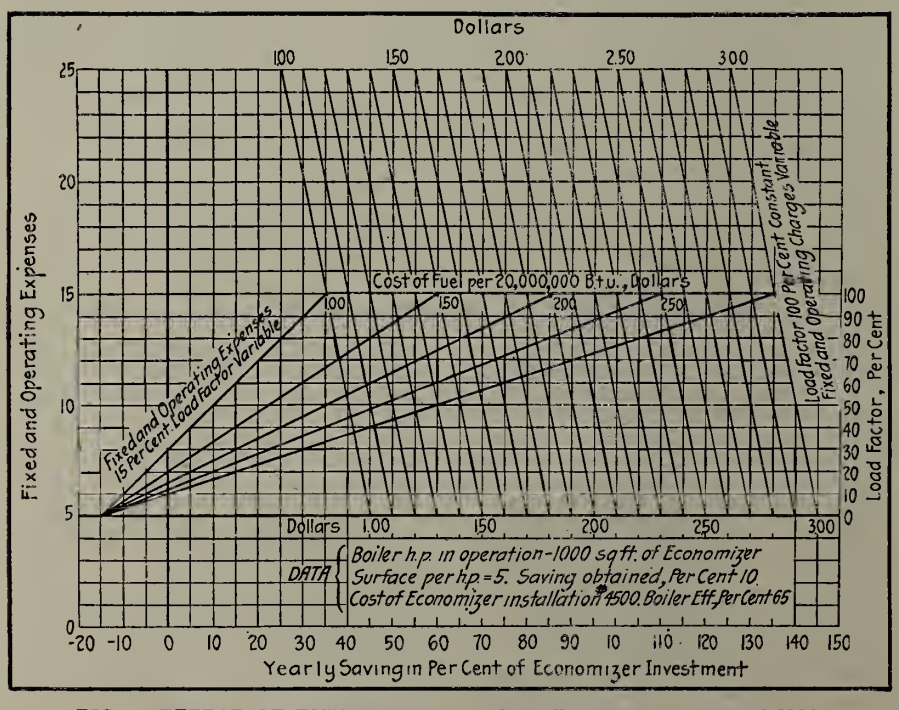


FIG. 3—EFFECT OF EXPENSES AND LOAD FACTOR UPON SAVINGS OBTAINED FROM ECONOMIZERS

Reducible Losses

The greatest and most neglected loss in the average boiler plant is from excess air. The curves, Fig. 10, show the magnitude of this loss at different CO_2 percentages and are applicable to any fuel, liquid, solid, or gas, if its available hydrogen percentage is known.

The impression prevails that coal must be burned with about 50 per cent of excess air. Some authorities claim that going beyond 10 to 12 per cent CO_2 the loss due to incomplete combustion will offset the saving affected by reducing the excess air This opinion is based upon certain types of installation only, and should not be accepted and disseminated as a general condition. Some few up-to-date plants are averaging 17 per cent CO_2 with bituminous coal, without serious losses due to incomplete combustion. The author himself obtained an analysis giving CO_2, 17.2 per cent, oxygen 1.0 per cent, CO 0.1 per cent, which appears remarkable with bituminous coal, but is easily possible if the furnace construction is right. Hence, it is ridiculous to use 200 per cent excess air, as is often done; also,

50 per cent is more than is needed, and with proper furnace design not more than 10 per cent excess air is required.

One objection to high CO_2 is the extremely high furnace temperature and consequent rapid depreciation of furnace linings. For this reason many maintain 10 per cent CO_2 as the maximum. On the boilers of the Detroit Edison Co., where CO_2 is maintained at from 15 to 17 per cent, the furnace lining shows no effect of high temperatures.

With low percentages of excess air, proper design of combustion space becomes much more important, to prevent incomplete combustion and too high furnace temperature. Exceedingly high furnace temperatures have no real advantage and several disadvantages, therefore heating surface exposed directly to the fuel bed to reduce the furnace temperature will not only cause a decrease of the slagging effect upon the firebrick, and thus increase the CO_2 possible to maintain, but will also increase the efficiency of the boiler due to the heat radiated directly to it, and will increase the boiler capacity without increasing the flue-gas temperature. With a proper furnace volume smoke will not form if provisions for gas mixing are maintained and the temperature does not drop off too low or the boiler is not forced too much.

Heat Transmission Ignored

Heat transmission in steam boilers is a matter of importance and it should be emphasized that velocity of gas, time of contact, and hydraulic mean depth are so important that they deserve thorough study under all conditions of installation. Not much is being done in this direction and quite large boiler builders ignore the matter altogether.

Flue-gas temperatures with different well-known installations at various boiler ratings are shown in Fig. 4. It shows that results obtained are varied, and that some installations obtain the same final temperature at 300 per cent of ratings as others at 100 per cent. In one case at 200 per cent of rating the temperature of the escaping gases was 285 degrees Fahr. higher than in another, and this in spite of the fact that in both cases the amount of air used to generate 10,000 B.t.u. was the same. The seriousness of this will be realized from the fact that this condition causes a loss of about 11 per cent in fuel consumption to the high-temperature plant. This is at 100 per cent overload; at higher ratings this difference will increase as indicated by the curves.

Boilers can be operated at two times the rating, and more, but not economically unless designed for it. If operated at very high ratings the loss will be too great, unless the temperature of the escaping gases be reduced in economizers. The increase of velocity will cause draft loss, but this is not so serious, for the necessity of installing mechanical draft brings other advantages.

With high ratings and high velocities the power required to produce the draft becomes of interest. Fear that so much of the steam generated will be required to produce the draft that the advantages obtained will be offset is unfounded, if the blower is designed for efficient work and driven by an efficient engine or motor.

Reduction of flue-gas temperature is possible in most boiler installations

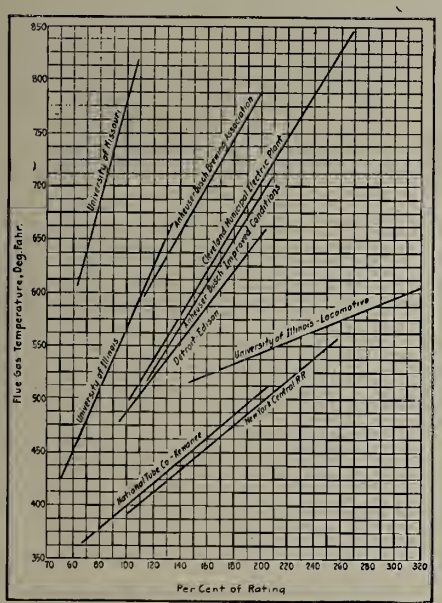


FIG. 4—FLUE-GAS TEMPERATURES AT VARIOUS PLANTS

by reducing excess air, increasing velocity, eliminating dead-gas spaces, rebaffling or installing auxiliary baffles, exposing some of the heating surface to direct radiation from the fuel bed, and last, but not least, maintaining clean heating surfaces by blowing with steam at regular intervals and scraping the heating surfaces when the boiler is down for cleaning.

Advantages of Economizers

Boiler-plant efficiency can be considerably increased by adding economizers, which are used in most European plants, but find little favor in this country. The objections ordinarily offered refer to their initial cost; reduction of available draft and, in many plants, necessity of installing mechanical-draft systems; cheap fuel (speaking comparatively); small load factors, and complication of the power-plant outlay.

The chief reason that they are not used more generally is that their value is not realized. It is difficult to reason out just what effect load variations have upon an economizer as a heat absorber. If plants were operated continuously for 10 or 12 hours and completely shut down the rest of the time, the saving would be in proportion to the load factor, but where the load remains and only varies from overload to underload, the value is difficult to determine. But since such plants are ordinarily operated uneconomically at both high and low loads, and since economizers are of greater value the lower the boiler efficiency, they are particularly needed in plants having variable loads, and the saving in fuel, if not more, will be at least proportional to the load factor. Much depends upon properly proportioning the installation, and, therefore, before an economizer is decided upon, a plant must be closely studied and the governing factors, such as flue-gas temperature, feed-water temperature, weight of air per pound of coal, load factor, character of load, etc., closely predetermined.

Economizers Affect the Ledger

That economizers are economical, not only in large, but also in small power plants, is shown in Fig. 3. It shows that the initial investment is warranted and usually will bring good returns. It was calculated upon the assumption that the fuel saving is 10 per cent; 5 square feet of economizer area were allowed per boiler horsepower, and it was assumed that the boiler efficiency, without an economizer, equalled 65 per cent. The total cost of the economizer installation was taken at $4500, which is about the actual cost except where extensive alteration must be made to accommodate it. This chart also plainly shows what effect fixed and operating charges and load factor will have upon the savings obtained from economizers.

The square feet of economizer area required per boiler horsepower to save 10 per cent in fuel with different flue-gas and feed-water temperatures is illustrated in Fig. 5. Other charts and data dealing with economizer theory and practical performance are given in Figs. 6 to 9. Installation costs quoted in the accompanying table apply to the middle-western states only.

Draft is considerably reduced by economizers, although much of the total loss is due to the gas passages leading from the boiler to the economizer and then to the stack. The drop of draft through an economizer 40 sections long will be about 0.25 inch

of water pressure if the mean gas velocity is 1500 feet per minute. other lengths of economizers the draft will vary with the length, and for other velocities as the square of the velocity. See Fig. 6. With natural draft there will be additional reduction of available draft resulting from the reduction of the stack temperature.

The loss of draft will reduce, somewhat, the amount of coal burned and consequently, the draft required. This loss, due to the economizers, is partly offset by the higher efficiency and therefore the smaller amount of coal burned and also by the ability to operate more economically the auxiliaries that previously exhausted into a feed-water heater. Maintaining high CO_2 percentage, together with having tight breeching, clean-out doors and dampers on idle boilers will tend to increase the available draft. If the stack height is so low or the boiler load so high that all the above will not insure sufficient draft at all times, mechanical draft will have to be supplied.

Installing mechanical draft with the power required will in one way reduce the saving due to added interest on investment, depreciation and operating charges. These charges can be offset by the greater boiler efficiency possible with thicker fuel beds, higher CO_2, and greater rate of heat absorption attending higher velocity of the gas over the heating surface of the boiler and economizer.

Method of Cleaning

Cleaning economizers is not simple. In some plants air and steam are used for blowing off the soot with considerable success. This is effective only with loose matter; hardened soot will not be affected. Blower tubes cannot be arranged so that blowing will be equally effective throughout. If scrapers are used and give trouble by sticking, it is better to force them by hand. The sticking allows scale to form in the tubes which limits the further operation of the scrapers.

Where the natural draft is too weak to warrant a fuel economizer and conditions are such that mechanical draft cannot be considered, there is still a way to improve the working conditions. At least 40 per cent of the boiler heating surface is inefficient as a heat absorber because of the low temperature difference, and any increase in temperature difference will reduce the amount of heating surface required to cool the gases down to a given point. Fig. 2 shows the effect of establishing a greater temperature difference by reducing the boiler heating surface per nominal boiler horsepower and adding economizer surface. With a feed-water temperature of 100 degrees Fahr., the total heating surface per boiler-horsepower, without an economizer, would be 10 square feet. With an economizer absorbing 3 B.t.u. per square feet per degree of mean temperature difference per hour, the total heating surface of the boiler and economizer would have to be only 8.55 square feet. With a heat absorption of 4 B.t.u. by the economizer (see Fig. 6) the total heating surface necessary would be 7.25 square feet, or 27.5 per cent less than when water is fed directly into the boiler without preheating.

The ratio of boiler to economize surface required with different initial feed-water temperatures, and the total heating surface required in each case is shown in Fig. 2. The saving of heating surface by establishing a greater temperature difference will become less with higher feed-water temperature. If the temperature increases up to 210 degrees Fahr., it still is possible to absorb the same amount of heat with 10 per cent less heating surface.

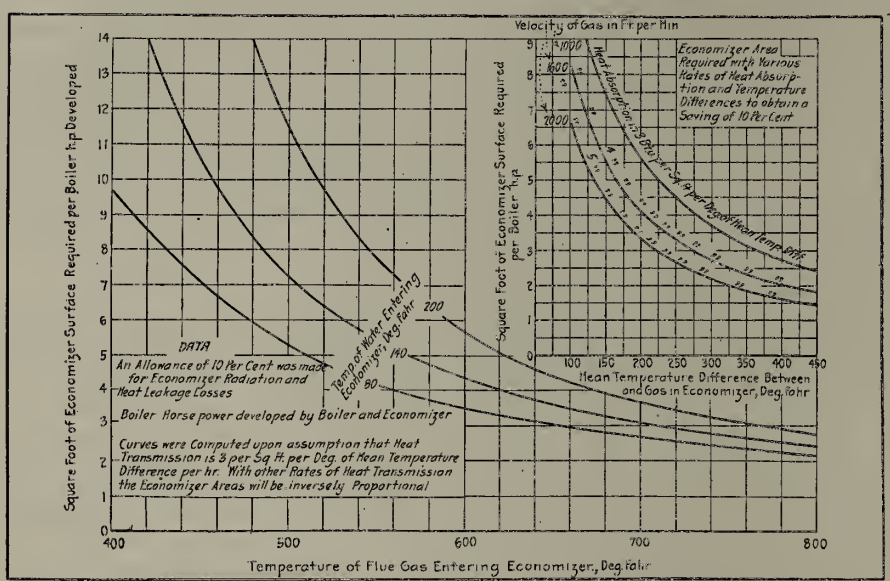


FIG. 5—ECONOMIZER SURFACE REQUIRED TO SAVE FUEL WITH VARIOUS FLUE-GAS AND FEED-WATER TEMPERATURES

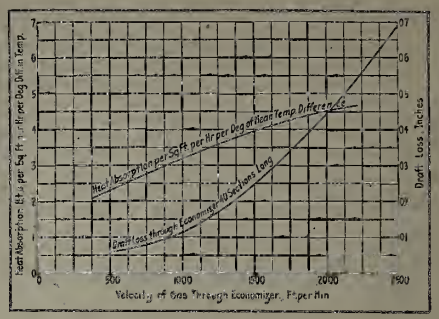


FIG. 6 — EFFECT OF VELOCITY ON HEAT TRANSMISSION AND DRAFT LOSS IN ECONOMIZERS

Draft Production

The draft loss will be less with this installation than when no economizer was attached. This will permit an increase in gas velocity over the added economizer heating surface. The installation could follow the European practice of building the economizer directly into the boiler setting, which would further reduce the draft and radiation losses. The economizers could also be of boiler steel since the temperature would never drop to a point where danger would exist from external corrosion, and to further prevent this, water entering should never be below 100 degrees Fahr.

Some engineers object to economizers because of their cast iron construction, and do not want to employ them with the high steam pressures maintained in modern plants. One way to overcome this objection would be to locate the boiler-feed pump between the economizer and the boiler. However, with this arrangement full benefit could not be obtained from the economizer, since the feed water could not be heated any higher than the evaporating temperature.

A solution for this would be to

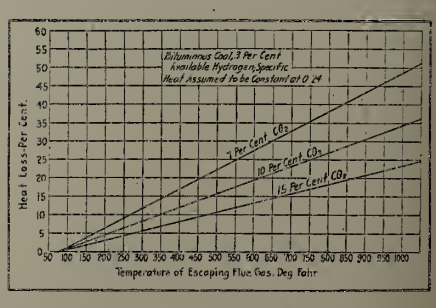


FIG. 7—HEAT LOSS IN DRY FLUE GAS WITH VARIOUS CO_2 PERCENTAGES AND DIFFERENT UPTAKE TEMPERATURES

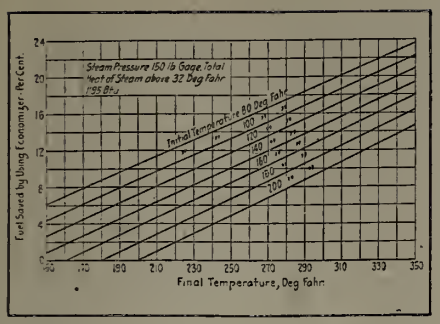


FIG. 8—SAVINGS FROM ECONOMIZERS WITH VARIOUS INITIAL AND FINAL FEED WATER TEMPERATURES

build economizers in two sections, as shown in Fig. 11. One should be built for low-temperature gases, through which water at low pressure would circulate and be heated around 210 degrees, depending upon the pressure; the other should be constructed in series with the first for high-temperature gases and full boiler pressure. The low-pressure and temperature section should be made of cast iron on account of the corrosive properties of the low-temperature gases and the high-pressure and temperature section of boiler steel as the temperature of the gases will never drop below 350 degrees Fahr. The boiler-feed pumps should be placed between these two sections. The ratio of high-temperature to low-temperature section would depend upon the initial and final flue-gas and feed-water temperature.

The internal corrosion with the above arrangement would be prevented, since the low-temperature tubes would be cast iron. By the time the water reached the steel section it would be at a temperature where it deposits inorganic matter. This precipitate would form a protective coating over the heating surface. The external corrosion would be prevented by the high-temperature water and the gas in contact with the steel section, and there would be no danger of condensing any vapor in the flue-gases. We must not forget, however, that care has to be taken to prevent the temperature in the steel section from dropping too low, or corrosion will result. But, ordinarily, the above arrangements will not be necessary, since economizers can be built of a cast-iron and semisteel composition with a safety factor of five for any boiler pressure.

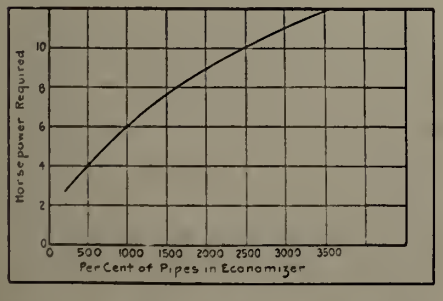


FIG. 9 — APPROXIMATE POWER REQUIRED TO DRIVE SCRAPER MOTORS FOR VARIOUS SIZES OF ECONOMIZERS

Proper Feed Water

Much heat is wasted by dirty boilers, and the cost of cleaning in most plants is considerable. Using distilled water as boiler feed should be advocated whenever possible. In large plants the condensate from the condensers of the main units could be used to condense the exhaust steam from the auxiliaries, and all the make-up water obtained from a multiple-effect evaporating system, or flue-gas evaporators working under vacuum. In other plants more attention should be paid to treating the feed water.

Properly treated feed-water will not only improve the efficiency of a boiler as a heat absorber, reduce the cost of boiler cleaning and its repairs and increase its life, but will greatly increase its safety, since most boiler explosions and accidents can be traced to unsuitable boiler feed-water.

Co-operation With City Authorities

City boiler-inspection departments, with the aid of water departments could be of great aid to the operating engineers in the particular cities by keeping them informed as to what treatment the water requires to make it suitable for boiler feed. Much good could also be done by the boiler-insurance companies, not only to the engineers and power-plant owners, but also to themselves, if they had chemists to inspect samples of feed water and advise proper treatment.

Preheating of furnace air with the heat in the escaping flue-gases would effect a saving of at least 5 per cent. Air preheaters could be constructed cheaply. They should be located outside the boiler room on account of their bulkiness. They would consist of a long sheet-iron compartment through which the air and flue gas would pass, as shown in Fig. 12. The cost of installing would be low provided no extensive building alterations were required. However, mechanical draft would be necessary since there would be not only more friction of the flue-gas and less stack draft because of lower temperature, but also more power required to force the air into the furnace. These heat abstractors could be easily cleaned by hand or by methods employed in economizer cleaning.

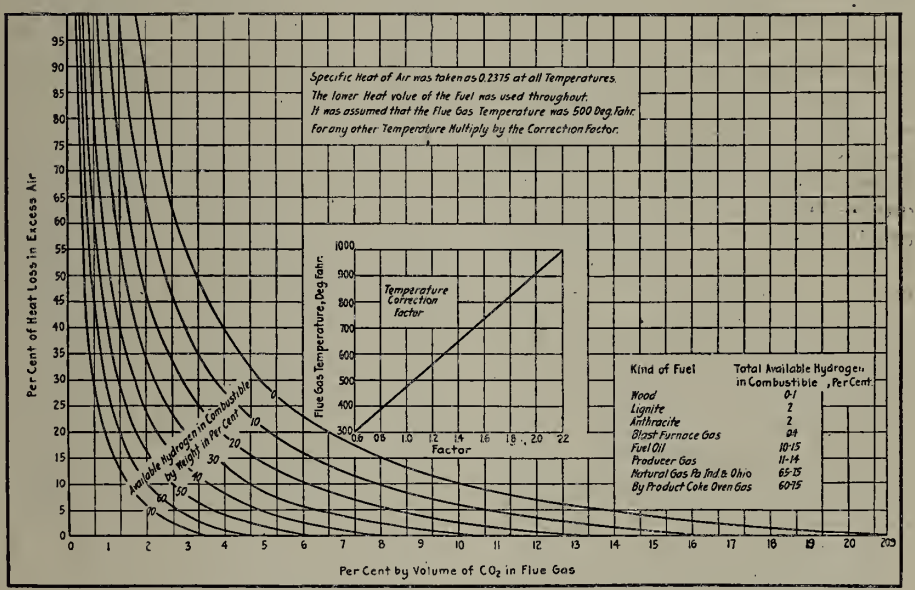


FIG. 10—HEAT LOSSES FROM EXCESS AIR WITH FUELS OF DIFFERENT HYDROGEN CONTENT

The air in summer could be taken from the boiler room and thus maintain the ventilation necessary in keeping the temperature down. In winter it could be taken from outside, thus insuring a comfortably warm boiler room and reducing somewhat the loss by radiation from the boilers and steam piping.

In larger central stations the use of air from the turbo-generators, as practiced by the Detroit Edison Co., is commendable. It not only saves heat, which, in this case, is small, but it cools the engine room and increases the comfort and efficiency of the men.

In many power plants, especially the larger ones, considerable attention is paid to the main power-generating units, while the auxiliaries are ordinarily neglected. Economical prime movers have auxiliaries that are so

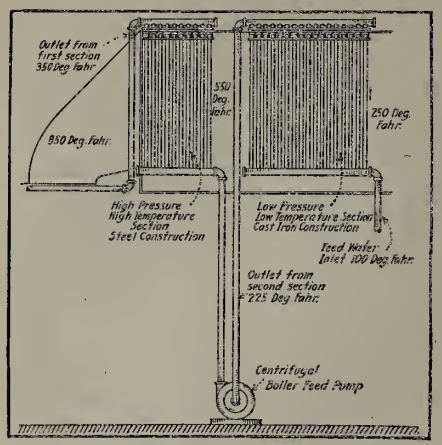


FIG. 11—DIAGRAM OF A TWO-SECTION ECONOMIZER

uneconomical that the efficiency of the whole plant is greatly reduced. Throttling steam pumps, especially direct-acting double and single pumps, are too generally used. Unless they exhaust into feed-water heaters or other heating appliances, they should not be used except in very small units, or only intermittently for short periods. Substituting motor-driven triplex plunger pumps, or motor- or turbine-driven centrifugal pumps would usually result in a substantial saving. In a small plant where duplex steam pumps are preferred and the plant operates condensing, the exhaust steam from the pumps could be discharged into the condenser of the main units. In a large plant, a separate condenser could be installed especially for the auxiliaries, and the discharged circulating water from the main condensers, with the make-up water, could be used to condense the steam from the auxiliaries.

Using exhaust steam from reciprocating steam pumps in the low-pressure stages of a steam turbine designed for this purpose is also quite a saving. There are many other such means that would effect large or small savings of power, but the operatives must be trained to reason and discover the ways and means to accomplish these savings.

The use of high-pressure steam for manufacturing and heating purposes should be discouraged; while sometimes its use is warranted, generally the use of low-pressure steam will effect a saving if the pressure is reduced through small turbines, engines, or pumps, since the mechanical energy will be extracted between the high- and low-pressure limits without materially reducing the heating qualities of the steam. Using large reducing valves to reduce steam pressure, while not a waste of heat, is a distinct waste of power.

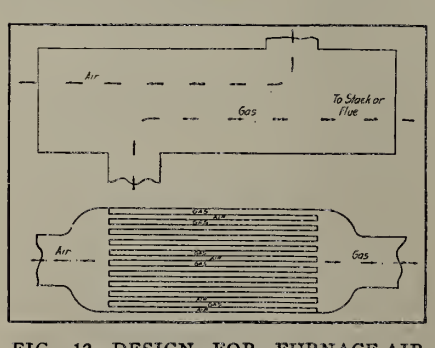


FIG. 12—DESIGN FOR FURNACE-AIR PREHEATER

Utilizing Exhaust Steam

The value of exhaust steam for heating should be more generally practiced. Even plants operating condensers could bleed the low-pressure receiver of a compound engine or the low-pressure stages of steam turbines and distribute this steam through the buildings. In power plants, where economizers are not employed and the temperature of the water is low when fed into the boilers, this partly expanded steam from the receivers could also be used to advantage in feed-water heaters.

In plants where large quantities of low-pressure steam are required and the pressure cannot be expansively reduced in a cylinder or turbine, a saving still could be made by generating this steam in a boiler under low pressure. It has been experimentally determined that there is about 6 per cent difference in boiler efficiency between generating steam at near atmospheric pressure and at 350 degrees Fahr. Because of the increased temperature difference between the furnace gas and the boiler water, greater heat absorption and consequently lower flue-gas temperatures result.

Economical Prime Movers

The uniflow engine is important to the economical operation of the smaller power plants, and has the advantages of simplicity of valve gear and reduced friction, large overload capacity, flat steam-consumption curve through various rating, reduced piston leakage and no exhaust valve leakage, poppet valves permitting use of very high superheat without complications, remarkably low steam consumption because of great reduction of cylinder condensation and re-evaporation, consequent to the foregoing smaller investment in boilers, stokers, chimneys, etc. The cost of uniflow engines is not excessive, ranging from $14 per indicated horsepower in 320-horsepower units to $16 in 190-horsepower sizes, unerected and without foundations.

The locomobile also deserves honorable mention and for most small plants is ideal. Its concentration and high efficiency are remarkable and with it a small power plant can produce one indicated horsepower hour on 1½ pounds of coal and thus be equal in efficiency to some of the largest power plants. Exhaust-steam turbines operating under proper conditions have demonstrated their benefits and should be used more generally.

Superheated steam also should be taken advantage of more than it is. In many plants substantial savings could be made by installing superheaters. Some that now have them pay little or no attention to whether the proper amount of superheat is obtained, and others have them almost cut out of service, ordinarily because of fancied objections. Frequently,

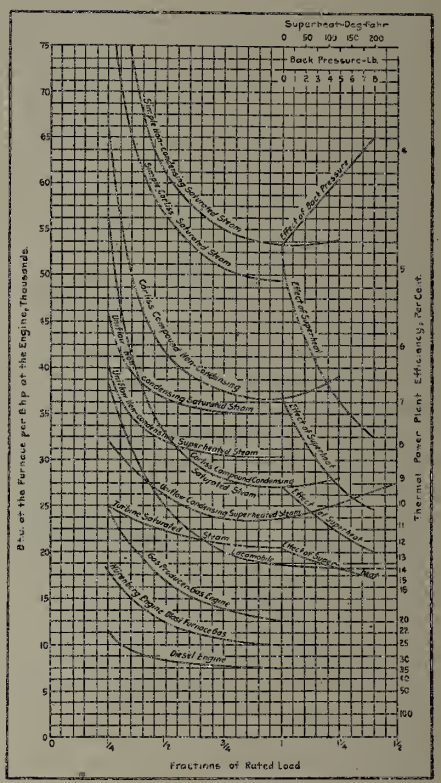


FIG. 13—RELATIVE EFFICIENCY AND HEAT CONSUMPTION OF VARIOUS POWER INSTALLATIONS

only enough superheat is obtained for the steam to reach the engine cylinder barely saturated, and thus little or no return on the superheater investment is obtained.

There are difficulties in operating corliss engines with superheated steam. Obstacles encountered should be overcome instead of condemning superheated steam without further investigation and trials. A change to a better grade of cylinder oil sometimes will settle the whole difficulty. If, after thorough inspection, the trouble is not eliminated, the highest possible superheat to maintain without difficulties should be determined and applied.

Producer-gas plants, gas engines, and diesel engines should find a much greater application. With proper care,

gas and oil engines today are entirely dependable and much more efficient than steam engines. The advisability of their use depends upon the price of the fuel, but the burning of oil and gas under boilers should be discouraged, since they are much more economically used in gas and heavy-oil engines. The gas producer's chief economic advantage is that it can use low-grade fuels unsuitable under steam boilers. The quantities of fuel wasted at the mines could be used in gas producers that supply gas to combustion engines.

The economical power plant is necessarily complicated. A higher learned class of men are required for gas and oil engines than for gas producers, and therefore we must begin to develop men thoroughly fitted to operate the up-to-date power plant. One-sided development such as inventing more efficient machinery should be balanced by educating the men to properly handle it.

Efficiency and Heat Consumption

The relative value of various power installations from a thermal standpoint are pointed out in Fig. 13. Effort was made to have the given values represent the average conditions, and while better results can be obtained (and also worse), the ones given will be ordinarily found.

All sizes of prime mover varied from 300 to 400 boiler-horsepower except the simple noncondensing engine and the locomobile which were 150 boiler-horsepower; the turbine, 4000 kilowatt, and the Nurenberg gas engine, 1200 boiler-horsepower.

Boiler efficiency in each case was assumed to be 70 per cent; an allowance of 3 per cent was made for the boiler feed pump, and 2 per cent for leakage and condensation. For the condensing engines the auxiliary steam consumption was assumed to be 5 per cent of the total steam consumption. The temperature of the feed water entering the boiler was assumed to be 200 degrees Fahr., to which point it was heated by either exhaust steam or an economizer.

The superheat for the uniflow engine when operating noncondensing with superheated steam was 120 degrees Fahr., and when operating condensing, 100 degrees Fahr., with 25½ inches of vacuum. The turbine tests represent a 4000-kilowatt horizontal turbine operating under 28 inches of vacuum, 175 pounds steam pressure and saturated steam. The effect of superheat is shown by the extension of the curve at full load. The locomobile curve represents tests made on a 150-boiler-horsepower locomobile with a varying high-pressure superheat of 80 degrees Fahr. at one-fourth load to 235 degrees Fahr., at one and one-fourth load, and ordinary intermediate superheat. Since the chart was drawn upon the assumption that the boiler and grate efficiency is 70 per cent, for any other efficiency the value will be:

$$\frac{\text{B.t.u.} \times 0.70}{\text{Boiler Efficiency}} = \text{Actual B.t.u.}$$

Smoke Prevention

There has been considerable agitation against smoke emission, and in all important cities smoke-prevention departments have been formed and laws made against smoke emission. The objections to smoke, as stated, are "public nuisance" and "fuel loss". The methods employed by smoke departments are effective in preventing the first, but the value of some of them as to the second is very doubtful. It is well known that the chief loss in a boiler plant is due to excess of air (low CO_2) and not due to incomplete combustion, of which the result might be smoke.

To prevent smoke effectively, it is necessary to center attention on the quantity of air used to burn the coal and keeping it down to a minimum, proper furnace temperature and possibilities for well mixing the combustible gases and the air. At present (with exceptions) most attention is paid to smoke and smoke alone, without paying the attention to excess-air loss that it deserves. As a result, many plants are wasting more fuel since operating smokelessly than before, because of using more excess air.

Exceedingly few firemen, not even 3 per cent, know the simplest rudiments of combustion. Many who are considered good firemen persist in operating their furnaces so that at least 20 per cent of the fuel is wasted; at the same time claiming that it is the better and proper way. To overcome such conditions they must be educated.

Literature is Helpful

It would be a great help if more of the simplest literature could be obtained, describing the economical process of firing, and this written in an interesting way. It is not meant that there is no such literature, for an immense amount of good has been done by journals, but the man who needs it most does not get it, and it would pay to bring it to him.

The United States bureau of mines would increase its usefulness by including in its excellent editions on fuel technology from time to time, bulletins of a thoroughly practical nature especially adapted to the average boiler-room man. These bulletins should be written by men who know the fireman and who have been through the mill themselves. After such bulletins are ready they should not be kept until those who need them write for them, but they should be given a forced circulation with the aid of boiler-insurance companies, smoke-inspection departments, business men's leagues, etc.

In larger power plants, reading rooms for men waiting for the change in their shift, with some good literature, will cause the men to come an hour or more before work time. Also good engineering literature should be kept on file for employes to take home. Meetings should be arranged between employes and foremen at regular intervals for discussion and instruction upon the special problems coming up, new work, and better and more efficient operation. Lectures upon different subjects pertaining to efficient power-plant operation should be given, and the men kept in close touch with not only the outside but also the inside details of their work. As a result they will be more interested in their work, eager for learning and, in general, better men, by whom the power plant will be operated much more economically.

Issuing Instructions

In smaller plants, typewritten instructions and discussions should be edited at regular intervals and given to the men to be studied. The proper amount of work and the most economical way of getting the results for each man should be predetermined. He should then be given his instructions, and it should be seen that he carries them out. Absolute strictness and discipline should be maintained, and, at the same time, if the men do the proper amount of work, in the proper way, they should receive the right compensation for it. Good men will seldom work for low wages.

A good power-plant manager should have the welfare of his employes at heart, yet usually not even proper washing facilities are provided and the men are allowed to live under unhealthy conditions, with the result that they are not vigorous enough to give efficient service. Proper treatment of men and just compensation for service rendered by them is necessary, and of much greater importance than ordinarily realized. Blindness on the part of the employers to the fact that workingmen must be treated as human beings has done an inestimable amount of harm to the industry, since organizations are springing up that directly counteract efficient performance of labor.

Competition is the best stimulus to the attainment of more and better work, and therefore should be de-

veloped wherever possible. One power plant should be compared with another. The engineers of each should be put in competition with one another whenever possible, and so also the firemen, by posting their fuel loss, obtained from average CO_2 readings, upon a blackboard in the boiler room. When practical, a bonus system should be provided and the workmen given some compensation. Better co-operation among power-plant owners and the formation of supervising engineering staffs to take care of a number of plants would be of great value, as in this way they all would obtain expert supervision that each alone, ordinarily, could not afford. Replacement of small, uneconomical power plants by large, efficient central stations will also promote conservation of the nation's coal supply.

Preventing Mine Accidents

BY HERBERT M. WILSON

THE relation of labor to the accident rate in mines is admirably epitomized by Thomas T. Read in his paper presented at the 1917 fall meeting of the American Institute of Mining Engineers in the sentence "Reliance for accident prevention must be upon the individual worker himself."

In connection with the inspection of mines for the fixing of merit premium rates for insurance under workmen's compensation, it has been the practice of the Associated Companies to allow 60 per cent of the credits for safeguarding of the physical hazards of the mine and 40 per cent for the human element. By "human element" is meant that inherent tendency of the industrial worker to be careless, negligent or disobedient, in respect to his own safety.

While the Associated Companies have accepted 40 per cent as a proportion of accidents due to the human element, a study of accident causes in the last two years for over 2000 mines has convinced me that the human element is responsible for a much larger percentage of accidents. J. S. Herbert, superintendent safety department, Cambria Steel Co., stated that 93 per cent of the accidents of that company have had no mechanical connection, and that 73 per cent of the injuries are chargeable to the man himself. Undoubtedly, one of the prime causes is industrial unrest, evidenced in the brief period during which any workman continues in the same employment or calling. In some European countries, and in some portions of the United States, where living and housing conditions, the character of the community, the treatment of the employes by their employer, and home and social conditions are satisfactory, men continue in their employment with one concern for many years. In consequence, they have a better understanding of the causes of accidents and the means of avoiding them, and the accident rate is reduced to a much lower figure.

The matter of safeguarding physical hazards can only be improved by personnel work. Mere trite aphorisms, lists of "dont's" posted on the bulletin board, pictorial bulletins and safety meets are useful in arousing an interest in the worker regarding the need of safety in his employment, but they fail to make sufficient impression on him.

There is a close relation between contentment in employment and good health on one hand, and accident prevention on the other. A contented mind gives the worker an opportunity to study his work. It is the distracted man, whose mind is elsewhere than on his work, who is the most unsafe worker. Next to him is the man in bad physical condition. The ill man does not stand firmly on his feet and is likely to stumble. He wields the pick with less vigor and precision than the well man. A strong physical body and an alert, healthy mind, are among the best safeguards against accidents.

Upsets Steel Mills' Claim Against Slag Charge

A decision handed down in Pittsburgh Jan. 31, by Judge W. H. S. Thomson, of the United States district court upholding the railroad tariffs in the slag rate case does not bring this long-drawn-out fight to an end. The iron and steel companies whose interests are involved took the case on appeal to the Supreme Court of the United States some time ago and it has not yet been passed upon. Judge Thomson's decision pertained principally to the contention made by the iron and steel companies that the tariffs should state the destination points where slag and refuse have been hauled for which service the railroads have assessed charges against the defendants. While the decision technically relates only to the case of the Baltimore & Ohio railroad against the Carnegie Steel Co., it in reality affects 28 companies. The tariff rates fix a charge of 20 cents a ton for all slag, slag dust and refuse and 35 cents a ton for ashes, mixed with brickbats, etc.

In his finding Judge Thomson said that the tariff rates had been approved by the interstate commerce commission, and it was not within the jurisdiction of his court to pass upon them. He held that the verb "to waste" meant to throw away, and that when the steel company placed slag and refuse on the dump pile to be hauled away by the railroad, it was wasted, and the latter had a right to do with it as it chose; further, that it was the defendant's duty to pay the full charges for hauling based on the regular tariff rates. A supplement to the opinion states that it makes no difference whether the destinations for the slag are omitted since the principle remains the same.

Book Review

The Canadian Mining Manual, edited by Reginald E. Hore; cloth; 448 pages, 6 x 8¾ inches; published by the Mines Publishing Co., Toronto, Can., and furnished by THE IRON TRADE REVIEW for $3 net.

Mine products necessarily form the basis for war materials. In explosives, in guns, and in shells the mines of the earth contribute their portion to the destruction of life, while all manner of protective devices have their origin in some element of the earth's crust. A survey of the mines and basic resources of Canada, covering the period which includes the first few months of 1917 is timely and valuable.

Recognizing the war needs of industry, special study is devoted to the supply of magnesite by the compilers of this manual. The magnesite obtained from Austria and Greece previous to the war is acknowledged to be superior to the North American product, but great steps have been made in overcoming the deficiency of the domestic mineral. Experiments involving the addition of iron ore and basic slag to magnesite have developed a satisfactory substitute for the imported calcined magnesite demanded for furnace linings.

Metallic magnesium which finds a wide range of war usefulness is treated in this volume. Magnesium is particularly valuable in shrapnel shells, as the explosion is shown to the gunner or observer by the white cloud of magnesium oxide by day and the dazzling light by night. Electrolytic methods of making magnesium are described in detail.

New Blast Furnace Now in Operation

Flue Dust Extracted from the Gas by a New Type Dust Catcher—Three Stoves Equipped With 4½-Inch Checkers Preheat the Blast—An All-Unit Power House is Installed

WHEN the process of preheating air before its introduction into a blast furnace was first introduced by Nielson, a large saving of fuel resulted. It was not until a number of years later that Nielson's iron pipe stove was replaced by firebrick construction. Stoves of the latter type have since passed through many stages of development both in this and other countries and even today many blast furnace managers are turning their attention to stove design in the hope of future betterment. Small checkers which increase the heating surface have been employed and with such marked success that today three large stoves will furnish all the heat necessary for efficient blast furnace practice. They are preferable to a four or five-stove layout on account of less radiation, fewer valves and gas burners, and with washed gas they can be kept in continuous service.

Furnace managers all agree that washed gas is essential to efficient blast furnace operation. It not only permits the construction of stoves with smaller checker openings but eliminates costly repairs due to the quantity of dust blown through the hot blast valves, mains and tuyeres. It offers further a better combustion of the gas in the stoves and a uniform temperature at all times for the furnace. These results could not be obtained by using dirty gas because the combustion walls and checkers would become covered with clinker which injures the brickwork and hinders its thermal conductivity and heat transfer.

Before the Whitaker-Glessner Co. built its furnace at Portsmouth, O., it considered with great care the type of gas washer and number of stoves with which the furnace should be equipped in order that maximum economy would be secured. After investigating other plants its was decided to build three stoves, 24 x 110 feet, which would contain the total amount of heating surface ordinarily found in a four-stove layout.. These are shown in Fig. 1. The shells are constructed of rolled steel plates and are built around sufficiently large combustion chambers and 4½-inch checkers. All furnace gas is delivered to the stoves in a clean and dry condition. The products of combustion are discharged through individual chimney valves into a tunnel which is connected to a brick-lined chimney, 195 feet high, near No. 3 stove. The temperature of the blast entering the furnace, the top heat, the temperature of the gases before and after washing, etc., are recorded by pyrometers housed in a building at the end of the stove platform. Each stove is equipped with a Mathesius vertical gate-type hot-blast valve and is connected to the hot-blast main which distributes the preheated air to the furnaces.

The furnace has a capacity of 550 tons per 24 hours and was erected on elevated concrete foundations by



FIG. 1—VIEW OF THE 550-TON BLAST FURNACE, SHOWING THE THREE-STOVE EQUIPMENT, DUST CATCHER, GAS WASHER AND DRIER

the William B. Pollock Co., Youngstown, O. It was blown in Aug. 27, 1917. The bosh, which is constructed at an angle of 78½ degrees, is amply strengthened by 1-inch bands. The latter are riveted on butt-straps and encircle the brickwork on the outside of the bosh from the top of the tuyere-breast to the mantle plate. The tuyere-breast brickwork is encased in a cast steel jacket, openings being provided for 12 tuyeres and the necessary cooling plates. The hearth jacket is of 1-inch rolled steel plates riveted together by butt-straps. This jacket and the hearth brickwork are protected by 1¼-inch pipes inserted between for the circulation



FIG. 2—VIEW OF A 75-TON HOT METAL LADLE POURING ITS IRON AT THE PIG MACHINE

of cooling water. These pipes are continuous about the entire circuit of the hearth jacket and are welded at the bottom to form a U-tube. They are connected in series of eights and discharge into funnels in plain sight of the water tender. Water for the furnace cooling equipment and for general use is supplied by a standpipe, 115 feet high, located near the cast house. Two turbine driven service pumps, each rated at 15,000,000 gallons per 24 hours transfer the water from the hot well to this standpipe.

The cast house is substantially constructed and well ventilated. The side walls nearest the furnace are brick and contain circular openings just below the roof. The building is roofed with medium-gage steel plates which are brought up around the furnace shell to form a ventilator for the bosh gases. A dust hood riveted to the furnace shell extends over the top of this ventilator and prevents any dirt from falling through to the furnace floor or into the waste water trough on top of the manifold. The hot metal track is also provided with a roof which protects the ladles in rainy weather while waiting for or receiving the cast of iron.

Ladles Are Adequate

These ladles hold 75 tons of molten metal and are equipped with double trunnions which rest in cradles supported on two standard railroad trucks. Since the steel mill department is not provided with a mixer, the iron is taken to the pig machine. If the open-hearth department needs any metal at this time, it is transferred from a 75-ton ladle to a 30-ton ladle mounted on an electrically-driven flat car and taken to the open-hearth furnaces. The remainder of the metal is cast into pigs. For this purpose a double strand, short-haul Uhling pig machine is provided. A ladle in the process of pouring is shown in Fig. 2. The pigs are cooled in transit by means of water sprays installed over each strand and are discharged into railroad cars.

Adequate space and equipment have been provided for stocking the ores. The ore yard has a capacity of 400,000 tons. This allows the ore to be spread evenly over a large pile so that the furnace receives it in a uniform condition. A general view of the yard, which is spanned by an ore bridge equipped with a 7½-ton clam-shell bucket, is shown in Fig. 3. By means of this bucket the ore is transferred from the stock pile to a 60-ton transfer car which delivers it to the various trestle bins. These bins are designed with closely spaced doors and sufficient slope to permit the ore and limestone to be easily withdrawn by the scale car operator. Two scale cars are provided. One is used to transfer the ore from the bins to two electrically-driven skips and the other is held in reserve. The skips, which are hoisted to the top of the furnace on rails clamped onto a cantilever bridge, are counterbalanced by weights. The latter operate in a steel tower placed to the left of the skip bridge, as shown in Fig. 4.

For lowering the stock into the furnace, the double bell system is used. Both bells are operated hydraulically by cylinders placed on the top platform and connected to individual hydraulic pumps which are installed in the power house. An I-beam carrying a double sheave trolley block is suspended from the top platform in a horizontal position and extends over the side of the furnace as shown in Fig. 4. The beam is strengthened by two king-post trusses fabricated from heavy angle iron. A stationary sheave at the end of the beam operates in conjunction with the trolley block when repairs to or dismantling of the top apparatus is necessary. The equipment is lowered through an opening in the cast house roof which is provided with a removable section for this purpose.

Gas is led from the furnace top through four off-takes, one of which carries a safety bleeder so designed that it gives immediate relief during heavy slips without permitting any coarse material to be thrown out. The off-takes are fitted with cast iron elbows. These are connected to four downcomer pipes fabricated from rolled steel plates. These pipes converge into two downcomer pipes. The latter enter the dust catcher. As shown in Fig. 1 new principles were employed in designing the dust catcher which is practically two dust catchers in one. A cylindrical gas chamber with cone-shaped ends is mounted on a similarly shaped vessel. As the dust-laden gases enter the upper vessel their velocity is decreased which causes a deposition of the heavier dust particles. Instead of the dust accumulating on the bottom of this receptacle, it is funneled into





FIG. 3—GENERAL VIEW OF THE FURNACE SHOWING THE ORE BRIDGE, THE 195-FOOT STOVE CHIMNEY AND THE ALL-UNIT POWER HOUSE FIG. 4—CLOSE-UP VIEW OF THE FURNACE SHOWING THE CAST HOUSE VENTILATOR, DOWNCOMER PIPES AND SKIP COUNTERWEIGHT TOWER

the dust catcher below. This holder is emptied every 12 hours by opening a bell valve at its lower apex which permits the flue dust to flow through a spout into a hopper car below.

The gas is led out of the top of the dust catcher gas chamber and is passed into the lower part of a Brassert gas washer where a large per cent of the dust carried over from the dust catcher is eliminated. A sow drier operates in conjunction with the gas washer. The washer and drier which are supplied with water from two motor-driven pumps rated at 3,250,000 gallons each per 24 hours, may be cleaned while the furnace is in operation by by-passing the gas from the dust catcher over the gas washer and down to the boiler and stove gas main. For this purpose several goggle valves which are made of heavy boiler plate shaped similar to a figure 8 with one end of the loop open and the other closed, are installed with the open end in the gas main. Goggle No. 1 is inserted in the main connecting the dust catcher and gas washer. No. 2 is inserted between the gas washer and the cast iron pipe cross on top. No. 3 is inserted in the main connecting the washer and drier. No. 4 is inserted between the drier and the boiler main, and No. 5 is inserted in the bypass main connecting the washer and the boiler main. By turning goggles Nos. 1, 2, 3 and 4 so that the blind loop is inside the various mains, the gas from the dust catcher is directed through a bypass main connected to the cast iron cross on top of the washer and is led down to the bypass main directly over the sow drier. Platforms equipped with hand rails and toe boards are installed permanently near all goggles and are used when bolting the goggles in place.

Power Plant is Interesting

The Whitaker-Glessner Co. has adhered to present-day construction by assembling all prime movers with their auxiliaries under one roof. The building is located a short distance from the furnace as shown in Fig. 3 and is well lighted and ventilated. A brick wall extends lengthwise through the building, partitioning the boiler room from the engine room. Six 823-horsepower, vertical boilers operating at a pressure of 250 pounds per square inch and containing 630 3½-inch tubes are installed. The boilers are served by two turbine-driven centrifugal feed pumps which were installed on account of their easier operation and cheaper maintenance and not for any gain in fuel economy.

These centrifugal units, the exhaust from which contains no oil, force the lime and soda ash treated water into an open-type feed water heater located between the blowing engines and service pumps in the engine room. Each boiler is equipped with a 42-inch steam drum and a superheater which increases the temperature of the steam from 125 to 150 degrees Fahr. The superheated steam passes into the main header and is distributed through a 10-inch steam line leading into the engine room where two rotary-type turbo blowers, two motor-driven generators, two 3000-kilowatt turbine-driven generators and two 15,000,000-gallon, turbine-driven pumps are installed.

Two turbo blowers are provided for blowing the furnace. They are supplied with steam from a line independent of the generator and pump feed 10-inch line. The air delivered per minute by each blower against a pressure of 22 pounds per square inch is 44,500 cubic feet. One blower supplies the volume of blast necessary for the furnace while the other is held in reserve.

All steam-driven units operate condensing and exhaust their steam into a condenser equipped with the necessary flumes through which the cooling water is supplied and discharged. This water is taken from the Ohio river, pumped into a 40-foot standpipe by three 20,000,000-gallon, motor-driven pumps, and delivered to the condensers. This standpipe also feeds the hot well.

Who Owns Spitzbergen?

In the region of the midnight sun, a literal "no man's land" is attracting attention from several European powers both among those engaged in the war and those who are ostensibly neutral. This land, a group of islands in the Arctic ocean north of Norway is known as Spitzbergen, and it belongs to no nation, although it is under several flags according to the nation which is developing parts of the islands. The approximate areas claimed by the respective nations are as follows:

	Square miles
Great Britain	3,574
Norway	770
Sweden	448
Russia	80
Germany	23

Prominence has been given during the past two years to work being done by Norwegian companies, one of which purchased the holdings of the Arctic Coal Co., an American concern. The Arctic company in its best year is said to have secured over 60,000 tons of coal from its mines.

The coal areas of Spitzbergen are extensive, and the deposits are easily accessible. It is not necessary in many cases to sink shafts to reach the deposits. The coal comprises anthracite, bituminous and some cannel varieties that are much favored for use in Scandinavia and North Russia. Those with knowledge of the deposits state that Spitzbergen will supply all of the coal required for these regions.

In addition to the coal deposits, the British possessions have a quantity of both hematite and magnetite, as well as marble, copper ore, iron and copper pyrites, molybdenum and galena. Development of many of these deposits was halted by the war. In a recent issue, *Engineering*, London, urges action to maintain the British control and to develop British-owned minerals in the islands, stating that the owners of territory in Spitzbergen should be in position to prevent trespass. It thus seems that the control of Spitzbergen may soon become an international political question.

Reducing Waste in Shipping

How shippers can aid in avoiding the waste and destruction of more than $2,000,000 worth of freight every year is shown in a bulletin entitled "Loss and Damage", recently issued by the Pennsylvania railroad. The purpose of the bulletin is to urge shippers to pack their goods properly and to use containers that are strong enough to stand transportation. The value of freight injured in transit on the Pennsylvania railroad has doubled since the war, due, considerably, to efforts on the part of shippers to economize in the use of packing materials and to the use of weak or second hand containers.

The bulletin is illustrated with a series of photographs showing actual examples of improper packing and the collapse of weak containers. One picture shows a shipment of axes, which broke through paper boxes never intended to carry such hardware. Other pictures illustrate similar conditions encountered in shipments of denim, cotton yarn, cotton piece goods and sheeting. To overcome these unfortunate conditions manufacturers are urged to help by: Using stronger containers, packing your goods properly, crating your furniture better, marking your goods plainly and removing all old marks.

The new plant of the Hydraulic Press Mfg. Co., Mt. Gilead, O., has been completed and the works is again in full operation. The new plant has a much larger capacity than the one it replaces, which was burned some time ago.

Manchuria Coal and Iron Deposits

Large Coal and Iron Deposits Exist in the Pen-hsi-hu District—Magnetite Belt Estimated to Contain 500,000,000 Tons of Ore—Description of $7,000,000 Blast Furnace and Steel Plant

BY C. F. WANG

MANCHURIA, called the "Three Eastern Provinces" in Chinese, forms the northeastern corner of China and is bordered by Siberia on the north and northeast, and by Korea on the east. The Black Dragon river forms the boundary between China and Siberia, and the Ya-lu-kiang divides it from Korea. The region to the south and west of these two rivers is rich in forests and in mineral resources, the latter including many deposits of iron, coal, gold and various nonmetallic minerals. The great magnetite belt which will be discussed later lies approximately in the central part of South Manchuria.

Ore Deposits

Magnetite and some hematite are found abundantly at An-shan-chang, on the Dairen-Mukden line, where a new joint company has been established. Other hematite deposits have been reported south and east of An-shan-chang; these deposits are found in various beds of different origin. Deposits of semibituminous, coking, and bituminous coals have been found near Mukden, at Fentai, Pen-hsi-hu, Niu-shin-tai and in the southeastern part of southern Manchuria. The two most important companies are the Fushun colliery, located about 10 miles east of Mukden, now worked by Japanese interests affiliated with the South Manchuria railway, and the Pen-hsi-hu Coal & Iron Co.

Pen-hsi-hu, a community of about 13,000 inhabitants, lies about 45 miles southeast of Mukden. Two hundred years ago this district was well known for its coal and iron industry, but owing to the underground water in the coal mines it progressively declined from about 1875 till the Russo-Japanese war. There were over 2000 people working there then. The ore for the iron industry was obtained from iron deposits at Miao-er-kou, Niu-shin-tai, and Huo-lien-chai, and today the bottoms of the crucibles which were used for smelting iron by the native method, can be seen in the street employed as bricks for building walls. The South Manchuria railroad, a standard-gage line, passes through this country.

After the Russo-Japanese war, in October, 1905, Count Okura reopened the abandoned coal deposit. It was worked without Chinese permission for several years, until 1908, when the governor of Fengtien province, proposed to combine Okura's interest with Chinese capital to form a joint international company. The company, with a capital of $2,000,000 silver, began operations as the Pen-hsi-hu Coal Co. In 1911, the Miao-er-kou iron deposit was located, and in August, the incorporation of the Pen-hsi-hu Coal & Iron Co., Ltd., with a capital of $4,000,000 in silver, $2,000,000 from each party, was completed. In 1914, an increase became necessary for building the second blast furnace, and the company increased the capital to $7,000,000 approximately equal to $3,500,000 gold. At present this company has coal mines producing over 1000 tons of coal per day, limestone quarries, a coal-washing plant, a coking plant of about 300 tons daily output, a blast furnace of 150 tons capacity and an iron ore mine at Miao-er-kou producing about 300 tons a day. A second blast furnace is at the present time being erected at Pen-hsi-hu. A concentration plant is to be erected at Nan-fen, near the main line of the railway, and a briquetting plant for fine iron ore and concentrates. In the near future a coking plant will be built, and also a steel plant.

This is perhaps the first joint company between Chinese and Japanese. The organization is based on the principle of giving equal participation to both in the personnel. It is therefore to a certain extent a duplicate system, which means more or less waste both in energy and expense. However, it tends to show in a general way that so long as one nationality is not seeking too much advantage over the other, a formal cooperation can exist.

Two-thirds of the employes are Japanese, while almost all the laborers are Chinese. In comparison with either American or European companies of this kind, or even with Chinese enterprises, the wages paid the employes are low, but the standard of living and the dominant patriotic mood seem to make them available in sufficient numbers.

Coal Mining

There are three coal mines in operation at Pen-hsi-hu. A fourth was abandoned on account of excessive water. They are all worked to the dip of about 20 degrees. No. 1 pit was first started in April, 1906, on the Chou-tuan seam, which has the Pao-cha and Siang-tuan seams above it, a total of about 15 feet of coal. Three inclined shafts were simultaneously sunk for this pit for haulage, drainage and ventilation and manway. The haulage shaft has reached 2240 feet, of 6 by 10 feet cross-section; the drainage and ventilation are taken care of by one inclined shaft, reaching 2352 feet, of 6 by 10 feet cross-section; and the manway, reaching 3042 feet from the surface, is 6 by 8 feet in cross-section. There are nine levels in the pit, 268 feet apart.

The No. 2 pit was started in October, 1907, about 200 feet below the Chou-tuan seam, along the second seam, which, with the first seam constitutes about 12 feet of coal. It was shut down for a year or so, but resumed working in March, 1909. It has two main inclined shafts; namely, haulage, which is 7½ by 12 feet cross-section and 2336 feet long at present, and manway, 6½ by 8 feet cross-section, 2964 feet long.

In the No. 3 pit there are eight levels. All coal is dumped from the third to the eighth level. The three inclined

The Chinese Iron Ore Problem

HOW much iron ore is there in China? This is a question which has long been puzzling mining engineers. Apparently most of the so-called estimates of the ore reserves of that country have been merely wild speculations for results vary by hundreds of millions of tons. For this reason mining engineers, and theorists holding visions of a huge steel industry in the Orient were especially interested in the paper of Chung Yu Wang, a native mining expert, presented at the 1917 fall meeting of the American Institute of Mining Engineers in St. Louis. Mr. Wang described in detail the formation and value of the Tayeh iron ore deposits. The accompanying article, also by a Chinese mining engineer, described the deposits of the Pen-hsi-hu district in Manchuria, and brings to light the developments made by the Pen-hsi-hu Iron & Steel Co.

shafts, the haulage, drainage and ventilation, and manway have 3000 feet, 3180 feet and 2130 feet, respectively. This pit was driven in October, 1909, to facilitate transportation when the No. 1 pit's production was curtailed on account of the long distance.

The method of mining employed is both long-wall and board and pillar systems. At present the latter is more generally used, but in the case of the first and second seams, which are close together and both thick, the long-wall system has proved a failure.

Coal Washing Plant

The coal from the mine is dumped through tipples to a moving screen which separates the size above and under 50 millimeters; the oversize passes to a traveling metal belt which distributes the coal to a shaking table perpendicular to it. Men standing at both sides of the table sort out the rock and the clean coal goes to the bin, to be loaded on the outgoing train. This oversize constitutes about 19 per cent of the total coal, of which 14 per cent represents the coal proper, the rest rock and sulphur balls. About ½ per cent of this oversize coal which is crushed to fine dust on the table is sent to the fine coal bin without any further washing. The sizes up to 50 millimeters are elevated by means of bucket elevators to the top floor of the washery, from there they pass through a series of shaking screens which separates four sizes; egg, walnut, pea and fine dust.

The washing plant is worked only in the daytime. It can handle 85 tons per hour. There are 20 men in each shift, and the washing cost, not including the repairing of machinery, amounts to about 5 cents silver or 2½ cents gold per ton. The picking cost is 20 cents gold per ton. The sizes above pea are sold, while only the fine coal is used for coking purposes.

Magnetite Belt

The great magnetite belt in Fengtien province is extensive in area and the deposits are of large size. Near Liao-yang, at An-shan-chang, poor ores—from 30 to 50 per cent iron—occur mostly in the form of magnetite in layers with quartz. Near Mao-chien-hu-tun, at Wai-tou-shan, the ore is 40 to 50 per cent iron. Magnetite, dipping 45 per cent west and about 100 feet thick, lies between quartz-porphyry and gneiss. At Miaor-kou, the ore zone is 300 to 600 feet thick, including two rich veins, 50 and 33 feet thick, respectively, and 66 to 70 per cent iron. The ore lies between walls of talc-schist. Above the talc-schist is gneiss and quartzite. The tunnel intersects pure white talc-schist, chlorite schist, poor ore, and finally the rich ore. The rich ore is so far known to be about 480 feet long and 50 feet wide, narrower at the middle and ends.

On a conservative estimate, the orebody at Miaor-kou, with about 500 feet now developed, must contain over 100,000,000 tons, of which about 2,000,000 tons is 60 to 70 per cent iron ore. In a general way, the great magnetite belt probably contains over 500,000,000 tons of ore, including rich and poor, associated with talc-schist and gneiss.

Mining was first started on the outcrops of rich ore, but later three levels of 120 feet apart were driven. The open-cut mining is done during the summer time, as the excessive coldness in the winter renders such work impossible. Overhand stoping is used in the underground work. No machines or machine drills are used—all the drilling is done by hand; dynamite and nitroglycerine are used as explosives. The roof rock, which is low-grade ore here, is very hard, as is the orebody itself. No timbering is used except at the drift entrance. Massive rooms of 80 to 100 feet each way and some 60 feet high are worked without any support. Precautions are taken to blast down all ore or poor ore that is attached to certain cleavage planes. In the three years' record, only one accident has happened when a block of the roof, about 80 feet square and 5 to 6 feet thick, fell and killed 13 men. The rich ore is crystalline and is friable, 10 to 20 per cent of the mined ore being fine dust. The mining is done under three foremen each of whom has command of 250 to 400 men, working 12-hour shifts when driving drifts. At midday, when the shots are fired, the miners have two hours for luncheon. The men are paid according to the number of cars of ore mined or number of feet advanced, and the men in a gang, mining, transportation, miscellaneous carriers, etc., all receive equal pay for the total output made by the gang. The cost of explosives, food, drills, lamps, and oil is deducted at the end of each month.

As I have mentioned already, the major part of the deposit at Miaor-kou is composed of poor-grade ore, running from 30 to 55 per cent iron. As around 75 to 80 per cent of the ore is in the magnetic form, and the quantity is so large, a concentration plant for treating it is necessary. This plant is now being erected at Nan-fen, near the railroad station, and will have a capacity of 150 tons per 12 hours. The poor ore is brought in by the narrow-gage railroad on the eastern hillside to the ore-bin, from which it runs into a jaw crusher of 620 x 325 millimeters aperture. This crushes the ore to about 1.5 millimeter. From here it goes through two Grondal magnetic separators; the magnetite is picked up and separated, the tailings proceed to the classifiers to be sorted into three grades, the heads are sent to the main flow, tailings to waste and the middling pumped back to be reconcentrated on tables. The product from the first Grondal separators is reground with water, in a tube-mill having a diameter of 1.3 millimeters and length of 5 millimeters, by means of steel and gravel balls, to under 0.07 millimeter. The ground ore is allowed to run through another set of two Grondal separators, which are exactly similar to those of the first set. The concentrate from this set is sent to shaking troughs, together with the incoming heads from the tables; from there they are discharged to the railroad cars by means of an overhead crane. The unmagnetic product from the second set of the magnetic separators is pumped to the tables for further concentration.

Blast Furnace Smelting

The first blast furnace was completed in December, 1914, after one year's work of erection. The plan of the company is to build eight blast furnaces and a steel plant. A second blast furnace is approaching completion this winter. The No. 1 blast furnace was built by Pearson, Knowles & Co., of England, at a cost of $2,400,000. It is 83 feet 3 inches above ground level, with two exhaust stacks 75 feet 9 inches high, standing above the charging level. The distance between the charging level and hearth bottom is 65 feet 7 inches. The hearth diameter is 9 feet 10½ inches and 7 feet 10 7/16 inches high. The bosh is 17 feet 8½ inches diameter and height 14 feet 7 15/16 inches. The diameter of the furnace tops is 11 feet 1½ inches. The capacity of No. 1 blast furnace is 10,279.34 cubic feet. The second furnace is of similar dimensions and design.

Unusual Tuyere Arrangement

The furnace has two sets of tuyeres, one above the other. The upper set was intended for emergency use, but it was later found good practice to use both of them. The charging is done by an inclined hoist with a charging bucket of two tons capacity. It has a length of 164 feet with an inclination of 51 degrees. The dynamo is 37 horsepower. There are three hot-blast stoves for No. 1 furnace. They are of the McClure type (three pass), each 90 feet high 20 feet in diameter, furnished with a stack of 70 feet high and 6 feet 3 inches diameter. The discharge valve of the hot blast is 8 feet 8 inches (1143 millimeters) above the floor. The air is supplied by two turbo-blowers, each having a capacity of 16,000 cubic feet per minute at 4 to 7 pounds pressure per square inch at 3000 revolutions per minute. We have found that three blast stoves are quite insufficient to

keep up a constant blast temperature, especially during the severe cold of winter; as 40 degrees Cent. below zero is not uncommon during December, January and February. The blast can be adjusted with cold air to maintain an even temperature blast. The temperature used is from 600 to 650 degrees Cent., depending upon the kind of iron produced.

Prewar Wages and Hours in the Iron Trade

The bureau of labor statistics of the United States department of labor has just issued a report on the survey of wages and hours of labor made in the iron and steel industry between 1907 and 1915. This report furnishes an insight into the normal development of labor conditions, uninfluenced by the drive of war production.

Full time weekly earnings in May, 1915, were from 4 to 8 per cent higher than in May, 1907, in blast furnace, bessemer converter and bar mill plants. These increases represent an even greater increase in average earnings per hour as the average full time week decreased from 2 to 6 per cent between 1907 and 1915 in the three departments mentioned. In all lines of the industry excluding only puddling mills, the decrease in hours of work over the period from 1910 to 1915 was from 1 to 6 per cent, while the increase in wages ranged from 2 to 22 per cent. In 1916, the year following the period covered by the report, other sources show the increase in wages in these lines to have been 33 per cent.

War-driven production has not made the seven-day week. In this report, it is shown that the tendency was strong for continuous operation of many plants, including of course blast furnaces before the war. In 1907, the plants reporting showed the customary working time to be seven days a week for 97 per cent of the employes. Since 1910 there has been a material reduction in the seven-day week, as many blast furnaces made provision to lay off each employe in rotation one day in seven. Eighty-nine per cent of all the employes reported in blast furnace operation worked seven days a week in 1911; 82 per cent worked a seven-day week in 1912 and 80 per cent in 1913. In 1914 only 58 per cent were continuously employed throughout the week.

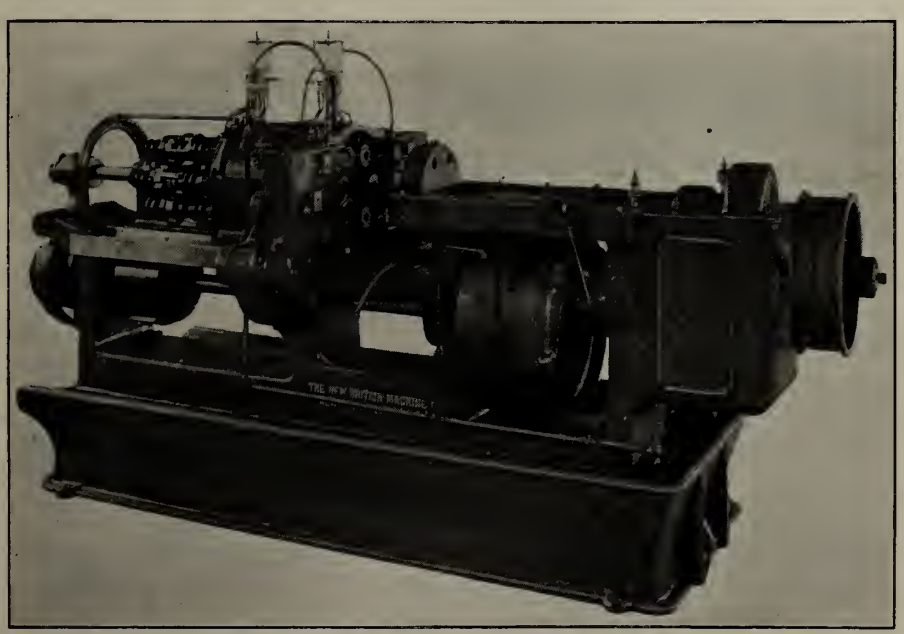
Bessemer converters and open-hearth furnaces are usually in operation day and night for six days a week, a shut down being made over Sunday for a period of from 12 to 36 hours, except when the demand is very heavy. In 1907, a year of large production, 24 per cent of the bessemer plants covered in the report, worked seven days a week. In the next two years the percentage was smaller, but in 1910, another prosperous year, 34 per cent of the employes in the same plants had seven working days a week. In 1911 the same plants showed only 11 per cent continuously employed. Throughout the nine-year period, the majority of employes in the bessemer converter plants worked six days a week, while a few alternated between seven and six days a week. The employes in open-hearth furnace departments during a six-year period covered were almost equally divided among the seven-day, seven-day and six-day alternately, and six-day groups. In all rolling mills, the per cent of employes working seven days per week was very small.

Gives Increased Output

Nonindexing Feature of Automatic Bar Machine Permits Series of Operations to be Performed in Each Position

FOR blanking rolls, sleeves and similar parts, the New Britain Machine Co., New Britain, Conn., has brought out an improved six-spindle automatic bar machine. In the new machine the spindle cylinder does not index, as the machine is designed to permit feeding, cutting, drilling, chamfering and cutting-off operations in each position. On simple work involving sleeves and the like, this feature enables an increase in the production of parts. Hand-control levers on either side may be used to start or stop the power feed. These, in connection with a hand feed crank for testing feed movements and tool positions are essential features, it is maintained, in that their use reduces the breakage of tools in setting-up, testing and adjusting. The bed, directly beneath the work, has a 45-degree slant, so that chips and pieces of stock which are cut off, are delivered at the side of the machine. The chip pan slopes over the reservoir so that oil drains from the chips before they are removed. Chips may be removed without changing the machine.

The six spindles rotate clockwise and are of heat-treated chrome-nickel steel, while the bearings are of bronze bearing metal, ground straight inside and taper outside. In order to maintain the original accuracy of the machine, provision is made for taking up the wear in the bearings without disturbing their alignment. A considerable reduction in the power required to drive the machine is obtained by fitting ball thrust collars on the spindles. The change gears provide six spindle speeds, while a separate system, which is supplied, provides for changes in feed by varying the speed of the camshaft. In order to operate the tool slide at high speeds when the tools have finished cutting, a differential motion is regularly fitted.



NEW SIX-SPINDLE AUTOMATIC BAR MACHINE

Even balance of the thrust of the work above and below the center line is aimed at by a special design which, it is asserted, overcomes any cramping or straining action. The tool slide cam is laminated similar to a leaf spring. This construction permits the adjustment of one cam to all lengths of work within the capacity of the machine. An internal gear drives the camshaft through the medium of the feed cam drum. The thrust of the tool slide against the feed cam is resisted by a hardened steel roll, fixed to the frame, and bearing against the edge of the drum.

Plans Norwegian Plant

Since the beginning of the war numerous attempts have been made to build steel mills in Norway, according to report of commercial attache Erwin W. Thompson at Copenhagen. While nothing much has been accomplished, a new company from Stavanger, it is reported, contemplates building a steel mill in Tysfjord, near Narvik that will cost $5,000,000. This will be in the immediate vicinity of large deposits of iron ore.

Talks on Electric Heat

Frank Thornton Jr., engineer, electric heating department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., read a paper entitled "Electricity as a Substitute for Natural Gas for Heating Purposes", at the annual meeting of the mechanical section of Engineers' Society of Western Pennsylvania at Pittsburgh Tuesday evening, Feb. 5. In view of the importance of obtaining substitutes for natural gas at the present time the attendance was large. Mr. Thornton's paper includes a resume of the present state of the art of industrial electric heat together with descriptions of industrial applications in successful operations. The paper also discusses the probable course of future developments and the possibilities of additional applications in various lines. The paper was illustrated by lantern slides.

Traveling Anti-Waste Exhibit

In large manufacturing plants where thousands of men and women are employed great opportunity exists for materially reducing one huge expenditure, that of waste, by instilling into the minds of employes the desire for thrift.

The Westinghouse Electric & Mfg. Co., Pittsburgh, recently devised the novel scheme of actually showing to employes the wasteful tactics practiced by them. On one side of an ordinary industrial truck was piled food such as bread, butter, meats, crackers, cheese, etc., which had been discarded as the remnants of lunches. On the other side of the truck were piled company owned manufacturing materials such as copper, zinc, lead, mica, rubber, felt and gum which had been discarded as waste but which undoubtedly could have found further advantageous employment. The truck was driven slowly up and down all the aisles in the plant to enable every employe to see it.

An object lesson of this character should be especially valuable at the present time when the nation is endeav-



WHY CONSERVATION MUST BE RIGIDLY ENFORCED

oring to impress upon the minds of all of us the necessity for conservation.

It was estimated that the food wasted daily amounted to $35 to $50, the largest individual portions of which must be borne by the most prolific wasters. It was pointed out, however, that the manufacturing materials which had been lost through the thoughtlessness, carelessness or laziness of employes must be entirely borne by the company.

Tungsten in Alaska

Most of the tungsten produced in Alaska in 1917 came from the Fairbanks district and the Seward peninsula. At the present time two tungsten mines are being worked in the Fairbanks district. A 75-ton mill, in operation at one of these mines, late in the summer of 1917 was turning out several hundred pounds of scheelite concentrates daily. Underground work was in progress at both mines. Present indications give promise of a large increase in the production of tungsten in the Fairbanks district. In the Seward peninsula tungsten was produced principally by sluicing the residual scheelite-bearing lode material in Sophie gulch. Smaller quantities of tungsten were obtained in other districts by placer mining.

To Build Gas Plant

The Koppers Co., Pittsburgh, has been awarded a contract by the Providence Gas Co., for the construction at Providence, R. I., of a battery of 40 Koppers gas ovens for the manufacture of illuminating gas and of metallurgical and domestic coke. The novel feature of the installation will be the heating of the oven by means of producer gas manufactured in an outside plant of mechanically operated producers, using coal as fuel. The use of producer gas for heating the ovens will release all the coal gas made in the coke ovens for distribution in the gas system. Construction work already has been started and it is expected to commence delivering gas during the fall of 1918.

Many Furnaces Operating

The United States Steel Corp. at the beginning of the year made public an interesting list of electric furnaces either installed or in the process of installation in plants of the United States and Canada. The list, totaling in all 272 furnaces, shows the Heroult unit the leader with 146 installations and the Snyder second with 36. Graded according to number of installations the list is as follows: Heroult, 146; Snyder, 35; Gronwall-Dixon, 14; Rennerfelt, 13; Greaves-Etchells, 12; Ludlum, 6; Booth-Hall, 6; Girod, 5; Moore, 4; Induction, 3; Stassano, 1; Wile, 1; special makes, 26.

Corrosion of Muntz Metal

The bureau of standards, Washington, D. C., has issued a new publication entitled "Typical Cases of the Deterioration of Muntz Metal (60:40 Brass) by Selective Corrosion." The paper reports the study of selective corrosion of muntz metal, a material having a variety of industrial uses. The selective corrosion is illustrated by four types, including tubings, sheets, and forgings. The metal becomes red in color, very weak, and brittle by this type of corrosion. The condition favorable to such corrosion is the accelerating effect of the closely adhering deposits of chloride resulting from the attack of the metal. Other conditions accelerate the corrosion such as contact with the more electronegative constituents, increase of temperature, and service stresses.

Avert Drastic Motor Cut

Builders of Pleasure Cars Plan Orderly Readjustment and Concentration on War Essentials—Confident of Future

DISINTEGRATION of the motor car industry, as threatened by the recommendation of the fuel administration that production of passenger cars be reduced immediately 50 per cent, has been prevented by a delegation of Detroit bankers and motor manufacturers who conferred with government authorities in Washington a few days ago. The change in the attitude of those interests in the capital that, since the entrance of the United States into the war, have regarded the motor car industry as unessential to the success of American arms abroad has came from a realization that this billion dollar industry, the third largest in the country, has taken a leading part in the production of the necessities of war.

Washington's official mind has been slow to grasp the significance of the motor car industry as a war time asset second only to the steel industry in the production of manufactured finished products. This has been true in spite of the fact that it has called upon the industry to furnish not only aeroplane motors, army trucks, dispatch cars, ambulances, tractors, shells, gun carriages, limbers, gun recoil mounts, mines and mine anchors but has drawn upon the industry's best technical and administrative skill in the direction and operation of its various munitions production departments.

Motor car manufacturers do not attempt to justify the assumption that passenger motor cars are unessential to the conduct of the war, but they do insist that any arbitrary or sudden curtailment of the production of such vehicles means the disintegration and disruption of an organization that has required a score of years to upbuild and which has reached the highest plane of efficiency of any industry of its type in the world.

As a result of the recent conferences in Washington it is believed that the government now realizes that the motor industry is willing and in fact already has adjusted itself to a war basis by subordinating the production of passenger cars to government requirements. The extent to which this has been done is indicated by the fact that in Detroit alone contracts for war materials have been accepted involving the expenditure of $590,000,000.

The motor car manufacturers realize that reduced production now means increased demand after the war. The problem of converting 235 passenger car factories in the country to munitions work through a gradual reduction of motor car output has been placed in the hands of a representative committee of seven leading manufacturers who will co-operate with the automobile industries committee of the war board. Operation of motor car plants under government contracts has so far proved profitable and several plants have been enabled to greatly expand their facilities to enter the truck manufacturing business on which there are no restrictions.

As to the future of the motor car industry after the war manufacturers are not worried, realizing that in that period the United States will be the only country in the world devoting attention to the passenger car business.

Detroit is Truck Center

The motor industry, 85 per cent of which is represented in Detroit, has developed the truck manufacturing end with amazing rapidity. Some of the larger builders such as the Packard Motor Car Co., are sending trains of from 20 to 50 trucks two and three times a week to the Atlantic seaboard under their own power for overseas service.

It has been estimated that 25,000 trucks are needed at once by General Pershing's army in France. The importance of the motor truck has not been underestimated by the quartermaster's department and nothing has been done to interfere with their production in unlimited quantities. The truck has been standardized and the manufacture of parts has been divided up among various manufacturing industries. It was motor trucks that saved Verdun and the government has taken the stand that the United States army should have plenty of these vehicles for transport and other service.

The industry has suffered heavily in loss of skilled workmen through the demands of the war department. This has followed from both the operation of the draft and from the call for mechanical skill from behind the battle lines in France. Women are filling many of the gaps, however, and have been found to be especially adapted for nearly all operations in motor car construction.

Bankers of Detroit believe the danger of any further radical action affecting the motor industry through legislation or governmental order is past. On three occasions it has been necessary to send strong delegations to Washington to sidetrack taxation proposals which would have been ruinous to the industry if enacted. They have pointed out that there is $800,000,000 of capital invested in the 550 motor vehicle manufacturing plants in 32 states and that 300,000 workers are employed. Their wages in 1917 approximated $300,000,000. The wholesale value of their products was $1,000,000,000. The production of passenger cars in the year 1917 was 1,800,000 and of commercial vehicles 181,000. This figure will be cut at least 50 per cent during 1918, owing to the conversion of plants to munitions work.

It has been computed that the motor and allied industries in the calendar year of 1918 will turn out approximately $1,000,000,000 of war materials. Completion of new plants under construction will take care of almost half of this business while the remaining facilities will be used to produce from $500,000,000 to $600,000,000 of passenger motor cars.



STANDARDIZED ARMY MOTOR TRUCK

Drive for Shipyard Labor

Countrywide Effort to Recruit 250,000 Workers for New Plants Nearing Completion Being Carried Out Vigorously

THAT victory in the war depends upon ships is being forced home upon the country more and more each day. For the country to build 6,000,000 tons of ships annually, which is its irreducible minimum if the country is to do its full share, according to Charles Piez, general manager of the Emergency Fleet corporation, the prerequisite is men. By the end of the present week it is hoped to have at least 250,000 men enrolled in a registered public service reserve. It is not intended to draw men from their present employment, as was explained in a letter to state governors sent out from Washington recently. When necessary to transfer men to needed points they are to be taken in such a manner as not to disturb manufacturing conditions. The first 60,000 men are required immediately to build three government shipyards to be completed in 60 days. It is planned to work that number in three 8-hour shifts, so that construction may be continuous.

In many sections schools and colleges are doing their part to turn out shipworkers and instruction in shipbuilding is being added to curriculums. At Newport News, a training camp is being conducted to fit men to be directors of training at their respective yards.

Much attention continues to be given to the housing problem. The Fore River Shipbuilding Corp., Quincy, Mass., stated recently that its force of 3000 would have to be increased to 4000 by the spring and that aid from the government to the extent of approximately $1,000,000 would be required to provide sufficient housing. Control of the housing proposition in all war industries including shipbuilding has been delegated to the department of labor, and according to a recent statement of the President and Secretary McAdoo, the $500,000,000 war finance proposition will have nothing to do with it.

Metal Trades Interpret Federal 8-Hour Day

Since many different interpretations have been made as to how the government's 8-hour day principle should apply on war contracts, the National Metal Trades association has endeavored to clarify the situation by conducting a correspondence investigation with the ordnance bureau at Washington. As a result, the following recommendations have been made to members:

First:—That, in accordance with the executive order of the President, and referring specifically to government work and to such as clearly comes under the law, there is no restriction as to the total number of hours short of 16 which may be worked, but that the provision requiring time and a half for overtime after eight hours is still in effect, *i. e.*, the amended statute now applies to wages and not hours of service.

Second:—Contracts that come under the law apply to "contractor or any subcontractor".

Third:—Where material manufactured comes directly within the provision of the law, rulings have been secured providing that methods of payment either by the piece price, premium or bonus, which result in a daily wage equal to that computed on the 8-hour basis with time and a half for overtime, has been acceptable.

Fourth:—That contracts for the purchase of material or articles which may be usually bought in the open market (except armor and armor plate) whether made to conform to particular specifications or not, do not come within the provision of the law.

Fifth:—It is recommended that members endeavor to secure the insertion, in any proposed contract with the government, of the explanatory not appearing in "Instructions to Bidders", which refers to the "Labor Disputes" clause.

Sixth:—So-called government mediators and conciliators have no authority to act other than in an advisory capacity, should the employer so desire. The government does not and cannot insist upon the closed shop.

Heroic Measures Overcome Flood and I. W. W.'s

The Puget Sound Iron & Steel Works, Tacoma, Wash., now engaged on a large amount of government work for the shipyards was compelled to use heroic measures to save its plant from the ravages of the Puyallup river during the recent floods and faced a serious labor situation at the same time. The plant managed not to lose any time, however. Sacks of sand and gravel to the number of 27,000 were thrown into the break which the river made toward the plant, threatening to undermine it. The works are situated in a bend of the stream and the river began carving out a new channel, which would have taken it directly under the plant.

When the danger was at its height the Industrial Workers of the World who were employed on the job struck for $1 an hour. This was in the evening and in order to save the plant the demands were granted. But the next day, the officers of the company having counselled with the military officers at Camp Lewis nearby, announced a rate of $5 per day for eight hours. The military police were brought in and the $5 schedule prevailed from that time on until the work was finished or placed in such position that the danger was past. When the military police were compelled to return to camp, they were succeeded by a contingent of the coast artillery and the plan of the Industrial Workers of the World to bring up the wages on the work to $2 an hour never materialized. The danger both as to labor troubles and the flood having passed the coast artillery has been recalled and the company is erecting a 1500 bulkhead to protect its property from future floods.

To Train War Cripples

The Norton Co., Worcester, Mass., has offered its plant and services to the United States government, "To fit and re-educate crippled soldiers for self-support." The plan is similar to that used by the Canadian government. The company proposes to take in five or more Worcester men each week and to attempt to train and re-educate them as soon as possible, providing the work does not interfere with their recovery from wounds. It is estimated that only 12 per cent of those severely crippled in the war must be re-educated. Men who come home on leave of absence to recuperate will be offered employment to their liking, if able to work, and unless they are obliged to return to their duties in the war zone will be continued in such employment.

Labor Notes

Approximately 125 riveters employed at the shipbuilding plant of the Texas Steamship Co., Bath, Me., struck early this month, giving as their reason, dissatisfaction with their rating and a desire for increased wages. The company has government contracts for ships.

The Webster Mfg. Co., Tiffin, O., states that a statement made in these columns recently to the effect that foundrymen went out on strike after being employed to take the place of union men who wouldn't work with nonunion men, is erroneous. Its plant has been running continuously since it commenced to employ nonunion molders.

Stricter Control Over Ferro Alloys

American Iron and Steel Institute to Act as Clearing Agent for All Imports of Ferro Alloys, Kindred Ores and Metals Under New Regulations of War Trade Board—Forms to be Used

REGULATIONS covering the importation of ferroalloys and kindred ores and metals have been announced by the American Iron and Steel institute, in accordance with the will of a meeting of those interested in this business which was held recently in New York at the special request of Frederick E. Peterson, director of the bureau of imports of the war trade board. These regulations, which have been approved by the war trade board, have been drafted with a view to exercising the supervision over imports that is desired by the government, without interrupting or embarrassing in any way the ordinary transaction of business. The new regulations cover the importation of ferromanganese, spiegeleisen and all ferroalloys, chrome, chrome ore, cobalt, cobalt ore, manganese, manganese ore, molybdenum, molybdenum ore, titanium, titanium ore, tungsten, tungsten ore, scheelite, wolframite, vanadium, vanadium ore, or any chemicals extrated therefrom.

Licenses must be obtained by the importers from the war trade board; in all cases imports are to be consigned to the American Iron and Steel Institute, which will notify the importer. All bills of lading, together with invoices and other documents, should be sent by the foreign shipper, through the regular trade or commercial channels, to the parties by whom the material is purchased or for whose account it is shipped, and in no case to the American Iron and Steel institute. Upon receipt of the documents by the importer or recipient in this country, the bills of lading are to be presented to the American Iron and Steel institute by the importer, accompanied by an undertaking and guarantee in one or more of the following forms: Importing consumer's guarantee; consumer's guarantee for ferroalloys manufactured from imported ore; importer's and consumer's guarantee combined; importer's and dealer's guarantee combined. Blanks to be used in making out these guar-

Import License No.

IMPORTING CONSUMER'S GUARANTEE

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE.
61 Broadway, New York, N. Y.,
or nearest branch office.

TO THE WAR TRADE BOARD:

Ex S/S ... Arrived, or due to arrive
(Here state place and date of arrival)

Shipper

Merchandise
(Here state kind of Ferro-alloy, Ore or Metal)

Marks	Number of Packages	Weight

In consideration of your consenting to the delivery to me/us of the merchandise specified above, I/we hereby give you the following undertaking:

I/We will not export any of the said material, or any metal, ferro-alloy or chemical made therefrom, or any other such merchandise which is now or at any other time in my/our possession, except under license from the War Trade Board.

I/We will not sell any of the merchandise, or any metal, ferro-alloy or chemical made therefrom, without satisfying myself that the purchaser has signed a guarantee on Form F. A. 2

I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No. 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected

(The Importer signs here)

Date

Import License No.

IMPORTER'S GUARANTEE

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE
61 Broadway, New York, N. Y.,
or nearest branch office.

TO THE WAR TRADE BOARD.

Ex S/S ... Arrived, or due to arrive
(Here state place and date of arrival)

Merchandise
(Here state kind of Ferro-Alloy, Ore or Metal)

Marks	Number of Packages	Weight

I/We have sold the merchandise specified above to

whose guarantee you will find on the back hereof. I/We will produce to you at any time on demand the original contracts or other documents evidencing the sale,

I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(The Seller signs here)

Date

CONSUMER'S GUARANTEE FOR FERRO-ALLOYS MANUFACTURED FROM IMPORTED ORES

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE.
61 Broadway, New York, N. Y.,
or nearest branch office.

TO THE WAR TRADE BOARD:

In consideration of your consenting to the delivery to me/us of any ferro-alloys, metals, or chemicals extracted therefrom, produced from imported ores, and subject to the regulations set forth in Bulletin No. 2 of the American Iron and Steel Institute under authority of the War Trade Board, namely: Ferro-Manganese, Spiegeleisen, and all Ferro-Alloys, Chrome, Cobalt, Manganese, Molybdenum, Titanium, Tungsten, Vanadium, or any chemicals extracted therefrom.

I/We hereby agree:

(a) That I/we will not sell any of the merchandise herein mentioned now in my/our possession, or which may hereafter be received by me/us, but will use same for my/our own manufacturing purposes.

(b) I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(Purchaser signs here)

Date

Date

IMPORTING AGREEMENT

(This agreement should be executed in duplicate. Both copies to be filed with the American Iron and Steel Institute, 61 Broadway, New York, N. Y., or nearest branch office.)

WHEREAS, the undersigned is
(Here state whether consumer, importer or dealer)

of Ferro-Alloys, Kindred Ores and Metals, and

WHEREAS, the American Iron and Steel Institute, without compensation, is undertaking at the request of the War Trade Board certain work in connection with such importations.

NOW THEREFORE, the undersigned agrees in consideration of services rendered by the American Iron and Steel Institute, and of the issuance from time to time of licenses by the War Trade Board covering materials on which I/we may be interested, as follows:

(1) Neither the American Iron and Steel Institute, nor any officer, member, or committee thereof, shall be in any way liable for the withdrawal at any time of any facilities for importing ferro-alloys, kindred ores and metals, or for any action on its part in connection with any of the duties undertaken by it.

(2) In the event of conditions arising in connection with any particular shipment or shipments of ferro-alloys, kindred ores or metals, as defined in Bulletin No. 2 of the American Iron and Steel Institute, in which I/we may be interested as an importer, dealer or consumer, or otherwise, and which may render it desirable, in the opinion of the American Iron and Steel Institute, to refuse or withhold delivery of said ferro-alloys, ores or metals, the American Iron and Steel Institute may refuse or withhold delivery of said ferro-alloys, ores or metals, and the case may be presented for final decision to the War Trade Board, whose instructions in the premises the American Iron and Steel Institute may carry out without incurring any liability whatsoever.

(3) I/We will conform to the requirements, regulations and provisions set forth in Bulletin No. 2 of the American Iron and Steel Institute, and any changes or amendments which may be made to such regulations hereafter.

(4) I/We will give you the required guarantee on all importations or purchases of ferro-alloys, kindred ores or metals made by me/us.

(5) I/We will furnish statements as required of all sales made by me/us and take guarantees as required from my/our customers.

(6) I/We will make the required statistical reports from time to time when called upon to do so.

(7) I/We will indemnify and hold harmless the American Iron and Steel Institute and/or its officers individually and collectively, and/or the Sub-Committee on Ferro-Alloys individually and/or collectively, from all liability in connection with any importations or dealings in ferro-alloys, kindred ores or metals, entered into by me/us.

(Signature of applicant)

Witness

(Address)

CONSUMER'S GUARANTEE

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE.
61 Broadway, New York N. Y.,
or nearest branch office.

TO THE WAR TRADE BOARD

In consideration of your consenting to the delivery to me/us of the merchandise specified on Page 1, I/we hereby give you the following undertaking.

I/We will not sell, transfer or deliver the merchandise, or any part thereof, now released by you, but will use if for my/our own manufacturing purposes.

I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores or metals as defined in Bulletin No. 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected

(The Purchaser signs here)

Date

DEALER'S GUARANTEE

To be delivered to
AMERICAN IRON & STEEL INSTITUTE,
61 Broadway, New York, N. Y.,
or nearest branch office

TO THE WAR TRADE BOARD.

In consideration of your consenting to the delivery to me/us of the merchandise specified on Page 1, which I/we have purchased from

(Here state name of seller)

I/We hereby give you the following undertaking

(1) I am/We are not buying this merchandise for speculative purposes, and I/we will not sell it to any other than a consumer

(2) I/We will not, directly or indirectly, at any time so long as the present War continues, sell any ferro-alloys, kindred ores or metals as defined in Bulletin No. 2 of the American Iron & Steel Institute, to any person in the United States without satisfying myself/ourselves that it is intended to be used exclusively by consumers in the United States, and that it will not be exported except under license, or other form of consent, duly issued by the War Trade Board.

(3) I/We will furnish a statement on Form F. A. 5 of all retail sales to consumers of the within described ferro-alloys, kindred ores or metals made by me/us and will not make any sale without delivering to the purchaser an invoice stamped with the clause provided in Form F A 5 signed by me/us

(4) I/We will furnish Consumer's Guarantee (Form F. A. 3) covering each sale of wholesale quantity, to be filed with the American Iron and Steel Institute before delivery

(5) I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No. 2, of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(Purchaser signs here)

Date

FORMS TO BE USED BY IMPORTERS AND CONSUMERS IN BRINGING IN FERROALLOYS, KINDRED ORES AND METALS

antees may be obtained from the American Iron and Steel institute. Representatives of the institute have been appointed at New York and San Francisco, clothed with custom house power of attorney for the endorsement of bills of lading as required by the United States treasury regulation. Additional representatives in other cities will be appointed as may appear necessary. These representatives will endorse bills of lading covering importations consigned to the institute only when the guarantee requirements have been satisfactorily complied with. Inasmuch as shipments frequently arrive before documents, the shipper is advised whenever possible to mail the signed bill of lading, one stamped consular invoice and a copy of the commercial invoice on the vessel carrying the shipment.

Records to be Kept

The institute will keep a record of all importations of ferroalloys and kindred ores and metals released under the guarantees, which will show the particulars indicating the shipper, the importer and the consumer to whom the materials have been released, and any other data necessary to indicate its final disposition and consumption. This record will be checked from time to time by government inspection of and comparison with the books and records of importers, dealers and consumers. Reports may be required from time to time showing stocks on hand at a given period, actual consumption and other data. These reports will be confidential and will be compiled by the institute for the information of the war trade board.. With this information as a basis, modifications or changes may be made from time to time in the regulations and practice controlling the importation, allotment and distribution of supplies of ferroalloys and kindred ores and metals so that the best interests of the importers, dealers and consumers as well as the public, properly may be served. The institute also will use its best efforts to assist in the distribution of imports and supplies upon an equitable basis, primary consideration being given to the requirements or necessities of the government program.

One of the duties of importers when negotiating for fire and marine insurance, under the regulations, is to have substantially the following clause inserted in their policies: "In case the assured holds the property covered by this policy under an agreement with the war trade board of the United States of America, it is mutually understood and agreed between the company and the assured that in the event of a loss occurring as a result of which the company shall take over any part or all of the property insured thereby, then the company shall be bound by the terms and conditions of the agreement held by the assured with the said war trade board."

Committee in Charge

The subcommittee on ferroalloys which has charge of the regulations covering the importation of ferroalloys and kindred ores and metals, is as follows: James A. Farrell, chairman; E. A. S. Clarke, E. G. Grace, E. J. Lavino, A. D. Ledoux, E. F. Price, Frank Samuels, F. W. White and A. A. Fowler, secretary. A bulletin has been issued by the institute which contains not only the complete regulations, but blanks for the various forms of guarantee, for dealer's monthly statements of retail sales and also for the importing agreement.

Evolution of the Modern Steel Car

BY HENRY P. HOFFSTOT

IN an address before the Traffic club, of Pittsburgh, Feb. 11, on the "History and Development of Steel Cars in America", Henry P. Hoffstot, of the Pressed Steel Car Co., Pittsburgh, revealed much interesting information on steel cars in general and traced their evolution for a period extending over several years. Especially did he discuss the increasing popularity of the car of heavy capacity showing how 100-ton units now are being employed. One railroad has now become interested in a 120-ton car and in connection with this Mr. Hoffstot said:

"Its officials felt that the concentration of a 120-ton load in one car would not only shorten up their trains, thereby making a less number of units for a given train per revenue tonnage but also a less number of operations in their dumping machines at their terminals, and would also reduce the number of wearing parts to be maintained as well as eliminate to a great extent the extra long sidings which would otherwise be required to handle the same tonnage in cars of lighter capacity. In other words some of the general reasons which brought about the change from the 30 and 40-ton capacity wooden cars to 40 and 50-ton steel cars are now tending to bring about the use of much heavier capacity steel cars. The official of this particular railroad, fearful lest a mistake might be made in ordering at the present time a larger number of cars in which such a radical change would be made, elected to have four of the larger car companies each build a sample car.

Details Left to Car Companies

The engineers of the railroad at that time supplied the car companies with the maximum height and width and approximate length which they believed would carry the required tonnage and left the details of the design of the cars to each of the car companies. Their idea was to get these samples into actual service and if experience actually showed that cars of 120-ton capacity could be more economically used than 50 and 70-ton cars they could pick out the best features of each of the four cars and design a unit which in their opinion would be best suited for the service. These four cars have all been delivered and are now undergoing trial."

Mr. Hoffstot referred to the fact that rulings of the Master Car Builders' association in the construction of all cars make it necessary to comply with certain regulations so far as clearances, strength, etc., are concerned, but do not go very far toward bringing about standard designs of cars. For many years, he pointed out, this question has received more or less attention and three or four years ago a committee of five builders was appointed by the railroad presidents representing the American Railway association to go carefully into this matter. Later 10 or 12 railroad representatives were placed on this committee. After three years of labor they made their report and submitted specifications and blue prints covering box cars and gondolas of several capacities. This work is now being continued by another committee and railroad men are keenly watching its progress, for the greatest advances that can be made in steel car construction at this time will come with the adoption of cars of standard design

for use all over the entire country.

"No further progress along these lines can, however, be expected until congress decides whether the railroads after the war are to remain the property of and be operated by their real owners under the control of the interstate commerce commission," Mr Hoffstot added, "or whether permanent government ownership is to prevail."

In tracing the development of the steel car, Mr. Hoffstot said:

"A good many years ago some few all-steel cars were built and placed in operation by some of the steel companies and these cars are, I believe, still in service. The change from the use of wood to steel in the construction of coal cars in America was not brought about at one time but was extremely gradual in its development. In the early nineties, C. T. Schoen commenced making pressed steel car shapes in his little plant in lower Allegheny, Pa., and for years was supplying the railroads with pressed steel center plates, side bearings, stake pockets, push pole pockets, etc., for use in connection with the construction of wooden cars. During the same time the Fex plant, Penn avenue, Pittsburgh, was furnishing pressed steel trucks and truck specialties to railroads for use on wooden equipment.

"About 1895 Charles T. Schoen conceived the idea of building steel cars on a large scale. The following year the first ones were ordered by the Pittsburgh, Bessemer & Lake Erie railroad and shortly after by the Pittsburgh & Western railroad and the Pittsburgh & Lake Erie road. It is therefore to the foresight of the officers of these three companies that a great deal of the credit for bringing about the change from wood, or wooden cars with steel trucks and a few steel specialties to the all-steel car, must be given. Mr. Schoen conceived the plan but to show the public it was necessary to find a buyer on whose railroad a demonstration of the cars in actual operation could be made. The heads of these three companies took the chance and that they made no mistake in their judgment is now well recognized. The demand for this type of car grew rapidly. Its construction virtually revolutionized railroad traffic of this country. The first hopper cars were built to carry coal and while stenciled 50-ton were hardly of 40-ton capacity so far as present requirements are concerned. Probably 85 to 90 per cent of these cars are still running after 20 years of service in and out of the Pittsburgh district which with its bituminous coal and ore gives the cars as severe service as could be received by them anywhere in this country.

Capacity in Demand

"The railroads are continually demanding cars of heavier capacity so that the increasing volume of tonnage offered can be handled more economically on our congested railroads. Early in this century the combination of pressed steel and structural steel was used in car construction, and this is the type of construction most commonly used today. Often an additional ton of steel carefully applied in the designing of a steel car will make it so much stronger and better able to withstand the shocks, wear and tear received in unfair treatment that by the end of 12 to 15 years it can be renovated at a comparatively small expense."

Obituaries

HENRY H. HODELL, who with his two sons organized the Cleveland Galvanizing Works Co., Cleveland, in 1886, and who served as that company's president, died at Mount Sinai hospital in that city, Sunday night, Feb. 10, at the age of 68. Mr. Hodell was born in Alsace and came to America when a boy, locating in Cleveland. After leaving school he worked in a rolling mill and later organized the Hodell & Collins Co., where he remained until he founded the Cleveland Galvanizing Works Co. At the time of his death he was also president of the Van Dorn & Dutton Co., Cleveland, tool manufacturers, and was likewise a director of the Van Dorn Electric Tool Co., and in the Equity Savings & Loan Co. His two sons, F. G. Hodell and Howard H. Hodell, survive him and will continue to conduct the galvanizing works company.

John J. Adams, for more than 40 years a manufacturer of cutting dies, chisels, cutting presses, engines and machinery in Worcester, Mass., died in the Memorial hospital, in that city, Feb. 7, from acute appendicitis, aged 60 years.

Abram P. Morris, president of the Morris Machinery Co., Newark, died recently of pneumonia, at his home in Lyons Farms, N. J., at the age of 54.

W. B. Williams, for many years superintendent of the tube department at Benwood, W. Va., of the Wheeling Steel & Iron Co., Wheeling, W. Va., died recently at Pleasantville, N. J., where he had made his home since July last.

James G. Doak, construction engineer, died recently in Philadelphia at the age of 52. For more than 25 years he had been engaged in the construction business and up until about 10 years ago was partner of James Doyle. During that period he supervised the erection of many of Philadelphia's largest buildings.

Arthur Grover Cutting, age 37, general manager of the Pittsburgh branch of the H. W. Johns-Manville Co., died resently, following an attack of rheumatism. Mr. Cutting came to Pittsburgh about six years ago from the New York office of the Johns-Manville company and prior to that connection he served as purchasing agent for the Chapman Valve Co., Ludlow, Mass.

Henry Elliot Sprague, formerly president of the Colorado Coal & Iron Co., predecessor of the Colorado Fuel & Iron Co., Denver, Colo., died recently at his home in New York City. He was born 82 years ago at Gibraltar, Spain, where his father was United States consul under President Polk. For years Mr. Sprague was a leading merchant in New York City.

Arthur Eastman Whitney of the Whitney Machine Co., Winchester, Mass., son of Joel Whitney, that company's founder, died at his home there recently, aged 70. He perfected many tannery machine improvements and took an active interest in Winchester's civic affairs. Among his three sons is Robert S. Whitney, president of the Whitney Machine Co.

Erastus B. Badger, born in Boston 90 years ago, died recently at his home on Beacon street in that city. Eight years ago he retired from active business as president of the present E. B. Badger & Sons Co., which he founded and which is now one of the largest chemical engineering and chemical apparatus manufacturing concerns in the country. Prior to that he was a partner in the business of Rice & Jenkins, coppersmiths, to which he was apprenticed by his father in 1844. Two sons serve as president and treasurer of the E. B. Badger & Sons Co., Daniel B. and Arthur C. Badger respectively.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ANDREW D., or Don Armitage, as he is well known to the iron and steel trade, was elected president of the Whitman & Barnes Mfg. Co., Akron, O., manufacturers of twist drills, reamers and other tools, at the recent annual meeting. He succeeds A. B. Rinehart, who disposed of his holdings and retired. Mr. Armitage began his affiliation with the company in 1892 as a mechanic at the Akron plant and in 1900 was made purchasing agent. Two years later, he was transferred to the Chicago plant, and became superintendent there in 1904. Subsequently he became general manager of the Akron, Chicago and St. Catharines, Ont., plants, and Canadian sales manager. He held these positions for seven years and then was elected vice president and manager of the Chicago and Canadian factories. He filled these posts from 1915 until his elevation to the presidency. Mr. Rinehart's place on the board of directors has been assigned to F. A. Seiberling. William H. Eager, former treasurer, who takes the vacant vice presidency, is succeeded by E. A. Fisher, who has been assistant treasurer. C. H. Tuttle was made assistant secretary, W. E. Rowell being re-elected secretary. A. B. Hall remains vice president, while C. E. Sheldon, who has been with the company 50 years, continues as chairman of the board.

J. F. Corlett, of J. F. Corlett & Co., Cleveland, is spending the month of February at Windermere, Fla.

John L. Orrell, formerly superintendent of the Union Foundry & Machine Co., Pittsburgh, is now affiliated with the Kirk Supply Co., Pittsburgh.

David P. Ballard, formerly with the purchasing department of the Wellman-Seaver-Morgan Co., Cleveland, is now associated with the National Acme Mfg. Co., Cleveland.

Charles B. Pearson, formerly with the Dail Steel Products Co., Lansing, Mich., has accepted the position of factory manager of the Steel Furniture Co., Grand Rapids, Mich.

Guy E. Tripp, who, as recently announced, was appointed chief of the production division of the ordnance department to supervise and stimulate the production of all ordnance supplies, has received a colonel's commission.

Thomas Hackley has accepted a position with the Gorham Mfg. Co., Providence, R. I., as chief electrician. He formerly was electrician for the Fall River Iron Works Co., Fall River, Mass.

James D. Frisbie, formerly manager of the St. Louis office of the Cohen-



ANDREW D. ARMITAGE

Schwartz Rail & Steel Co., has resigned and accepted a similar position with Hansman & Wimmer, scrap dealers, Pittsburgh.

John F. Guider was recently elected vice president of the Cadillac Motor Car Co., Detroit, in charge of manufacture. He was formerly factory superintendent of the Pierce-Arrow Motor Car Co.

David Spence has severed his connection with the Riverside Foundry Co., Kalamazoo, Mich., to accept a position as manager of the New England Foundry & Machine Co., Campello, Mass.

J. C. Ferver, who has been affiliated with the Youngstown Sheet & Tube Co., Youngstown, O., as assistant chief electrician, resigned Feb. 1, and is now chief electrician of the Submarine Boat Co., Newark, N. J.

C. L. O. Graul, who since December 1914, has been assistant to the superintendent of the coke oven plant of the By-products Coke Corp., Chicago, has been promoted to the staff of C. G. Tufts, general superintendent of the Semet-Solvay Co., Syracuse, N. Y.

N. C. Back is now affiliated with the sales force of the Cataract Refining & Mfg. Co., Buffalo, manufacturer of core oil, having resigned as foundry superintendent for Hart & Crouse, Utica, N. Y., manufacturer of heating apparatus.

M. J. Somers has been made foundry superintendent of the new Blanchester, O., plant of the Fulflo Pump Co., Cincinnati. He was formerly assistant superintendent of the American Seeding Machine Co.'s foundry at Springfield, O.

Evan F. Jones, treasurer and general manager of the Morgan Spring Co., Worcester, Mass., will sail from New York, Feb. 16, on the steamship BRAZOS, of the New York & Porto Rico Steamship Co., for a 16-days' cruise of the West Indian islands.

Frederick R. Harris, civil engineer, U. S. N., formerly general manager of the Emergency Fleet corporation, has been made public works officer of the Norfolk navy yard. He at one time was chief of the bureau of yards and docks of the navy department.

O. P. Palmer, Stratford, Conn., was recently appointed secretary and purchasing agent of the Artillery Fuse Co., Wilmington, Del. For more than 15 years he was affiliated with the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn.

P. J. Phillips, in charge of Spanish American sales for the steel department of the Federal Export Corp., New York, left recently on an extended trip through the West Indies, Central America, and northern South America in the interests of his firm.

T. K. Webster was chosen president of the Amalgamated Machinery Corp., at the annual meeting of the board. Other officers of the company include: Vice president, L. I. Yeomans; secretary, Walter A. Strong; treasurer, C. M. Moderwell.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JOHN J. SHANNON, who recently was made general manager of the Woodward Iron Co., Woodward, Ala., and who has been connected with various blast furnaces for 25 years, was among the first to start deep ore mining operations in the south. He was interested in such a proposition at Shannon, several miles below Birmingham, which was named after him, and later was sold to the Gulf States Steel Co. Mr. Shannon was born in England, and when still a young man, came to this country to locate in Lehigh, Pa. About 42 years ago he moved to the south, locating at Rising Fawn, Ga., and then for 14 years had charge of the Oxmoor furnaces of the Tennessee Coal, Iron & Railroad Co. Subsequently he became connected with the Alabama Steel & Wire Co., Gadsden, Ala., and later accepted a position with the Sloss-Sheffield Steel & Iron Co. After a period, he became affiliated with the Woodward Iron Co., and was appointed general superintendent of furnaces, which position he held until his recent promotion.

Elbert H. Gary, chairman of the United States Steel Corp., has left for a stay of several weeks at Miami, Fla.

A. O. Backert, editor of *The Foundry*, Cleveland, addressed the regular monthly meeting of the New England Foundryment's association, Boston, Feb. 13, on "Machine Molding".

C. W. Hodges has resigned as general material supervisor of the American Locomotive Co. to become general purchasing agent for the Worthington Pump & Machinery Corp., 115 Broadway, New York. The change became effective Feb. 1. Mr. Hodges succeeds I. C. Roger.

Paul Debevoise, of the Debevoise-Anderson Co., 56 Liberty street, New York, dealer in pig iron and coke, has received a commission as major of infantry and is stationed at Camp Dix, N. J. W. K. Callow, also of that company, has been granted a warrant as ordnance sergeant.

J. W. Beattie, chief clerk of the Inland works of the Republic Iron & Steel Co., East Chicago, Ind., for three years, has accepted a similar position with the Fulton Iron Works Co., St. Louis, Mo., manufacturer of Diesel oil engines, sugar cane mills, etc.

E. F. Jones, formerly sales manager of the G. H. Williams Co., Erie, Pa., manufacturer of grab buckets and conveying equipment, has been appointed to succeed C. C. Williams as president and general manager. Mr. Williams recently was killed in an automobile accident.

Frank Raiff has been elected a director of the American Smelting & Refining Co. and the American Smelters Securities Co., 120 Broadway, New York City, succeeding S. W. Eccles, deceased. Mr. Raiff is at present traffic manager of the American Smelting & Refining Co.

Robert P. Lamont, president of the American Steel Foundries, Chicago, has been commissioned a lieutenant colonel in the war department and has been appointed assistant chief in the procurement division of the ordnance department.

Edgar S. Fassett, formerly general manager of the United Traction Co., Albany, N. Y., has been elected secretary and director of Goldschmidt & Forbes, Inc., 90 West street, New York, dealers in all kinds of metals and metal products. He assumed his new duties Feb. 1.

George M. Kerr, Worcester, Mass., eastern sales engineer of the Oxweld Acetylene Co., Newark, N. J., has been commissioned a second lieutenant in the army and will have charge of oxyacetylene welding at the United States filing stations, with headquarters in Washington.

William S. Trask, for 16 years connected with the P. & F. Corbin division of the American Hardware Corp., New Britain, Conn., as superintendent of design and construction, has resigned. His plans for the future are uncertain. The employes presented him with a watch chain and charm set with diamonds.

John Skelton Williams, comptroller of the currency, has been made director of the division of finance and purchases of Director General McAdoo's permanent railroad staff. Frank McManamy, chief inspector of locomotives for the interstate commerce commission, has been made manager of the locomotive section.

Leo G. Smith, formerly general superintendent of the Prime Steel Co., Milwaukee, and later promoter of the Electric Steel Casting Co., Milwaukee, is now manufacturers' agent for a number of northwestern foundries. Among his clients is the Western Crucible Steel Castings Co., Minneapolis, Minn.

R. Z. Virgin, who has been superintendent of the mining department of the Wheeling Steel & Iron Co., Wheeling, Va., resigned recently to accept a position as instructor in the mining extension work in the West Virginia University at Morgantown, W. Va. He will travel through the state, giving lectures on mining and mine management.

G. F. Evans, formerly connected with the W. C. Moore Co., Columbus, O., has been appointed supervising engineer for the National X-Ray Reflector Co., Chicago. His territory will comprise the state of Ohio, except Toledo and Cincinnati, West Virginia and western Pennsylvania, and his headquarters are in the Columbus Savings & Trust building, Columbus, O.

Waldo H. Marshall, who formerly was president of the American Locomotive Co., New York, and more recently associated with J. P. Morgan & Co., on the staff of Edward R. Stettinius in the munitions department, was recently appointed assistant to Colonel Guy E. Tripp, head of the division of production of the ordnance department at Washington.

Major Weaver H. Rogers, president of Weaver H. Rogers & Co., First National bank, Pittsburgh, dealers in iron and steel, has been in the government's service for several months at Washington. He was assigned to that city as head of the iron and steel manufacturing facilities branch of the production section of the carriage division, Sixth and B streets N. W. Captain H. W. Reed, an engineer of Philadelphia, was affiliated with him in that division. Major Rogers was likewise delegated as a representative of the ordnance bureau, war department, on certain special matters.

Steel Exports in 1917 Set Record

Tremendous Tonnage in First Six Months of Year Makes Up For Falling Off in Second Half—Year's Total 6,443,161 Tons—December With Sharp Gain, Makes Surprising Showing

ALTHOUGH conditions during the greater part of 1917, and especially in the last six months, were exceedingly unfavorable to foreign commerce, the total tonnage of iron and steel products exported for the calendar year exceeded the 1916 shipments by 341,287 tons. The report of the bureau of foreign and domestic commerce shows that 6,443,161 tons of these products were shipped from the United States to other countries in the 12-month period ending Dec. 31, 1917, compared with a tonnage of 6,101,874 in the year 1916. This large total is due to the fact that shipments during the first six months of the year were at a record-breaking rate, in three of these months the tonnage having exceeded the 600,000 mark. Exports for the last half of the year fell off.

IRON ORE IMPORTS, GROSS TONS

	December,		Twelve months ending December,	
	1917	1916	1917	1916
Spain	2,510	17,952	152,713	161,422
Sweden	2,594	18,711	63,715	212,063
Canada	732	.....	178,785	136,835
Cuba	51,801	81,380	546,069	716,571
Oth. countries	526	.....	30,381	98,845
Total	58,163	118,043	971,663	1,325,736

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555

It is surprising to note the remarkable increase in foreign shipments during the month of December. Exports for that month amounted to 654,867 tons, compared with 580,988 tons in December, 1916, this being the first month since June to show an increase in tonnage over the 1916 figure. In November, 1917, the total of these shipments was only 473,549 tons, or 181,318 tons less than in December. The tonnage of billets, ingots and blooms reached a total of 204,555, which is almost equal to the record set in October, and 41,654 tons more than December a year ago, when exports amounted to 162,901 tons. For November, 1917, the tonnage was 150,120. Other products showing notable increases were steel bars and sheets and plates. Pig iron exports, which fell off so sharply in November, were again normal in December, with a total of 66,573 tons. This total is much below the December, 1916, figure of 105,195 tons, but is greater than the total for any month since June.

IRON AND STEEL EXPORTS, GROSS TONS

	December,		Twelve months ending December	
	1917	1916	1917	1916
Scrap	857	14,860	150,560	212,765
Pig iron	66,573	105,195	655,265	607,236
Steel billets, ingots and blooms	204,555	162,901	2,032,039	1,504,562
Wire rods	20,759	13,414	181,972	158,281
Steel rails	50,935	41,125	512,638	540,828
Steel bars	78,569	63,288	626,454	774,440
Iron bars	6,919	6,341	56,331	74,068
Struc. iron and steel	34,567	35,684	296,968	300,594
Hoops, bands and scroll.	7,343	3,038	58,876	44,001
Sh'ts & plates	84,882	50,190	831,719	515,549
Tin and terne plate	24,025	18,229	233,296	227,387
Barbed wire	14,907	15,821	192,395	418,874
All oth. wire	17,053	14,484	201,422	264,137
Cut nails	617	223	4,527	4,752
Wire nails	16,829	11,012	114,911	150,170
All oth. nails incl. tacks	2,099	1,303	21,001	12,353
Pipes & fit'gs.	16,538	19,921	205,640	228,569
R. R. spikes	1,286	1,391	21,190	23,852
Bolts, nuts, rivets and washers	4,365	2,226	32,264	29,226
Horseshoes	759	145	8,492	7,806
Cast radiators	430	197	5,201	2,424
Total	654,867	580,988	6,443,161	6,101,874

In valuation, iron and steel exports for the calendar year show an increase of $372,476,353, compared with the 1916 total. In the 12 months of 1917, $1,243,803 worth of iron and steel products were shipped from this country, and in 1916, these shipments amounted to $871,327,322. For the month of December, 1917, this valuation was $119,635,609, compared with $97,970,114 in November, 1917, and $88,876,120 in December, 1916.

Imports of iron ore for the year 1917 were 971,663 tons, compared with 1,325,736 tons in 1916, a decrease of 354,073 tons. In 1915, 1,341,281 tons were imported.

IRON AND STEEL IMPORTS, GROSS TONS

	December,		Twelve months ending Dec.,	
	1917	1916	1917	1916
Scrap	3,428	31,424	180,034	116,039
Pig iron	5,143	8,176	76,786	135,349
Steel ingots, blooms and billets	2,446	2,556	44,197	26,141
Wire rods	332	653	1,060	4,130
Rails	1,428	522	9,263	26,299
Bar iron	1	277	2,240	7,701
Structural	777	261	6,215	1,473
Sheets & plates	214	235	1,748	1,730
Tin and terne plate	.....	34	124	1,008
Total	13,769	44,138	321,667	319,870

A comparison of shipments of iron and steel products into the United States for the years 1917 and 1916 shows very little change. Imports for 1917 amounted to 321,667 tons, a gain of 1797 tons, compared with the 1916 total of 319,870 tons. For the last three months of 1917, the tonnage of imports was very small, the figures being 13,769 tons, 13,995 tons and 14,225 tons, for December, November and October, respectively.

IMPORTS AND EXPORTS, GROSS TONS.

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,949
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,385	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,219
December	44,134	580,988
1917		
January	40,192	608,105
February	24,379	449,099
March	37,280	606,559
April	48,213	519,397
May	26,013	588,514
June	28,419	614,600
July	28,859	357,776
August	22,635	519,518
September	20,196	482,311
October	14,225	557,138
November	13,995	473,549
December	13,769	654,867

May Exempt Steel From Embargoes

Plans Being Worked Out to Grant Preferential Transportation to Mill and Furnace Products and Materials—McAdoo to Pass on Proposal to Keep Industry Clear of Recent Stagnating Conditions

WASHINGTON, Feb. 12.—Increased steel production awaits the action of Director General McAdoo. Plans worked out and submitted by steel traffic officials and passed on by various government transportation experts are in his hands. Acceptance of the plans, which include the exemption of all iron and steel raw and finished products from general railroad embargoes, is regarded as an essential move if the nation's steel war needs are to be met. The plans go farther than that, however, and include placing the steel freight in a preferential class.

The railroad administration, going further than its provisions in ordering food, fuel and war essentials exempt from the general embargo on the Pennsylvania, the Philadelphia & Reading and the Baltimore & Ohio railroads and the individual embargoes on other lines, last week ordered preferential handling of all shipments of grain, flour, cornmeal and other cereal products. The car service committee of the interstate commerce commission is working up a more comprehensive list and steel men insist their products must be included if war steel is to be manufactured.

Thousands of Tons Tied Up

The seriousness of the traffic problem, as affecting the steel mills, developed when the shipping board delved into the question with a view to moving plates consigned to the various steel shipyards throughout the country. The investigation disclosed thousands of tons of steel piled up along mill tracks and in warehouses awaiting shipment. Cars were not spotted to keep pace with the output of the mills and as a result the yards were falling behind in meeting their schedules.

In the meantime, the steel traffic men, acting under A. G. Young, chairman of the American Iron and Steel institute's subcommittee on traffic conditions, pointed out to the government that the stagnated condition of the industry was due to the lack of cars to haul raw materials to the mills and to take away the finished products. Mr. Young was in Washington the latter part of last week and took up the question with the traffic division of the railroad director's staff. The matter then was submitted to Mr. McAdoo.

It has been pointed out that whatever action the director may take, it must be broad enough to not hamper the mills either through receipt of coal, coke, ores, etc., or in the delivery of any product consigned to the government or to seaboard for export. In the case of plates for the shipping board, the board's traffic department obtained special authority to move several train loads of ship steel. Near the close of the week the shipping board declared nearly 9000 cars of steel and wood consigned to its yards were tied up somewhere in the traffic jam.

Improved Weather Helps

With the weather clearing, sufficient coal for industrial needs is expected to be obtained through reduction in domestic consumption and in the ability of the railroad to make better progress in deliveries. This weather factor is also expected to assist in delivery of other freight, which has likewise been held up.

To study traffic conditions as they exist, Mr. McAdoo has appointed a special committee composed of B. L. Winchell, traffic director of the Union Pacific; G. F. Randolph, commissioner of the trunk lines, and T. C. Powell, vice president of the Southern railway. This staff, which will consider the traffic problem as a whole, will have the assistance of the regularly established traffic department of the administration which has been subdivided to meet the needs of the various government departments. Edward Chambers, vice president of the Santa Fe, has been permanently retained a traffic director. He will be assisted directly by C. B. Buxton, Philadelphia, and Dallas, Tex.; Robert C. Wright, Philadelphia, traffic manager of the Pennsylvania, for freight; Gerrit Fort, passenger traffic manager of the Union Pacific, for passenger; and G. A. Kirtley, New York, assistant to Vice President Stone, of the Erie, for priorities.

J. F. Holden, Kansas City, vice president of the Kansas City Southern, is handling shipping board traffic. H. M. Adams, St. Louis, vice president of the Missouri Pacific, represents the war department. H. P. Anewalt, Los Angeles, traffic manager of the Santa Fe's coast lines, has been assigned to the navy. J. A. Middleton, Kansas City, traffic manager of the Frisco lines, will deal with fuel administration traffic problems, and the food administration will be represented by Mr. Chambers.

Trade Board Watches Imports Carefully

WASHINGTON, Feb. 12.—Thorough application of the provisions in the trading-with-the-enemy and the espionage acts applying to imports of the United States is being made by the import bureau of the war trade board. In October the President assumed the power given him over imports and delegated it to the war trade board. As strict observance of the possibility of an enemy or an ally of an enemy benefiting through the importation of any commodity into this country either for use or for re-export is made by the board through its bureau as is maintained by the export bureau on any consignment destined for points beyond the borders of the United States.

The general information sought by the bureau of imports on applications for import license—applications must be made in duplicate—is similar to that required for export, names, addresses, kind, size, weight, etc., of commodity, etc. In addition, however, the importer, or the applicant for license, must give the country in which the goods were bought, the name of the port from which they will be shipped, the port of entry in the United States, whether export license has been obtained from the country of shipment, whether the commodity is to be used for the applicant's own manufacturing use

or to be held in stock or for the account of some one else, his name, the quantity of the same goods on hand, whether the applicant was importing the same kind of goods prior to the outbreak of the war in Europe and how long business relations have been maintained with the consignors and producers named.

Information must also be given as to whether a general license has been obtained to trade with an enemy, if any person in the transaction is an enemy or an enemy ally, the exact nature of the connection of the person with the transaction and the full method of proposed payment with names of banks and agencies. Application for import license must be made on form WTB8, white for the original and pink for the duplicate.

The application for license to trade with an enemy, to cover imports, must describe fully the transaction, giving, in general, the same information as required on the application for an import license. If a license expires before importation is made, new application must be made and the old license returned. Documents to be presented as exhibits must accompany the original application, in each case.

Since promulgation of the new regulations covering exports, the war trade board has announced that all licenses issued on or after Jan. 22, 1918, shall be good for periods of 90 days only and no extension will be granted. This is to enable manufacturers who contract for future delivery better to meet their obligations and to relieve congestion at ports which in the past was caused, to an extent, by expiration of the 60-day licenses. Extensions will be given, however, in the case of licenses granted on or before Jan. 21.

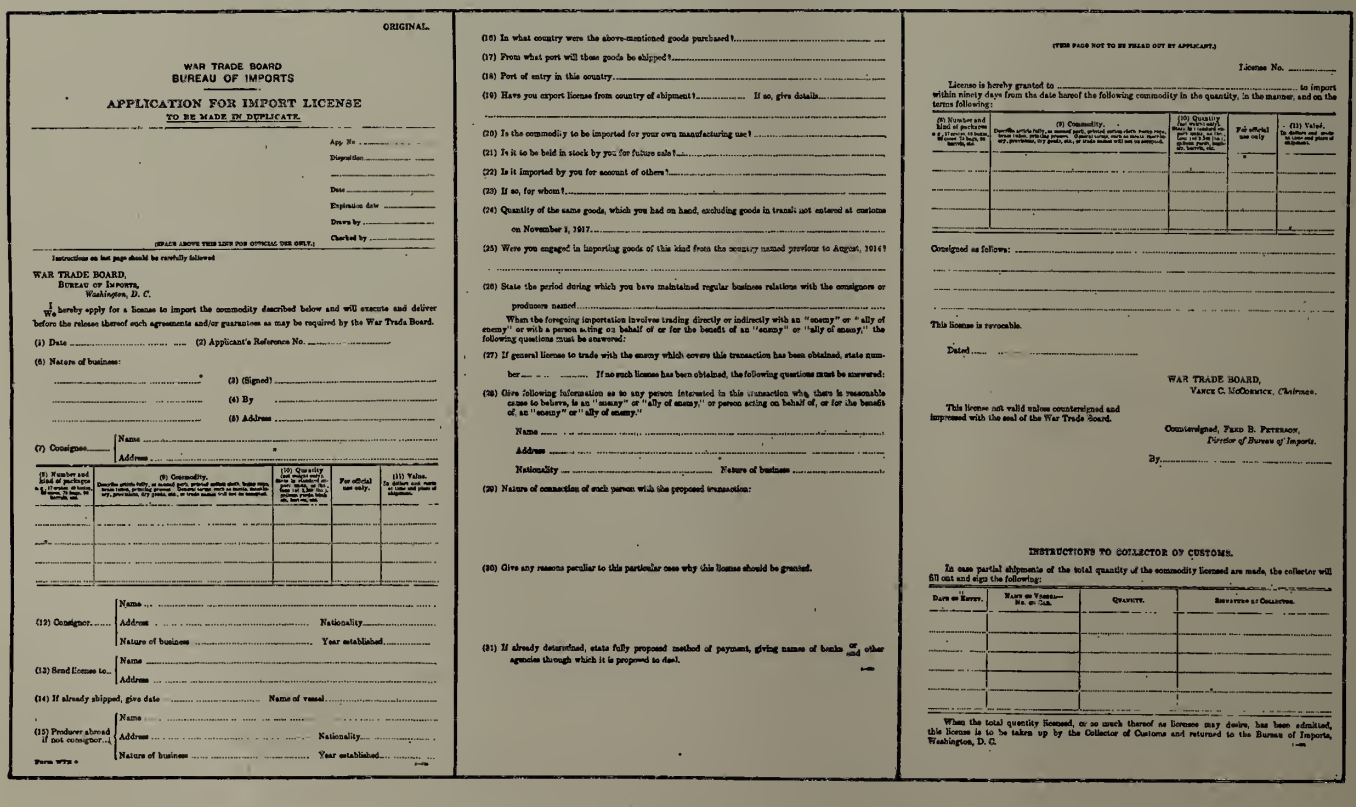
While no extension will be made of 90-day licenses, if the exporter finds the time will expire before delivery to seaboard, he has the privilege of applying for a new license within that time. In special cases license will be granted for longer periods than 90 days and in extreme instances the time limit will be placed at six months. In these cases, too, no extension of time will be allowed. New licenses will have to be sought.

Steel Bids to Navy Stir Up Argument

WASHINGTON, Feb. 12.—Demoralization of the iron and steel industry will follow adoption by the navy department of the policy of buying through competitive bidding, its requirements of steel on which the President has not actually fixed the price originally. This is an argument advanced in support of the war industries board's stand against a competitive test made by the bureau of supplies and accounts.

The war industries board argues, evidently with the expectation of continuing its steel distribution system, that if any other plan is employed by government agencies, mills having received allocated orders through the division of steel supply, will be jammed. Other customers of mills, such as the war department, the shipping board or some firm engaged in war work, would not stand for having production of their own requirements curtailed. This argument of the war industries board is looked upon in some quarters as disregarding its priorities committee. This committee is operating to prevent just what the board fears will happen if the navy's policy becomes general, or is continued by the navy itself. In the event the board insists on maintaining its steel supply division and other branches of the government should adopt the navy's plan, Steel Director Replogle's office would become practically one of statistics where records of the mills would be kept.

The impression is felt in some



ORIGINAL.

WAR TRADE BOARD
BUREAU OF IMPORTS

APPLICATION FOR IMPORT LICENSE
TO BE MADE IN DUPLICATE.

App. No. .....
Disposition .....
Date .....
Expiration date .....
Drawn by .....
Checked by .....
(SPACE ABOVE THIS LINE FOR OFFICIAL USE ONLY.)

Instructions on last page should be carefully followed

WAR TRADE BOARD,
BUREAU OF IMPORTS,
Washington, D. C.

I/We hereby apply for a license to import the commodity described below and will execute and deliver before the release thereof such agreements and/or guarantees as may be required by the War Trade Board.

(1) Date ..... (2) Applicant's Reference No. .....

(3) (Signed) .....

(4) By .....

(5) Address .....

(6) Nature of business: .....

(7) Consignee..... Name ..... Address .....

(8) Number and kind of packages	(9) Commodity. Describe articles fully, as manufactured, gross, printed cotton cloth, bales cops, bales cotton, principal strand, hosiery, woven, such as books, wood-ley, pure linen, dry goods, etc., or trade names will not be accepted.	(10) Quantity (Net weight unless otherwise specified. Give in U.S. gallons for liquids, number of yards, bales, etc., for others)	For official use only.	(11) Value. In dollars and cents as near as possible.

(12) Consignor..... Name ..... Address ..... Nationality..... Nature of business ..... Year established.....

(13) Send license to... Name ..... Address .....

(14) If already shipped, give date ..... Name of vessel.....

(15) Producer abroad if not consignor...(Name ..... Address ..... Nationality..... Nature of business ..... Year established.....

Form WTB 8

(16) In what country were the above-mentioned goods purchased?.....

(17) From what port will these goods be shipped?.....

(18) Port of entry in this country.....

(19) Have you export license from country of shipment?..... If so, give details.....

(20) Is the commodity to be imported for your own manufacturing use?.....

(21) Is it to be held in stock by you for future sale?.....

(22) Is it imported by you for account of others?.....

(23) If so, for whom?.....

(24) Quantity of the same goods, which you had on hand, excluding goods in transit not entered at customs on November 1, 1917.....

(25) Were you engaged in importing goods of this kind from the country named previous to August, 1914?

(26) State the period during which you have maintained regular business relations with the consignors or producers named.....

When the foregoing importation involves trading directly or indirectly with an "enemy" or "ally of enemy" or with a person acting on behalf of or for the benefit of an "enemy" or "ally of enemy," the following questions must be answered:

(27) If general license to trade with the enemy which covers this transaction has been obtained, state number..... If no such license has been obtained, the following questions must be answered:

(28) Give following information as to any person interested in this transaction who there is reasonable cause to believe, is an "enemy" or "ally of enemy," or person acting on behalf of, or for the benefit of, an "enemy" or "ally of enemy."

Name .....
Address .....
Nationality ..... Nature of business .....

(29) Nature of connection of such person with the proposed transaction:

(30) Give any reasons peculiar to this particular case why this license should be granted.

(31) If already determined, state fully proposed method of payment, giving names of banks or and other agencies through which it is proposed to deal.

(THIS PAGE NOT TO BE FILLED OUT BY APPLICANT.)

License No. .....

License is hereby granted to ..... to import within ninety days from the date hereof the following commodity in the quantity, in the manner, and on the terms following:

(8) Number and kind of packages	(9) Commodity.	(10) Quantity	For official use only	(11) Value.

Consigned as follows: .....

This license is revocable.

Dated..... .....

WAR TRADE BOARD,
VANCE C. McCORMICK, Chairman.

This license not valid unless countersigned and impressed with the seal of the War Trade Board.

Countersigned, FRED B. PETERSON,
Director of Bureau of Imports.

By.....

INSTRUCTIONS TO COLLECTOR OF CUSTOMS.

In case partial shipments of the total quantity of the commodity licensed are made, the collector will fill out and sign the following:

Date of Entry.	Name of Vessel—No. of Cab.	Quantity.	Signature of Collector.

When the total quantity licensed, or so much thereof as licensee may desire, has been admitted, this license is to be taken up by the Collector of Customs and returned to the Bureau of Imports, Washington, D. C.

FORM FOR IMPORT LICENSE APPLICATION

quarters that certain interests, both in the government and in the steel industry itself, have witnessed the navy's independent action with some degree of satisfaction. In fact there is a belief that the overthrow of the present system would be welcomed by these interests. This belief arises from the general knowledge that certain government departments, and even various iron and steel producers, are not satisfied with the present policy. It is pointed out this is not necessarily due to the management of the system but chiefly to the system itself.

The navy's action is with the avowed purpose of forcing the war industries board to accept the prices recommended on steel products by the industry or to formulate a set of prices on which it will get the President's approval. In that event the navy will accept those prices as final. Under present conditions it feels it can do better in many instances. On an order of 404,000 pounds of rivets in the recent bidding test the accepted total figure was more than $600 under the recommended price.

While the fixed price question is being threshed out by the navy and the war industries board, the federal trade commission is going ahead in compiling data as to steel costs for comparison with that submitted shortly before the first of the year. This is preparatory to whatever action may be taken in the revision scheduled for April 1. Nothing further has been heard from the Pomerene bill although at last reports it is still the intention of its author to have the bill acted upon shortly.

Oil Well Supply Makers to Weigh War Needs

Washington, Feb. 12.—Oil Director Requa of the fuel administration has called a meeting of oil well supply men in Washington March 4. This conference follows an informal one here last week at which it was decided full representation should be given the industry in order to intelligently discuss the needs of the supply companies. Steel makers, particularly pipe manufacturers, will be interested in this conference and it is expected several will attend. In addition to discussing the home needs of the oil producers it is quite probable consideration will be given oil well supply needs in other countries, particularly in Mexico. It is likely representatives of the war trade board's export bureau will attend. Among the points also to be discussed possibly will be some of the requirements as regards tank cars and tank ships. Figures are not available for the number of tank cars now under construction, but it was revealed in the senate shipping board inquiry that 60 tank steamers are being built or are under contract.

More Chrome Needed

Washington, Feb. 12.—Further discovery and exploitation in the abandoned chromite field in the southern part of Lancaster and Chester counties, Pennsylvania, and the northern part of Cecil county, Maryland, is urged by the geological survey. The demand for chrome steel in making high-speed tools, projectile and armor plate affords ample market for the production of any new chrome mines, it is urged, especially in view of the fact domestic production in 1917 aggregated only 40,000 tons and importation of the ore reached only 103,000 tons, for a total supply of 143,000 tons, less than in 1916 by nearly 20,000 tons. Domestic production in 1916 was 47,000 odd tons and by importing 115,945 tons more were available. Domestic ores now are obtained chiefly along the Pacific coast and foreign ores in South Africa and New Caledonia. The survey says many of the old mines in Pennsylvania and Maryland, abandoned in 1882, offer excellent opportunity for increased home production of chrome.

Capital Odds and Ends

Japanese capitalists are reported to be planning the reopening of a number of Mexican mines which have been idle for a long time. Advantageous terms are being offered.

Metal buttons of American manufacture are in heavy demand for export. Button exports in the fiscal year of 1917 increased in value to $1,982,104 from $1,902,556 in 1916 and $654,372 in 1914.

The labor department is planning national registration of women available for work on farms as one of the steps in a campaign to secure sufficient farm labor for the coming season.

The navy is urgently in need of binoculars, spy glasses, telescopes, sextants and chronometers. Owners are requested to send them to the department. An earlier call brought more than 6000 glasses, but more are needed.

On pig iron, the Chicago, Milwaukee & St. Paul railroad asks for an increase to $1.05 per ton in carload rates from Rockford, Rockton, Stillman Valley, Byron, Freeport and Mandota, Ill.; Beloit, Janesville, Watertown, Monroe, Monticello, Madison and Stoughton, Wis., to Chicago and all points taking the same rate.

On carbonic gas in steel tubes, the New York Central railroad asks for a cancellation of the carload rates from Albany, N. Y., to Montreal, Can.

On iron pyrites, chrome ore in bulk and manganese ore, eastern carriers ask for an increase to $4.25 per gross ton in the import rate from New York to Chicago. Authority also is sought to increase import rates to the domestic basis from north Atlantic ports to central freight association territory.

On journal boxes in carloads, an increase from 18.9 cents to 21.5 cents per 100 pounds is asked by the Delaware, Lackawanna & Western railroad on shipments from Lancaster, N. Y., to Hammond, Ind., and Hegeswich, Ill., by way of the Erie railroad to align with rates in competing routes.

On coke from Alabama ovens to Carondolet, Crystal City, St. Louis and other Missouri points and to Collinsville and East St. Louis, Ill., the St. Louis & San Francisco railroad applies for an increase to $3.40 per ton.

The American Institute of Banking's decision to help secure quick attention on drafts attached to bills of lading on food commodities also is expected to help clear the railroad freight congestion.

Settlement of a labor dispute at a plant of the American Locomotive Co. where 5000 employes were out, and of a strike of 60 employes of the Crown Pipe & Foundry Co. at Jackson, O., has been announced by the labor department.

A high power radio station, costing $2,250,000, is being erected in France by the American navy to be used in communicating with the station nearing completion at Annapolis. It will be taken over by France after the war.

Motor truck manufacturing centers in Ohio, Michigan, Illinois, Indiana and Wisconsin are to be connected with two additional main highways to the Atlantic coast to be established by the army transport service. Two such routes, one from Detroit, the other from Buffalo, are already in use.

Amendments by the war trade board to its rules regulating the licenses for bunkering fuel and ship's stores apply to any vessel of American registry not requisitioned by the shipping board as well as to neutrals.

The Merchants & Miners Transportation Co. seeks an increase to 8 cents per 100 pounds on machinery and 5 cents on other traffic in the transfer charge on less-than-carload freight between its pier and other piers at Norfolk.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Financial Sentiment Turning Cheerful

IT used to be the farmer who worried and fretted about the weather, but now the stock broker, the banker and the manufacturer are as keenly interested in the vagaries of the elements as ever a farmer was. The improvement in the weather, not only from a psychological standpoint but from its effect upon the movement of coal and freight helped cheer the spirit of long pessimistic Wall street last week. The workless Monday order unquestionably has helped substantially the railroad situation. It is the railroad situation, and its sister calamity, scarcity of fuel, which have been the outstanding economic phenomena in this country the past few months. There have been other developments contributing to better feeling in financial circles. It is believed the date of the next war loan has been postponed considerably by the adoption of short term government financing by the banks until such borrowings reach $3,000,000,000. But most important of all have been the indications that the government's borrowing for this season will be smaller than the original estimates. Whereas the original budget for the fiscal year 1918 was $21,000,000,000, the estimates later were scaled down to $18,000,000,000 and now it is difficult to see how the sum total for the fiscal year can run as high as $15,000,000,000, in view of recent monthly disbursements. As the government financing has a direct effect upon stock market operations and upon the general business situation as well, these more optimistic inferences are receiving a warm welcome.

May Extend Income Filing

Owing to the delay in distributing individual income tax blanks for incomes in excess of $3000, excess profits and corporation forms, in addition to other forms on which returns must be made, internal revenue officers are convinced that the treasury department will have to extend the time for filing returns beyond Feb. 28, the date originally set for making all final returns. Various collectors have written Commissioner of Internal Revenue Roper suggesting a general extension of time, because of the situation which is developing. However, no ruling as yet is forthcoming. Collectors may in their discretion grant extensions not to exceed 30 days, providing written application is made, but a general extension would eliminate this necessity, although many taxpayers already have applied for such extensions. However, such action would not necessitate a change in the date on which the tax payment is due, June 15. The blanks known as 1040A, covering incomes under $3000, have been sent out in numbers. But there have been distributed few of the blanks known as 1040, covering individual incomes in excess of $3000. Similarly, form 1099, calling for returns from employers and others making payments in 1917 exceeding $800 has been distributed to a very limited degree. In addition, the excess profit and corporation tax blanks are yet to be sent out.

Bethlehem Explains How Surplus Was Acquired

In order to assist its stockholders to establish the amount of their income taxes resulting from dividends paid in recent years, the Bethlehem Steel Corp. has issued a letter explaining these disbursements. Particular reference is made to the 200 per cent stock dividend distributed Feb. 17, 1917. The letter says:

"Some doubt having been raised as to the application of the recent decision of the United States Supreme Court in the case of Towne vs. Eisner to stock dividends declared in 1917, we give the following information: In regard to the stock dividend: The basis of the dividend was a surplus of $30,863,638. The books of the corporation show that its surplus (as distinguished from the consolidated surplus of the corporation and its subsidiaries), on Jan. 1, 1913, was $8,517,953; on Dec. 31, 1913, $12,195,964; on Dec. 31, 1914, $12,814,390, and on Dec. 31, 1915, $12,807,256.

"In determining the surplus at the end of each year, all dividends declared and paid during the year and the dividend that was payable Jan. 2 in the following year were deducted. Of the remainder of the surplus on which the stock dividend was based $56,382 was the amount by which the income received by the corporation in 1916 exceeded expenses and dividends paid or accrued during that year, and $18,000,000 represents an increase on the books of the corporation, as directed by the board of directors, in the value at which the corporation carried the stock of the Bethlehem Steel Co. owned by it.

"The resolution which directed this increase in value on the books of the corporation did not specify when the accumulated earnings or surpluses that undoubtedly were the basis of this increase were accumulated. The books of the Bethlehem company, however, show the following:

Surplus on Dec. 31, 1914, (all added during year end. that date)..	$5,524,203
Added to surplus in 1915, after deducting dividends paid.....	13,102,209
Added to surplus in 1916, after deducting dividends paid.....	35,848,860
Surplus on Dec. 31, 1916.....	$54,475,272

"Of the surplus thus accumulated by the Bethlehem Steel Co., only $2,734,645, which was part of the surplus added in 1914, has been taken upon the books of the Bethlehem Steel Corp. prior to Jan. 23, 1917, in showing the value on such books of the stock of the Bethlehem Steel Co. The resolution adopted by the board of directors in declaring the stock dividend states 'that said dividend as to $8,517,953 is declared out of the accumulated surplus of the corporation on Jan. 1, 1913'."

Midvale's Profits Greater After Excess Provision

Net profits of the Midvale Steel & Ordnance Co. for 1917, before allowing for federal taxes and depreciation, amounted to $71,264,560, or more than double the return in the preceding year, according to the preliminary statement issued last week. The report showed that the management set aside $27,360,270 for the excess profits and war income taxes and then had a balance of $40,650,542, a total $5,630,000 larger than the year before. The reserve for depreciation was $6,415,039, against $3,560,277 in 1916, leaving $34,235,503 available for dividends and the surplus account, an in-

crease of $2,000,000 over 1916 results. The dividend balance was equal to $17.12 for each share of stock, compared with $16.11 the previous year. The Midvale report was particularly interesting in one respect, in which it differed from the other steel companies which have made reports for 1917. This was in its income for the final quarter, which was larger than in any of the preceding quarters. This increase was due partly to the fact that the company reserved a smaller amount for federal taxes than in the previous quarters. The earnings of the year, with deductions, compare as follows:

	1st half	2nd half
Net earnings	$34,825,875	$36,438,687
Federal tax	14,521,618	13,038,652
Interest charges	1,630,977	1,622,771
Depreciation	3,559,097	2,855,942
Net profit	15,314,181	18,921,322

The report states that the figures presented are subject to change in accordance with possible rulings of the treasury department, which may affect excess profits and income taxes.

Hydraulic's Sales Heavy

In the 12 months ended Dec. 31, 1917, the Hydraulic Pressed Steel Co., Cleveland, sold $15,500,000 worth of its products, on which the net earnings amounted to approximately $2,810,000. After reserving $800,000 for estimated income and excess profits taxes, the balance available for interest and dividends, amounted to $2,010,000. Interest and preferred dividends deducted, left a balance which was equivalent to 3½ per cent on the $4,900,000 common stock outstanding as of Dec. 31, which percentage was considerably larger than for the previous year. Unfilled orders on the books at the close of the year totaled approximately $11,000,000.

National Radiator Expands

The Federal Radiator Co., New Castle, Pa., has been purchased by the National Radiator Co., Johnstown, Pa., and Trenton, N. J., and has been merged under the latter title. Branch offices will be maintained in Boston, New York, Philadelphia, Baltimore, Washington, D. C.; Richmond, Va.; Pittsburgh, Cleveland and Cincinnati, with main office at Johnstown. Boilers will be manufactured at the New Castle plant, while hot-water and steam-type cast iron radiators will be produced at Trenton and Johnstown.

This corporation had for its foundation the Fowler Radiator & Mfg. Co., which commenced business in 1894 at Norristown, Pa., in a small leased foundry, with an authorized capital stock of $100,000. In 1902 the name was changed to the National Radiator Co., and in 1911 a plant twice the size of the Johnstown one was built at Trenton, N. J. Officers of the company are: John H. Waters, president; S. B. Waters, vice president and treasurer; G. C. Blackmore, vice president and superintendent of manufacturing; R. E. Warden, general manager of sales; Charles L. Crouse, credit manager, and C. E. Resley, auditor.

Trade Balance Rising

Exceeded only by January's record total of merchandise exports of $613,324,582, which is the largest month in six years, the figures for December, 1917, just announced, are $588,874,958. This brings the year's total to $6,226,255,654, as compared with $5,482,641,101 for 1916. Merchandise imports show a corresponding annual increase. Imports for December, 1917, totaled $227,909,497, compared with $306,622,939 for June, $280,727,164 for May, $270,257,139 for March, and $267,854,767 for August. These last four are the largest months in the 4-year period. The total for 1917 of $2,952,465,955 is the largest in six years. Excess of exports over imports continues to mount. For 1917 it was $3,273,789,699 against $3,091,005,766 in 1916, and $1,776,074,152 in 1915. Since Aug. 1, 1914, $1,637,792,828 worth of explosives and firearms have been exported.

Steel Foundries Doubles Earnings in 1917

Operating earnings of the American Steel Foundries of $4,842,237 for 1916 were almost doubled in 1917, the total, Dec. 31, 1917, being $8,718,296. Reservation of $2,287,600 was made for income and excess profits taxes. The net surplus for 1917, $5,531,839, was equivalent to $32.13 a share on capital stock of $17,184,000, as compared with $19.64 a share in 1916 with a surplus of $3,374,975. The comparative statement of the company for the past three years is as follows:

	1917	1916	1915
Oper. earn.	$8,718,296	$4,842,237	$517,325
Deprec.	917,646	739,414	204,083
Balance	7,800,650	4,102,823	313,242
Oth. income	238,024	122,987	189,523
Total income	8,038,674	4,225,810	502,765
‡Reserve	.....	344,000	250,139
Int. chgs.	219,235	†506,835	†472,200
War taxes	2,287,600	.....	.....
Surplus	5,531,839	3,374,975	*219,574

†Includes sinking fund.
‡For retirement of debentures.
*Deficit.

At an annual meeting of stockholders of the Chicago Railway Equipment Co., Chicago, an increase in the capital stock from $2,500,000 to $3,000,000 was authorized. This increase will be distributed to stockholders.

Reduced Output

Of Coke By-Products Caused by Shortage of Coal

New York, Feb. 9.—Decreased production, due to the shortage of coal, continues to be the dominating factor in the coal tar products market. Contracts previously entered into are taking up so much of the output that stocks available for spot shipment are shrinking. This is particularly true of phenol. Most of the producers some time ago closed contracts for about all they expected to turn out for months ahead. Curtailed operations at by-product plants have made it impossible to make as much phenol as contracts call for. As a result, only a few spot lots are being sold mainly by second hands. These are bringing around 53 to 55 cents per pound. Decreased output also is exerting an influence on the toluol market. Owing to the large requirements of the government as well as the large quantities called for by old contracts closed before the commandeering order of the government no toluol can be spared. Demand upon the government for releases of toluol for commercial purposes is large.

In benzol a good-sized business continues. Producing capacity now is so large that despite the curtailment due to coal shortage, there is enough to take care of contract commitments and to supply spot requirements. Benzol continues at 35 to 40 cents per gallon. Although sales of solvent naphtha are small, this product is strong at 18 to 22 cents per gallon, both for spot and contract. Business in sulphate of ammonia is at a low ebb, due to lack of supplies. Only occasional sales of spot are reported, these going around $5.10 to $5.25 per 100 pounds at tidewater.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant
Pure benzol ..... $0.35 to .40
Toluol (nominal) ..... 1.70 to 1.80
Solvent naphtha ..... .18 to .22

Per Pound at Producers Plant
Phenol ..... $0.53 to .55

Per 100 Pounds at Seaboard
Sulhate of ammonia (nominal) ..... $5.10 to 5.35

Contract

Per Gallon at Producers Plant
Pure benzol ..... $0.35 to .40
Toluol ..... nominal
Solvent naphtha ..... .18 to .22

Per Pound at Producers Plant
Phenol nominal.

Per 100 Pounds at Seaboard
Sulphate of ammonia ..... nominal

Traffic Problems Perplex Trade

Car Shortage and Slow Freight Transit Cause Financial Losses to Dealers—Government Commandeering Complicates Matters—Establishment of Second Ordnance Base Depot Rumored—Ordnance Companies Buy Tools

TRANSPORTATION difficulties as affecting the machine tool industry have become distressing in the east, where the car shortage is interfering with the shipment of tools for essential war work. The slow transit of freight, with the consequent inability of dealers to make prompt deliveries, is resulting in financial loss to the latter. Government commandeering without notification to the original purchaser has been conducive to further complications to dealers and to purchasers. In the Chicago district the tenseness of the traffic situation gradually is subsiding; embargoes are being relieved in some degree, and tracers are endeavoring to straighten out the tangle of freight in railroad yards there. A definite announcement has been made by the fuel administrator permitting the industries to resume work on Mondays. Fuel has been a source of much trouble in New England, and builders in that district, in some cases, are using wood in order to keep their plants operating.

Rumors relative to the establishment of a second ordnance base depot—a duplicate of that now being built in France—persists in the New York market. A Boston interest has issued a list of machines which would be required in the event that another plant of this kind is built. Several companies in the central west which have large ordnance orders have been active in buying equipment of late. So urgent is the need that their inquiries specify either new or used tools, in many cases.

Scattered inquiries prevail in the crane market. Several lists have been issued by shipyards, but these, generally, have been of small size. Shipyards are also active in securing punching and shearing machinery. Builders of coal-handling machinery report that a number of inquiries for this type of equipment are current.

Nation Now Concentrates on Production

TRAFFIC troubles have been the source of considerable difficulty to the machine tool trade. Lack of cars frequently has held up shipments of tools urgently needed for government work. In some cases shipments have been in transit from builders' plants for more than 60 days and still are due to arrive. Instances are noted occasionally where such shipments are found to have been taken and installed by some arsenal or other government plant while the buyer and seller have remained in ignorance until informed by the tracer. Dealers representing manufacturers have found the situation particularly perplexing. Necessarily doing business on a narrow margin of profit, they discount their bills, or in any event avail themselves of very short terms. They buy the machines f.o.b. shipping point, and from the time the machines are boxed until they are delivered, the dealer is compelled to carry the goods on his own capital. This means a substantial shaving down of his profit where the shipments are long delayed. The fuel situation continues troublesome among New England builders. In some cases they are still using wood in lieu of coal and production has been seriously affected in some instances.

Gossip continues to be heard in the trade concerning the construction of a second ordnance base depot to duplicate the base now being built in France. According to these rumors, a decision has not been reached as to whether this base will be built in England or in France. However, a list of machines has been issued by the Stone & Webster Engineering Corp., Boston, government contractor, with a view toward ascertaining how many of the requisite machines are available. From the west the New York market hears reports of further heavy buying by companies having contracts for ordnance and ordnance parts. The Studebaker Corp., South Bend, Ind., which has a contract for recoil cylinders, still has much equipment to purchase. The Standard Steel Car Co., Hammond, Ind., remains in the market. Dodge Bros., Detroit, and the Minneapolis Steel & Machinery Co., Minneapolis, are reported to have filled practically all of their machine tool requirements. An Indiana company, the Wagner Axle Co., which was awarded a contract for artillery wheel hubs, is understood to have closed for about $100,000 worth of machines. The contract for artillery wheels, which originally was arranged to have gone to the Wagner Axle Co., and which is valued at about $5,000,000 to $6,000,000, is not officially reported to have been placed, but is expected to go to the W. F. McCord Co., Chicago. This contract will involve purchases of several hundred thousands dollars' worth of machines.

The lull in the crane market continues, very little new inquiry appearing before dealers and little business being consummated. The General Electric Co. is in the market for three 20-ton, one 7½-ton and one 5-ton electric cranes of special design for its plant at Lynn, Mass. The Pensacola Shipbuilding Co., Pensacola, Fla., is inquiring for a 3-ton electric crane. The government continues to negotiate for three 5-ton and one 15-ton hand-power cranes for the Sandy Hook proving grounds. The Imperial Shipbuilding Co., Detroit, is reported to be inquiring for a second-hand locomotive crane. Demand for punching and shearing equipment may be summed up in two or three sizable inquiries. The latest is from the Cape Fear Shipyards Corp., Wilmington, N. C., which is understood to have taken a government contract for the construction of several tug boats. The requirements of the Groton Iron Works for its shipyard at Alexandria, Va., are yet to be acted upon. The Atlantic Corp., Portsmouth, N. H., which has been the biggest buyer of late, continues in the market for punching and shearing machinery.

Government Buys Heavy Machinery in Pittsburgh

MACHINERY and machine tool equipment purchases being made by the government are heavy, according to sellers in the Pittsburgh district. Domestic business

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Agathon laboratory tests are exceedingly severe. Chemically and physically Agathon steels are subjected to every known test to ascertain their fitness for their particular uses,—tests which far exceed those of actual service in intensity and severity.

The comprehensiveness of Agathon laboratory tests affords some suggestion of the thoroughness observed through every stage of the production of Agathon Alloys. Agathon methods represent the ultimate in steel making.

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Massillon, Ohio

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Detroit Office: 326-27-28 Ford Bldg.
F. Walter Guibert, District Representative.
Cleveland Office: Hickox Bldg.
The Hamill-Hickox Co., District Representatives.
Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd.
C. H. Beach, District Sales Mgr.
Philadelphia Office: 603 Widener Bldg.
Frank Wallace, District Sales Mgr.
Syracuse Office: 601 University Block
T. B. Davies, District Sales Mgr.
J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.

AGATHON STEELS TRADE MARK

is dull. This is attributed to high prices and slow deliveries occasioned by the filled-up condition of the books of most makers and to the transporation situation. The fact that iron and steel prices are subject to revision on April 1 also has caused commercial buyers to be hesitant about coming into the market. Inquiries and sales of rolling mill equipment have been rather brisk up to recently. The Cleveland Crane & Engineering Co., Cleveland, has sold a 10-ton crane to the Savage Arms Co., Sharon, Pa. The Knox-Andresen Co., Empire building, Pittsburgh, is specializing in tools and production machinery. This company now represents Hannifin Mfg. Co., Chicago, air chucks; Kelly-Reamer Co., Cleveland, production tools; Keller Pneumatic Tool Co., Grand Haven, Mich., riveting hammers; Hoefer Mfg. Co., Freeport, Ill., multiple spindle drill heads; Van Dorn Electric Tool Co., Cleveland, portable electric tools; Bury Compressor Co., Erie, Pa., compressors and vacuum pumps; Economy Baler Co., Ann Arbor, Mich., metal and paper baling presses.

Traffic Situation Improves at Chicago

ALTHOUGH demand for machine tools in the Chicago district seems small compared with the heavy inquiry which prevailed recently, the volume of business is still considerable. Not a single large inquiry is current at present, but many concerns with much equipment are in the market from time to time for single tools to supplement their existing facilities. The Rock Island arsenal recently placed orders for considerable equipment of a general character to supplement larger purchases made previously. Embargoes against shipments have been relieved to some extent and dealers are busy tracing shipments which were caught in the recent blizzard and lost in freight yards. It is understood that the Pettibone-Mulliken Co. and Winslow Bros. of Chicago, have taken contracts from the government and have been supplementing their equipment. It is possible at present to obtain reasonably prompt delivery, three months or less, on medium-sized lathes, all sizes of shapers, hand screw machines, small gear cutters, and small punch presses. Delivery is slow, ranging from four to ten months, on boring mills, horizontal boring machines, millers, planers, grinders, turret lathes, large punch presses and lathes from 24 inches up. The American Tractor Corp. is planning to build a plant at Peoria. The Western Steel Car & Foundry Co. is building a foundry at Hegewisch.

Manufacturers' Planer Needs are Urgent

PLANER needs predominate in the tool lists received in Cleveland during the past week. The Duff Mfg. Co., Pittsburgh, Pa., is in need of the following equipment: One 3-inch bar boring machine; one 2½-inch heavy duty drilling machine; one 5-foot drilling machine; one universal grinder; two milling machines; one 26 x 26-inch x 10-foot planer; one 27 x 27-inch x 8-foot planer; five 30 x 30-inch x 8-foot planers with two heads; one 48 x 48-inch x 10-foot planer; one 48 x 48-inch x 16-foot planer; one 24-inch universal table shaper. Following are the tools included in a list issued by the Locomotive Stoker Co., Pittsburgh, Pa.; one 48 x 48-inch x 10-foot planer with two heads; one slab miller, planer type, 24 x 24 inches x 8 feet or larger; one 5-inch bar boring mill with 48 to 60-inch travel; one 4-inch bar, knee-type horizontal boring mill; one 6-foot radial drill; one drill press with two heads; two 24-inch x 16-foot screw cutting lathes. Quotations on an 84 x 84-inch x 20-foot planer have been asked for by the United Engineering & Foundry Co., for its Youngstown plant. The Murphy Iron Works, Detroit, desires prices on a 42 x 42-inch x 14-foot planer. Prices on a radial drill are desired by the Cleveland Electric Motor Co., Cleveland. The Simplex Mfg. Co., Meadville, Pa., is in need of a 42-inch planer with two heads and one 5-foot motor-driven radial drill. Inquiry has been made by the Ohmer Fare Register Co., Dayton, O., for a 48 x 48-inch x 16-foot planer, with two heads. The W. S. Tyler Mfg. Co., Cleveland, has asked for prices on a 42-inch gear cutter and a crank shaper. A second-hand punching machine with a 24-inch throat is to be purchased by the Insley Mrg. Co., Indianapolis. The Briscoe Motor Corp., Jackson, Mich., is in the market for considerable equipment.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BOOTHBAY HARBOR, ME.—The Lincoln County Power Co. has taken over the Boothbay Harbor Electric Light & Power Co. and plans to enlarge the plant. Contracts have been awarded for the construction of a new power station.

ANDOVER, MASS.—The plant of the Beaver Chemical Mfg. Co. has been damaged by fire with a loss of $100,000.

BOSTON.—The William Duncan Co. has been incorporated to engage in the foundry business with $75,000 capital by Justin A. Duncan, Andrew W. Duncan and others.

BOSTON.—The Western Coke & Collieries, Inc., has been incorporated to do a coal and metal business with $1,000,000 capital by Webster B. Evans, John F. Oderman and T. M. Tennent, Seattle.

FITCHBURG, MASS.—Fire in the main building of the Fitchburg Foundry Co., Jan. 30, caused $5000 damage.

MAYNARD, MASS. — The Assabet Mills has let the contract for a 5-story, 50 x 400-foot addition.

MIDDLEBORO, MASS.—The Maxim Motor Co. has been incorporated to manufacture automobiles with $100,000 capital, by Carlton W. Maxim, Ernest L. Maxim and F. W. Swett.

NEWTON, MASS.—A spinning mill will be erected this spring by the Sheperd Worsted Co., from plans prepared by Monks & Johnson. It will be four stories high, 80 x 200 feet, of reinforced concrete.

NORTHBORO, MASS.—The main mill and addition of Whittaker & Bacon, manufacturers of wool waste, were damaged by fire Jan. 28, causing a loss of $300,000. Considerable new machinery was damaged. The firm has been working on government contracts.

PAWTUCKET, R. I.—The Steel Specialty Corp. has been incorporated to manufacture steel products with $100,000 capital. Walter A. Briggs, Fred A. Sweet and George E. Thurber are interested.

PROVIDENCE, R. I.—The Paul Stierle Co. has been incorporated to manufacture jewelers' instruments with $10,000 capital. William Forstner, Otto Schierioth and Raymond P. McCanna are incorporators.

BRIDGEPORT, CONN.—J. L. Lucas & Son has been incorporated to engage in the machinery manufacturing business with $25,000 capital. James L. Lucas, Frank B. Lucas

COAL TALKS WITH ROLLING MILL JIM



Don't get the blues, fellows, over this coal shut-down. If you've got Hubbard Rolls in the mill you can roll enough in the five days anyway.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

and Chester L. Lucas, New York, are interested.

BRIDGEPORT, CONN.—A $100,000 plant will be erected by D. Flint, Providence, R. I. The structure will be two stories, 100 x 300 feet.

NEW HAVEN, CONN.—The International Leather & Belt Co., New York, has let the contract for a 1-story, 51 x 144-foot factory building on Middletown avenue, to cost $30,000. It will be the first of three units, the second being the same size as the first and the third a 4-story, 100 x 300-foot structure.

STAMFORD, CONN.—A $12,000 plant will be erected by the American Synthetic Color Co. The building will be two stories high, 50 x 121 feet. Harold A. Parsons, 49 Bank street, has been awarded the general contract.

THAMESVILLE, CONN. — The Eastern Connecticut Power Co., New London, Conn., has completed plans for a $1,000,000 power plant. The building will be of brick, and so constructed that other units can be added as desired. Included in the new equipment to be purchased are two 10,000-kilowatt generators.

Along the Middle Atlantic Seaboard

ALBANY, N. Y.—Contract for the erection of a machine shop, 1-story high, 53 x 125 feet, has been let to the William Key Sheehan Construction Co. by George H. Thatcher, Thatcher and Leonard streets. Cost will be about $9000.

AMSTERDAM, N. Y.—The N. L. Merwin Co. will erect a $9000 factory addition, three stories high, 20 x 130 feet.

BUFFALO.—Bids will be received shortly by Cousins & Son, 74 Wabash street, for 1-story, 80 x 125-foot reinforced concrete boiler manufacturing plant, to cost about $25,000.

BUFFALO.—The Oldman Boiler Works, 38 Illinois street, has awarded the general contract for an addition to its plant.

BROOKLYN, N. Y. — The Interborough Rapid Transit Co., 165 Broadway, New York, has completed plans for a transformer station, one story, 50 x 100 feet.

BROOKLYN, N. Y.—Incorporation papers have been granted to the Star Auto Radiator Works, organized with a nominal capital of $5000. The incorporators are D. and M. Gertel, A. Stutman and others, 450 Georgia avenue.

BROOKLYN, N. Y.—General contract for the erection of a power plant at the navy yard has been awarded to the Marble Architect Co., Broadway and 216th street, New York, by the bureau of yards and docks, Washington. Cost is estimated at approximately $256,000.

ELMIRA, N. Y.—The Horton Avenue Machine Works has been incorporated with $50,000 capital. Incorporators include J. Bocknewch, J. R. and E. Horton and others.

LONG ISLAND CITY, L. I., N. Y.—Plans are being drawn by Louis Allen Abramson, architect, for a 1-story plant, 75 x 180 feet, to be built by the Central Smelting & Refining Co. at Borden avenue and Hayward streets.

MECHANICSVILLE, N. Y. — The West Virginia Pulp & Paper Co. is having plans prepared by F. G. Ten Broeck, architect, 200 Fifth avenue, New York, for a plant addition.

NEW YORK.—The Gilbert Mortimer Co. has been incorporated with a nominal capital of $5000 to manufacture hardware and machinery. The incorporators are J. Warner, B. H. Guterman and G. J. Magnus, 860 East 161 street.

NEW YORK.—The Equitable Machinery Corp. has been chartered with a capital of $25,000. Incorporators include C. and T. F. Hussa and E. C. McManus, 400 West 160 street.

NEW YORK.—The Melrose Tool Corp. has been incorporated, capitalized at $5000. The incorporators are O. R. Lindgren, T. Blank and J. Carlsson, 316 East Fifty-seventh street.

NEW YORK.—The Alloys Mfg. Corp. has been organized with $250,000 capital by M. M. Grunthal, H. C. Wing and C. W. Lucas, 27 Cedar street.

NEW YORK.—Brandon, Hodges & McLean have been organized with $20,000 capital to manufacture metallurgical supplies, and to produce graphite and other industrial carbons. Incorporators include A. C. Head, M. M. Eisenberg, and E. M. James, 2 Rector street.

NEW YORK.—The Controller Co., capitalized at $500,000, has been chartered to manufacture calculating machines. Incorporators include W. E. Miller, F. Vehr and S. N. Taylor, 311 West Ninety-fifth street.

NEW YORK.—A $25,000 warehouse, 1-story high, 50 x 75 feet, will be erected by Edward Caterson, 17 Battery Place. The Beverly S. King & Shiras Campbell Co., 103 Park avenue, will receive bids shortly.

PLATTSBURGH, N. Y.—Construction of a warehouse is contemplated by the A. H. Marshall Co., Inc. Ralph A. Signor, architect, is drawing plans.

ROCHESTER, N. Y. — The High Speed Hammer Co. will receive bids shortly through its architect, Arthur J. Stickney, for the erection of a 1 and 2-story plant addition, 53 x 110 feet.

BIRDSBORO, PA. — The Birdsboro Steel Foundry & Machine Co. is building an extension to its iron and steel foundries, to be L-shaped, consisting of two arms, 70 and 135 feet in length, respectively. New equipment to be installed includes one 35-ton and one 10-ton crane, an additional open-hearth furnace in the steel foundry and an additional 52-inch cupola in the iron foundry. The company has recently undertaken extensive contracts for ship castings, which have made necessary the enlargement of the plant. L. E. Thomas is secretary of the company.

BROWNSVILLE, PA. — The Brownsville Foundry & Machine Works has been incorporated with $10,000 capital. Incorporators include William P. Welker, William W. Welker and Ira E. Stevens.

DUNCANSVILLE, PA.—A company has been formed with $30,000 capital stock to erect a canning factory, manufacturing its own cans. Among the incorporators are A. C. Morrow, J. K. Shoenfelt and Louis McMaster.

MILTON, PA.—The Milton Mfg. Co. has awarded the contract for the construction of a $15,000 machine shop, one story, 50 x 300 feet.

OIL CITY, PA.—The plant of the Oil City Foundry Co. recently was damaged by fire.

PHILADELPHIA. — Work has begun on the construction of a $200,000 round house and a $100,000 machine shop, to be built on American street, by the Philadelphia & Reading railroad. The round house will be of concrete and brick, 1-story high, 109 x 334 feet. The machine shop will be 1-story, 130 x 216 feet, of brick and concrete construction. The William Steele & Sons Co. is in charge of the work.

PHILADELPHIA. — A. L. Carhart has been awarded the contract for the construction of a power house and signal station to be built at Skillman, N. J., by the Philadelphia & Reading railroad. The cost will be about $40,000.

PHILADELPHIA.—Bids will be received soon by John M. Kennedy for the construction of a $15,000 plant addition.

PHILADELPHIA.—The Fulton Truck Co. has been incorporated with $200,000 capital to manufacture automobiles and power boats. The incorporators include F. R. Hansell, and others. The company is incorporated under a Delaware charter.

PHILADELPHIA. — John Dobson, 809 Chestnut street, will take bids shortly, for the erection of a $25,000, 5-story warehouse.

PHILADELPHIA. — A charter has been granted to the Schwerdtle Machine Co., incorporated with a capital of $15,000. Henry G. Schwerdtle is interested.

PITTSBURGH.—The D. L. Wilkoff Steel Co. has been organized with a capital of $50,000. H. T. Feinberg is interested.

READING, PA.—The Linde Air Products Co., Forty-second street building, New York, contemplates the construction of a 1-story plant in this city.

SCRANTON, PA.—A $40,000 factory addition will be erected by the American Color Co. The Taylor & Guryea Lumber Co. has received the general contract.

WILKES-BARRE, PA. — Peter Fry has awarded the general contract for a $40,000 wagon shop, one story, 40 x 80 feet, to Wilson J. Smith.

BOUND BROOK, N. J.—The Calco Chemical Co. is enlarging its plant to provide facilities for filling government contracts.

ELIZABETH, N. J.—The Organic Products & Color Co., Inc., has been chartered with $10,000 capital to manufacture dyestuffs, chemicals, etc. The incorporators are Seymour M. Herman and Hugo Helburn, New York, and Charles B. Rosenberger, Brooklyn, N. Y.

HARRISON, N. J.—The insulated wire and electrical cord departments of the plant of the Driver-Harris Co. were damaged severely by fire Jan. 31. Stanley M. Tracy is in charge.

HARRISON, N. J. — The Standard Wire Co. has been chartered with a capital of $50,000 to manufacture wire cloth and wire goods of all kinds. The company maintains offices at 11 Passaic avenue.

IRVINGTON, N. J.—M. H. Donovan &



—tractor, truck or machine,

Farrell-Cheek Quality Steel Castings will increase its durability



Made from the finest shock resisting steel, insuring lighter castings of greater strength.

We also manufacture Blank Gears; Carbonizing Boxes and Case Hardening Boxes.

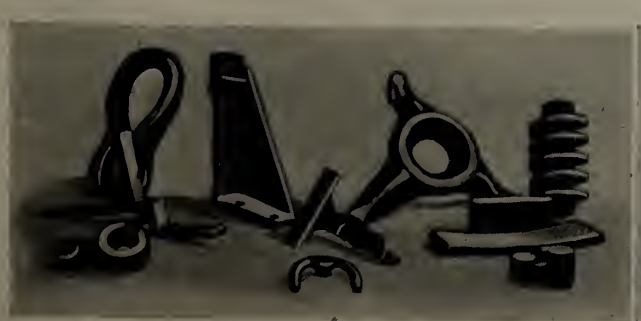
Let us know your requirements.

Farrell-Cheek Steel Foundry Co.

SANDUSKY, OHIO

BRANCH OFFICES

NEW YORK PHILADELPHIA CHICAGO





Say you saw it in THE IRON TRADE REVIEW

Co. has been chartered with $100,000 capital to manufacture skylights. The incorporators are M. H. Donovan, I. E. Donovan and H. H. Habicht, Newark, N. J.

MOUNT HOLLY, N. J.—The government is reported to be planning the erection of a large munitions plant in this city. It is stated that 10,000 acres of the Hanover Farms tract will be taken over for this purpose.

NEWARK, N. J.—The Ballach Smelting & Refining Co. will soon start work on the construction of a $7000 warehouse.

NEWARK, N. J.—The Aluminum Ware & Mfg. Co. has been incorporated with a capital of $1,000,000, by John E. Potter, George F. Bradenburgh and James H. Opp.

NEWARK, N. J.—The Newark Instrument Co. has been chartered with $175,000 capital to manufacture instruments. George W. C. Carter, D. B. Smith and Conover English are incorporators.

NEWARK, N. J.—The Salicylate Products Mfg. Co. has been chartered with $25,000 capital to manufacture chemicals. The incorporators are A. C. Ullman, Charles D. Wagner and William P. Murphy.

NEWARK, N. J.—The Hampered Piston Ring Co. has been chartered with a capital of $1,400,000 to manufacture piston rings. William Schmidt, Christian Schmidt and B. A. Brennan, Baltimore, are the incorporators.

THOROFARE, N. J.—A wagon works to cost $30,000 will be erected by H. A. De Hart. C. W. Willkins will soon take bids.

MAYS LANDING, N. J.—The Bethlehem Steel Co. will start work at once on the construction of a shell loading plant for the government.

PLAINFIELD, N. J.—The Crescent Color & Chemical Works has been chartered with $25,000 capital to manufacture dyes and chemicals. Jerome Alexander, Alexander Alexander, and Walter Alexander, New York, are the incorporators.

PLAINFIELD, N. J.—The Niles-Bement-Pond Co. will start work shortly on the construction of a 60 x 200-foot forge shop. It will be 1-story, of brick, steel and concrete construction.

TRENTON, N. J.—The city commission contemplates the erection of an industrial shop at the School of Industrial Art, North Willow street, to cost $30,000. Address F.

WILMINGTON, DEL.—The Engineering Development Co. of America has been organized with $250,000 capital to manufacture mining machinery. Incorporators are M. L. Hogan, L. A. Irwin and Harry W. Davis.

WILMINGTON, DEL.—The Carneys Point works of the Du Pont Powder Co. has been damaged by fire with a loss of $250,000.

WILMINGTON, DEL.—The Gamble Briquette Process Co. has been incorporated with a capital of $120,000. The incorporators are M. L. Rogers, L. A. Irwin, Harry W. Davis. W. Donnelly, mayor.

BALTIMORE.—The general contract for a $20,000, 2-story mill work plant to be built by Otto Duker & Co., has been awarded to John E. Marshall & Son.

ALEXANDRIA, VA. — The Groton Iron Works, Groton, Conn., plans to build and equip a new shipyard here. The company operates a plant for making steel ships at Groton, Conn., and a yard for wooden ships at Noank, Conn.

BRISTOL, VA.—Erection of a $30,000 power house is contemplated by King college. D. Tilden Scherer is president.

BRISTOL, VA.—The Reynolds Corp. contemplates building a 1-story addition to its chemical plant.

RICHMOND, VA.—The Kingan Co. will erect a $15,000 1-story machine shop addition. W. B. Newell, architect, is taking bids.

WASHINGTON.—The navy department has asked bids for a boiler shop at the Washington navy yard.

Activities in the Central States

APPLETON, WIS.—The date for closing bids for the erection of the new plant of the Reliance Motor Truck Co. has been extended from Feb. 1 to 8. As previously noted, the shop will be 75 x 300 feet, 1-story, and is estimated to cost $25,000 without machinery and equipment. T. M. Purtell, 821 College avenue, is secretary.

BELOIT, WIS. — The Mattison Machine Co., C. W. Mattison, president, has increased its capital from $25,000 to $225,000 and will build additions to its foundry and machine shop.

DE PERE, WIS.—A new pattern shop to cost about $15,000 will be erected at once by the C. A. Lawton Co., manufacturer of gas engines, tractors and farm machinery, to replace the shop which was damaged by fire several weeks ago. The work is in charge of P. T. Benton, architect, Green Bay, Wis.

EAU CLAIRE, WIS. — The Cast Stone Construction Co. has taken the contract for erecting a reinforced concrete and steel truss bridge across the Chippewa river in Chippewa county, at the contract price of $12,000.

GREENBAY, WIS.—The Hartmann-Greiling Co., manufacturer of machinery and boilers, has doubled its machine shop and plans other extensions.

KAUKAUNA, WIS.—The Kaukauna Machine Works has been chartered with $50,000 capital. Incorporators include B. W. Fargo, F. W. Grogan, Joseph J. Jansen and others.

MADISON, WIS.—Articles of incorporation have been filed by the Benson Speed Signal Co., with a capital stock of $100,000. The incorporators are Hal R. Martin, A. D. Campbell and Louis W. Wiedenbeck. The company will manufacture the Benson speed signal device for automobiles and other automobile accessories and supplies.

MILWAUKEE.—The Res Mfg. Co. has awarded to Byrne Bros., 2516 Fond du Lac avenue, contract for the erection of a reinforced concrete and brick shop addition, 55 x 70 feet, to its plant at 2907 Meinecka avenue. The company manufactures hardware specialties. Adam W. Kaufmann is secretary.

MILWAUKEE. — Articles of incorporation have been filed by the Electric Welding & Mfg. Co. The capital stock is $10,000 and the incorporators are George F. Luehring, Oscar Greulich and Joseph Stika.

MILWAUKEE. — The George H. Smith Steel Castings Co. has obtained a permit for the erection of a foundry addition to cost $50,000.

MILWAUKEE.—The Badger Mfg. Corp. has been organized to manufacture automobile parts with $300,000 capital. The incorporators are E. J. Cunningham, Walter H. Schwab and H. W. Schwab.

MILWAUKEE.—Articles of incorporation have been filed by the Ozone Co. of Milwaukee, organized to manufacture machines for the production of ozone. The capital stock is $25,000 and the incorporators are William J. Eberly. Julius E. Kiefer and E. T. Zautcke.

PORTAGE, WIS.—The Chicago, Milwaukee & St. Paul railroad has announced plans for the construction of new machine shops and division headquarters here. Estimated cost is about $50,000. J. A. McDonald, division superintendent, is in charge.

BENTON HARBOR, MICH.—The Metal Specialties Co. has been incorporated with a capital of $87,000.

CADILLAC, MICH. — The Acme Motor Truck Co. has increased its capital stock to $1,000,000 to provide for plant expansion.

DETROIT.—The Russel Wheel & Foundry Co. plans to build a 1-story factory to cost about $75,000. J. Russel is secretary.

DETROIT.—The Swedish Crucible Steel Co., Butler avenue and Grand Trunk railway, has awarded the contract for a 1-story brick and steel foundry addition.

DETROIT. — The Michigan Stamping Co. has awarded a contract for the erection of a 1-story brick and steel pickling shop.

GRAND RAPIDS, MICH.—The Haskelite Co., capitalized at $1,000,000, is planning to purchase $500,000 worth of machinery and equipment for its aircraft wood treating plants at Grand Rapids and Ludington. A new plant is being erected by the J. G. White Engineering Corp., New York.

JACKSON, MICH.—Factory No. 3 of the Perlman Rim Co., Chapin and Horton streets, has been damaged by fire with a loss of $80,000.

BELLEVILLE, ILL. — The Orben Stove Co. has been incorporated with $50,000 capital to operate a foundry. Henry A. Langfelder, Jacob Mueller and George C. Mueller are interested.

CHICAGO.—The Century Rubber Co. has had plans prepared for a 6-story factory to be erected on West Thirty-first street, to cost about $100,000. C. J. Venn, 1346 Rawson street, is in charge.

CHICAGO.—A permit has been granted to the Western Steel Car & Foundry Co. for a 1-story steel and frame foundry, to be erected at a cost of $60,000 at 13600 Brandon avenue. Dilliard & Bacon, architects, are preparing the plans.

CHICAGO.—The C. F. Brown Mfg. Co. has been incorporated with $12,000 capital. Incorporators are Vernon Bloom, Claude F. Brown and Thomas M. Campbell.

DECATUR, ILL.—The H. Mueller Mfg. Co. is in the market for machines for the manufacture of fuse parts, including 50 turret lathes.

MACOMB, ILL.—The American Steel Products Co. has increased its capital from $60,000 to $100,000 to provide for increased manufacturing facilities.

MONMOUTH, ILL. — The Monmouth



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17 Ton Buckets,* capacity 1,250,000 tons per season; *15 Ton Buckets,* capacity 1,000,000 tons per season; *10 Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8 Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Bridge & Mfg. Co. has been incorporated with $20,000 capital by E. J. Jayne, G. M. Jayne and J. H. Jayne.

PEORIA, ILL. — The American Tractor Corp. of which A. E. Rosenthal, 122 South Michigan avenue, Chicago, is in charge, plans a tractor manufacturing plant to include a power house, two foundries, a machine shop and an assembly building to cost jointly about $175,000.

SPRINGFIELD, ILL. — The factory of George Meikle, Eighth and Princeton avenues, has been damaged by fire with a loss to building and machinery of $18,000. The factory was engaged in the manufacture of automobile parts.

EVANSVILLE, IND.—The Hercules Gas Engine Co. plans to build a $50,000 addition to its foundry.

INDIANAPOLIS.—The Cleveland Tractor Co., Cleveland, has awarded an extensive contract to the Weidley Motors Co. for the manufacture of tractor motors. The Weidley company will enlarge its plant.

LOGANSPORT, IND.—The foundry of the Logansport Castings Co. has been damaged with a loss of $75,000. The plant will be rebuilt.

MONTEREY, IND.—The Monterey Electric Light & Power Co. will build a power house 50 x 125 feet in size, to cost $50,000.

MUNCIE, IND.—The Indiana Steel & Wire Co. has increased its capitalization from $150,000 to $450,000 to provide for plant extensions.

AKRON, O.—The Liberty Die Sinking & Drop Forge Co. has been incorporated with $10,000 capital. Edwin R. Hagan, Charles B. Schoonover, J. Walter Harwood Jr., George E. Carle and Merle E. Rudy are interested.

AKRON, O.—The P. H. Kingston Machine Co. has been organized with $20,000 capital. The incorporators include S. S. Wortley, A. A. Schlegel, E. J. Turine, P. H. Kingston and others.

CANTON, O.—The Bumbaugh Foundry & Machine Co. has been incorporated with $20,000 capital. William Potts and William Martin are interested.

CARTHAGE, O.—Plans have been completed for rebuilding the plant of the Hess Spring & Axle Co., 124 West Sixty-ninth street, which was recently damaged by fire. The loss sustained was about $100,000.

CINCINNATI.—The H. Zering Mfg. Co. has been incorporated with $50,000 capital. The incorporators include Walter M. Beinhart, R. J. Wuenker, M. E. Beinhart and others.

CLEVELAND.—E. D. Koetch, architect, 274 East 131 street, will receive bids Feb. 15 for the erection of a factory building to cost $350,000 for the Willard Storage Battery Company.

CLEVELAND. — The Western Machine Products Co., recently incorporated with a capital of $100,000, has leased a plant which it will equip for the manufacture of screw machine products, installing screw machines, boring, milling and drilling machines and forming presses. Total cost of new equipment is estimated at $125,000. L. A. Katz, Williamson building, is president.

CLEVELAND. — The Standard Equipment Co., West 106th street and Lorain avenue, has purchased a site of twelve acres, on which it proposes to build an extension to its plant for the manufacture of automobile parts.

CLEVELAND.—The Northern Boiler Co., 2511 Elm street, has purchased a 5-acre site on Maywood avenue, on which it contemplates erecting a boiler manufacturing plant.

CLEVELAND.—The Woldon Tool Co. has been incorporated with a capital of $25,000. Incorporators include A. R. Sandine and C. A. Bergstrom.

COLUMBUS, O.—The Caldwell Mfg. Co. has been granted a charter with a capital of $15,000. Harold A. Caldwell, Samuel Caldwell, Benton F. Stitt and others are interested.

DAYTON, O.—The Duriron Castings Co., 115 Baird street, plans to erect two 1-story foundry buildings, 50 x 200 feet, to cost $20,000 each. The company specializes in acid resisting castings chiefly for chemical purposes.

LEETONIA, O.—The Aetna Steel Corp., New York, has purchased the plant of the Crescent Machine Co., which it will enlarge and equip for the manufacture of pressed steel products.

WARREN, O.—The plant of the Warren Iron & Steel Co. was severely damaged by fire Jan. 31.

New Business in Eastern Canada

SOUTH VANCOUVER, B. C.—Judge W. H. Bard is interested in a company which will build a rope and twine factory to cost $500,000.

VANCOUVER, B. C.—The Sydney Rubber Roofing Co., Sidney, B. C., will build a factory here to cost $125,000. M. B. D. White is superintendent.

BRACEBRIDGE, ONT.—The W. W. Kinsey Co., Ltd., has been incorporated to manufacture hardware, boats, automobiles and gas engines with $40,000 capital stock. Incorporators are Richard Pawson, Joshua L. Yeoman, Charles E. Lount and others.

BRANTFORD, ONT. — The planing mill owned by the Slingsby Mfg. Co. was damaged by fire with a loss of $35,000. The mill will be rebuilt and new equipment will be required. A. J. Knoepfli is superintendent.

CHATHAM, ONT.—The Pittsburgh & Des Moines Steel Co., Inches avenue, whose plant was recently damaged by fire with a loss of $25,000, will rebuild at once and has let the contract for the erection of building.

ELMIRA, ONT.—A. S. Gingrich is in the market for an oil engine.

FORT WILLIAM, ONT. — The Nyando Pulp & Paper Corp. has been chartered with a capital stock of $1,000,000. William A. Dowler is in charge of the company's affairs.

GEORGETOWN, ONT.—J. B. MacKenzie is in the market for woodworking machinery and equipment.

HAMILTON, ONT.—The Wentworth Orchard Co. is in the market for a 5-horsepower electric motor for use in hydroelectric development.

OSHAWA, ONT.—The Thornton Rubber Co., Ltd., has been incorporated to manufacture automobile and bicycle tires with $50,000 capital stock and will build a plant. Joseph Thornton, Joseph W. Weldon, Spencer L. D. Harris of Montreal, Que., and others are interested.

PORT COLBORNE, ONT. — The town council will build a waterworks pumping plant and requires equipment. A. G. Ross, clerk of the council, is in charge.

RENFREW, ONT.—The British Explosives Ltd., whose plant was recently damaged by fire will rebuild and is in the market for equipment, including electric motors. W. C. Cram is manager.

TORONTO, ONT.—The Turnbull Elevator Co. will erect a 1-story brick factory at 251 Richmond street west, to cost $20,000.

TORONTO, ONT. — Canadian Aeroplanes Ltd., will build two sets of 1-story dry kilns on Dufferin street, at a cost of $9000.

TORONTO, ONT.—The Canada Cycle & Motor Co. has increased its capital stock from $50,000 to $2,000,000 to provide for extensions.

TORONTO, ONT.—E. Pullen, 20 Main street, is in the market for an electric motor.

TORONTO, ONT.—The Monarch Tractors Co., Ltd., has been incorporated to manufacture farm tractors, machinery and implements, with $1,000,000 capital stock, by Edward J. Swift, Almer J. Gannon, E. G. Gore and others.

CAP DE LA MADELEINE, QUE.—The town council will purchase a centrifugal pump for its waterworks plant. J. Bourque is secretary.

LAUZON, QUE. — Joseph Gosselin, St. George street, Levis, Que., has been awarded the contract for the erection of drydock sheds for the Davie Shipbuilding & Repairing Co., to cost $600,000.

LEVIS, QUE.—P. A. Beaulieu, Bienville, Que., will build a foundry here to cost $15,000 and has awarded contract for the building to Joseph Blais, Mont Marie street, Lewis, Que.

MONTREAL, QUE.—The Suburban Water Co., Ltd., has been incorporated to build and operate waterworks plants. John W. Blair, Francis J. Laverty, Westmount, Que.; Charles J. Hale and others are incorporators.

MONTREAL, QUE. — Sussenwein Bros., Ltd., have been incorporated to manufacture iron and steel products and machine tools, with $35,000 capital stock. Peter Bercovitch, Ernest Lafontaine, Nathan Gordon and others are interested.

ST. NARCISSE, QUE.—Price Bros. & Co., 56 St. Peter street, Quebec, will build a pulp and paper plant on the Batiscan river, to cost $30,000.

SYDNEY, N. S.—The Dominion Iron & Steel Co. will commence work shortly on the erection of a coal washing plant to cost $400,000. C. S. Cameron is secretary.

SYDNEY, N. S.—The Atlantic Milling Co., Ltd., Pictou, N. S., will commence immediately on the erection of mills at Sydney. J. F. Smith is president.

WINNIPEG, MAN.—The Manitoba Steel & Iron Co., Ltd., has been incorporated to manufacture steel, iron and copper products, machinery, implements, etc., with $500,000 capital stock, by Thomas R. Deacon, Hugh B. Lyall, Robert D. Guy and others.

New Trade Publications

TOOL GRINDERS.—The Gisholt Machine Co., Madison, Wis., has recently issued a folder describing a belt-driven, semi-automatic, universal tool grinding machine. The machine is said to be especially adapted for grinding tool-post tools, such as used on turret lathes, gear planers and similar machine tools, and the bitts used in tool holders. The folder contains seven illustrations and two tables giving clearance angles for grinding different kinds of tools.

BUCKETS.—The Browning Co., Cleveland, has a new booklet describing its line of grab buckets, clam shells, wood grapples and coke forks. Features of design and the materials of construction are fully described and illustrated. The coke forks and wood grapples are novel adaptions of existing principles in handling machinery. The last few pages of this publication are devoted to descriptions of locomotive cranes, illustrated from photographs.

BUCKETS AND TUBS.—A new catalog issued by the Brown Hoisting Machinery Co., Cleveland, contains full details regarding the line of coal, ore, excavating, drag line and special buckets and tubs manufactured by the company at the present time. Details of construction are explained in a graphic manner and illustrations give an idea of the extensive uses to which this class of machinery is adapted. Grab buckets from 27 to 360 cubic feet capacity are noted in this catalog, and tubs from 13.6 to 292.7 cubic feet are tabulated.

GRAY IRON CASTINGS.—An attractive folder entitled "A Message From Our General Manager" was recently published by the Stroh Casting Co., Detroit. This booklet describes a line of gray iron castings for automobiles and tractors which constitute the chief products of the company. Practically all castings, a number of which are illustrated in the folder, are made on molding machines. The booklet describes the general plan of the work and shows how the Stroh organization has been shaped to realize the largest possible output.

METERS.—An 8-page bulletin describing and illustrating the Thomas type of meter was recently published by the Cutler Hammer Mfg. Co., Milwaukee. The booklet describes the principle of operation of the meter and shows several typical installations. The meter is said to be individual in its construction in that in measuring large quantities of gas it gives the quantities in standard units by which gas is bought and sold and requires no corrections for temperature or pressure. Furthermore it shows the totalized result on an integrating meter and a graphic record of the rate of flow on a curve-drawing meter.

TOOL HOLDERS.—In a catalog issued by the Lovejoy Tool Co., Springfield, Vt., the company's products consisting of turning, facing and planing tools and tool holders are illustrated and described. These cutters are locked in position in the tool holders. The tool thrust is taken up by the locking key, which in turn takes its seat on the solid metal of the holder. A vertical locking wedge secures the cutter in position. The latter may be adjusted when it becomes worn. In the boring bar, the cutter is placed in such a position that it receives largely an end thrust and a natural top rake. The cutter is locked in its holder without the use of set screws.

DRYING OVENS.—The Central Scientific Co., Chicago, has issued a descriptive bulletin describing a new single-walled drying oven which is electrically heated and regulated. This is an addition to the line of constant temperature apparatus previously manufactured by this company. The heating elements of the oven described are located in the base beneath a false bottom, and the make and break is placed on the outside of the oven to secure ease of access and to guard against the explosion of inflammable gases within the oven.

BUILDINGS.—The Trussed Concrete Steel Co., Youngstown, O., has issued a 24-page booklet devoted to standardized structures. The word "standardized" is explained in a foreword. It is pointed out that all the steel shapes necessary for the construction of any building that might be ordered are in the warehouses of the company. All the buyer has to do is to pick out the type of structure he wants. The fabricated shapes can be assembled on the ground in a few days.

OIL FILTERS.—The Burt Mfg Co., Akron, O., recently issued a catalog illustrating and describing oil filters, exhaust heads and ventilators. The use of oil filters is discussed, with particular reference to economy in lubrication. The catalog contains reproductions of photographs of the company's oiling systems. A short description of ventilation in the factory introduces the section devoted to ventilators. A glass top ventilator manufactured by the company is described in detail. Concluding the catalog is a discussion of exhaust heads giving details of construction and operation. Numerous testimonials as well as views in plants where these devices are in use are to be found throughout the booklet.

HAND STOKERS.—An attractive bulletin devoted to hand stoking systems is being distributed by the Files Engineering Co., Inc., Providence, R. I. This stoker is of the overfeed type, being designed to feed the coal into the furnace in such a manner as to effect the distillation of the volatile matter from the fuel and insure complete combustion. The fire, it is said, may be seen and watched at all times. The fuel is advanced mechanically and all refuse may be deposited in the ash pit as frequently as required. The stoker is designed and constructed for heavy duty. The booklet shows several sectional views and also presents detailed descriptions of small parts.

TUMBLING BARRELS.—Tumbling barrels are illustrated and described in a 20-page bulletin recently published by the Whting Foundry Equipment Co., Harvey, Ill. The barrel heads are heavy cast iron. The trunnions are hollow and made separate from the head. Heads are lined with perforated steel plates on the inside. Ample air space is allowed between heads and liners. Trunnion bearings are cast iron of the self-aligning type, fitted with ring oilers. The exhaust connection box for the separation of grit and heavy particles is fitted to the trunnion at the discharge end of the barrel and is furnished with an automatic dumping device. A portion of the booklet is also given over to Whiting dust arresters and cinder mills.

HEAT TREATING FURNACES.—An 8-page folder has been issued by the Electric Furnace Co., Alliance, O., describing automatic electric furnaces for the heat treatment of high explosive and shrapnel shells. It is pointed out that these furnaces are an adaptation of furnace equipments of similar sizes that have been used for the heat treatment of steel railway equipment and motor car parts for a number of years. It is said that these furnaces combine the accurate temperature control of electric furnaces with uniform quenching through automatic manipulating devices. Manual handling is said to be largely eliminated in treating shells. These furnaces are made in three standard sizes having heating capacities of ½, 1 and 3 tons per hour, respectively.

LATHES.—The Oliver Machinery Co., Grand Rapids, Mich., recently issued an attractive folder devoted to speed lathes. These lathes are for direct or alternating power. The swings are 12 inches diameter over the bed and either 24 or 36 inches between centers, as required. Variations of speed are obtained by means of a 4-step cone of suitable size attached to the armature shaft of the motor, which is located under the housing beneath the bed. The headstock has bearings adjustable to wear. The bed is a cored casting. The top is planed flat to enable the operator's tools to rest on it securely. The inside edges are machined and act as ways for aligning the head and tail stock. The tail stock is of the open side design. It is secured to the bed by a positive lever clamp.

BUCKETS.—The Hayward Co., 50 Church street, New York, recently published its catalog No. 44 in which interesting information on buckets for industrial plants is detailed. Originally the automatic bucket was considered to be only a digging, loading and unloading machine; but this use has been broadened to include a great part of the conveying and rehandling work necessary in foundries, boiler rooms, steel mills and power plants. A wide variety of uses of the electric motor and rope operated buckets is shown by means of photographs, and typical installations are demonstrated by blue prints. The possibility of extending track-ways throughout a plant has greatly widened the field of usefulness of the electric crane and bucket system, and this catalog contains some valuable suggestions along this line.

REINFORCING BARS.—A 24-page bulletin devoted to descriptions and illustrations of concrete reinforcing bars was recently issued by the Cambria Steel Co., Philadelphia. These bars are of substantially uniform cross section in order to provide an equal strength throughout the entire unit. The projections on the bars are arranged in the form of undulations or waves and are so located that the concrete can be firmly bedded on all portions of the bar without possibility of formation of air pockets. It is claimed as a distinct point of superiority that these bars can be spliced satisfactorily which makes the beam dependent on the steel rather than the concrete for its strength. The booklet includes sizes, areas and dimensions of different types of bars and includes specifications such as areas in square inches, weight per foot, etc. Photographs of buildings in the course of erection employing Cambria bars are reproduced in the booklet.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo	7.70c
No. 28 galv. sheets, Cleve	7.60c
No. 28 galv. sheets, Cinci	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	24.00 to 26.00
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	28.00 to 28.50
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.00 to 19.50
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	21.50
Stove plate, Birmingham	19.00 to 21.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa	23.00 to 24.00
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$22.00 to 23.00
Boiler plate, cut, No. 1, St. L.	22.50 to 23.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	37.50 to 38.00
Stove plate, Chicago	22.50 to 23.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	30.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	28.00 to 29.00
Cast borings, New York	17.50
Cast borings, eastern Pa	20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo	19.00 to 19.50
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	34.50 to 35.00
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	21.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	17.00
Machine turnings, Pitts	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chgo	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	34.50 to 35.00
R. R. wrgt. No. 1, Birming.	29.00 to 33.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 38.50
Angle bars, steel, St. Louis	31.50 to 32.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	39.00 to 40.00
Busheling, No. 1, Chicago	25.50 to 26.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.00 to 26.50
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.50
Machine turnings, Cinci	13.00 to 13.50
Machine turnings, St. L.	17.25 to 17.75
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	24.50 to 25.00
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa	47.50
Steel car axles, Chgo	47.50

(Net Tons)

Shafting, St. Louis	33.50 to 34.00
Steel car axles, St. Louis	43.00 to 43.50

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts	$30.00
Car wheels, (steel), Pitts	33.00 to 35.00
Car wheels, eastern Pa	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, Birmingham	24.00 to 26.00
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	24.00 to 24.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00
Malleable railroad Chgo	30.00
Malleable, agricultural, Chgo.	29.50 to 30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	24.50 to 25.00

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	32.00 to 33.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, February 21, 1918 *No. 8*

Recovery of Production Extending

Blast Furnaces Make Best Showing of Week Toward Regaining Normal Operations—Steel Works' Output Still Retarded—Pig Iron Shortage Continues to Arouse Apprehension—Government Acts to Relieve Low Phosphorus

PRODUCTION in iron and steel is working back into accustomed channels, but the slowness of the process serves to illustrate the severe lengths to which the curtailment had extended. Open-hearth operations in the Pittsburgh and valley districts have been at 81 per cent this week, against 84 per cent last week. Poor gas coal has been the main cause of this reduction. Blast furnace operations show the greatest increase, gaining 11 per cent, to 80 per cent of capacity. Bessemer plants were 63 per cent active compared with 61 per cent the preceding week. By-product coke plants have been operated at 91 per cent. Freight congestion was the cause of an increase from 162,000 tons Jan. 1, to 194,000 tons Feb. 1, in southern furnace stocks of pig iron.

Export Ban is Effective

The constant accretions of war tonnage are holding unfilled orders on mill books to a very large volume. The question becomes pertinent as to what proportion of this tonnage over and above the several million tons of essential requirements may be regarded as liquid business, especially in view of the changing aspects of manufacturing operations. Directly bearing upon this point are the sweeping regulations requiring all exports to be licensed, which went into effect this week. That these restrictions will cause a further differentiation in iron and steel order books is apparent. The mills already are requiring export buyers to obtain licenses before orders entered for rolling are executed. An interesting new piece of war business is the allocation of 13,000 tons of heavy sheets for submarine chasers. Some of the large bolt business recently before makers has been distributed, including 18,000,000 for the general engineers depot. Under the revised design the airplane shelters for France will call for an increased tonnage of steel of about 100,000 tons, it is estimated.

Some recent departures in quotations from maximum price levels have been coming in for attention. In finished products, these have been chiefly in such lines as shafting, bolts, etc. Certain of these price irregularities have been linked up in some way with the warehouse schedule. Deviations in scrap also are reported and charges have been made that consumers here and there have paid more than recommended levels. Protests from consumers and sellers alike against the original schedule fixed under the auspices of the American Iron and Steel institute, are to be recognized by the putting out of a new list of price recommendations in scrap.

Iron Shortage Forces Action

The problem of pig iron supply presses more insistently with each passing week. In the east, the government has taken a hand in the serious shortage in standard low phosphorus iron for war production. It has arranged to have made from foreign ore in stock about 20,000 tons of metal for distribution to plants filling orders for essentials. Steps are being taken to bring in additional low phosphorus ore from Cuba. The supply of copper-bearing low phosphorus iron also has been endangered by the practical stoppage of shipments of pyrites from Spain. One of the Steel Corporation subsidiaries was the buyer of 10,000 tons of this grade of iron. An impending shortage of iron continues to be reflected by conditions in Pittsburgh, valley and lake territory. There leading sellers already are booked to within a small margin of full output for the last half and large requirements for companies in the district heavily engaged in war work remain uncovered, despite the urgent efforts of these consumers. Among these are steelmaking lots of something like 100,000 tons for one interest and 40,000 tons for another, which have become active the past week. A similar condition prevails in the east. Although sales of 30,000 to 40,000 tons of basic were made under pressure in the week, urgent inquiries for 100,000 to 125,000 tons remain unsatisfied. The uncertainty of the position of foundry and malleable buyers in the central west is reflected by the estimate that a former output of fully 40,000 to 50,000 tons monthly in these grades has been diverted to steelmaking iron. Sales of southern iron for second quarter and last half in Chicago and St. Louis districts have been large.

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EDITORIAL

Let the Real Facts Be Known

INVESTIGATION by the commerce committee of the senate into the workings of the shipping board has apparently centered at the present time into a probe of conditions at the Hog Island shipyard. President Wilson's request to Attorney General Gregory to institute a further investigation with a view of determining any criminal liability involved, may be expected to bring about a clear understanding of the facts in this case—something that the public has not been able to get from the committee's hearings.

The senators have found a great deal to criticize in the way the work at Hog Island has been done, in the form of contract given by the Emergency Fleet corporation to the American International Corp., the operator of the yard, and in the sums paid by the government for the "know how" which this company furnished. This phrase appeared as an explanation for the money expended by the government in paying the corporation for operating the yard. In other words, the government has been furnishing the money, the private company has been furnishing the organization.

Little information has appeared at the senate hearings regarding the other side of the story. The president of the American company in promptly pledging to Attorney General Gregory cordial assistance in the investigation, points out, for instance, the serious delay resulting from the dilatory action of the government in awarding the contract. The company was approached in May with the request to handle the job of building a shipyard and 120 ships in the shortest time possible. But the contract was not signed until Sept. 13. The estimates based on construction work during the summer months naturally fell far short of the mark when this work was delayed until winter. Material costs, of course, went up steadily. And throughout the negotiations, according to President Stone of the American International Corp., the government placed first emphasis on speed, with costs as an incidental feature. The compensation was set at not more than 3½ per cent of the estimated cost. This fee is to be divided among the company's associated firms expert in shipbuilding and engineering. And the excess profits tax must be deducted.

These items, as outlined by the company's president, lend themselves to an entirely different interpretation than those which have been coming out of the commerce committee's room. If the attorney general finds conditions as satisfactory as outlined by the officials of the American company, the apparent magnitude of the present "scandal" may be found to have resulted largely from the hypercritical attitude of some of the senators.

Germany Paying the Price

WARS are won and lost in many ways, but some factors entering into twentieth century conflicts of arms are of more vital importance than a great military victory. That Germany was industrially efficient and for 40 years prepared herself militarily now is generally conceded. Fresh evidences crop out once in a while, however, which show that, blinded by expectation of an early and easy victory, she took no thought of certain possible economic contingencies, and already she is beginning to pay the price of her mad rush into battle. Before the war many things came from Germany which it was commonly thought could not be made as well or as economically in the United States. This long ago became an exploded theory and in many lines American skill has superseded German proficiency.

As an example, witness the dye industry. Most complex in character, it is still the most thriving of infant industries in the United States. Before the war and for some time after it commenced, Germany was the chief source of dye supply. Upon that country all depended for "dyes which could not be excelled equalled or approached elsewhere". The United States furnished one of her chief markets and imported annually as much as $10,000,000 worth of aniline dyes alone. In 10 months of last year, however, this situation was changed radically. American ingenuity, enterprise and energy have turned to best account that which was waste material for the most part. Instead of importing German dyes, about $12,500,000 worth of dyes were exported by the United States, Great Britain being the largest purchaser. At present over 200 manufacturers of dyestuffs in the United States, representing a combined capital of $200,000,000, are working to improve the quality of their product and to co-ordinate the industry.

Great Britain likewise is busily engaged in the manufacture of dyestuffs since it captured 257 German recipes, which gave considerable impetus to the industry in that country.

This business, which the fortunes of war have

The Iron Trade Review.

EDITORIAL

wrested from Germany and diverted to the United States and Great Britain, will never be restored to its original hands. In a large measure it is lost forever to that nation that proudly claimed and held its proprietorship. "Made in Germany" has ceased to be a mark of quality and mastery in dye manufacture. It required war to arouse other nations to the proper appreciation of the great commercial as well as military value of the coal tar industry. Germany's folly in applying this spur of necessity has weaked herself and strengthened her enemies both for the immediate contests of arms and for those of trade which are to come later.

Nonessentials Feel the Pinch

CURTAILMENT in industries not essential to the prosecution of the war, if not already here, is bound to come. This is in spite of repeated avowals by government officials and others that no business is nonessential. Everyone admits practically every industry is essential to the men and the money invested. But that is neither here nor there when a war is to be won. It was the announced purpose of the Garfield order of Jan. 17 to halt all industry but only those that did not obtain exemptions were curtailed. The McAdoo railroad embargo is slowing up production in all lines not producing food, fuel and war essentials. The call to arms has taken a million men, and judging from the number of stars in the service flags flying over industrial plants the draft upon the forces of employes has been heavy. This, too, has led to some curtailment. The treasury department has urged bankers to help only such industries in the new financing as will contribute to the progress of the war. With conservation of at least 50,000,000 tons of coal essential to prevent recurrence next winter of the shortage now being felt; with investigation by the railroad administration of the advisability of issuing a list of commodities which shall not be affected by present and subsequent embargoes; with the labor department bending efforts to regulate the labor supply of every employer, whether he be Uncle Sam or not, and with the financial power of the country centering in actual war channels, it is clear some industries, partly at least, will be curtailed, and perhaps suspended indefinitely. The present business of the nation is war. Life and property, whether taken in battle or by draft, must bow to it. Nonessentials cannot escape curtailment if the nation is to follow to the end the course upon which it has set its feet.

Export Trade Yields to War

IRON and steel manufacturers cannot but be deeply interested in the President's proclamation of the extension of absolute government control to our foreign trade. The future of the domestic steel business undoubtedly is so interwoven with the future status of our export trade that steps which may hinder our progress in the foreign markets will be received with concern. Yet, it follows as a matter of course if such drastic action is deemed necessary to conserve vessel space for the transportation of troops and supplies to France, the trade will stand with the government, as in all other matters of large policy.

The administration's decision is described by some as being one of the most drastic steps yet taken by the United States in the prosecution of the war. It is asserted that the control will be tightened gradually until only the framework of the great structure of our foreign commerce, which amounted to $9,000,000,000 last year, will remain. Steel export houses, however, are not so pessimistic although they feel that this policy will increase the number of red tape difficulties of doing business.

The edge of this measure is dulled by the various other conservation measures that have been taken in recent months. First was the export embargo on certain steel products which became effective last August and which involved prolonged negotiations with Japan in the matter of ship plates. Since that time exporters have experienced much trouble in obtaining export licenses for various materials on the conservation list. Then came the traffic congestion and railroad embargoes, with resultant difficulties in obtaining railroad shipping permits. These conditions in themselves have prepared the export trade for the new control.

Steel exporters expect to feel the ultimate effects of the government's control to a lesser degree than some other branches of commerce, for iron and steel products and machinery are essential to the existence and progress of the nonproducing countries. It is not impossible that eventually the ships which bring us such essential materials as manganese ore, sodium nitrate and low phorphorus ore will carry back cargoes of steel and machinery. But such a condition is highly improbable. Before the government's transport needs can reduce our foreign trade to such a skeleton, our shipbuilding program will be far advanced and the war will be near an end with the emergency past.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 516

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered.	$250.00
Spiegel, 20 per cent fur.	60.00
Spiegel, contracts, furnace.	58.00 to 60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh.	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.80c to 4.90c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	5.715c to 6.215c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products February 20, average for January 1918, average for November 1917, and average for February 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Feb. 20, 1918	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Bessemer pig iron, Pittsburgh	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	33.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	31.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	34.50
Malleable, Chicago	33.50	33.50	33.50	31.25
**Southern, No. 2, Birmingham	33.50	33.50	33.50	24.50
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	33.00
Basic, eastern Pa.	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace	33.50	33.50	33.50	29.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	32.00
Ferromanganese, delivered	250.00	250.00	247.00	265.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	62.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	62.50
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	62.50
Open-hearth billets, Pitts.	47.50	47.50	51.00	62.50
Steel bars, Pittsburgh	2.90	2.90	2.90	3.00
Steel bars, Chicago	2.90	2.90	2.90	3.15
Iron bars, Philadelphia	3.50	3.648	4.335	3.259
Iron bars, Cleveland	3.64	3.64	4.00	3.00
Iron bars, Chicago mill	$3.50	$3,50	$4.10	$3.00
Beams, Chicago	3.00	3.00	3.00	3.38
Beams, Pittsburgh	3.00	3.00	3.00	3.25
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.75
Tank plates, Chicago	3.25	3.25	3.25	3.94
Tank plates. Philadelphia	3.435	3.435	3.435	5.009
Sheets, blk., No. 28, Pitts.	5.00	5.00	5.30	4.56
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.60	4.37
Sheets, galv., No. 28, Pitts.	6.25	6.25	6.50	6.50
Wire nails, Pittsburgh	3.50	3.50	3.50	3.00
Connellsville furnace coke	6.00	6.00	6.00	8.00
Connellsville foundry coke	7.00	7.00	6.60	6.50
Heavy melting steel, Pitts.	30.00	30.00	29.60	21.87
Heavy melting steel, eastern Pa.	30.00	29.80	27.50	20.50
Heavy melting steel, Chicago	30.00	29.70	28.50	21.65
No. 1 wrought, eastern Pa.	35.00	35.00	35.70	27.00
No. 1 wrought, Chicago	35.00	35.00	35.00	27.00
Rerolling rails, Chicago	35.00	35.30	35.70	25.63
Car wheels, Chicago	30.00	30.40	27.50	18.31

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 516)

Low Phos Shortage Forces Action

Government Directs Foreign Ore to Eastern Furnaces and Will Speed Further Importation—Shutting Off of Spanish Pyrites Endangers Supply of Copper-Bearing Iron—Huge Tonnage of Basic Uncovered

Philadelphia, Feb. 18.—By arranging for the utilization of foreign ore, the famine in standard low phosphorus pig iron is to be partially relieved. Two cargoes of high-grade Spanish ore which have been in storage at Pottstown, Pa., are to be worked up in one of the furnaces of the Eastern Steel Co., with coke to be furnished by the government. In addition, steps are being taken under the direction of Jay C. McLauchlan, in charge of pig iron distribution at Washington, to secure vessels to bring in additional low phosphorus ore from Cuba. The use of this foreign ore, it is expected, will result in the production of some 20,000 tons of standard low phosphorus iron. Of this, about 9000 tons are to be furnished to the Tacony Ordnance Corp. for manufacture into gun forgings for the government. Provisions also have been made for the maintenance of the regular domestic output of standard low phosphorus. The government has undertaken to provide coke for a New York state furnace, on this grade, the operations of which have been interfered with seriously of late. While the standard low phosphorus situation is being ameliorated, a new factor has arisen to threaten the continued maintenance of at least 50 per cent of the copper-bearing low phosphorus production. This is the practical cessation of shipments of pyrites from Spain, due both to the lack of ships and to the inability of the producers to obtain coal at reasonable prices. Prompt action by Washington, it is believed, will be necessitated if production is to be maintained. Among sales of copper-bearing low phosphorus iron is one of 10,000 tons to a subsidiary of the United States Steel Corp. Current inquiries call for more than 15,000 tons. Part of the pressing demand for basic for second half was relieved during the past week, two eastern furnaces taking 30,000 to 40,000 tons for large eastern consumers making steel for the government. The tonnage placed is only a fraction of what is wanted. Urgent inquiries for 100,000 to 125,000 tons for the remainder of the year continue unsatisfied. The Pennsylvania railroad wants 1000 to 2000 tons of charcoal for second half. Numerous sales of second half foundry, aggregating at least 25,000 tons, have been made by eastern Pennsylvania furnaces, in addition to those last reported, but most of the sellers now have withdrawn. All of the contracts, as far as known, contain a provision that the sale is void if the government price at the time of shipment is too low to allow a profit. Some of the contracts allow for cancellation by the buyer in case the government price is advanced.

Furnaces Well Sold Up

Cleveland, Feb. 19.—With the principal merchant sellers along the lakes and in the valleys now within a small margin of being sold up against normal output to Jan. 1, 1919, the continued appearance of large inquiries especially for steelmaking iron has intensified the problem of supply. The two leading interests in the city have little iron left after July, and Chicago merchant producers are reported to be in a similar position. One of these companies was a heavy seller in the week, booking 70,000 tons, principally in foundry and mal-

leable grades. Heavy new inquiries for basic have appeared, a western Pennsylvania user asking for close to 100,000 tons for last half and a northern Ohio works for 30,000 to 40,000 tons in addition to 4000 to 5000 tons of bessemer for the same delivery. In addition, various other tonnages for northern Ohio and elsewhere which have been out for several weeks still are uncovered. One northern Ohio melter has bought additional basic tonnage for the last half and a southern Ohio works also has closed for a future tonnage probably with a nearby furnace. Another local selling interest has continued to book freely the needs of regular customers for foundry and malleable for last half subject to government requirements. It is estimated a former production of at least 40,000 to 50,000 tons monthly of foundry and malleable in Cleveland and valley territory has been diverted from buyers of these grades by furnaces turning to basic. Many of these consumers now are in a difficult position as to forward supplies because of this condition. New government lots up for allocation include 2000 tons of prompt basic for St. Louis; 1000 tons of charcoal for an Illinois arsenal; 1500 tons of foundry for New Brunswick, N. S., and smaller quantities. Furnace operations still are irregular and output considerably below normal.

Car Shortage Big Factor

Boston, Feb. 18.—It is pretty much the same old story about pig iron in this territory. While there are probably very few melters who are not covered by contract for the first half, there are a good many who need considerable more iron for immediate use, and such lots as are offered are eagerly snapped up. Illustrative of the demand for prompt iron is the sale at the government price of a lot of 175 tons that ran 0.11 sulphur, with no penalty for the high sulphur content. The purchase probably was to replace scrap, which the foundries are not finding it easy to secure owing to the railroad situation, but there is no question but that several of the big New England consumers, though pretty well covered, would be glad to place orders if they would be accepted. One house reports that the booking of 50,000 tons would be merely a matter of getting in touch with the buyers. Actually, users are not making many inquiries as they realize the futility under present conditions. When the furnaces are in a position to accept business there is no question but that they will get all they can handle. Virginia deliveries still are at a standstill and the movement from the west has not improved much, for while the tracks are not blocked as badly as they were recently, there is a marked scarcity of cars. Deliveries from the Birmingham district are better. Notwithstanding this and the fact that the New England railroads have lifted their embargoes, the net results are disappointing to both shippers and consumers. At the moment, the car shortage is very acute because of the big drive to supply New England with coal, which is taking cars which otherwise might be available for the shipment of iron and raw materials. There continues to be a good deal of business in local by-product oven coke both to Dec. 31 and June 30, 1919.

Northern Makers Withdraw

New York, Feb. 19.—Several thousand tons of foundry iron for second half shipment have been sold in this district by an Alabama furnace. Otherwise the market has been quiet during the past week. Current sales comprise only spot lots urgently needed. Various northern furnaces have withdrawn on second half business and are taking only occasional tonnages, which regular customers insist upon placing. Many second half inquiries are waiting to be disposed of. Numerous export inquiries are current, including 5000 tons of low phosphorus for Canada. Makers are not quoting on this business owing to the stringency of supply that exists in this grade at the present time.

Buffalo Sells Good Tonnages

Buffalo, Feb. 19.—Though the pig iron industry is still hampered by most of the difficulties which have been worrying producers all winter, there has been a certain picking-up of business in some quarters. Operating difficulties have caused one large producing interest here to bank, leaving only one furnace going in this city and one outside of it. Hardly sufficient coke is being obtained for this sort of operation. The car shortage was very bad last week and there was a dearth of coal. Notwithstanding difficulties, one producing interest disposed during the week of 3000 tons of foundry grades. This was the largest aggregate tonnage sold by one producer. The demand for foundry and basic is good. Another interest negotiated a sale of 1000 tons of foundry in addition to smaller tonnages. These sales were for last half delivery, as this interest is practically sold out for first half. There has been some Canadian inquiry for basic and bessemer, but the producing interest to which these inquiries were addressed was unable to take on the contract. The inquiry is not quite so heavy as heretofore, due to the realization by melters that little iron is available.

Chicago Selling Active

Chicago, Feb. 19.—Inquiry for pig iron continues active and the leading producer is taking contracts steadily for last half delivery. With one producer able to supply only about half its usual tonnage for 1918, some melters are seeking to place their requirements elsewhere and it has become necessary to limit sales in order to spread the tonnage as far as possible among the regular customers. Melters who have not bought steadily from furnaces in this district find themselves practically unable to place their requirements. One interest has allotted all its last half production at the rate of about 50 per cent its usual sales to various users. Southern furnaces are not taking as large tonnages as usual and the effect of this is to throw a heavier burden on Chicago furnaces. The leading seller is booking tonnage on a basis of purchases for delivery during last half of 1917 and first half of 1918. Melters seeking to obtain more pig iron than is represented in their past purchases find themselves faced by this condition. This indicates there will be a shortage of iron for last half use unless southern furnaces are able to supply more than they seem willing now to contract. Even the most vigorous selling by southern makers may not avoid a severe stringency. An unusually heavy inquiry for malleable iron is being put out and it seems likely there may be a greater shortage in this grade than others. Silvery iron is practically unobtainable, but some bessemer ferrosilicon still is available. The Woodward Iron Co. is contracting with old customers for last half, limiting its sales to iron containing 1.75 to 2.25 silicon. Its contracts contain the revision and cancellation clause recently adopted by this company. One of the largest southern producers continues to sell tonnage for last half in the north without the cancellation provision.

Can't Satisfy All Demands

Cincinnati, Feb. 18.—Southern foundry iron is experiencing a lull although there are quite a number of inquiries for a last half tonnage being figured on. Under the terms of present contracts buying amounts simply to making reservation for a future supply with the odds favoring the furnaces in case there should be any downward revision of prices. Not all of the southern furnaces have participated

in the recent selling of iron for last half but it is estimated that the total tonnage to be offered later, by no means, can satisfy all demands. Both producer and consumer realize clearly that there will not be enough iron to go around, even if production is speeded up to full capacity.

Few Sales Are Made

St. Louis, Feb. 16.—The demand for pig iron in this district continues on a broad scale but actual transactions are light. Representatives of leading producers in all directions report that for the moment their allowances have about run out, and they are not in the market. Spot transactions are confined to a few scattering cars, mainly of southern foundry grades. Some improvement in deliveries on contract material is noted, especially from the north. Congestion in the local terminal has loosened up and the mills and foundries are getting more shipments.

Ship Iron More Freely

Pittsburgh, Feb. 19.—Shipments of pig iron are being made more freely, it having become easier during the past few days to obtain permits from the railroad embargo committee. Production also is increasing gradually and promises to show a marked improvement within the next week owing to the greater supplies of coke being received. The Carnegie Steel Co. now has 36 of its 59 furnaces in operation and expects to add three tonight to its active list. Fourteen furnaces are being repaired, occasion having been taken by reason of the shortage of coke to blow this number out and put them in good shape. Considerable inquiry is being made for iron, especially the steelmaking grades, for last half delivery. Two inquiries out in this district involve approximately 10,000 tons of bessemer and there is a standing call for basic tonnages. There is also a considerable tonnage of foundry iron under informal negotiation. Other inquiries involve between 5000 and 10,000 tons of both foundry and malleable. Actual sales have not been numerous. Some merchant interests are fully committed for the last half. Basic appears to be exceedingly scarce. Some producers who have limited tonnages of bessemer and greater quantities of foundry for last half, have sold all their basic. The Westinghouse Electric & Mfg. Co. has not yet closed for a round tonnage of foundry and a small lot of bessemer for second half. A Wheeling, W. Va., buyer, as far as known, has not placed 5500 tons of foundry and 2500 tons of low phosphorus.

Report Coke Pool Dropped

Opposition of Furnace Interests to Proposed Plan of Concerted Distribution is Effective—Conditions Clearing Up

Pittsburgh, Feb. 19.—Reports have been received here that the federal fuel administration at Washington has abandoned its plan to pool coke in the Connellsville region. This proposal was strongly opposed by blast furnace interests and the railroads themselves are said not to have been insistent upon its adoption. The question has been under discussion between the fuel administration, railroad representatives, blast furnace interests and coke operators since early in December. Makers of pig iron have opposed the pooling plan on the ground that it would compel them to use grades of coke with whose analysis they are not familiar and which are not suitable to their usual practice. Receipts of coke were increased considerably during the past week and there is much less complaint from consumers on account of the shortage of fuel. The car supply, however, continues to be insufficient, although it was expected that returning empties should have largely overcome the shortage by this time. The supply today on the Monongahela railroad was estimated at only 30 per cent, as against between 60 and 70 per cent yesterday. The supply on the Pennsylvania railroad has improved appreciably. The congestion in the coke region is entirely cleared up on the lines of the Pittsburgh & Lake Erie railroad and is greatly relieved on other roads.

Sells Heavy Tonnage

New York, Feb. 19.—The New England by-product cokemaker has sold fully 100,000 tons of foundry coke for delivery through the remainder of this year and for the 12 months ending July 1. Consumers now appear to have closed on their requirements as far ahead as they desire.

Furnace Request Denied

Philadelphia, Feb. 18.—The request which eastern Pennsylvania blast furnace owners recently made of A. H. Smith, assistant director general of railroads, that the Pittsburgh & Lake Erie railroad be ordered to withdraw its restriction against the removal of coke cars from its own lines, has been refused. The Pittsburgh & Lake Erie showed that the movement of cars on its own lines is 35 miles per day, compared with a much lower average daily movement upon eastern trunk lines. Hence it was decided that even if such a policy results disadvantageously to eastern blast furnaces, its continuance would prove beneficial to shippers along the Pittsburgh & Lake Erie and thus aid in the general freight betterment.

Shipments More Regular

Cincinnati, Feb. 18.—Shipments from the Connellsville field are moving forward with a little more regularity but the demand for furnace coke is yet very urgent. The few days of mild weather last week aided the railroads materially and while the situation has improved the relief afforded is not sufficient to enable pig iron producers to operate their furnaces at full capacity. Reports from Wise County and Pocahontas fields are not as encouraging as from the Connellsville district, but the labor situation in these two fields is in much better shape. The local foundries are more hopeful of getting enough coke ahead so that they will not have so much uncertainty as to the future operation of their plants. The present stage of the Ohio river does not interfere with the movement of cars across the river, as was the case ten days or two weeks ago when sidetracks on both banks were under water.

Shipments More Normal

St. Louis, Feb. 16.—The higher temperatures this week have served to brighten up the coke situation here. Deliveries on contract material from eastern ovens have been more satisfactory than at any time since the acute railroad congestion set in. There has been notable improvement in the terminal tie-up at this gateway and cars of coke are moving across the river with a fair amount of regularity.

Alabama Production Good

Birmingham, Ala., Feb. 19.—Coke production in Alabama is keeping up well and shipments are taking the full output. Apprehension prevails that labor disturbances in the coal fields is likely to cause a deflection in the coke output. Independent coke producers are busy. The New Castle Coal Co. is shipping on a 3000-ton order to Carrizal, Chile, for a smelting plant. The furnace demands in this state are heavy while foundries and machine shops throughout the south, southwest and southeast are calling on this district for fuel.

Scrap Buyers Are Awaking

Interest of Consumers Grows as Transportation Tieups Are Untangled—Some Price Evasions Receive Committee's Attention

FOR COMPLETE SCRAP PRICES SEE PAGE 516

Buffalo, Feb. 19.—Scrap dealers in this district still continue to do little else but hope for the best. The weather at this time appears to be steadily moderating and dealers soon may be in a position to proceed with their ordinary business. Stocks in dealers' yards are practically negligible and these have been practically stationary under recent conditions. The shortage of heavy melting steel has been the means of boosting to practically heavy melting steel prices all grades of steel scrap. Some consumers who have heretofore not used steel turnings are in the market for this grade. As the production of steel turnings from shells will be very heavy in a short time, there is reason to believe that the scarcity of heavy melting steel will be partially made up in this way. The elementary difficulty in this comes in the fact that so much scrap is being lost on account of the number of shells and munitions going to Europe which when shot away becomes unavailable for scrap augmentation. Scrap dealers say the nation faces the situation of about two years ago when the production of shells and increased volume of munitions for Britain and France began to intensify the scrap stringency in this country. Later the supply climbed again when the factories of the allied countries began to take over the burden of production. Some interests intimate government prices are being observed less rigidly. Attention has been called to shipments of shoveling machine shop turnings going to a steel consumer at Pittsburgh at $3 to $4 above the government price.

Better Tone in New England

Boston, Feb. 18.—The market for scrap is doing better as a result of an improved shipping situation. At the same time, the industry is not yet "out of the woods" in the matter of deliveries. There is no question but with really normal railroad conditions, a good deal more business might be passing. It is believed, however, such improvement as has come about is permanent. Prices do not change much, but the tone of the market is decidedly firm. The foundries want cast scrap. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought No. 1 yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $21 to $22; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $27 to $28; steel rails, $26 to $27; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $13 to $16; cast borings, $16 to $17; drop forge trimmings, $21 to $22; cast-iron car wheels, mill price, $35 to $37.

Eastern Inquiry Improves

Philadelphia, Feb. 18.—Interest in iron and steel scrap has improved greatly during the past week. Although the aggregate of the business closed was small, it was fully double that of any previous week during the past couple of months. In addition, a number of important consumers seem to be on the verge of taking on large tonnages, particularly of heavy melting steel, wrought scrap and No. 1 machinery cast. Incidentally, there is not much disposition among scrap dealers here to regard $30, delivered, as the maximum price on heavy cast scrap for foundries. This point is expected to be cleared up by the recently appointed subcommittee on scrap of the American Iron and Steel institute. In the meantime, No. 1 machinery cast is being sold to foundries at $34 to $35, delivered. The transportation situation is much better.

Gradually Lifting Obstacles

New York, Feb. 19.—Improved weather conditions and better shipping facilities have added much to the general optimism of the New York scrap market. The obstacles to trading, which have been in evidence during the past few weeks, are gradually being removed, and a freer handling of material is in evidence generally. Recently, the Philadelphia & Reading railroad lifted its embargo on iron and steel scrap. Although this is the only instance of where an embargo has been lifted, the Pennsylvania and several other railroads are much freer with their permits. As a result of this improvement in shipping conditions, consumers now are concentrating their efforts considerably to obtaining back shipments; however, new demand is holding up in good volume. Prices generally are steady, a change being noted in only two instances. Machine shop turnings and clean cast borings have dropped off 50 cents, and are now holding at $16.50 and $17, respectively.

Slightly More Active

Pittsburgh, Feb. 19.—Slightly increased activity is reflected in the market for old material. Brokers and dealers are reluctant about making sales on account of the difficulty experienced in obtaining and shipping scrap, but it seems evident that large consumers more freely than previously have been buying direct from producers and also from the smaller middleman. This apparently explains in part the difficulty being experienced by the larger brokers and dealers in getting material. While large tonnages have not been involved, sales made have been rather numerous. The principal grades which are in demand include heavy melting steel, guaranteed low phosphorus, heavy cast scrap, cast-iron borings and machine shop turnings.

Heavy Steel in Demand

Cleveland, Feb. 19.—Open weather the past week has materially stimulated trading in iron and steel scrap in this district. Melting steel is in great demand, but while almost any quantities could be sold, producers are not letting go of it. A melter at Canton, O., is inquiring for an unstated tonnage of heavy melting and shoveling steel. One sale of 500 tons of defective shrapnel shells has been made at $40. One of the largest scrap-consuming interests in Cleveland has laid down the rule that hereafter it will refuse to pay the 3½ per cent commission on carload lots or so of scrap; only when the lot runs up into a thousand tons or more will the commission be forthcoming. Permits for railroad shipments are coming much more easily, but no tonnages are being shipped. Consumers apparently are seeking to buy for future as well as present needs, but prices have remained practically stationary.

Chicago Trading Light

Chicago, Feb. 19.—With lack of fuel and interrupted railroad communication causing intermittent and shortened operation of most plants, demand for and production of iron and steel scrap has been lessened materially over the past six weeks. This has had the effect of limiting the volume of trading and the market has not yet regained its usual condi-

tion. Better railroad conditions and resumption of six-day operation already has brought about somewhat better demand and larger offerings. It is believed that within a short time ordinary conditions will prevail. However, there promises to be something of a shortage of scrap, which is being manifested now, and dealers find it difficult to obtain as much material as they desire. Various grades are in much smaller supply than usual and some consumers are seeking more than dealers are able to supply. Increased activity of railroads is bringing about delivery of much scrap which was snowed in and badly delayed and this is giving melters a better supply than they have had for some time.

Consumers More Interested

Cincinnati, Feb. 18.—Dealers are a little more hopeful of the early disappearance of, at least, some of the transportation difficulties that prevent the movement of any scrap to the large consuming centers. Melters seem to be taking more interest in the market, and are more inclined to provide for their future requirements. So far negotiations along this line have not developed into any large contracts, as far as is known.

Await Ruling on Questions

St. Louis, Feb. 16.—The more important consumers of scrap are showing somewhat more interest since the first of the month but generally the market continues quiet. Complaints relative to delayed shipments still are numerous, though this week has been marked by some improvement. It is thought that with a few days more of open weather, the transportation problem will be disposed of. Considerable local interest has been expressed in what action the new scrap committee may take on pressing questions put up for its consideration.

Further Weakness in South

Birmingham, Ala., Feb. 19.—Further weakness has developed in the scrap market, though southern consumers have been buying steadily. Embargoes still are preventing much shipping of old material to the east or north. Promise that better transportation will be available in every direction in the near future gives some encouragement. Stocks in this district are ample and almost all demand can be met. The quotations remain as last week, but negotiations here and there are being concluded at a lower price than those given. Some of the consumers in this section have accumulated considerable stock on their yards.

Steel Shipments Heavier

Buyers However, Remain in Difficuties to Supply Wants—Shell Discard Offerings Less—Slabs Are Allotted

Pittsburgh, Feb. 19.—After remaining out of the market for a long period, the automobile trade has begun to put out inquiries for tonnages of cold-rolled strip steel for pleasure car construction. The demand has not developed into one of much activity, but on account of improvement in the railroad situation, together with the fact that consumers apparently have almost exhausted their stocks, it has been accepted as an encouraging sign. Producers are in a position to take care of demands of buyers and to make good deliveries now that they have been able to restore heavier operations. The government continues to take tonnages rather freely. Manufacturers say that operating costs have increased on account of prices they have to pay for materials and labor and also due to heavy overhead charges arising from idle capacity. The price of 6.50c, Pittsburgh, is said to leave only a narrow margin of profit, and in view of this situation, makers point out that there is no prospect of the level being reduced voluntarily, and they do not think the government will take action along this line.

Shipments are Better

Pittsburgh, Feb. 19.—Shipments of billets and sheet bars to consuming mills have increased during the past week and the production also is somewhat greater. Sheet and tin-plate makers particularly have been in need of larger supplies of sheet bars, the former having suffered acutely on account of the shortage. Requirements for billets and sheet bars are heavy, but inquiries have not been numerous because consumers have realized their inability to cover their needs. With the improvement in the traffic situation and in production, deliveries which have been deferred are expected to go forward more freely, and it is believed there will be a renewal of many inquiries.

Western Makers Sell

Philadelphia, Feb. 18.—Shell discards which last year were offered plentifully on the market, constantly are becoming more difficult to obtain. The mills are finding special uses for them. One mill is using them for rolling sheets which answer certain purposes very well. Numerous sales of semifinished steel have been made here during the past couple of weeks, but with only a few exceptions they involved small tonnages. The largest sale was one of several thousand tons of special quality forging billets. All of these sales are being made by middle western mills, as eastern makers have no steel to spare.

Demand for Offgrade Steel

Buffalo, Feb. 19.—There is quite a demand for offgrade shell steel, billets, slabs, etc., in this district. One producer sold 200 tons during the past week.

Receive Slab Orders

Cleveland, Feb. 19.—Producers of semifinished steel in this territory continue to receive government allotments for finishing mills which are rolling orders for the government. A tonnage of slabs has just been placed to cover plates needed by lake shipbuilders which are to be rolled in this territory. Various sheet and tin plate mills continue in need of sheet bars for regular business. They are not hesitating to pay full prices for off-heats. Billet buyers are doing the same. Shell steel discards are being sold at around $47.50, mill.

Jobbers Supplies

Are Cut Far Below Normal—Mill Deliveries are Deferred

Cleveland, Feb. 19.—Tin plate mills operated at only 51.4 per cent of capacity during January, and this condition is reflected in the jobbing trade, where great difficulty is being found in meeting the needs of old customers. Jobbers already have been limited to only 40 per cent of their normal yearly requirements. Deliveries of tin plate scheduled for November will not be completed until the end of the first quarter and deliveries for the first quarter have been deferred to the third quarter, by one jobber. A scarcity of blue annealed sheets also prevails in the local markets.

Mill Deliveries Poor

Boston, Feb. 18.—Business at the local warehouses continues to be hampered by the lack of deliveries from the mills. Neither the improved railroad situation, nor the lifting of embargoes by New England roads has as yet resulted in local jobbers getting much needed supplies of tin plate to their warehouses.

Bar Sales Are Restricted

Recent Production Loss is Factor and Open-Hearth Material Scarce —Price Irregularities in Shafting and Bolts

Chicago, Feb. 19.—Practically nothing is now being booked by steel bar producers for any buyer except the government or manufacturers engaged on government work who obtain their raw material supply through preferential orders. The same condition obtains as to shipments from mill. Buying of shell steel and material for gun carriages was done largely several weeks ago and little tonnage for these purposes is being placed now. Present allotments by the government are mostly for shipbuilding purposes, chiefly plates and shapes with a comparatively small tonnage of bars. The leading independent in Chicago is out of the market and will not resume selling until it is able to determine how much tonnage will be available for second quarter. With tonnage already on books for first quarter in excess of finished capacity, it is feared second quarter tonnage will be largely absorbed. The bar iron market continues to be a spot proposition, with small tonnage being booked constantly for delivery in 30 to 60 days. Considerable bar iron is being taken for use in place of steel, which cannot be obtained. Bar iron mills have lost much time from shortage of fuel, which still continues. Part of a large tonnage of iron for wagon tires has been placed but the remainder still is pending. Hard steel bars rerolled from rails are quiet with mills operating about half time. Bed and agricultural implement manufacturers are the largest consumers with reinforced concrete builders still out of the market. Comparatively small tonnages of rerolled rails are entering the market and some mills are short of this material. The Northwest Steel Co., Seattle, has received 2000 tons of rivets from the Erickson Engineering Co., Seattle, covering a government ship contract.

Demand Not Heavy

Pittsburgh, Feb. 19.—Demand for steel bars in this district is not heavy. While operations of mills have been greatly curtailed on account of the railroad situation and the shortage of steel, slight improvement in these respects has taken place during the past week, and producers are expecting to reach a point soon where they will make good headway in catching up on deferred deliveries. Some makers are taking orders subject to shipment at their convenience. It is generally the rule that large producers can take on no business in open-hearth steel except for war orders, and any commercial bookings in merchant steel at present are of bessemer. Makers of iron bars are well committed on orders and some of them are not taking new business. Operations on government requirements are heavy.

Start New Bar Mill

Buffalo, Feb. 19.—The Donner Steel Co.'s new bar mill will start operation some time during the next two weeks. It is expected that deliveries will be begun after April 1. The mill's capacity will be 400 tons a day. Bar inquiry has been good in this district and some sales have been made but traffic restrictions during January and thus far in February have caused a congestion of government orders, hampering commercial sales.

Car Shortage Relieved

Pittsburgh, Feb. 19.—Shortage of cars has seriously interrupted operations of nut, bolt and rivet makers. The car congestion, however, which has been existing at plants, has been greatly relieved, and it is believed a better supply soon will be available. In that event producers will be able to maintain heavy operating schedules inasmuch as they have considerable business on hand.

Price Matters Claim Attention

Cleveland, Feb. 19.—Some renewed efforts have been made by the nut and bolt makers in this district to induce the mills to revise high-priced steel bar contracts to the basis of government prices. As previously noted, however, the mills have taken a strong position against the rewriting of bar contracts, notwithstanding the fact that the nut and bolt makers have adjusted prices in old contracts for their products to the fixed level. A local maker has received a large order for bolts from the government and now is covering for its steel. Some new war business in rivets also has been distributed locally. It is understood there has been some deviation from maximum bolt prices in recent quotations to the government. Price irregularities which also appeared in the shafting market are less in evidence. Some sellers were cutting prices to the extent that quantity differentials were being omitted and warehouse shipments were being made at mill prices. Some sellers continue in a position to furnish bessemer bars and merchant steel in the open market, but their open-hearth output is being absorbed by the government. A new inquiry for about 1000 tons of spring steel for motor trucks is current. The Trussed Concrete Steel Co., Youngstown, is the low bidder on 4480 tons of reinforcing steel for the general engineers depot of the army.

Revision Talk Checks Buying

Pittsburgh, Feb. 19.—Talk of revision of prices by the government on April 1 has checked buying of hoop steel, although demand continues fairly active. Makers say the present price of 3.50c cannot be consistently reduced and profess to believe it will not be cut. The market for bands is dull.

Heaviest Demand

In History Expected for Spring Pipe —Cities Buying Little

Pittsburgh, Feb. 19. — Operating schedules of pipe mills in this district have been increased considerably during the past week. A number which were down owing to a lack of coal have resumed, including those of the A. M. Byers Co. Demand for lap weld tonnages is brisk and comes principally from the oil trade. Requirements to be put out this spring promise to be greater than ever before in the history of the trade, and it is stated that those who delay making inquiries will be unable to cover their needs. Mills are confining their efforts to the supplying of their regular customers as a general thing. In instances where large tonnages are involved some producers can only promise delivery at their convenience. This is due to interruptions that have affected rolling operations. Car lots for jobbers, however, can be delivered in good time.

Demand in Fair Volume

New York, Feb. 19.—Demand for cast iron pipe continues to come out in fairly good volume in this district. The government is the biggest buyer, although a good sprinkling of private business is in evidence. Public and municipal work, however, remains dull. Among recent export inquiries are 700 tons from a New York commission house for South America. In addition, several smaller inquiries have come out lately from Central and South America. The difficulty in obtaining vessels continues a big retarding factor in the transaction of foreign

business. Although some slicing of prices has been noted in a few instances when the tonnage involved was particularly desirable, quotations generally are steady at the level set by the government several weeks ago.

West Takes Small Tonnage

Chicago, Feb. 19.—Comparatively little cast iron pipe is being sold and inquiry is much below ordinary demands at this period of the year. Larger cities are taking practically nothing compared with ordinary demands and as a rule extensions are being limited to absolutely necessary work on account of present high prices. Bids will be opened Feb. 19 at Great Falls, Mont., on 150 to 200 tons, and at Rockford, Ill., Feb. 20, on 450 tons. The American Cast Iron Pipe Co. has been awarded 1400 tons at Minneapolis, but awards have not yet been made for St. Paul and Milwaukee.

Labor Troubles in South

Birmingham, Ala., Feb. 19.—Labor troubles are threatening the foundries, machine shops and mills in the Birmingham district and already one of the plants of the United States Cast Iron Pipe & Foundry Co. at Bessemer has curtailed operations.

Priority Given

To Tin Plate Causing Some Easing of Mill Congestion

Pittsburgh, Feb. 19.—Priority shipments have been given to tin plate to be manufactured into cans for perishable food products. The order was issued by Railroad Director General McAdoo and is partially in operation, but it will be fully in effect within the next day or so when all of the railroads will have received official notice of the issuance of the order. Some relief has already resulted from the order, shipments being made from stocks in warehouses whose capacities had almost become exhausted, a situation which threatened to again greatly curtail operations of tin mills.

Canners Are Alarmed

Yungstown, O., Feb. 20.—Shipments of tin plate are being made westward, but in order to ship east permits first must be obtained by the buyer. Light tonnages are going eastward under this condition. Pig tin is scarce but makers in this district say they are fairly well stocked. At the Boston meeting of the American Canners' association, held last week, it developed that a majority of the canmakers are becoming alarmed over new governmental orders concerning exports.

Lose Much Plate Output

Eastern Mills Still Crippled by Lack of Gas and Coal—Lukens Plant Idle, Can't Accept War Orders

Philadelphia, Feb. 18.—Production of plates during the past week was restricted to even smaller proportions than previously by the lack of gas coal. One of the most important eastern Pennsylvania makers, the Lukens Steel Co., has not produced a pound of plates since Feb. 9, and still is shut down for lack of fuel. Other makers either are shut down or are operating spasmodically. Inasmuch, however, as the moderating of the weather has resulted in much better transportation conditions, a materially better supply of coal and other raw materials, is expected to be maintained shortly. Heavy demands for plates are coming from boiler manufacturers and other users, who, in most cases, are working on orders either for the government or for companies making government materials. The mills are utterly unable to take on this business. Further orders continue to be placed by the Emergency Fleet corporation.

Expect More Car Orders

Pittsburgh, Feb. 19.—No orders for cars were placed with makers in this district during the past week. While it is believed that additional rolling stock will be bought in the near future, it is not certain as to whether the purchases will be made by the government or by the railroads themselves. The plate market is not active and the limited number of offerings which have been made recently by smaller producers appears to have grown less.

Ship Demand Insistent

Chicago, Feb. 19.—Demand for steel plates for shipbuilding purposes is absorbing practically all the steel plates now being rolled, with the exception of a few sizes and the government continues to place large tonnages with all makers. Heavy tonnages are being ordered for the Pacific coast shipyards and smaller lots are being awarded for shipment to fabricating plants located in the east and middle west to be used in preparing material for ships for Atlantic coast and Gulf shipyards.

Making Electric Steel

The Fulton Steel Corp. now has in operation at Fulton, N. Y., one heroult electric furnace with a capacity of 17 tons a day. Irving R. Valentine, chemist and metallurgist, who is in charge, formerly supervised the production of high-speed steel in the heroult electric furnace plant of the General Electric Co., Schenectady, N. Y. The Fulton Steel Corp. expects soon to install another electric furnace to bring the daily capacity to 50 tons.

Labor Shortage

And Other Factors Restrain Wire Output—Bolt Stock Wanted

Pittsburgh, Feb. 19.—Increased output of wire and wire products has been made by some mills and promises to be extended to others in this district beginning with the present week. Mills either have been down altogether or have been operated only intermittently for some time on account of the scarcity of steel and fuel and the transportation situation. Some employes who were made idle by the shutting down of plants have taken up other work and this has caused a shortage of labor at wire mills. Since the improvement in traffic conditions has set in, the difficulties in other respects are expected to be overcome in part at least. Coal is being received from river mines and this will mean heavier blast furnace operations through by-product coke. Large tonnages of steel required for government work which ordinarily would go to wire mills have been diverted. This has resulted in a sharp curtailment of production of wire and wire products. Some authorities doubt seriously that the production in this line can be increased sufficiently to fully meet requirements of commercial buyers. The use of discard steel is being looked to as a source of relief.

Bolt Wire is Wanted

Cleveland, Feb. 19.—A local manufacturer who has received a large order for the government has inquired for 1000 tons of bolt wire suitable for making ⅜-inch bolts. Other inquiries for bolt stock are coming out from time to time. Little business for spring distribution yet is moving in wire nails, but this is expected to broaden in the near future. The wire and nail mills of the American Steel & Wire Co. in this district gradually are resuming, but production still is far below normal.

Hangar Tonnage Increased

Sheeters in France Under Changed Design Will Require 100,000 Tons of Structurals—Magazine Buildings Planned

Philadelphia, Feb. 18.—Distribution by the government of orders for the steel for 2500 airplane shelters for France is being held up as a result of a change in design. Some of these buildings are to be of heavier sections than those originally specified, so that instead of 87,500 tons, about 100,000 tons will be required for the entire work. With the exception of these buildings, the structural market here is featureless. Plain shapes continue to be sold at government prices but the tonnage embraced in current business is small.

Bridge Work Placed

New York, Feb. 19.—Conditions in the structural market in the metropolitan district remain dull. There is almost no demand whatever for plain shapes except for the government requirements. Railroad bridge business has figured more prominently in the week's business. The Pennsylvania placed 850 tons and wants 1400 tons additional.

Fabricators Seek Turnbuckles

Pittsburgh, Feb. 19.—Fabricators who have been awarded contracts for the 2500 hangars for shipment to France have put out inquiries for turnbuckles, of which between 80,000 and 90,000 will be required. The seven 820-foot radio towers to be erected in France will require about 3000 turnbuckles. Government business completely dominates the structural market and continues to involve large tonnages.

Need Steel for Magazines

Cleveland, Feb. 19.—The government is expected to put out an inquiry in the near future calling for the construction of a large number of magazine buildings in France. It is estimated that perhaps 25,000 tons of steel will be required. Some of the fabricating shops have shown a preliminary interest in looking around for material for such an undertaking. At least three structural shops in this and surrounding districts are fabricating tonnage for the Emergency Fleet corporation and negotiations for the tonnage of a fourth plant are under way. General building work remains lifeless.

Western Mines Buy

Chicago, Feb. 19.—Contracting for steel shapes in the west continues to be confined to needs of industrial concerns, and during the past week the only tonnages involving 100 tons or more have been for mining purposes. The Calumet & Hecla Mining Co. has placed 592 tons with the American Bridge Co. for its plant at Lake Linden, Mich.

CONTRACTS PLACED

Bridge over the Genesee river, Rochester, N. Y.; 1000 tons; to the Bethlehem Steel Bridge Co.

Extensions to the plant of the White Motor Car Co., Cleveland, about 500 tons, to the King Bridge Co., Cleveland.

Flotation plant for Calumet & Hecla Mining Co., Lake Linden, Mich., 406 tons, to American Bridge Co.

Eleven Dorr thickener tanks with three steel conical trays for each, for Calumet stamp mills of Calumet & Hecla Mining Co., Lake Linden, Mich., 186 tons, to American Bridge Company.

Coal tipple for mine No. 4, for Superior Coal Co., Gillespie, Ill., 107 tons to independent shop.

Bridge work for the Pennsylvania railroad, 850 tons, to independent shops.

Alcohol plant at Tyrone, Pa., and Mechanicsville, N. Y., for West Virginia Pulp & Paper Co., 1000 tons to Hays Foundry & Iron Works.

CONTRACTS PENDING

Double-leaf bascule bridge, Seattle, Wash.; 915 tons of steel and 63 tons of reinforcing bars; bids to be received up to March 8.

Addition to League island navy yard, Philadelphia; 600 tons; bids to be taken Feb. 28.

Bridge work for the Pennsylvania railroad, 1400 tons, bids being taken.

Rail Orders

Placed by Eastern Buyers Quote Trunk Lines $55 to $57

New York, Feb. 19.—The first rail order placed by an eastern railroad for some months is that for 3000 tons of standard open-hearth sections closed by the Cumberland Valley railroad with the Cambria Steel Co. About 10,000 tons in all were included in rail sales of the past week. Standard rail prices now being quoted to trunk lines are $55, mill, for bessemer and $57, mill, for open hearth. Smaller roads and industrial buyers are paying from $60 to $70, mill.

Open-hearth rails are exceedingly difficult to get. Bessemer rails are to be had with greater freedom. One mill, in fact, now is in a position to take on orders for 30,000 to 40,000 tons of bessemer rails.

The Peking-Mudken railroad in China has placed an order for 14 locomotives through the Baldwin Locomotive Works. The American Locomotive Co. has booked 20 locomotives for the South African railways; 25 for the South Manchurian railways; one for the Hudson Coal Co.; 25 for the Missouri, Kansas & Texas; 13 for the Central of Georgia railway; and one for the Delaware River Steel Co. The Western Pacific has specified five locomotives on orders received some months ago by the American Locomotive Co.

Jobbers Increase Inquiries

Pittsburgh, Feb. 19.—While the lots sought are small in most instances, jobbers have come into the market more freely for small spikes. Numerous inquiries for quantities from 200 to 500 kegs are pending. Some producers are not quoting on this business, while those who are doing so are promising deliveries in from eight to 12 weeks. Shipments have been held up on account of railroad embargoes, but the situation improves.

Buy No Cars or Rails

Chicago, Feb. 19.—Practical cessation of car and rail buying is noted in the west. The only cars placed recently are 4500, ordered by the United States government for use in France, and nothing but small orders here and there are now pending before builders.

Ore Troubles

Cause Curtailment of Ferro Production—Ferrosilicon Prices Break

New York, Feb. 19.—Difficulty in obtaining deliveries of manganese ore is beginning to interfere with operations of eastern blast furnaces making ferromanganese. One maker, due to a depleted supply of high-grade ore temporarily is producing 40 per cent ferromanganese. In addition, practically all makers have suffered from the scarcity of coke. As a result, stocks of ferromanganese available for spot shipment are smaller than usual and the market is correspondingly strong at $250 delivered for all positions. Inquiries are more numerous but the aggregate tonnage is small. The largest inquiry is from a western consumer for 250 tons.

One of the chief developments of the past week was an interesting break in prices on 50 per cent ferrosilicon for forward delivery. Inclination in certain circles to a belief that prices shortly may be fixed by agreement with the government, and the desire to book future tonnage at the present attractive price, is believed to be the reason for this break. An eastern Pennsylvania consumer bought

500 tons for May-January delivery at $155, delivered. Several offers were made at this price. The market on spot continues strong and is quoted at $175 to $180, delivered.

Makers of spiegeleisen are inclined to ask higher prices. One important seller who has closed several contracts lately at prices ranging from $58 to $60, furnace, now has advanced his minimum to $65. Another maker continues to adhere to a $75 minimum. Other sellers continue to do lower. The Whitaker-Glessner Co. has not yet closed for its inquiry for 12,000 tons. A Chicago buyer wants 700 tons.

Manganese Ore Sold

Philadelphia, Feb. 18.—Several good-sized tonnages of high-grade Indian manganese ore have been sold here during the past 10 days around $1.30 per unit at tidewater. In all cases the steamer has been named so that shipment is assured.

Ferrosilicon in Demand

Pittsburgh, Feb. 19.—Increased demand is current for 50 per cent ferrosilicon. One consumer has sounded out the market for an indefinite tonnage and apparently is in a position to take between 500 and 1200 tons for the remainder of the year. A figure of $150, delivered, is said to have been quoted by one maker. The spot market for sizable tonnages appears quotable at $185, delivered. Small lots for March shipment have been sold at $200, while a few tons have been marketed at $225. Some consumers are asking makers to insert a clause in contracts providing that deliveries after the first quarter shall be made subject to government price revision. Producers apparently have no objection to doing this, but consider it unnecessary. Some producers think such a clause might be beneficial to them because the government price might be fixed at a level higher than in the contract. The general belief is, however, that the government will not fix prices on the higher grades of ferroalloys. Demand for 20 per cent spiegeleisen is active, and spot sales are being made at $60, furnace. The market for 80 per cent ferromanganese is not active. This alloy is quoted at $250 to $255, delivered, for early shipment.

Chicago Ferromanganese Firm

Chicago, Feb. 19.—Strength continues in ferromanganese from the local stack and in spite of difficulty in obtaining ore, the quotation has not advanced from $250 per ton, furnace. However, makers are backward about taking much additional tonnage until the matter of ore is better understood.

Place Sheets For Chasers

Northern Ohio Maker to Furnish Ford With 13,000 Tons—Allot Second Quarter Tonnage in Galvanized

Cleveland, Feb. 19.—An interesting new allotment of war business is represented by the placing of 13,000 tons of sheets with a producer in this district for shipment to the Ford Motor Co., Detroit, by which they will be fabricated into the new type of submarine chasers. Practically all of these sheets are to be of No. 8 gage. Another war inquiry which has been before local sellers in the week involves 500 to 1000 tons of 6 to 16-inch powder cans for the navy. Makers of light plates and sheets continue to quote 4.20c, Pittsburgh, on 3/16-inch thickness under the schedule of sheet prices. Middlemen are finding it difficult to get quotations from the mills except on war business and for requirements of the implement trade.

Offerings Again Plentiful

Philadelphia, Feb. 18.—Sheets, for the first time in months, are being offered here plentifully. Black, blue and annealed may be had from middle western makers for delivery within two months. Considerable business is being placed, although no single large sales are reported. Consumers, as a rule, are well covered for first quarter and it is only in additional or emergency requirements that they are interested at this time.

Open Second Quarter Books

Pittsburgh, Feb. 19.—The American Sheet & Tin Plate Co., last Friday opened its books for second quarter business on galvanized sheets. This company together with others some time ago allotted galvanized tonnages for the first quarter and recently inquiries from miscellaneous consumers for galvanized sheets for second quarter shipment have become numerous, but it is not known just how fully requirements for this business can be met by makers. The prices to obtain on second quarter deliveries are subject to determination by the government. The present price for No. 28 gage galvanized sheets is 6.25c per 100 pounds, Pittsburgh. Books of producers were opened for first half on black and blue annealed sheets at the same time that they were opened for the first quarter for galvanized. Government requirements for the different grades continue heavy and owing to this, makers are not certain as to how large allotments for galvanized sheets for second quarter they may make for domestic consumption. Mills are operating at a low rate which perhaps does not exceed 40 per cent of capacity. This has been occasioned by the shortage of sheet bars and the railroad situation. Some improvement has taken place in both respects, however, and greater output of sheets is expected soon.

Government Buys Terne Sheets

Youngstown, O., Feb. 20.—So huge is the demand for sheets among the valley mills that sales managers predict a shortage in the near future. No exceptionally large individual tonnages are wanted, but the aggregate is greater than the mills are rolling. All grades are being inquired for. The government just now is a heavy buyer, both directly and indirectly. This past week inquiries for terne sheets have come out from Washington. About seven different inquiries were received. These called for from 500 to 20,000 sheets each. It is understood they are to be used for acid and gas containers which will be exported when fabricated. More sheets were wanted than could be supplied, as the valley mills are not large producers of this grade. Makers here took their share of the business and will make immediate deliveries.

Lake Coal Shipments Set Record in 1917

A record was set in 1917 when bituminous coal aggregating 26,828,756 tons was shipped from Lake Erie ports up the Great Lakes. This tonnage, which was compiled by the Lake Erie Bituminous Coal Exchange, compares favorably with that of 1916 when only 24,692,936 tons were shipped and that of 1915 when 21,507,374 tons were moved. The 1917 record is considered to be remarkable in view of the short navigation season and the fact that only 60 per cent of the normal equipment was available. Toledo with 9,894,345 tons, Sandusky with 3,493,852 tons and Ashtabula with 3,365,903 tons lead all other Lake Erie ports in coal shipments.

Levering Bros., Baltimore, Md., have placed a foundry in operation at York, Pa., for the manufacture of brass, bronze, copper and aluminum castings.

Export Grip Checks Nonessentials

Sweeping Powers Exercised by Government Under New License Plan Further Extends Control Over Nonwar Business—Relief of Rail and Ship Freight Congestion Expected to Result From System

WASHINGTON, Feb. 19. — Proclamations issued by the President last week placing all foreign commerce of the United States under license will have the effect of increasing the car supply of the railroads as well as the tonnage of ocean carriers. This will have beneficial results in the iron and steel industry where production should increase through speedier receipt of raw materials and quicker expediting of shipments of finished products.

Wants Production Restricted

It has been argued by Edward N. Hurley, chairman of the shipping board—and he has not been alone in his contention—that it is useless to continue production of materials which will crowd off the railroads and the ocean those articles essential to the conduct of the war. This argument has been made not only for speed and delivery of steel and lumber to the shipyards, but in behalf of the plea for more men with which to build the ships.

While the President's action requiring license of all imports and all exports will have the effect of relieving the ocean and railroad freight congestion, it is appreciated by the government other steps must be taken to keep pace with the tonnage that will be available when the ships now building are completed. For this reason Director General McAdoo last week named a special waterways committee to speed the utility of canals, rivers, lakes and other inland water routes, and also a committee to recommend standardized types of cars for the railroads. These two important developments will be big factors in future freight handling. Dr. H. A. Garfield's statement that his fuel conservation order was issued, among other reasons, to relieve the iron and steel industry when production fell 50 per cent from Dec. 1, 1917, to the middle of January, indicates to some extent what the steel trade has been up against.

The proclamations of the President apply to every article intended for export from or import to the United States. Consumers of foreign made goods will be as hard hit as those manufacturing for consumption abroad. If the goods are intended for war purposes, directly first, indirectly afterward, they are not to be accepted for shipment or transport. The export proclamation extends to all commodities not covered by the proclamations of July 9, Aug. 27, Sept. 7 and Nov. 28, 1917, and the import edict covers all articles not restricted under the edict of Nov. 28.

To prevent congestion or delay in shipments which previously had not required export license, the war trade board requested the treasury department to instruct collectors of ports to accept export declarations in lieu of license when it can be shown that the shipments are covered by bills of lading for export, provided they are dated Feb. 19 or earlier, and that they actually are exported by March. 15. Shipments carried to vessels by carriers other than railroads must be exported by March 1 on export declaration. After March 15 all exports must be accompanied by license presented with export declaration. Shippers are urged to make application for license for only those shipments which they may reasonably expect will be ready in the immediate future.

Drastic Iron and Steel Effect Not Expected

New York, Feb. 19.—The sweeping export regulations which were announced by President Wilson last Friday are not expected in iron and steel export circles to be as drastic in their effects as appears from the face of the proclamations. Already applications, which previously undoubtedly would have been granted, for the exportation of locomotives to South America, have been refused. It is taken for granted that applications for exporting products not previously on the conservation list, such as sheets, wire nails, wire rods, etc., will be refused. At the same time, it is felt that the cutting off of iron and steel exports would be too revolutionary a development to contemplate. By reason of the exigencies of important requirements, such as tin, manganese ore, rubber and other articles, it is pointed out, there will have to be a considerable volume of exports, because it would not pay to send empty vessels for these materials. At the same time, steel mills are preparing to protect themselves in case the embargo should prove drastic. One large mill has advised its export customers that it is up to them to get licenses, and that the mill will not roll the steel ordered until such licenses have been secured.

Aid Traffic by Waterways and Standardized Cars

Washington, Feb. 19.—Director General McAdoo has not yet announced his policy regarding placing all freight consigned to and from steel mills and blast furnaces on a preferential shipment list. It is thought likely he will continue to let railroad embargoes cover the conditions as best they can and hope that better weather will solve the problem. But last week he appointed two committees which, if their findings are adopted, will relieve the railroads in handling much of the country's freight. One is for the utility of inland waterways and the other is for standardization of cars.

Maj. Gen. William M. Black, chief of the army corps of engineers, was made chairman of a waterways commission which is to go thoroughly into the question of developing canals, rivers, lakes, etc. It should not take the commission long to complete its work, because its membership includes three men who were on the national defense council's waterways committee which urged the vigorous use of the waterways. Other members of the commission are G. A. Tomlinson, president of the Superior Shipbuilding Co., Superior, Wis.; Walter S. Dickey, Kansas City, Mo., and Col. Charles Keller, of the engineers' corps, secretary of the council's committee.

The car standardization committee is headed by S. M. Vauclain, vice president of the Baldwin Locomotive Works. Others on the committee are W. H. Woodin, president of the American Car & Foundry Co.; J. M. Hanson, president, the Standard Steel Car Co.; N. S. Reeder, vice president of the Pressed Steel Car Co., and Clive Runnells, vice president, the Pullman Co. Director McAdoo indicated that the standardization desired by the administration is one that provides for the use of most of the car appliances now manufactured.

Mining Engineers

Open New York Meeting—Discuss War Problems

New York, Feb. 19. (By wire.)—War's influence on the mining industry was clearly reflected at the 116th meeting of the American Institute of Mining Engineers, which opened at New York, Feb. 18. This influence was specially notable in the papers presented, most of which showed the action of the war in lending emphasis to measures for greater economy and conservation. The symposium on employment problems was of particular value in this connection, while the general discussions reflected the same general trend.

At the business session held today, Sidney J. Jennings was elected president. Mr. Jennings had just completed a term as vice president of the institute. He is a mining engineer of broad experience. He attracted wide attention by his work in the South African gold mining districts where he was located for many years. At the present time he is vice president of the American Smelting, Refining & Mining Co.

Simultaneous sessions on the opening day were devoted to coal and to nonferrous metallurgy. The coal session was presided over by Edwin Ludlow of the Lehigh Coal & Navigation Co. Papers were presented by E. B. Humphrey on the "Drift on Breaker"; by R. E. Hobart on "The Economy of Electricity Over Steam for Power Purposes in and About the Mines"; by W. P. Frey on "The Briquetting of Anthracite Coal"; by C. M. Young on "The Heating of Coal in Piles"; by G. S. Rice of the bureau of mines on "The Coal Situation of the World"; and by C. F. Wang on the "Pen-hsi-hu Coal & Iron Co., South Manchuria, China".

The paper by Mr. Rice attracted considerable interest as he gave an exhaustive analysis of the coal resources of the world, concluding with an explanation of the problem which this country has been facing in recent weeks in matching coal supply with coal demand.

The Tuesday sessions were given over to a study of mining and milling, iron and steel and petroleum and gas problems. The concluding sessions on Wednesday will be devoted to employment problems, to metallography of steel and to geology and ore deposits. A number of the papers which were read at the meeting have appeared in earlier issues of THE IRON TRADE REVIEW.

Special attention has been given to the program of visits and entertainments. The new subway workings were inspected on Monday afternoon. Motion picture views of Bolivian tin mines were presented on Tuesday, followed by a war smoker in the evening. On Wednesday evening, the president's reception will be followed by a "Hoover" dinner. On Thursday, the members will visit Princeton, N. J., where they will inspect the aviation ground school, and witness a drill of the students' battalion.

Sand Men Elect Officers

The annual meeting of the Ohio Sand Traffic association was held at the Hotel Statler, Cleveland, on Feb. 13. The following officers were elected for the ensuing year: President, H. C. Koontz, the Superior Sand & Gravel Co., Cleveland; first vice president, H. G. Leonard, the Oliver Silica Sand Co., Massillon, O.; second vice president, M. McC. Everhard, the Everhard Co., Massillon, O.; Hubert B. Fuller was continued as permanent secretary and treasurer with offices in the Williamson building, Cleveland.

In addition to the members from Ohio, representatives from other states attended and joined in the discussion of plans to make the association national in scope to embrace silica and molding sand producers whose problems are identical with those of the Ohio body. A round table discussion of costs and accounting problems developed the urgent need for a batter basis for determining the depreciation and depletion factors encountered in sand production. A detailed comparison of cost systems, and costs over a fixed period will be presented at an early meeting. Production methods which relieve foundries of the labor of mixing and grading molding sand were stated to be features to which Ohio sand men are paying special attention.

New Plant to Start

Officials of the Trumbull Steel Co., Warren, O., announce that part of their new open-hearth plant will be in operation about March 10. This plant consists of seven 100-ton furnaces and will supply the steel for the 18 and 21-inch bar mills now under construction. Until the bar mills are completed, it is understood the Trumbull company will dispose of its ingots to outside parties.

The Aetna Steel Works, Port Moody, B. C., is installing a new 6-ton electric furnace this month, equipment for which now is going forward.

Scrap Prices

Will Be Revised Soon to Meet Protests On Original Schedule

New York, Feb. 19.—A revised schedule of prices for iron and steel scrap will be announced within a few days by the committee on steel and steel products of the American Iron and Steel institute. The base quotations approved by President Wilson, Nov. 5, last year, and amplified by the institute, Dec. 22, were followed by a storm of protest by consumers, particularly the iron mills and foundries. Repeated definitions of the intent of the schedule did not clear up the situation and this led to a general meeting of scrap dealers and users in New York several weeks ago when it was decided to appoint a new committee on scrap iron and steel that would represent the interests of consumers as well as dealers and producers.

This enlarged committee held a two-day conference in New York, Thursday and Friday, Feb. 14 and 15, at which an entirely new schedule was prepared and this has been submitted to the committee on steel and steel products of the institute for ratification.

The new prices and scrap classifications, it is believed, will meet with the approval of consumers and dealers generally. The situation in New England, where an acute shortage of old material greatly is interfering with the operation of mills and foundries, has been given careful consideration. The question of brokers' commissions also was discussed and the plan to be announced covering this form of compensation to the dealer insures to the user the delivery of the entire tonnage of material as specified.

A shortage of scrap throughout the country was reported. This is attributed largely to the railroads which are not scrapping rolling stock at nearly a normal rate, and such old material available is not sorted and is sold in mixed lots. Shortage of labor makes it impossible for the railroads to classify their stock and the subsequent delay in handling and sorting by the dealers is cause for further delay. Country scrap collection has been interfered with by the severity of the weather. The pig iron shortage also is compelling the use of a greater proportion of home scrap by steelworks, iron mills and foundries and this source of supply, during the last three months has been reduced more than 50 per cent. The use of shells abroad has greatly increased the scrap shortage.

Considerable Gain

Shown in Iron and Steel Operations Except in Open Hearth

Youngstown, O., Feb. 20.—Operating conditions in the valley and general Pittsburgh district show much improvement over last week with all finishing mills running. The coke ovens are operating at 91 per cent capacity, the same as last week. Companies operating open-hearth furnaces in this district attribute this drop to the poor quality of gas coal which they were required to use, a scarcity of iron, embargoes and repairs to the furnaces. Blast furnace operation increased 11 per cent over the previous week to 80 per cent. Bessemer plants are blowing at 63 per cent as compared with 61 per cent last week.

While production has increased, the amount of steel stocked shows an increase. Reports show that 43,579 tons are piled in the various mill yards in this district, an increase of about 1000 tons over last week. Shipments are being received more regularly among which are brick for relining purposes, mill supplies, etc. Embargoes, however, continue to hamper shipments. Westbound shipments are going forward, but in order to ship east the buyer and not the producer first has to obtain permits.

Metal Trades to Meet

The annual convention of the National Metal Trades association will be held at the Hotel Astor, New York city, April 22 to 25, inclusive. The secretaries' dinner will be held Monday, April 22, and the executive committee will hold its meeting, the same day. On Tuesday the administrative council will meet at 10 o'clock, local branch secretaries will hold their session and the alumni dinner will be served at 6:45 o'clock.

The first convention sessions will be held Wednesday, at 9:30 a. m. and 2 p. m., with a buffet luncheon between and the annual banquet will be served at 7 p. m. Final convention sessions will be held at the same hours Thursday, with luncheon at noon and the incoming administrative council will meet in the afternoon to organize.

Southern Stacks Gain

Stocks of pig iron on the yards of southern blast furnaces on Feb. 1 were 194,000 tons, this comparing with 162,000 on Jan. 1. The increase of 32,000 tons in these stocks was divided roughly into 7000 tons each of foundry and machine cast foundry iron and about 18,000 tons of basic. This banking up of southern iron at furnaces shows the effect of restricted railroad shipments due to the freight car congestion in January.

More Furnaces Start

Pittsburgh, Feb. 20. (By wire.)—The Carnegie Steel Co. last night added four blast furnaces to its active list, making 40 out of 59 in operation. The Jones & Laughlin Steel Co. now has six out of 11 furnaces producing.

The shortage of cars in the Connellsville coke region is a source of much concern, especially in the case of foundry fuel.

Organize Iron Merger

Tennessee, Georgia and New York capitalists have incorporated the Dayton Co., Dayton, Tenn., with a capital stock of $5,000,000. This represents the merging of the Dayton Coal, Iron & Railroad Co., Dayton, Tenn., and the Matthews Iron & Steel Co., Rome, Ga. To improve and develop the properties which are appraised at $3,999,000, the expenditure of $100,000 is contemplated. These properties, located in Gordon and Walker counties, Georgia, and Rhea county, Tennessee, include three iron furnaces, two at Dayton and one at Rome, 374 coke ovens, 27,000 acres of coke and coal land, limestone quarry, etc. The coal mines which were owned by the Dayton company are being put in shape to provide a supply of coke for the furnaces. C. P. Ludwig of the Matthews company has charge of the work.

Tube Stock Increased

Increase in the capital stock of the National Tube Co. from $80,000,000 to $85,000,000, notice of which was field yesterday at Trenton, N. J., is to cover the payment by that company for the plant of the Shelby Steel Tube Co., Ellwood City, Pa., maker of seamless tubes. The stock of the latter company was held by the United States Steel Corp., and the new issue by the National company was made in lieu of an issue by the Shelby company. By the terms of the increase, the stock of the National company is divided into 400,000 shares of preferred and 450,000 shares of common stock.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Feb. 18.—Announcement was made from Washington last week that the price agreement between manufacturers of zinc plates, zinc sheets and grade A spelter had been ratified by the president. Under this agreement, Grade A spelter is fixed at 12c, zinc plates at 14c and zinc sheets at 15c, subject to revision June 1. The spelter price is f. o. b. East St. Louis and the plates and sheets f. o. b. plants, with the usual extras and discounts. Unlike other industries affected by fixed price agreements, the sheet zinc trade has not been in the custom of making long time contracts, selling only for nearby delivery, to commercial customers, so that it will be only a short time until all the higher priced business in zinc plates and sheets will be cleaned up. To the government sales have been made for longer periods at the former price to the government of 16c, which will remain unchanged during the life of the contracts. There has been almost a scarcity of Grade A spelter, despite the plethora of prime western, owing to large government requirements and the new price marks a reduction of 1½ cents from the former quotations of 13.50c. The market for prime western spelter is dull and prices are unchanged, at about 7.75c, St. Louis, for prompt February, March and April shipment.

The tin situation has changed little the past week, spot being scarcer than ever and sellers being utterly unable to satisfy the recent inquiry which has been in the market. The London tin market advanced remarkably during the first few days of last week, on reports that the steamer GLENCARTHY, enroute from Singapore to London, had been torpedoed and lost with 1000 tons of Straits tin. The advance in Straits tin in London amounted to £19 in three days. This advance was cut down by a decline of £8 on Monday this week. Some interest is manifested in prices of shipments, February-March shipment from Batavia now being quoted 72c, New York; February shipment Chinese, 99 per cent from Hong Kong is quoted 70c and March shipment Chinese 68c.

Lead quotations of the American Smelting & Refining Co. and independent and outside sellers are about on a parity for the first time in months. The quotation for prompt, February and March shipment is 7c, New York. Spot in the east is quoted 7.12½c to 7.25c, New York.

Conditions in the copper market continue so favorable that little news of interest develops. The supply of metal appears plentiful, for no complaints from consumers are heard. Producers are taking business as far ahead as May 30, the present fixed price being subject to revision June 1. Carloads continue quoted 23.50c, f. o. b., New York and less than carloads 24.67½c.

A munition maker is inquiring for 60,000 pounds of antimony, which is the first inquiry of note that has appeared in the market for more than a week. The market continues dull and weak at 13.50c to 13.50c, duty paid, New York, for spot metal.

Making Grenades For the U.S. Army

How a Foundry Was Built and Brought to a Daily Average Production of 25,000 Grenades Three Months After Ground Was Broken—Description of Plant and Methods

FOR many generations the hand grenade has been considered as being among the foremost destructive weapons of warfare, but it is in grave danger of having its ranking position wrested away by the rifle grenade now employed extensively by the hostile forces intrenched on the European battlefields. Although introduced only in comparatively recent years, inventive genius has developed nearly as many varieties of the rifle as of the hand type of grenade. The strong arm of the grenadier, however, cannot compete with a gun in imparting propelling power to this instrument of warfare and it is because of its greater range of effectiveness that this new missile is in such high favor among the occupants of the trenches.

Furthermore, the hand grenade is an exceedingly dangerous weapon, even in the hands of the most skilled soldier. Unless thrown within a few seconds after the fuse is lighted or the trigger set, it is liable to explode in the hands of the grenadier and the list of casualties from this cause in this war is known to be heavy. By employing the rifle as the propelling medium, using either the bullet to set the trigger or some other means for discharging the explosive, this danger is almost entirely eliminated.

Immediately following the declaration of war by the United States, experiments were made with different kinds of rifle grenades to ascertain their effectiveness and destructive power. Hand grenades generally are made of cast iron and are nearly of as many different designs as the number of countries at war. The shattering of the grenade is facilitated by its corrugations, either on the outside or inside, and it is the aim of ordnance experts to have it break into as many destructive pieces as possible, by its contained explosive. Neither cast iron nor cast steel proved a desirable metal for the rifle grenade. When made of gray iron, the explosive reduced the grenade to powder, whereas cast steel proved to be too resistant and unyielding. Malleable iron was finally resorted to and was found to possess the desirable shattering properties for this purpose. Malleable grenades, in different tests, have been broken into 100 or more pieces of destructive effectiveness and this metal now is being used in rifle grenade manufacture.

The Westinghouse Electric & Mfg. Co., Pittsburgh, was awarded one of the first orders placed for rifle grenades, and not having a malleable cast iron foundry, it became necessary to erect one immediately. It was decided to

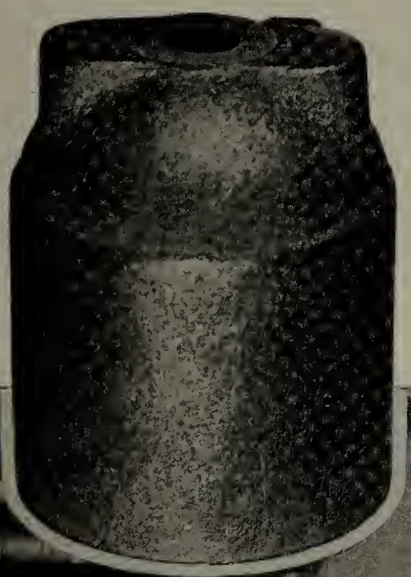




FIG. 1—MALLEABLE IRON RIFLE GRENADE THAT SOON WILL BE ON ITS WAY INTO THE GERMAN TRENCHES.
FIG. 2—A CONTENTED FORCE OF AMAZONS DOING THEIR BIT MAKING CORES FOR RIFLE GRENADES



FIG. 3—RIFLE GRENADES ARE MOLDED ON POWER SQUEEZERS. THIS ILLUSTRATION SHOWS THE DRAG ON THE MACHINE, WITH THE DRAG PLATE AND THE COPE ON THE BENCH. FIG. 4—IN THIS VIEW THE CORES HAVE BEEN PLACED IN THE DRAG. FIG. 5—MOLD CLOSED AND VENT WIRES *A* BEING WITHDRAWN. FIG. 6—SNAP FLASK REMOVED. COPE HALF OF MATCHPLATE IS SHOWN



FIG. 7—ROLL-OVER DEVICE THAT TRANSFERS THE GRENADE CORES FROM THE DRYERS TO WOODEN TRAYS FOR DELIVERY TO THE MOLDERS. A RACK LOADED WITH CORES IS SHOWN ENTERING THE OVEN

build it at Cleveland on a side adjoining the Westinghouse gray iron plant in that city. The period intervening between the placing of the contract and the date of first delivery of rifle grenades was spanned by only a few months. The burden of this stupendous undertaking was placed upon Benj. D. Fuller, superintendent of the Cleveland foundry of the Westinghouse company and his assistant, C. F. Knowlton, and how well they performed their task is best reflected by a record of 83 days from the time ground was broken until the first grenades were cast. The foundry building and the melting furnace were designed and erected under the supervision of Bernard H. Prack, Pitts-



FIG. 8—THE CORE DRYER AND TRAY JUST BEFORE ROLLING OVER



FIG. 9—CORES DEPOSITED ON WOODEN TRAY AND DRYER SWUNG BACK



FIG. 10—SOME OF THE FLOORS AT 11:30 A. M. THIS VIEW INDICATES THAT THE FOUNDRY IS WELL-LIGHTED. FIG. 11—FRONT OF THE FOUNDRY SHOWING ROOF CONSTRUCTION. FIG. 12—ANOTHER VIEW OF SOME OF THE FLOORS AT 11:35 A. M.

burgh, and to him and other contractors much credit is due for having expedited the work. Before excavations could be made, 12,000 cubic yards of earth had to be removed. This work was started Sept. 14, last year, and the first run of the furnace was made on Nov. 22. Four days later, namely, Nov. 26, the first grenades were cast. The contract specifies the delivery of 25,000 daily and an average in excess of this amount has been maintained since casting was begun.

clearly defined the black heart and the gradual shading from the white to the gray and to the black center. A grenade that was subjected to repeated blows by a heavy sledge is shown at *D* and the fractured pieces of another grenade, at *E* and *F*. These also outline clearly the regularity of the corrugations inside of the grenade casting. Tests of the iron from which these grenades are made have developed a tensile strength of 42,500 pounds per square inch and

provided, the entire mold being made in one operation. The cores are delivered to the operators on wooden trays and a sufficient supply is kept on hand constantly in order that delays can be prevented.

In Fig. 3 is shown one of the power squeezers, with the drag on the machine. The cope which has been lifted off is on a bench at the right. The drag side of the matchplate also is illustrated. In Fig. 4 the cores have



FIG. 13—THAT THE RIFLE GRENADES ARE MADE OF TOUGH MATERIAL IS INDICATED BY THESE SPECIMENS
The clearly defined fracture with its black heart is shown at *A* and *C*; *B* is one of the test wedges; a grenade after being subjected to repeated blows by a sledge is shown at *D*; and *E* and *F* are broken specimens that reveal the regularity of the inside corrugations

As illustrated in Fig. 1, these grenade castings are cylindrical in form, cored out inside, with small openings top and bottom for the passage of the rifle bullet, which sets the trigger for discharge. The casting weighs only 15 ounces, is corrugated inside, as shown in Fig. 13, and is only 3/16-inch thick, which is reduced to ⅛-inch at the corrugations. The discharge of the bullet from the rifle propels the grenade which may be fired a distance of 300 yards.

The grade of the malleable cast iron from which these rifle grenades are being produced is illustrated in Fig. 13. The wedge, *B*, satisfactorily passed the bending test and the fractures, *A* and *C*, an elongation of practically 5.5 per cent.

Floors of 200 molds for a day's output not only reflect the driving power of the operator, but also the efficiency of the mechanical molding equipment and the ingenuity of the special rigging provided. The grenades are molded, eight in a flask, on air-operated squeezers. Twenty-one of these machines have been installed by the Osborn Mfg. Co., Cleveland, and an additional battery of five has been ordered. The squeezers are arranged around the walls and near the center of the shop, in positions which afford light at the proper angle. Aluminum matchplates, with cope and drag pattern on either side, have been

been placed in the mold and the operator is preparing to close-over the cope. The mold has been closed in Fig. 5 and wires for venting each of the cores are withdrawn before removing the snap flasks, Fig. 6. These vent wires are shown at *A* in Figs. 3, 4 and 5 and are lying on the table of the machine in Fig. 6. To vent these cores by the usual method would require eight operations, but this simple device has reduced the venting to one. The wires are passed through openings in the cope flask and passing over the tops of each of the eight cores, provide vents that extend through the sides of the mold. The wires are properly di-

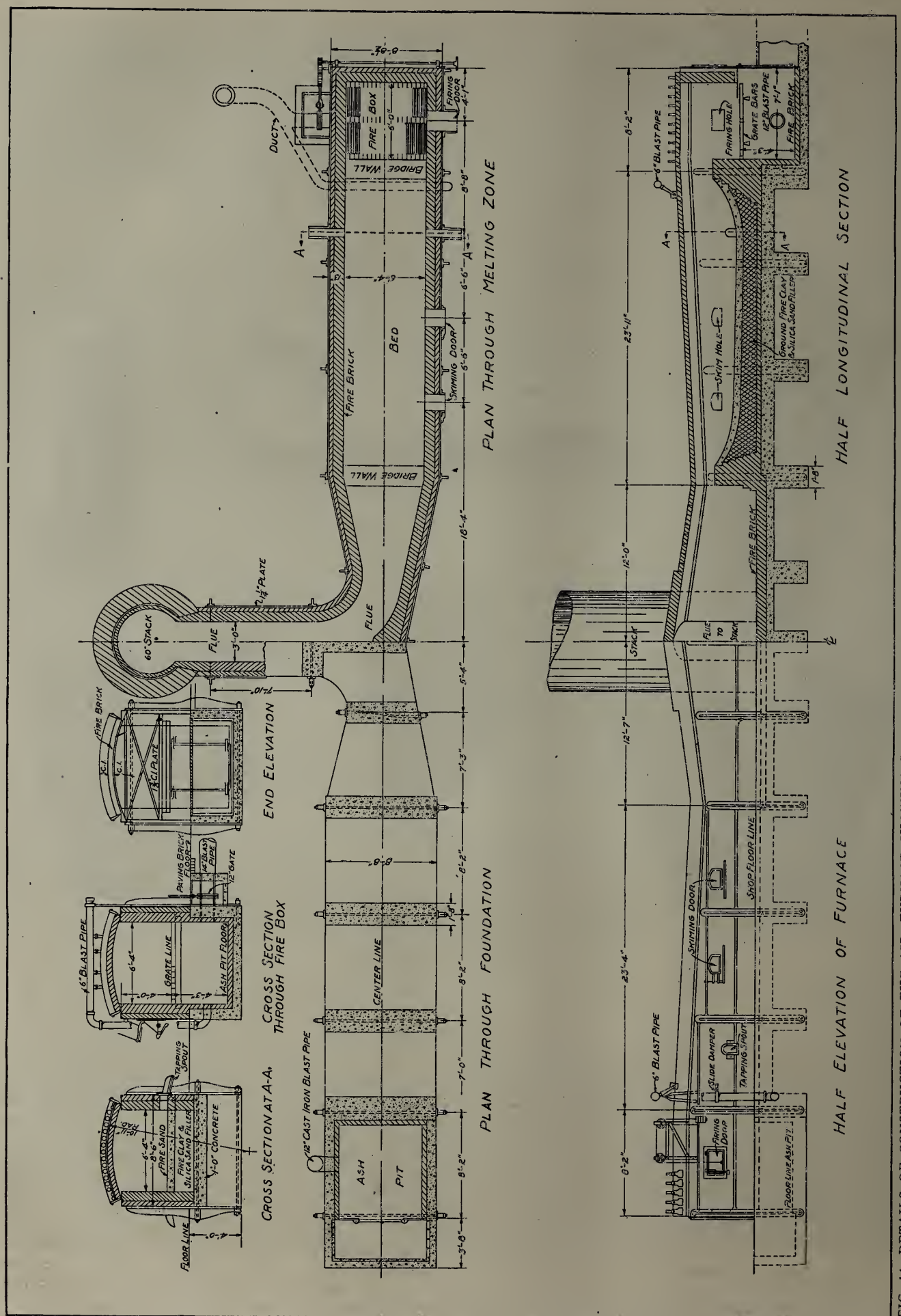


FIG. 14—DETAILS OF CONSTRUCTION OF THE AIR FURNACE SHOWING PLANS THROUGH THE FOUNDATION AND THE MELTING ZONE, HALF ELEVATION AND HALF LONGITUDINAL SECTIONS THROUGH THE FURNACE

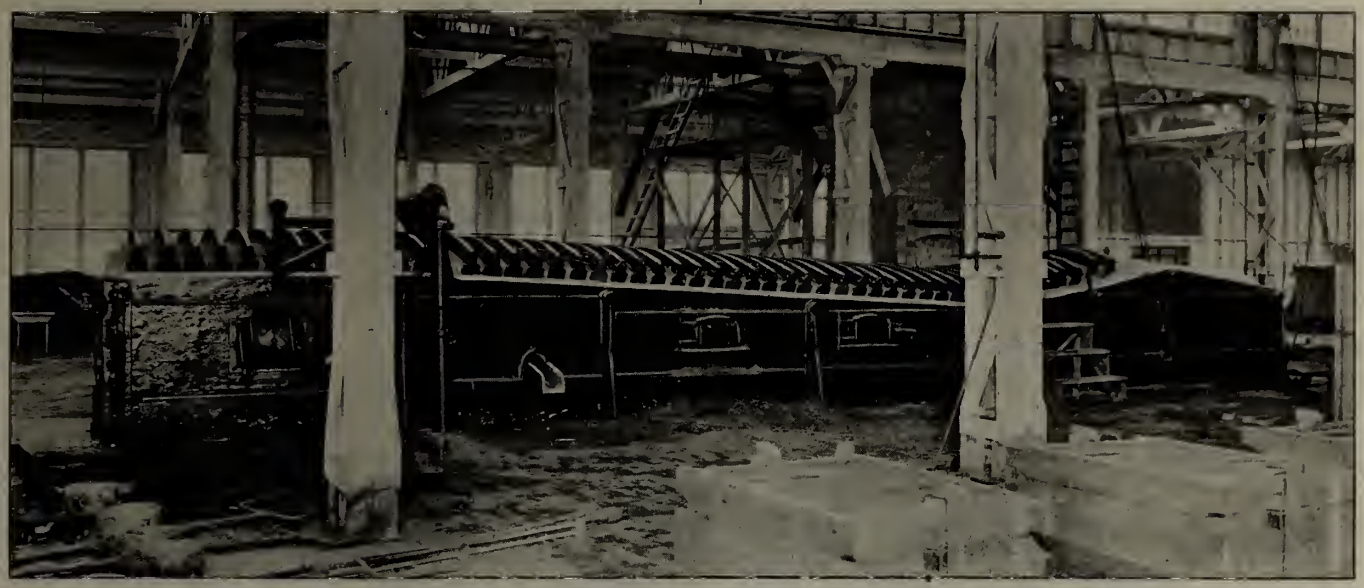


FIG. 15—THE AIR FURNACE, SHOWING TAPPING SPOUT AND SKIMMING DOORS

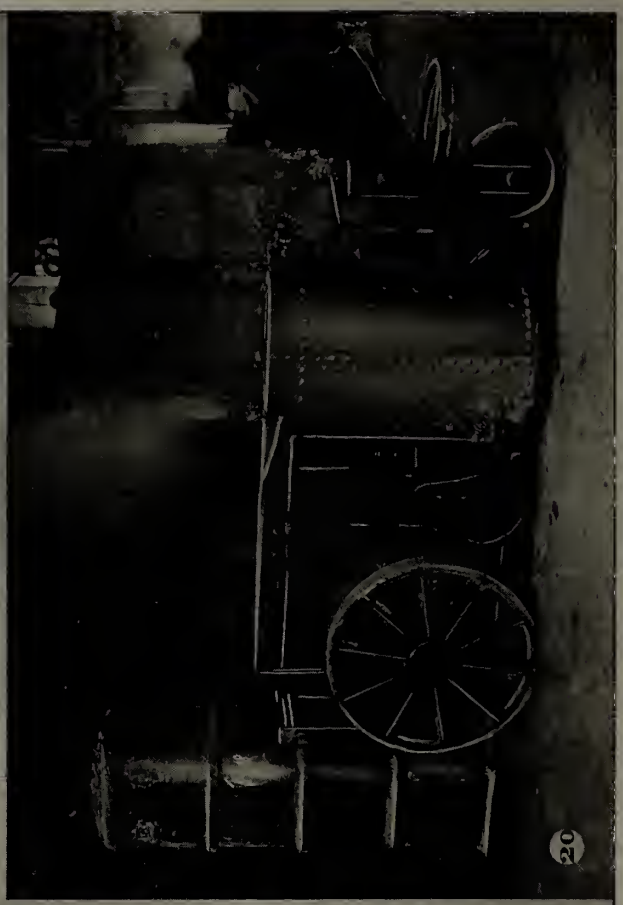
rected by the openings in the flask and when withdrawn form perfect vents for the cores.

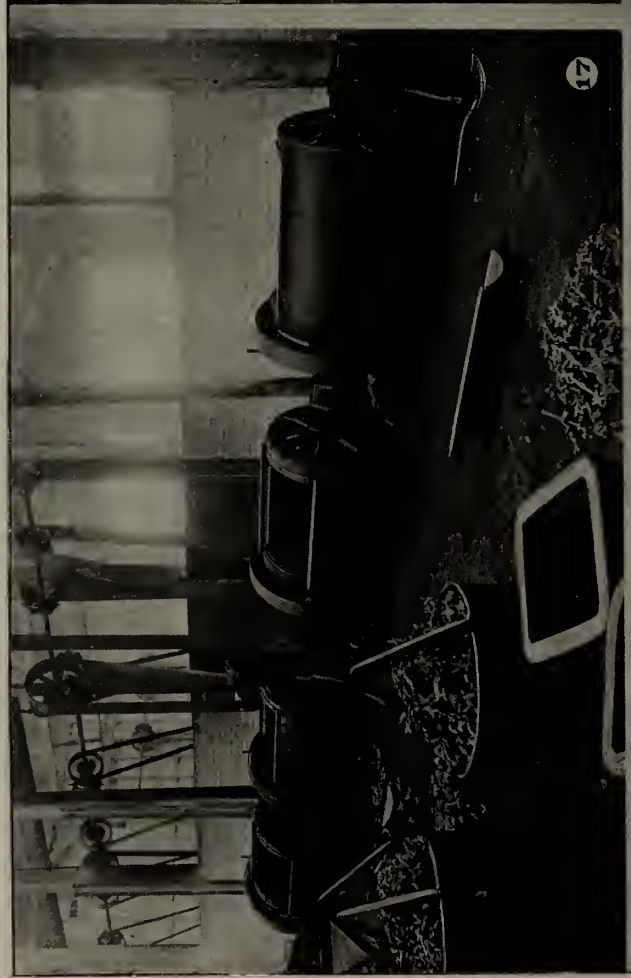
The cope half of the matchplate is shown in Fig. 6, and the size and direction of the gates is clearly defined. The depth of the gates also is illustrated in Figs. 3 and 4, showing the cope halves of the mold. A part of the gate thickness also is carried by the drag, but the greatest thickness is in the cope. These gates represent a large percentage of the foundry remelt, but their size is essential because of the high shrinkage of the metal. It will be noted that the grenades are molded on end, instead of on their sides when they would be split longitudinally. The entire pattern is carried in the drag, only the top print of the core being in the cope. Molding the grenade in its vertical position makes it possible to center the core accurately and prevents it from shifting which may occur when molded on its side with a greater surface exposed to the lifting action of the metal. The entire operation of molding has been reduced to simplicity by the care exercised in selecting the equipment and in designing the rigging. The prints in both cope and drag are ample to insure the proper centering of the core without adjustment by the operator. The sand is prepared for the molders by a sand cutter furnished by the Sand Mixing Machine Co., New York. Figs. 10 and 12 clearly illustrate the arrangement of the molding floors and the wonderful progress of the day's work at 11:30 a. m., when these views were taken. At this hour one operator had put up 140 molds and another, 125. The record, up to the present time, is 200 for a day's output and with further experience the high mark soon will pass this figure. An output of 200 molds involves the setting of 1600 cores, each one of which must be placed with care. Producing the necessary core for a minimum output of 25,000 sound rifle grenade castings per day requires organization. This involves not only the personnel of the working force, but every facility to expedite operations. Although the cores themselves are made by hand, much ingenuity has been displayed in the design and construction of the core boxes and other devices, that are wonderful aids in the attainment of an output of 36,000 cores daily. Women coremakers only are employed, the force at present consisting of 42. The interior of the core room is shown in Fig. 2 and



FIG. 16—STACK SIDE OF AIR FURNACE SHOWING A CRADLE AT *A* TO FACILITATE RELINING THE BUNGS AND A TAPPING SPOUT AT *B*







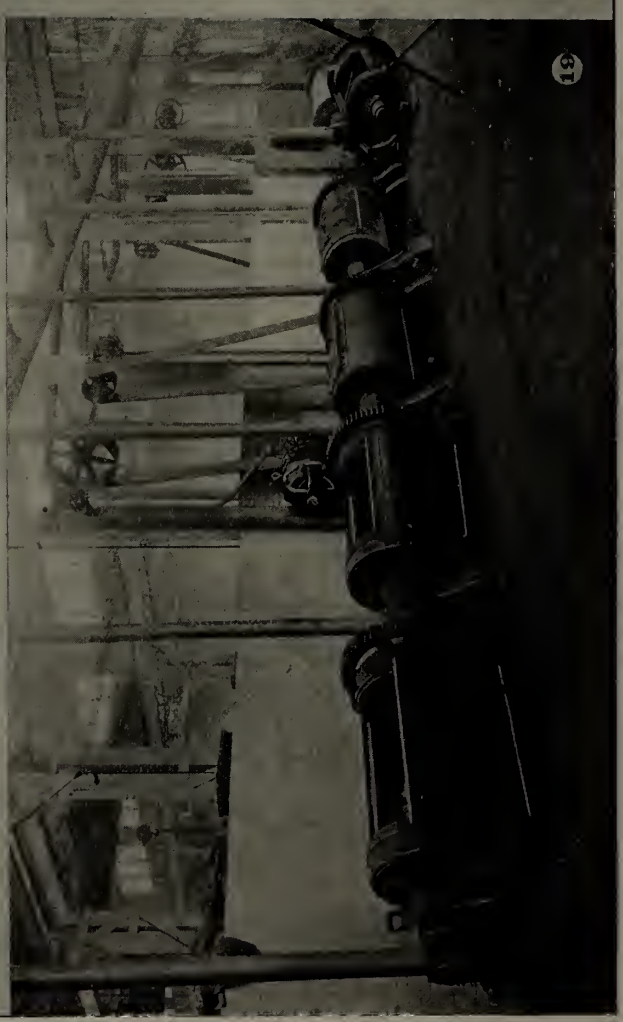


FIG. 17—THE FOUR MILLS FOR TUMBLING THE GRENADES IN THE HARD. FIG. 18—WHERE THE GRENADES ARE GROUND AND INSPECTED BEFORE SHIPMENT.
FIG. 19—MILLS FOR TUMBLING THE CASTINGS AFTER ANNEALING. FIG. 20—THE STEAM-DRIVEN ANNEALING FURNACE CHARGING MACHINE



FIG. 21—TWO BATTERIES OF FOUR OVENS FOR ANNEALING THE GRENADES

a striking feature of this department is its cleanliness. The white walls and roof reflect an ample flood of daylight and only on the darkest days is it necessary to resort to artificial illumination. The core room is in a building detached from the other departments. It is provided with a separate entrance which obviates the necessity of the coremakers passing through the other parts of the plant to their places of employment. On a mezzanine floor at one end of the building are the rest and lunch rooms and the only male employes who have access to this department are the men who truck the racks to the core ovens. The latter are located in an adjoining room, separated from the core department by a partition which excludes the gases and smoke from the baking of the cores. A simple but effective device has been provided for removing the baked cores from the dryers to wooden racks on which they are delivered to the molders. To handle each core would not only require the employment of four or five men, but the loss through breakage would be a serious item. By the use of the roll-over device, illustrated in Figs. 7, 8 and 9, one man now performs this work without handling a single core and the loss from breakage is so small that it is barely recognizable. Each dryer holds five cores and seven dryers are placed on a frame, as illustrated in Fig. 9. Handles are provided on either end of the frame to permit of the easy removal of the cores from the rack. Each tray holds 35 cores. When the tray of cores is removed from the rack it is set on one of the cradles of the roll-over device. As the dryers are not held together on the tray, a U-shaped wire, *A*, Fig. 9, is passed through holes in ribs on the bottom of the dryers thereby fastening all of the dryers together. The wire also passes through holes in the ends of the tray or frame, thereby fastening the dryers to the tray. The wooden tray on which the cores are delivered to the machine operator then is set upon the cores, being perforated for the lower print extension. In Fig. 7 the wooden tray is shown clearly and in Fig. 8 the other cradle has been rolled-over. By grasping the handles of the cradles the parts are lightly clamped together and turned over, as illustrated in Fig. 9. The cradle containing the tray of dryers then is rolled back, being securely fastened to the cradle. Before lifting off the tray the U-wire is withdrawn and the tray of dryers is replaced on the rack for return to the core room. The cores are made in two parts, one of the neck and print extensions being pasted on. The body of the core hollows out the inside of the grenade and



FIG. 22—THE TEMPERATURES OF THE OVENS ARE INDICATED BY PYROMETER, TWO THERMO-COUPLES BEING ATTACHED TO EACH FURNACE

also makes the corrugations. Necks on either end of the body core make the top and bottom openings in the grenade and the cone-shaped extensions on the necks of the core fit into the cope and drag halves of the mold, centering the core and preventing it from shifting.

The racks on which the cores are dried are of steel angle and cast iron construction. Each shelf has a capacity of 10 trays, or 350 cores, and the eight shelves therefore carry 2800 cores. The cores are baked in about 20 minutes at temperatures of approximately 350 to 400 degrees Fahr. The racks are lifted and conveyed by trucks, built by the Cowan Truck Co., Holyoke, Mass., which have proved unusually satisfactory for this purpose. A battery of four oil-fired ovens has been installed, three of which are used for baking cores while the fourth is employed for heating ladles. Sand for the cores is prepared in a mixer furnished by the Blystone Mfg. Co., Cambridge Springs, Pa. This machine is installed in one end of the core room.

Installing Second Furnace

Although only one melting furnace has been provided, space has been left for a second unit, which is now being built. The flue to the stack and the stack were designed for two furnaces. Details of the furnace are illustrated in Fig. 14, which shows plans through the foundation and melting zone, and half elevation and longitudinal sections. It is designed to melt 15 tons per heat, although 19½ tons have been tapped out on several occasions. The overall length is 44 feet 1 inch, and the metal is tapped out on both sides. Being located in the center of the shop this greatly reduces the distance that the metal has to be carried. The blast is directed onto the flame through a 6-inch blast pipe and the bridge walls are 3 feet 3 inches high. As indicated by Fig. 14, the furnace is unusually well stayed. The flue leading to the stack is 3 feet wide and 5 feet 6 inches high, while the stack has a base diameter of 5 feet and is 80 feet high. Fig. 15 is a view of the skimming side and shows one of the tapping spouts; Fig. 16 shows the opposite side with a tapping spout at *B*. A frame for supporting the bungs while relining is shown at *A*. The sides of this frame are curved to conform to the contour of the bung and the edges of the brick are lined up to this frame. The work of relining is expedited by the frame and all brick are in alignment on the edges.

In the production of malleable cast iron, two cleaning operations are necessary. The castings first have the adhering sand and the cores removed while still in the white hard condition and they are tumbled again after their removal from the annealing pots. Four large exhaust, motor-driven tumbling mills, Fig. 17, clean the castings in the hard, and six mills of a smaller diameter, Fig. 19, tumble the grenades after they have been annealed. All of the mills are equipped with exhausts that prevent the accumulation of dust which is delivered to an arrester located outside of the building. The dust collector is of the Morse rarefied type, built by the Knickerbocker Co., Jackson, Mich., and the tumbling mills were installed by the W. W. Sly Mfg. Co., Cleveland. The two batteries of double grinding stands, belt-driven from motor-operated shafts, are shown in Fig. 18. These were furnished by the Safety Emery Wheel Co., Springfield, O. After grinding, the castings are inspected and are ready for shipment.

The grenades are annealed in two batteries of four ovens, Fig. 21. These are coal-fired from the rear, Fig. 22, the temperature being controlled by a thermo-electric pyrometer installed by the Haskins Mfg. Co., Detroit. The temperature is taken at two points in each furnace, namely at the back, as shown at *A*, Fig. 22, and on one side near the front. The castings are annealed at a temperature of about 1700 degrees Fahr., being held at this point for 60 hours. This temperature is attained in about 12 hours and 24 hours are required for cooling, the entire annealing operation consuming 96 hours, or four days. Four pots constitute a stack, each pot holding about 490 castings and each oven 55,000, or slightly in excess of two days' output. Since the molding capacity is greater than that of the annealing ovens, two additional ovens will be built. A steam-driven charging machine, Fig. 20, furnished by the Jewell Steel & Malleable Co., Buffalo, is employed for placing the stacks in the ovens and for discharging them when the castings are annealed. The annealing department floor is wood block and is commanded by pillar trolleys equipped with air hoists of the Ingersoll-Rand type for stacking and lifting off the pots.

How the Foundry is Laid Out

The foundry is a brick and wood, heavy mill type structure, 165 x 242 feet, designed and built by Bernard H. Prack, Pittsburgh. It is located south of the other Westinghouse foundries on West Fifty-eighth street. The molding and melting departments occupy more than one-half of the building, covering an area of approximately 135 x 165 feet. The air furnace is in the center of this section, provision having been made for the installation of a second unit. In the other part of the structure, 107 x 165 feet, are the annealing ovens, assorting and packing floor, hard and soft iron tumbling mills, grinders, core and shipping rooms. The core room is entirely enclosed, constituting practically a detached building and the hard and soft iron floors are separated by a brick wall, 6 feet 6 inches high. The annealing ovens were built by Holcroft & Co., Detroit.

The roof construction of the foundry is outlined in the front view of the building, Fig. 11, and that it affords ample daylight to every part of the shop is shown by Figs. 10 and 12. While the building is of mill construction, the large number of columns do not interfere with the floors.

War Increases Domestic Magnesite Production

Magnesite brick and the crude form of magnesite used to repair open-hearth furnaces are vital to steel production. Previous to the war the United States produced only 10,000 tons of the 300,000 tons which were consumed in this country. The remainder was imported from Austria-Hungary and Greece. In 1916 the domestic production which was almost exclusively from California, reached 150,000 tons; but as imports were only about 93,000 tons a serious shortage developed that was augmented by an increased demand. Under these conditions domestic production was greatly stimulated.

According to C. G. Yale of the U. S. geological survey, the production of magnesite in California in 1917 exceeded that of all former years, being estimated at 215,000 tons. In addition to this the output of a recently discovered field in Stevens county, Washington, is estimated by R. W. Stone of the survey at close to 100,000 tons for 1917. In view of this great increase in production over our normal needs, it is hoped that we may supply our own increased demand and have a surplus for our allies.

The new deposits of magnesite in Washington occur in beds like limestone, that is, in thick lenses up to a quarter of a mile long exposed so that quarries can be opened. The deposits are readily accessible to railroads. The first few hundred tons of crude rock were shipped from this region in December, 1916, and by August, 1917, the production had reached over 500 tons a day. Of the total amount produced in Washington in 1917, nearly 65,000 tons were shipped in the crude state, while the remainder was burned in kilns near the quarries.

Dyestuff Industry Now On Established Basis

The dyestuff industry in the United States, which was promoted by the war is fast reaching a thriving basis. This country formerly imported annually about $10,000,000 worth of aniline dyes alone and according to a report by the bureau of foreign and domestic commerce, during 10 months of last year $12,500,000 worth of dyes were exported to 21 foreign countries. The largest purchaser was Great Britain, which used over $3,000,000 worth of dyes in 10 months. Dye recipes numbering 257 recently captured by Britain from Germany, however, will give an impetus to the manufacture of dyes in that country, since these have all been tested in Switzerland by F. M. Rowe, of the Manchester School of Technology, and turned over to the government.

Electric Air Heater

To help meet the emergency created by the fuel shortage and to supplement the heating systems of shops, warehouses, etc., the Cutler-Hammer Mfg. Co., Milwaukee, is marketing several new types of electric air heaters, one of which is shown in the accompanying illustration. In addition to filling the ordinary demands of every-day use it is said that they are finding successful application in crane cabs, outhouses, pump and meter houses, exposed or remote corners of rooms, watch or signal towers, etc. The heaters are self-contained units and may easily be moved from one department or room to another.

Output of Texas Mines

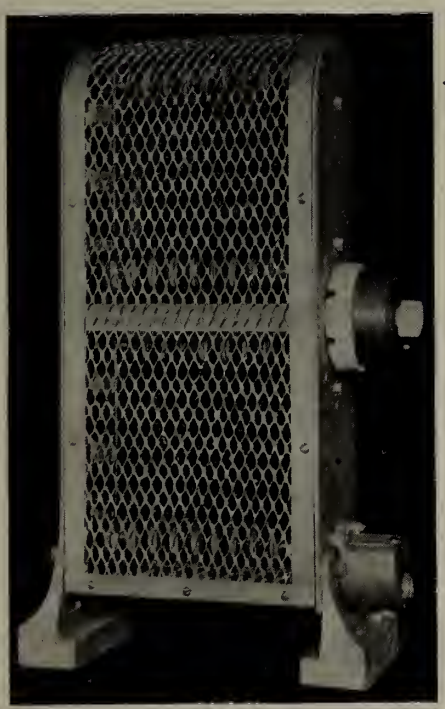
The output of Texas mines for 11 months of 1917 and the estimated output for December, as shown by preliminary figures reported by Charles W. Henderson, of the United States geological survey, amounted to $1000 in gold, 579,000 ounces of silver, 160,000 pounds of lead, and 20,000 pounds of copper, as compared with $414 in gold, 653,455 ounces of silver, 49,927 pounds of lead, 99,569 pounds of copper, and 232,388 pounds of zinc in 1916.

The Presidio silver mine and cyanidation mill in the Shafter district, Presidio county, continues to be the principal producing property in the state. Small shipments of silver-copper ore were made from the Allamoore-Van Horn district, Culberson county, and from the Sierra Blanca district, El Paso county. Several small shipments of copper ore from the deposits in the "Red Beds" were made from Crowell, Foard county, and from Chillicothe, Hardeman county.

Heat Treatment of Steels

Various Methods for Treating Nickel Steels Used for Case Hardening Purposes—Physical Properties Increased

ABOUT 20 years ago alloy steels were practically unknown and were used only for the manufacture of cutting tools, it was stated by F. C. A. H. Lantsberry, chief chemist, Birmingham Small Arms Co., Birmingham, Eng., in a paper read recently before the British Society of Chemical Industry. The introduction of high-speed machinery, Mr. Lantsberry continued, resulted in the creation of stresses, simple and compound, dynamic and static, which the plain steels at that time were incapable of resisting. Consequently the addition of various alloying elements to the steels was resorted to with the object of improving their physical properties. Improvements in electrical machinery and new appliances also demanded the improvement of magnet steels. The introduction of these harder steels increased machining difficulties and consequently improvements were needed in cutting tools.



ELECTRIC AIR HEATER

At the present time chromium, silicon, molybdenum, tungsten, manganese, cobalt, nickel, vanadium and titanium are added to steels for the purpose of increasing their hardening properties. Such steels as contain these elements, are classed as alloy steels. Prior to the outbreak of the war, they were used in an untreated state when plain steel would have done equally as well.

When originally introduced, alloy steels owed their merits to their proved, but in some cases only assumed, mechanical properties. It was soon discovered that these properties could be still further improved by heat treatment, and that the full value of the alloying element was obtained only after such treatments.

Alloy steels used in engineering are divided into three classes; structural, tool and magnet steels. The simple steels used for structural purposes contain from 0.1 to 0.75 per cent carbon. In the annealed state their mechanical properties are rectilinear functions of the carbon content and are included within the following limits:

Yield stress, lbs. per sq. in..	32,000 to 90.000
Ultimate stress, lbs. per sq. in.	40,000 to 130,000
Contraction, per cent.....	30 to 70

Alloy steels for structural purposes are listed as nickel, nickel-chromium, chrome-vanadium and manganese steels.

Nickel steels might be divided into two classes, namely, **low carbon steel** with 0.1 to 0.15 per cent carbon and

Analyses of Chrome-Nickel Steel

Grade of alloy—Steel:	Carbon, per cent	Chromium, per cent	Nickel, per cent
Quenched	0.30 — 0.45	0.5 — 1.50	1.0 — 3.00
Air-hardened	0.25 — 0.35	Up to 1.50	3.5 — 5.50

PHYSICAL TEST OF METAL

	Yield stress pounds per sq. in.	Ultimate stress pounds per sq. in.	Contraction per cent
Quenched	70,000 — 250,000	100,000 — 260,000	60
Air-hardened	170,000	232,000	45

medium carbon steel with 0.3 to 0.6 per cent carbon. The usual content of nickel contained in these steels is 3 to 4 per cent, but in the case of the mild steels the nickel sometimes analyzes as high as 6.5 per cent. Some makers sell nickel steels with a content as low as 1 per cent. It is doubtful whether steels containing below 2.5 per cent of nickel possess any advantages over ordinary carbon steels. Low carbon, nickel steels are invariably used for case-hardening purposes. Their treatment consists in heating to 900 degrees Cent. in some carbonizing mixture. The period of heating depends on the depth of case required and the size of the articles to be treated. After slow cooling, the articles are re-heated to 900 degrees Cent., quenched, and again re-heated to 780 degrees Cent., and quenched in water or in oil according to the degree of hardness required. The reason for this two-fold quenching is that a composite bar is being dealt with. After treatment the core of the stel has a yield stress of about 110,000 pounds per square inch, and an ultimate stress of 150,000 pounds per square inch with a reduction of area of 55 per cent. These figures compare with 50,000 pounds, 66,000 pounds and 65 per cent, respectively when in the untreated condition.

Medium carbon-nickel steels are largely used in construction engineering. Their method of treatment consists in heating to 800 degrees Cent., quenching in oil, followed by reheating to a temperature not exceeding 725 degrees Cent., according to the particular mechanical properties required. The physical properties of an average steel include a yield stress of 56,000 pounds per square inch, an ultimate stress, of 90,000 pounds per square inch, and a contraction of 40 per cent. Heat treatment varies these properties to such an extent that the yield stress is 56,000 to 200,000 pounds per square inch, the ultimate stress 100,000 to 200,000 pounds per square inch, and the contraction 60 to 40 per cent. Chrome steels are seldom used; the element chromium is usually added in conjunction with either nickel or vanadium. Chrome-nickel steels are divided into two classes: Steels that require quenching and air-hardened steels. The analyses and physical tests of these steels are shown in the accompanying table. The air-hardened steel was heated to 800 degrees Cent., and allowed to cool in the air. The quenched steel was brought to 800 degrees Cent., quenched in oil and tempered according to the physical properties required. The variations obtainable in the physical properties of a steel quenched in this manner should make it the most widely used of the alloy group.

Means of Conserving the Fuel Supply

As a means of far-reaching economy, the government of the United States should at this time apply intelligent and direct-acting efforts to the conservation of fuel at the industrial plants, which are responsible for its greatest consumption. It is unnecessary before a body of engineers to show proof that coal is wasted in vast quantities in the boiler furnaces of our plants, to feed which it is mined and distributed at a high and ever-increasing cost of labor and material.

The mining and distribution of coal have been placed under the supervision of the war coal board in order more nearly to meet the crying needs in these directions, to use the railroad facilities more efficiently so that the present car shortage may be minimized to the greatest possible extent, and to apportion the coal in quantity and to uses deemed most expedient.

While this organized effort to bring about efficiency in the production and distribution of coal is being made, no parallel measures have been adopted to bring about a normal and practicable efficiency in its use. The hundreds of large plants which are consuming fuel wastefully, in many cases more wastefully and carelessly than ever before, are directly and needlessly causing a large fraction of the existing car shortage. They are overloading the already strained capacity of the railroads; they are rendering slower and more difficult the transportation of food and other vital commodities, and, in short, they are simply counteracting the measures of efficiency in production and distribution which have elsewhere been established.

The preventable waste of fuel in the boiler furnaces of one steel mill amounted to 40,000 tons per year, which at $5 a ton would cost $200,000. This was a comparatively modern plant. The efficiency of boilers and furnaces in a 14-day test was 55 per cent. The load factor was unusually favorable to high efficiency and could readily be raised to 70 per cent or over. This is only one example and there are many more extreme cases. In one hand-fired plant the evaporation was raised from 6 to 9 pounds in a few days of instruction, and continuously kept close to this higher mark with the help of coal and water measurements which inaugurated. The saving was due exclusively to instruction and consequent better operation.

Preventable Waste of Fuel

The saving or wasting of one-fourth of coal consumption of any industrial plant depends entirely upon the efficiency of its operating management. Let me emphasize that this fraction of the consumption relates exclusively to the *boiler* plants, *i.e.*, the production of steam; and does not include the large economies possible in connection with its distribution and use.

For well-known reasons the boiler plant offers the more lucrative field for producing economies, and these with a minimum of alteration in physical equipment.

Under present conditions a plant which carelessly operates at an efficiency of 40 to 50 per cent receives from the government the same consideration in the delivery of coal as the one whose efficiency is 70 to 75 per cent. This obviously is unfair as well as wasteful.

The government hands over, say, 200,000 tons of coal a year to a plant owner, but asks for no account as regards its consumption, nor any questions as to the amount of steam it is made to produce. There is nevertheless an equivalent amount of steam this fuel is capable of generating, and it can and should be made to produce that quantity.

The object of this paper is to open a discussion which it is hoped will ultimately lead to the formulation of definite recommendations of means for the reduction of the present great preventable waste of fuel in our industries; to direct such means principally toward the elimination of that portion of the present waste which is due to faulty, careless and uninformed operation of plants; to forward these recommendations to the proper governmental authorities as an official communication of this society, and to offer to the government the services of the society for the organization, furthering, and, as far as possible, the execution of the plan which may as a consequence be adopted.

In general, there are two plans of operation worthy at least of consideration. One might be termed the autocratic method. This would involve the use of authority to compel coal

consumers to execute such measures of economy as the proper authorities might prescribe for any given case. Limits to be set as to expense to the user. Such limits might be in terms of a percentage of their present yearly coal bill. Alterations to be directed chiefly, as previously implied, to purely operating improvements. Many objections would probably be made by consumers against this plan, but once in effect the majority would do doubt realize its precuniary advantage to themselves. But its tendency may be too strongly opposed to democratic principles.

The other plan would be largely an educational one, in which patriotism and efficiency would furnish the motive forces required.

The teaching must be accomplished with the utmost simplicity and directness. Above all it must be in such form as to be readily comprehended and applied. This is a big task, but with the technical and executive ability represented in this society, these things should be and can be accomplished.

The requisite information must reach the owners and managers of industries, and there must be simple instruction sheets for the engineers and firemen. The vital importance of daily accurate records of coal and water must be taught and information given regarding practical appliances for automatic measurements of both.

Blank forms might be sent in advance to plant owners in order to be advised by them, first, whether they would be willing to co-operate with a governmental organization offering to assist them in reducing their coal consumption, and second, to obtain such data as to size, type, equipment, operation and fuel consumption of the plants as would enable a classification which would permit a government board of experts to send such instructions as would include the information needed for any one class of plants.

This work would be greatly aided by a staff of experts ready to visit plants when so requested by owners and make investigations and recommendations and keep in touch with the progress of economies. Included in such a staff should be men intimately familiar with practical operating economies whose duties would be the delivering of lectures or talks, which should be planned so as to reach directly not only managers and owners of the industries, but also the chief engineers and firemen of the boiler plants. This feature of the plan, by itself, would undoubtedly result in great savings.

The bureau of mines has for a number of years engaged in obtaining and disseminating scientific information regarding the mining and consumption of coal, and the results of the work have been of great value to technical engineers who are able to use and apply it. It is evident that we now require an extension of the idea of education, but in such form as directly to affect the men who run the boiler plants of our country, for in their hands is the saving or wasting of one-fourth of our fuel supply.

Six hundred million tons of coal were mined in the United States in 1916. If we assume only one-half of this to have been used for our industrial boiler plants, then a quarter of the coal used under boilers amounts to 75,000,000 tons per year. It is worth while to save this fuel by preventing its waste. This quantity of coal represents the use of 1,500,000 50-ton freight cars.

Metal Cross Tie

The abnormally heavy traffic and consequently greater strain to which railroads are being subjected is making



STEEL CROSS TIE

railroad men apprehensive of the ability of wooden ties to bear up under the rough usage. For this reason the use of metal cross ties is receiving more attention than it did some years ago, especially in Europe, where large numbers of them are employed.

The steel tie shown in the accompanying illustration was recently placed on the market by the Maryland Metal Cross Tie Co., Baltimore. The rail is fastened to the tie by means of a standard railroad spike, which is bent in the process of driving and held in its final position by means of a grooved hole with sinuous sides in four planes.

The tie is made of annealed cast steel and weighs about 140 pounds. Although it weighs less than a wooden unit it is claimed to have greater stability owing to its construction and to the employment of a number of ribs on the bottom of the base where they are imbedded in the ground. It eliminates the use of tie plates and rail braces and requires only two-thirds as many spikes as are necessary for a wooden tie.

The metal tie can be placed in the same roadbed side by side with wooden ties already installed, utilizing the same tools and equipment as those required for the placing of wooden ties. It may also be adapted to either standard or narrow gage roads, provision being made on the tie for different sized rails. No nuts, bolts or rivets are employed in its construction.

How to Measure High Temperatures

In a paper on the "Automatic Control and Measurement of High Temperatures", presented to the Faraday society, London, Richard P. Brown discusses the practice of this country. He points out that his experience in the United States has shown that for industrial purposes an instrument actuated by the expansion of nitrogen gas is satisfactory for temperatures up to 800 degrees Fahr. or 425 degrees Cent. This gas expansion instrument consists of a bulb of copper which is inserted in the heat. The bulb is connected by capillary tubing to the recording gage which contains a helical expansive spring.

It is essential in an instrument of this type that the capacity of the bulb be approximately 50 times as great as the capacity of the capillary tube and spring. The object is to reduce to a minimum errors due to atmospheric changes in temperature. He did not believe this instrument desirable to employ when the gage must be placed more than 100 feet from the furnace.

For use at moderate temperatures, where it is necessary to install the measuring instrument some distance from the furnace, the thermoelectric pyrometer is extensively used in the United States. A thermocouple, formed of one wire of 90 per cent nickel and 10 per cent chromium and the other wire of 98 per cent nickel and 2 per cent aluminum, is used for temperatures up to 1800 degrees Fahr. For temperatures above this, as high as 2800 degrees Fahr., thermoelectric pyrometers using a platinum rhodium thermocouple are satisfactory. For still higher temperatures, a radiation type of pyrometer is available. This consists of a thermocouple in the focus of a reflector at the rear end of the tube which is pointed at the door or opening of the furnace.

For measuring the voltage produced by a thermocouple, whether of base metal, platinum, rhodium, or the radiation type, high resistance millivoltmeters are available. Such instruments of 1000 ohms and higher are produced in the United States. This remarkably high resistance is desirable practically to eliminate the errors due to changes in resistance.

Troop and Cargo Ship Construction



Steel Tower Twirlers are Used for Handling the Materials Required in Ship Construction.

ACTUAL shipbuilding operations have been commenced by the American International Corp. at its new Hog Island plant, near Philadelphia—Fifty vessels of 7500 tons and 70 ships of 8000 tons will be built, according to the provisions of the contract signed Sept. 13, 1917—The contract prices are $1,100,000 for cargo vessels and $1,650,000 for troop ships — Deliveries are hoped for at the rate of approximately three ships per month—Provision for the building of 50 ways has been made—Insert shows workmen reaming tank top plates.



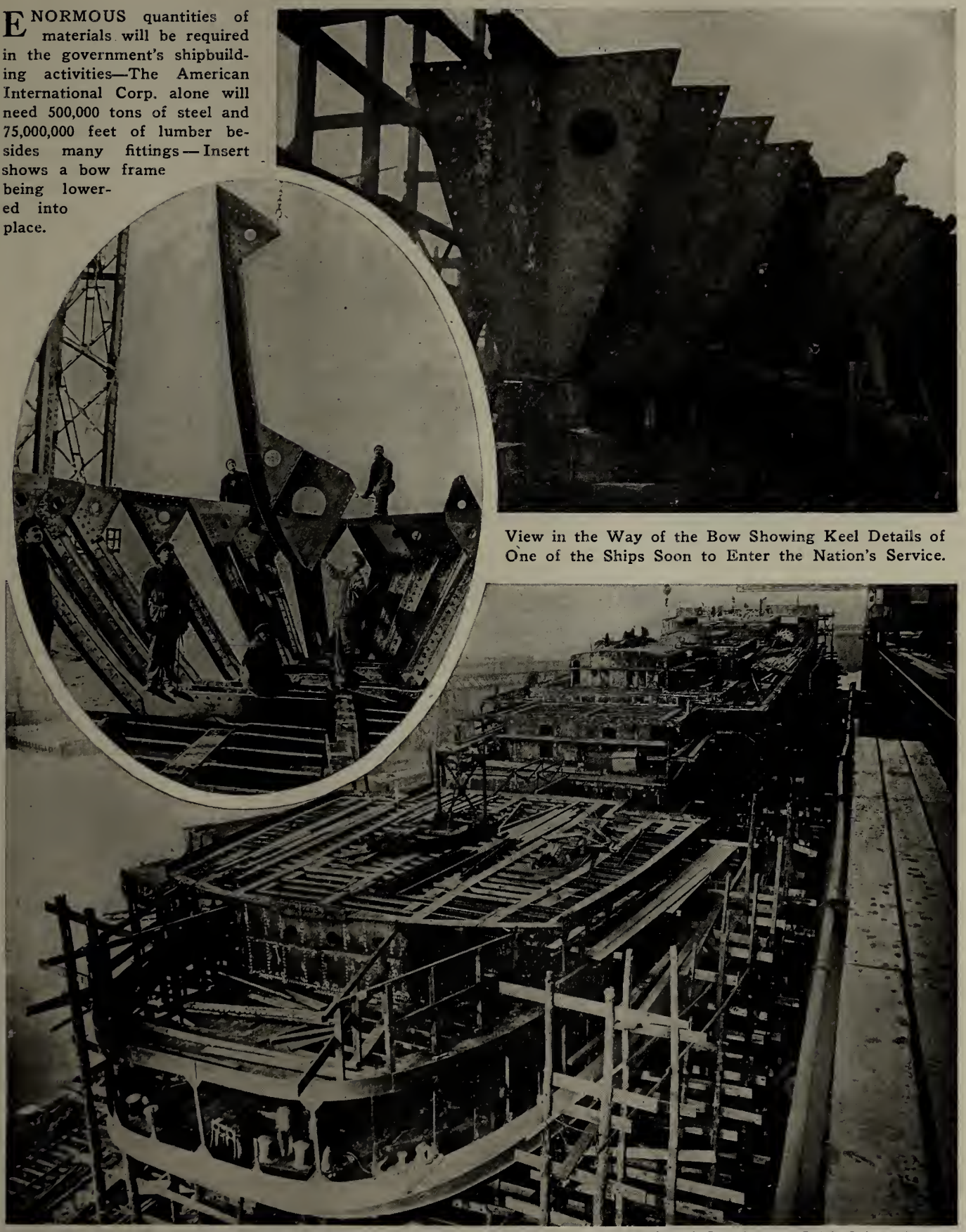




Material is Being Assembled Preparatory to Fitting Out the Ship in the Illustration at the Left—One of the Hundreds of Templates Required in Marking Plates for These Sea Carriers is Reproduced at the Right.

Begins at Great Eastern Shipyards

ENORMOUS quantities of materials will be required in the government's shipbuilding activities—The American International Corp. alone will need 500,000 tons of steel and 75,000,000 feet of lumber besides many fittings — Insert shows a bow frame being lowered into place.



View in the Way of the Bow Showing Keel Details of One of the Ships Soon to Enter the Nation's Service.

By permission of Committee on Public Information

Method of Framing a Vessel Together With Many Superstructure Details are Illustrated in This View of a Ship Nearly Ready for Launching—Evidence of the Amount of Detail Entering Into Ship Construction is Abundant.

Book Review

Electric Furnaces in the Iron and Steel Industry, by Rodenhauser, Schoenawa and Vom Baur; cloth; 429 pages, 6 x 9 inches; second edition, published by John Wiley & Sons, and furnished by THE IRON TRADE REVIEW for $3.75 net.

This book is divided into two parts, of which the first deals with all questions relative to the construction of electric furnaces and the apparatus used. Not only are all the existing furnaces described in detail with their corresponding advantages and disadvantages, but also the metallurgical reactions occurring in hearth furnaces and electric pig iron furnaces as well. The principal laws are stated which the construction and operation of electric furnaces entail without giving long mathematical discussions. Short arithmetical examples are given dealing with actual furnace problems. The furnaces most extensively used, such as the Stassano, Heroult, Girod, Kjellin and Rochling-Rodenhauser, are described in detail. The discussions are accompanied by a large number of illustrations and reproductions. In chapter XIV furnace designs are briefly discussed which have only a limited use and finally the electric shaft furnace is described at length.

Part II is devoted to the materials for furnace construction; cost of operation; electric smelting of iron ores with the production of iron and steel; use of the electric furnace for melting, for the refining of pig iron, and for the production of ordinary and special qualities of electric iron and steel. This volume is useful to the furnace builder, the student, or anybody who is interested in electric furnaces for the production of iron and steel. The book has been rewritten from the first edition to keep abreast of the remarkable expansion in electric furnace practice.

Britons Shun After-War Waste

An advisory committee to act for the British government in the disposal of surplus government property and stores after the war has been organized. The intention of this committee is to avoid waste, the flooding of the markets with surplus materials, and to secure efficient use of the stocks of material on hand. These stocks will include machinery and ships as well as food stuffs, clothing, etc. Incidentally the British government owns extensive lands and buildings in which war work is being carried on. These will come under the management of the advisory committee.

It is stated that the after-war demand will be enormous. Every available brick, beam, and machine will be needed. More than all these, food will be required. The committee will prepare inventories through the help of existing government departments having war properties and stores under their control.

There will be many competitors for these stores and materials; concerns, public and private, are deferring work and extensions through lack of materials. A shortage of workers' houses exceeding 300,000 will have to be faced; shipbuilding will be a vital need, also land settlement and increased agriculture; many railways and public concerns will have repairs and renewals to make; and there is a talk of new canals and other ventures.

The use of war transport motor trucks for agricultural and commercial purposes is an opportunity for the alternative peace use. Examples from the war zone itself show that the finding of alternative uses for war materials offers an immense field for ingenuity and research.

To Build Dry Dock

Beaumont, Texas, Feb. 10.—The Beaumont Shipbuilding & Dry Dock Co. has been awarded two contracts by the Emergency Fleet corporation of the United States government, involving an expenditure of approximately $10,000,000. One of the contracts is for equipping thirty wooden ships and the other is for the construction of a large floating dry dock at Beaumont. In connection with the building plant there will be constructed machine shops, warehouses, storage lofts and a 1500-foot wharf. The contract for equipping the thirty wooden ships covers mostly the labor, the government undertaking to furnish the machinery and equipment. The dry dock will have a lifting capacity of 8000 tons. It will be sectional in design in order to enable its enlargement from time to time. The plans call for an ultimate capacity of 14,000 tons. The dry dock will be used both by the government and by private shipping interests. J. W. Link is president of the company.

A contract for the design and installation of complete conveying and elevating systems in the Marquette plant at Saginaw, Mich., of the General Motors Corp., was closed recently by Frank D. Chase, industrial engineer, Peoples Gas building, Chicago. This installation was made necessary by munitions contracts recently taken by the corporation.

Eastern Toluol Output to be Given Impetus

Since toluol is the base of the explosive trinitrotoluol, and the government's requirements of it are increasing daily, much attention is being paid to the recovery of this by-product. Gas consumers of New Jersey recently consented to a 30-day suspension of the present standard of gas required from the Public Service Gas Co., in Newark, Jersey City, Paterson, Trenton, Camden and other cities where toluol is produced, since the manufacture of the latter diminishes the quality of the gas. In thus taking the initiative, they probably have anticipated a request along that line from the ordnance bureau of the United States war department. In New York City, orders have been received by the gas companies from the ordnance bureau to manufacture gas on the B.t.u. basis of measurement instead of the present candlepower basis. Necessary apparatus will be installed by the government in order to increase the output of toluol as much as possible. A sufficiently high price for the chemical will be paid the various companies by the government to cover any losses sustained, and the latter will see that any rebate made to consumers because of a lower quality of gas, is figured in the price of the by-product.

In Springfield, Mass., it is anticipated that 30,000 gallons per year will be obtained by the effort of the Springfield Gaslight Co., recently undertaken. Charles H. Tenney, president, recently stated that his company's plant is one of 80 in the United States with sufficient capacity to warrant the installation of machinery for recovering toluol. He estimated that 7,314,390 gallons could be produced by those 80 plants in a year.

Spanish Ore Extensive

Foundation for the wealth of the Biscayan provinces of Spain is furnished by their extensive iron ore deposits, according to Consul Paul H. Foster's report from Bilbao, which city, he says is the center of the industry and the wealthiest city of its size in Europe. A total of 39,013 acres represents the nonproducing territory and 2985 acres the producing provinces. Engineers' estimates of the supply in sight in a few provinces follow: Vizcaya, 60,000,000 metric tons; Guipuzcoa and Navarro, 10,000,000; Santander, 30,000,000, and Leon, 300,000,000. Mr. Foster states that the base price for 1917 has averaged 25 pesetas per metric ton, or $5.80 at the present rate of exchange.

Subsidize British Stacks

Makers Get One Pound on All Iron Sold—Wages Board Faces Labor Problems—Increase Day Workers

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 7, 1918.

THE first quarterly meeting of the year held at Birmingham recently was largely attended and in many ways a most interesting gathering. For several quarters Wales has been poorly represented, chiefly because the tinplate trade has been under a cloud; but there were numerous representatives on this occasion, chiefly attending on behalf of the raw steel industry. Wales has become the principal source of supply for raw steel, its contribution to the district in the way of billets and wire rods being about 500,000 tons per annum.

It would appear that the question of a subsidy for makers of pig iron has at last been amicably settled. Makers are to get £1 per ton from the government on all pig iron sold. This is considered fairly satisfactory, and settlements of arrears will, presumably, proceed at once. There is great difficulty in getting supplies, however, some foundry descriptions being almost unobtainable. No manufacturer will book anything over 50 tons of any class, and some works are in great straits for lack of supplies. Unfortunately, the recent settlement of the subsidy has brought a number of labor difficulties in its train. A week ago, several blast furnaces were on strike, in addition to a number of iron and steel works, and it is computed that the loss of output in the Sheffield district alone totaled at least 50,000 tons. One large concern, the Staveley Co., was banked down until yesterday. The day workers in the iron trade have been solaced for the present by the concession of 12½ per cent. Though the men have returned to work, they are not satisfied, and wages questions from various points of view solely will occupy a special meeting of the wages board in Birmingham Monday.

Large Demand with Stocks Low

In the Cleveland district, a fair amount of business is being pushed through on the month's allocations. The allies are in the market with big demands, which will be met as far as possible. In the hematite department, strong efforts are being made to increase the output; but demand grows with at least equal rapidity. There is undoubtedly an acute shortage both of forge and foundry pig iron. In Scotland especially pig iron is short, hematite being most in demand.

One of the results of the uncertainty as to prices is a circular lately issued by a Derbyshire house to its customers announcing its intention to insert a clause in contracts stipulating cancellation in the event the arrangement for reimbursing producers for extra cost falls through or the allowance is reduced. This subsidy has been the subject of so much criticism that the step may have to be reconsidered. Staffordshire pigs can be bought in small lots. For all brands of pig iron full rates are asked. Stocks at the works are very small, and the foundries and forges can be kept going only by constant receipts from the furnaces.

Steel Buyers Exceed Sellers

The quarterly meeting of the iron trade in Birmingham in many ways showed the vigorous state of trade. There were plenty of buyers but very few sellers. The buyers for export have, latterly, deserted this meeting, owing to their inability, under the system of government control, to place business. All the orders accepted were for government requirements. Substantially, prices are unchanged, but on the eve of the meeting the ministry of munitions issued a new order reducing the price of heavy steel melting scrap from £5 5s ($25.20) to £4 15s ($20.40), the same price applying to mixed steel and wrought iron scrap. Steel planings, turnings and borings are reduced 5s ($1.20). Some such reduction was expected but the time chosen for making it is considered unfortunate as a good deal of contracting was done at the turn of the year on the old prices. There is great demand for scrap of all sorts.

In the finished iron trade orders continue abundant, the only anxiety being to get deliveries, all of which are in arrears. Steel also is constantly insufficient and the demand for puddled bars is far beyond the ability of makers to supply. Whatever bars are available can readily be sold at £12 15s ($61.20) per ton. Nut and bolt makers in particular are inquiring for this material. There is a great demand for tube strip, the German supply of this before the war never having been fully replaced.

As the result of a conference held in London a week ago between representatives of the iron and steel trades and the minister of munitions, the ministry sanctioned an advance for those time workers who have not received more than 20s ($4.80) war advance to the extent of 12½ per cent. In cases where the advance already exceeds 20s ($4.80) a sufficient percentage is added to bring up the total to 12½ per cent.

It is considered a misfortune in the trade that anything should have disturbed the natural operation of the wages boards, which have been singularly successful in the past in the amicable regulation of remuneration to the workpeople. Those skilled workmen who were paid through the sliding scale are asking for some concession in view of the arrest of wages which they say has come through the substitution by the ministry of munitions of a subsidy to pig-iron makers for the customary rise in prices. This is likely to prove a somewhat knotty problem. For many years the wages board entirely left the day workers outside its ken, but the war has compelled attention to be given to the demands of these men. They are now claiming 25 per cent advance, but a counter proposition is that men of all classes will be brought under the operation of the sliding scale, so as to prevent constantly recurring demands for wage settlements. It is possible, however, that the day workers may object, since the sliding scale advances have amounted to 85 per cent, whereas in many instances day workers have had their wages doubled, and still will be eligible for the whole or part of the 12½ per cent now conceded. It is quite likely that the permanent machinery of the wages board may be modified.

The recent fluctuations in the price of tin have compelled tinplate makers to arrive at some scale for the regulation of tinplates and it has now been settled that for every £5 ($24) added or deducted from the price of tin, boxes of tinplates shall vary at the rate of 1½d (3c) per box.

Consignee Only Can Get Embargo Permit

The Pennsylvania lines east of Pittsburgh have inaugurated an inviolable rule, completely changing the plan obtaining for some time past, whereby the consignee or the shipper obtained permits to move freight affected by embargoes. This new order applies to present embargoes as well as to all future embargoes that may be laid, until further notice. It will now be possible for the con-

signees only to make aplication to railway superintendents for permits to move freight from one point to another on their respective divisions; to general superintendents, when it is desired to move freight from point to point within their respective grand divisions and to W. C. Glynn, assistant general freight agent, Broad street station, Philadelphia, when freight is to be shipped from one grand division point to a destination in another grand division or to or from points on other railroads. The person who is to receive the shipment, in making application for the permit, must demonstrate to a reasonable degree, not only that the shipment is needed to meet his existing requirements, but that he will be able to quickly unload the cars. The new arrangement will not apply in connection with export traffic via New York, Philadelphia and Baltimore, or to domestic carload shipments to New York.

Business Methods

Would Eliminate Present Chaos in War Management, Says Baackes

Frank Baackes, vice president and general sales manager of the American Steel & Wire Co., Chicago, pointed out a few practical truths regarding present conditions of war management in an address before a joint convention of eastern hardware men in New York recently. He declared that the appointment of business men to look after the needs of a war administration would have eliminated much of the chaos and confusion that has existed and still exists.

Mr. Baackes said in part:

"It is not the part of any American citizen to criticise the acts of our executives in Washington at this time, but it is not improper to express regret that a more logical policy was not hit upon in the handling of commodities during the progress of the war. The coal situation is one of the examples of this sort of policy. You cannot expect a tailor to operate a blacksmith shop successfully, nor can we expect too much of an administrator who was nothing more than a professor of economics.

"To the manufacturer and the practical business man it would seem to have been far more advantageous for the country's good had representative men in every line of industry in this country been summoned to Washington and organized into a council to take full charge of this important branch of the government's gigantic task.

"These practical men would be in a position to know the capacity of every factory in the country and apportion the orders in such manner as to have prompt delivery and at the same time fix prices with wisdom and fairness.

"The most deplorable feature of the situation at present is the fall down of our railroads, and right at the outset I will say that the railroads were not entirely to blame for the conditions which confronted them at the crucial moment. Whenever the roads have sought to impose increased freight rates the shippers have invariably united in opposing any such increase. The result has been that the railroads were unable to add to and improve their equipment.

"Our President decreed wisely when he said that there should be a policy of price limitations on all commodities, and we should stand back of him in upholding this principle. Selfish interests should find no place in the business affairs of the present, and the sooner we drop that old spirit of 'what do I get out of it' the quicker we will make it possible for the government to place itself on a substantial war footing."

Meetings similarly addressed have been held in other districts and one will be held this week at Columbus, O. They have for their purpose the mobilization of the hardware trade to effect a closer co-operation with the government.

Obituaries

WILBUR B. AYER, president of the Belcher & Loomis Hardware Co., Providence, R. I., dealer in machine tools, etc., and president of the New England Iron and Hardware association, died at his home in that city, Feb. 15, aged 52 years. He formerly was in the hardware business in Chicago and Bangor, Me.

Cosmos J. Shurley, who retired in 1910 from the Shurley & Dietrich Saw Works, Galt., Ont., which he founded in 1874, died recently, aged 53.

W. E. Hackett, head of Skowhegan Foundry & Machine shop, Skowhegan, Me., died at Somerset hospital in that city recently.

James E. Roderick, chief of the Pennsylvania bureau of mines and associated with it since May 1, 1899, died recently at Hazleton, Pa., aged 76.

George F. Arndt, aged 28, former secretary of the William F. Arndt Co., Milwaukee, sheet metal works, died recently in that city from typhoid fever, after a short illness.

Fred Hoehne, president of the Hoehne Machine Works Co., Kaukauna, Wis., died recently following a stroke of paralysis, aged 63. He was a pioneer machine shop owner of the Fox River valley.

David A. Bixby, former purchasing agent for the American Car & Foundry Co., St. Louis, died recently at the age of 64. He had resided in St. Louis for 35 years, after serving in the Michigan state legislature.

Ernest Le Duc, surveyor and mining engineer, formerly with the Oliver Iron Mining Co., Duluth, died recently at his home in that city, following an operation. He was born in Calumet, Mich., in 1869. He made various surveys of the Mesabi and Vermillion ranges. In the past 10 years, he was instrumental in organizing the Cuyuna Mille Lacs Iron Co., now a subsidiary of the American Manganese Mfg. Co., the Mesaba-Cuyuna Iron Land Co., and the Big Ledge Copper Co.

F. W. Matthiessen, a pioneer of the zinc industry in the middle west, and head of the Matthiessen & Hegeler Zinc Co., La Salle, Ill., which he founded in 1858, died at his home in La Salle, recently from heart failure, following a stroke of paralysis. He was born in Germany in 1835 and located in America in 1856. From 1887 to 1896 he was mayor of La Salle and at the time of his death was affiliated with the Western Clock Co., there.

Park Painter, who recently died in the Belgravia hotel, Philadelphia, at the age of 69, after a year's illness, was the son of Jacob Painter, one of Pittsburgh's first iron manufacturers. Born in Pittsburgh, Park Painter was graduated from Chester academy in 1866 and became a member of the firm of Jacob Painter & Son, after which Painter's mill, Pittsburgh, of the Carnegie Steel Co., was named. In 1903, the Jacob Painter & Son mill was sold to the American Steel Hoop Co.

John Taylor, founder of the firm of Taylor & Arnold, Ltd., dealer in railway supplies, Montreal, Que., died recently in his 85th year. Born in Scotland he came to Montreal as a young man but later he became a member of the firm of Mortland, Watson & Co. This company established the Montreal Rolling Mills which were subsequently taken over by the Steel Co. of Canada. It was after the dissolution of Morland, Watson & Co., that Mr. Taylor with his son-in-law Thomas Arnold organized the concern of Taylor & Arnold, Ltd.

Frown on Ship Labor Rows

President Takes Vigorous Hand Against Recalcitrant Carpenters—Meeting of Employers and Employed Called to Consider Strike Truce

PRESIDENT WILSON'S intervention in connection with eastern shipyard labor difficulties is considered in many directions as clarifying considerably a situation which was menacing the country's war program at a vital point. For the time being at least, the disaster of curtailment or cessation of shipbuilding has been averted.

With an irreducible minimum of from 3,000,000 to 4,000,000 tons of shipping to be produced in 1918, shipyard labor has become a factor of paramount importance in the war. The facts are that during the last two weeks, strikes in shipyards have done more to delay shipbuilding than any other cause. Not only did 5000 employes of shipbuilding plants at Gloucester, N. J., and Wilmington, Del., strike because they would not be paid double time for Feb. 12, which they considered a holiday, but a general walk-out was started in about 70 yards in the east, when William L. Hutcheson, Indianapolis, president of the carpenters' brotherhood, permitted about 7000 workers to quit and many more men were prepared to follow. As a result of joint appeals of President Wilson and Chairman Hurley of the shipping board to the loyalty, patriotism and Americanism of the men, Hutcheson ordered those on strike back to work and kept on their jobs others who were ready to strike.

Federation Pledges Loyalty

The American Federation of Labor has refused to back the carpenters' union in its strike policy and again has formally pledged its loyalty during the war and its opposition to wage profiteering.

The bone of contention seems to be the wage scale. No sooner had the federal mediation commission formulated a scale for Pacific coast yards than Atlantic coast yard employes demanded that they be placed on a parity. It is expected that shipyard wages in general will be fixed by the adjustment board. Another cause for striking which has been advanced is the unsuitable housing conditions of shipyard localities. To alleviate this situation action upon the $50,000,000 housing bill for shipworkers is being rushed in congress. Houses will first be erected at Sparrows Point, Hog Island and Newport News, and the plan will be under the direction of J. Rogers Flannery, of Pittsburgh. While the labor turnover in some American yards has been as great as 600 per cent, in Gretna, Eng., after the government built homes for the workmen the turnover was about 5 per cent. It is believed many of the American yards could increase their forces from 25 to 50 per cent if the housing problem is solved.

Consider Truce During War

In England a truce between capital and labor was declared for the duration of war, and looking toward something of this sort, a meeting will be held in the office of Secretary of Labor Wilson on Feb. 25, of five representatives of employers and five representatives of workers. Each group will choose one representative of the public, making 12 conferees. Among the representatives of employers are Loyall A. Osborne, vice president, Westinghouse Electric & Mfg. Co., New York; Charles F. Brooker, president, American Brass Co., Ansonia, Conn.; W. H. Vandervoort, president, Root & Vandervoort Engineering Co., East Moline, Ill., and L. F. Loree, president of the Delaware & Hudson Railroad Co., and president of the Hudson Coal Co., New York.

Labor Troubles Check War Work on All Sides

That labor difficulties interfering with war work are not peculiar to shipyards alone, is shown by reports of strikes in other industries. Southern supplies of coal were recently curtailed by a walkout of 2000 miners employed by the Tennessee Coal, Iron & Railroad Co. Birmingham, Ala. Approximately 80 per cent of the work done in the shops of the Condit Electric Mfg. Co., South Boston, Mass., is on government war orders, and 200 mechanics went on a strike recently when their demands for changed working conditions and increased wages were refused. Superintendent Young stated that the men walked out when he told them that owing to the large war orders, it would not be possible to reduce the 53-hour week to 45 hours. Machinists and helpers, about 250 in number, employed by the Albert & J. M. Anderson Mfg. Co., South Boston, Mass., went out on strike recently for an increase of 10 cents an hour in pay, time and a half for overtime and double time for Sundays and holidays. the company is making munitions. The employes are not organized. A call for a federal conciliator of labor was sent to the department of labor at Washington by the General Electric Co., Pittsfield, Mass., when about 80 toolmakers and machinists walked out in a body to attend a meeting of the union concerning their grievances over wages. When they reported for duty the next morning, they were not admitted.

Compromises effected have sent a large number of workers back to their respective shops, among them being 75 employes of the Gibby Foundry Co., Wakefield, Mass, who struck for higher wages and obtained an increase of 50 cents a day. This is one of several shops outside the molders' union which recently countenanced a strike of 2300 workers in between 75 and 100 foundries in the east, including molders, coremakers and patternmakers. After being out two weeks and much government work delayed, a settlement agreement was reached by representatives of the union and the New England Foundrymen's association. The men who were receiving $4.50 a day, demanded $5.50 and have been given an immediate advance of 50 cents a day with a further increase of 25 cents a day on April 1.

Labor Notes

Women are being employed for the first time in the coremaking department of Stanley G. Flagg & Co., Pottstown, Pa. They are receiving pay over the period of instruction.

Structural iron and steel workers who will do construction work in France are filing applications for passports with the deputy United States court clerk in Pittsburgh. A number of passports have been issued.

War's call has left nearly 1000 vacancies in the plant of the Packard Motor Car Co., Detroit, most of which have been satisfactorily filled by women. In some departments they have been found to be more efficient than men and their employment has made for increased production.

As a result of taking off 104 weekday and 51 Sunday trains, which reduction is service became effective Jan. 6, the Pennsylvania lines east of Pittsburgh and Erie have achieved the following economies: Twenty-nine locomotives and 55 locomotive crews daily; 47 train crews per day and 2,708,212 train miles per year.

Record of Whole Industry is Shown

Weekly Reports Received by Steel Director Replogle From Every Iron and Steel Plant Give Complete Data Regarding Order Books and Furnish Government With Guide in Allocating New Tonnage

WASHINGTON, Feb. 19.—Weekly reports from practically every pig iron producer and steelmaker in the country have built up in the office of J. Leonard Replogle, director of steel supply under the war industries board, one of the most interesting records of the war. Here the condition of every furnace and mill may be seen at a glance. These records are also kept, in duplicate, in the Washington office of the American Iron and Steel institute, in charge of James B. Bonner, vice chairman of the institute's subcommittee on steel distribution.

These records which might ordinarily be made public—not in detail as to each mill, but in total as to the industry—now are regarded as military secrets along with documents of state and strategic plans of the army and navy. They are carefully kept from the public. To steel statisticians these records would furnish material enough for tables and charts unnumbered. Some day they may be made public and show the part steel played, and is playing, in the greatest of wars. A glimpse at the summaries of these reports would disclose the tonnages under production for the most important government departments using steel, the chief allies, South America and other countries of the world.

Producers Make Weekly Reports

The reports, required to be made in duplicate and mailed to Mr. Replogle and Mr. Bonner not later than Monday of each week, are made on forms prepared by Mr. Replogle similar to ones used by him back in 1907 when he was with the Cambria Steel Co. They have been changed sufficiently to meet present conditions and are designed to show, almost at a glance, where tonnages should be placed, how mills and furnaces are progressing in the work assigned, what each plant is doing for the allies and the various American war branches, how many tons are under priority and how the priority orders stand in relation to the entire tonnage booked.

Separate reports are required for rails, shapes, sheared and universal plates, merchant bars, projectile steel, sheets, tinplate, tubular products and seamless tubes, wire and wire products, all other steel products and pig iron, ferromanganese, etc. All the forms for the various steel products are identical. The pig iron form is different.

The form for plates provides for the total orders, in net tons of 2000 pounds, subdivided as to the amount brought forward from the week before and that received during the week. Then provision is made for shipments made in the week and the orders cancelled, leaving the volume of the unfilled tonnage. This information is entered in perpendicular columns which extend horizontally across the form under "Orders for U. S. Government (direct and indirect*)", and "Orders for foreign governments (direct government orders only)". The asterisk specifies that orders for material to be used by the government should be listed whether the orders were placed directly by the government or indirectly through a subcontractor on a government contract. Space is provided for domestic orders not government and foreign orders not government with space for the grand total.

Under the government orders section, columns are provided for tonnages placed by the army, the navy, the Emergency Fleet corporation and other government departments, showing the total orders handled for the American government. Under the foreign governments section columns have been left for Canada, England, France, Italy, Russia, Japan, South America and other foreign governments, with a total for all of them. Below this table another is prepared for classification of all unfilled tonnages according to priority rating. This is provided on all reports except those for pig iron, which must be in gross tons.

The pig iron report forms provide for the same information as to tonnage orders received, shipped, cancelled, etc., as do the steel forms with added requirements covering the tonnage produced during the week and the stock on hand. In addition also the total number of furnaces owned and the number in blast is asked. If the output has been reduced the report should give the causes. This particular space has been of great use during the past few months.

The information asked regarding pig iron is given in grand total after entries in parallel columns for tonnages of basic, bessemer, foundry and malleable, low phos, bessemer ferro and high silicon, spiegeleisen and ferromanganese and all other, including off iron.

It is pointed out by Mr. Replogle that unless all the government and foreign purchasing agencies comply with the system of steel distribution, havoc would result in the industry because no centralized source, unless, perhaps, in the trade itself, would be in position to know which mills can and which cannot accept more tonnage. As it is, he said, all departments, even the navy which has been experimenting with competitive bids on steel products, the prices of which were not fixed by the President, notify Mr. Replogle of tonnages they place or want placed so that his records may be kept accurately. The navy's consideration of bids, while independent enough, was not without Mr. Replogle's knowledge and the results were discussed by him and navy officers.

Navy Needs Light Relatively

In this connection it is to be emphasized from a purely independent viewpoint that the navy's requirements of steel tonnage is less than 5 per cent of the entire number of tons allocated and that it is even less than some of the steel ordered for account of some of the allied governments. If the navy should persist in resorting to competitive bidding it would possibly result in the small percentage upsetting a system adopted by 95 per cent of the consumers of American steel. For this reason many steel men are of the opinion Admiral McGowan, whose bureau of supplies and accounts has been conducting the price test, will hesitate in adopting the policy generally.

While the majority of steel trade is not in sympathy with the war industries board—a condition typical throughout the country—manufacturers comply with the system and many have even gone so far as to ask Mr. Replogle whether they should accept orders not allocated through him. In one case a branch of the government, not the navy, placed an order without competitive bids and without consulting Mr. Replogle. The director

Name of Company _____ *Report for the Week Ending* _____

Location _____

WAR INDUSTRIES BOARD OF THE COUNCIL OF NATIONAL DEFENSE, WASHINGTON, D. C.

PIG IRON, FERROMANGANESE, ETC.

All in Gross Tons

	BASIC	BESSEMER	FOUNDRY AND MALLEABLE	LOW PHOS.	BESS. FERRO. HIGH SILICON	SPIEGEL FERROMANG.	ALL OTHER, INCLUDING OFF IRON	GRAND TOTAL
1 Tonnage brought forward from last week								
2. Tonnage received during week								
3. Total tonnage								
4. Tonnage shipped during week								
5. Tonnage canceled during week								
6. Total outstanding tonnage at end of week								
7. Tonnage produced last week								
8. Stock on hand								

9 Total number of furnaces (_____). Number of furnaces in blast (_____). If reduced output state cause _____

Send Original each Monday to
J. LEONARD REPLOGLE,
Director of Steel Supply,
War Industries Board,
Washington, D. C.

Send Duplicate each Monday to
JAMES B. BONNER,
Vice Chairman, Subcommittee on Steel Distribution,
American Iron & Steel Institute,
Wilkins Building,
Washington, D. C.

Signed _____

By _____

Name of Company _____ *Report for the Week Ending* _____

WAR INDUSTRIES BOARD OF THE COUNCIL OF NATIONAL DEFENSE, WASHINGTON, D. C.

SHEARED AND UNIVERSAL PLATES

State all Tonnages in Net Tons of 2,000 Pounds

No. 2

	ORDERS FOR U. S. GOVERNMENT (DIRECT AND INDIRECT)*					DOMESTIC ORDERS NOT GOV'T.	ORDERS FOR FOREIGN GOVERNMENTS (DIRECT GOVERNMENT ORDERS ONLY).									FOREIGN ORDERS NOT GOV'T.	GRAND TOTAL
	ARMY	NAVY	EMERGENCY FLEET	OTHER U. S. GOVT.	TOTAL U. S. GOVT.		CANADA	ENGLAND	FRANCE	ITALY	RUSSIA	JAPAN	SOUTH AMERICA	OTHER FOREIGN GOVTS.	TOTAL FOREIGN GOVTS.		
Orders brought forward from last week																	
Orders received during week																	
Total orders																	
Tonnage shipped during week																	
Orders canceled during week																	
Total outstanding orders at end of week																	
ALL OUTSTANDING ORDERS AT END OF WEEK CLASSIFIED ON PRIORITY BASIS.																	
Class A-1																	
Class A-2																	
Class A-3																	
Class A-4																	
Other Class A																	
Total Class A																	
Class B																	
Class C—All other orders																	
Total—Must equal total above																	

* Orders for material to be used by the Government should be listed here whether the orders were placed directly by the Government or indirectly through a subcontractor on a government contract.

NOTE.—Mail copies not later than Monday to the following addresses:

J. LEONARD REPLOGLE,
Director of Steel Supply,
War Industries Board,
Washington, D. C.

JAMES B. BONNER,
Vice Chairman, Subcommittee on Steel Distribution,
American Iron & Steel Institute,
Wilkins Building,
Washington, D. C.

Signed _____

By _____

Name of Company _____ *Report for the Week Ending* _____

WAR INDUSTRIES BOARD OF THE COUNCIL OF NATIONAL DEFENSE, WASHINGTON, D. C.

ALL STEEL PRODUCTS

OTHER THAN

RAILS, STRUCTURAL SHAPES, SHEARED AND UNIVERSAL PLATES, MERCHANT BARS, PROJECTILE STEEL, SHEETS, TINPLATE, TUBULAR PRODUCTS, and SEAMLESS TUBES, WIRE AND WIRE PRODUCTS
(these Products being covered by separate blanks)

State all Tonnages in Net Tons of 2,000 Pounds

No. 12

	ORDERS FOR U. S. GOVERNMENT (DIRECT AND INDIRECT)*					DOMESTIC ORDERS NOT GOV'T.	ORDERS FOR FOREIGN GOVERNMENTS (DIRECT GOVERNMENT ORDERS ONLY).									FOREIGN ORDERS NOT GOV'T.	GRAND TOTAL
	ARMY	NAVY	EMERGENCY FLEET	OTHER U. S. GOVT.	TOTAL U. S. GOVT.		CANADA	ENGLAND	FRANCE	ITALY	RUSSIA	JAPAN	SOUTH AMERICA	OTHER FOREIGN GOVTS.	TOTAL FOREIGN GOVTS.		
Orders brought forward from last week																	
Orders received during week																	
Total orders																	
Tonnage shipped during week																	
Orders canceled during week																	
Total outstanding orders at end of week																	
ALL OUTSTANDING ORDERS AT END OF WEEK CLASSIFIED ON PRIORITY BASIS.																	
Class A-1																	
Class A-2																	
Class A-3																	
Class A-4																	
Other Class A																	
Total Class A																	
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American Iron & Steel Institute,
Wilkins Building,
Washington, D. C.

Signed _____

By _____

REPRODUCTION OF BLANKS UPON WHICH ORDER DATA IS REPORTED TO STEEL DIRECTOR BY MILLS AND FURNACES

immediately received a wire from the mill asking if it should accept the order. Several days later the government official placing the order submitted it to Mr. Replogle for allocation.

Price Advances Allowed in Coal and Coke

Washington, Feb. 19.—As far as the fuel administration here is concerned, all industries operated yesterday without restrictions of the general fuel conservation order of Jan. 17. Last Wednesday night Dr. Garfield announced the ban would be lifted, subject, however, to the judgment of the various state administrators who were given authority to continue the fuel-saving plan as they saw fit.

At the time the state administrators were told to care for their own states' needs, it was felt the restrictions would be continued in New England, at least for another week. Administrator Storrow of New England informed the administration he would continue the fuelless Mondays. Increased shipments to this section are continuing from the fuel supply at Hampton Roads, according to a diversion order from Dr. Garfield. This is in addition to the present 500 cars a day.

Dr. Garfield last week increased the maximum prices on coke in certain districts as follows, all f.o.b. ovens: Goke produced in the Black Creek, Blue Creek and Brookwood districts, Alabama, and in the New River district, West Virginia, $8, except that made by the Empire Coal Co., Empire, Ala., $8.25; by the United States Cast Iron & Foundry Co., Bessemer, Ala., $8.50; in the Big Seam district, Alabama., $6.75, except that by the New Castle Coal Co., $7.50; by the Durham Coal & Coke Co., Walker county, Georgia, $8.75; and by the McCurtain Coke Co., McCurtain, Okla., for smelting, $10.75, and for 72-hour foundry, $11.75.

In the thin-vein district, Pennsylvania, Dr. Garfield increased to $2.60 on all grades of bituminous coal, classified as run of mine from the following prices fixed by the President: Run of mine, $2; prepared sizes, $2.25; and slack or screenings, $1.75. Fully 90 per cent of the 60,000,000 tons mined in this district annually is used by manufacturers.

In Illinois, certain prices were reestablished as follows: On coal produced by the Moweaqua Coal Mining & Mfg. Co., the Assumption Coal Mining Co., and the Spoon River Colliery Co., respectively, run of mine, $2.40, $3, $2.65; prepared sizes, $2.65, $4.55, $2.90; and slack or screenings, $2.15, $2.15, $2.40.

The administration will eliminate jobbers' commissions, ranging from 15 cents to 30 cents per ton, beginning April 1. It will expect the jobbers, recognized as essential to the handling of fuel, to look to operators for their compensation as the new prices fixed and to be announced will take care of the former.

Start Nation-Wide Quest For Enemy Property

Washington, Feb. 19.—Discovery by Alien Property Custodian Palmer last week that the Schutte & Koerting Co., Philadelphia, maker of automatic ejector and injector boiler valves, is, or was, owned entirely by German capital has spurred the former and agents of the department of justice to a nation-wide hunt for enemy-owned property. Several millions of dollars in this kind of property already have been turned over to Mr. Palmer, but fresh evidence leads to the belief still more millions are at large.

The plant of the Schutte & Koerting Co., whose valves are said to be made for installation on every ship built, is reported to be worth $1,700,000 and the earnings for the fiscal year to end March 18 are estimated at more than $200,000. The company has been engaged in work under government contracts. To what extent has not been disclosed. The fact that common stock was in the name of Ernest Koerting, Hanover, Germany, said to be a relative of the kaiser, before it was transferred to his daughter, Mrs. Helene Fischer, was disclosed at a hearing before Director Garvan of the custodian's investigation bureau. Daniel W. Hildreth, vice president of the company; J. Wilson Bayard, of counsel for the company; Mrs. Fischer, and her husband, Adalbert K. Fischer, interned at Fort DuPont as an alien enemy, were questioned at the hearing.

Thousands in Service Will Get Technical Training

Washington, Feb. 19.—Approximately 100,000 men now in the army, in training camps or subject to draft are to be given special technical training in schools conducted by industrial corporations, colleges and other educational institutions. They will be picked according to the answers found in the questionnaires and from reports made from special survey of the men under arms. The war department last week announced appointment of a committee of army officers, headed by Col. Hugh S. Johnson, deputy provost marshal general, which will plan the entire educational program. This committee will be assisted by an advisory board, of which J. W. Dietz, educational director of the Western Electric Co., and Dr. Charles R. Mann, of the faculty of the Maschusetts Institute of Technology, are members. All educational facilities likely will be utilized in training men for the signal corps, the ordnance bureau and the engineers corps.

Finishing Gas Plant

The gas-producing plant being erected by the Arthur G. McKee Co., Cleveland, for the Carbon Steel Co., Pittsburgh, is nearing completion. It will have 10 Hughes gas producers, which are being installed by the Wellman-Seaver-Morgan Co., Cleveland. The Carbon company will through this plant supply its entire works with its own gas instead of using natural gas. Of steel and concrete construction, the plant being completed is 31 feet wide, 67 feet high and 187 feet long. The coal bunker will have a storage capacity of 1600 tons.

Dayton Dedicates Engineers' Club

The Engineers' Club of Dayton, O., recently dedicated its new club house, which was the gift of Col. E. A. Deeds, chief of the Aircraft Production board, and F. C. Kettering, Dayton Engineering Laboratories. Following a banquet served to 300 members of the society and their guests, addresses were given by a number of prominent speakers. H. B. Canby, chairman of the building committee, formally presented the new building to the club. Orville Wright, second vice president, accepted the building on behalf of the board of governors. In the absence of Henry M. Waite, city manager, who had been called to the colors recently, George B. Smith offered the speech of acceptance on behalf of the membership. Other speakers were Col. J. J. Carty, chief engineer, American Telephone & Telegraph Co., in charge of all electrical communication in the present war; Dr. W. O. Thompson, president, Ohio State University; Elmer Sperry Jr., member, naval consulting board, and designer of the naval gyroscope; Dr. C. W. Chamberlain, president, Denison University; and Dr. L. H. Baekeland, member, naval consulting board. Governor James M. Cox of Ohio and a number of other prominent guests, including representatives of other engineering societies, attended the dedication.

What is Future of Steel Exports?

Changed Conditions of Production and Consumption Will Have Important Influence Upon After-War Competition—What the United States Must Do to Preserve the Large Overseas Trade Built Up So Quickly

BY LLOYD H. ATKINSON

WITH the world at war, and with all effort personal and governmental directed toward winning the war, it seems almost unpatriotic to discuss a business problem. Yet, so much of our success in military affairs depends on business, and so much more does our future prosperity rest on the proper solution of the great economic problems which the war has raised, that one may be pardoned for essaying a look forward, to the time when Europe will again be a competitor of the United tates in the steel consuming markets of the world.

Of all forms of business, none so appeals to the imagination as export trade. No other branch of commerce so satisfies that spirit of adventure, which is one of the prime causes of initiative and daring in any field. That the United States for many years before the war had not seized her opportunities in this line is to be regretted, but to the student of economics is not surprising.

War Changes Industrial Position

We had grown in 40 years to be not only the largest producer, but by far the largest consumer of steel products. Our home markets were so large, and notwithstanding occasional depressions, so constant, that there was small incentive to enter a field already well covered by England, Germany and Belgium, and in a lesser degree by France. With the breaking out of the war, however, our position changed. In a few months time we became the greatest exporter of iron and steel and of metal products in the world. The wealth of all Europe flowed our way in an apparently endless golden stream. Steel plants and allied industries doubled and trebled capacity. New companies entered the field until the productive capacity of the country reached a point undreamed of by even the most optimistic, and far beyond the normal line of growth. How this capacity may be employed at full rate after the war is an interesting and very important problem and to a great extent depends on our ability to maintain our position in international export markets.

It has been said that such changed conditions will prevail after the war, that no one can predict with certainty what will take place. There is a slight basis of truth in this. It must, however, be remembered that human nature has changed little, if any, in all the years of recorded history. The ordinary business of life goes on, even during war, and it is probable that the world will readjust itself to peace and resume its customary activities in a much shorter time than now seems possible.

Recent observations of the writer in France and Italy tend to confirm this conclusion. Both of these countries already are planning for the conversion of their war industries into commercial manufacture. France, in particular, even now is offering encouragement to new industries, and has done much toward replacing the loss of her northern steel plants by new construction in other sections. She will likely be a larger producer of the tonnage grades of steel after the war than before. England already has largely added to her capacity. Italy, though not a large producer of steel, has become a great consumer, and has developed an immense metal working industry.

All of these countries have changed radically in their methods of manufacture. Automatic tools and high speed machines have been introduced generally. Quantity production is taking the place of the old slow made-by-hand method. All of these countries are now making a large proportion of their own metal working machinery and tools. This development has been most marked in Italy.

Labor conditions likewise have changed. Women are employed with splendid results in the lighter manufacturing operations and Chinese or other native labor is extensively used in departments not requiring technical skill.

European Consumption Grows

All of these factors tend to make Europe a strong competitor of ours in the fields where we hitherto have excelled. That our exports of machinery and finished steel products will be cut down through this development seems likely, but also this increase in finishing capacity creates a larger demand for crude steel. The war also has taught Europe new uses for steel and per capita consumption will probably be greater in the future than in the past.

To maintain our volume of trade, therefore, requires an increase in our exportation of crude and semifinished tonnage products. Here we meet a very difficult situation. England will be a formidable competitor. Belgium, when her steel industries are restored, will again be an important factor, while France shortly will be self-sustaining again, or nearly so. Germany with an increased capacity will strive harder than ever for business in Russia, Asia and South America. She will no doubt be under a severe handicap for years in the countries which have suffered from her war operations but sentiment alone will not be a serious deterrent in neutral fields nor in those lands which have not felt the weight of her military oppression. How are we to meet these conditions and turn them to our advantage?

New Conditions Mean New Methods

The vast increase in our wealth and our enormous stock of gold may prove a hindrance rather than a help. Money tends to flow to the place of greatest need—the place where interest rates are highest. Trade tends to flow towards money. In other words, Europe with depleted wealth will try to pay her debts with goods. Her manufactured products will tend to come to us, who not only have the gold but who hold her paper as well. Our money also will be attracted by the higher returns which her needs will offer. This in time would bring an equilibrium but the equilibrium would be obtained at the sacrifice of our export trade and at the expense of our manufacturers.

This natural economic trend cannot be wholly changed but we can alter the trend by prudent forethought and wise action and to the benefit both of ourselves and of Europe as well. How may this be done?

First—by buying back the large volume of our own securities still held abroad, paying partly in money and partly in the European bonds which we now hold thus providing funds for further trading with us.

Second—by extending banking aid to Europe, in the construction of

railways and in financing European concerns which will be consumers of our products rather than competitive producers.

Third—by the removal of the non-economic restrictions on trade with which our statute books are cumbered and by substituting measures giving the legitimate protection which we need.

Fourth—by the building and encouragement of an independent, privately owned merchant marine.

Fifth—by teaching our manufacturers and merchants (and our bankers) the meaning and use of foreign credits, trade acceptances and commercial bills of exchange.

It is a large program. Many necessary correlaries will suggest themselves to the thoughtful reader, such as a revision of our shipping laws, possible changes in our alien labor laws, etc. We are called on at an eleventh hour notice to build a system to meet one that England has been 500 years in perfecting. We also must meet the plan of paternal fostering of export trade which Germany has cultivated so sedulously. Which of these systems offers the best model for our own efforts?

England, by geography, density of population and natural resources was forced to become a manufacturing nation and an exporter. Her shipping and naval development logically followed. The combined proceeds of manufacturing and transportation profits, made her the world banker. Her banking investments created new fields for her industrial enterprise and so in ever widening circles has her sphere of economic influence grown. In this growth there has been little of governmental direction. Private and individual initiative has reaped the reward of its own vision. Export trade was built up more by individual and by merchandising companies than by manufacturers.

Germany, on the other hand, developed a great export trade along different lines. Her banking influence in foreign lands was extended not as the result of a growing export trade but with the idea of compelling it. Her transportation systems on land and sea were subsidized as an aid to her manufacturers. They in turn were encouraged to combine in associations for commercial propaganda and for the most efficient extension of export business. That they have been successful is evident.

Of the two systems, England's seems the more logical, just as any natural growth is finer and more symmetrical than a forced one. Germany's system leads to a condition of industrial oppression, as her scheme of military domination leads to individual oppression and by the same token ultimately is destined to the same failure.

The United States has its opportunity to take and to hold its place among the great trading nations. It matters little whether our commerce is extended through the direct representatives of manufacturers or through export companies or merchants, so long as the opportunity for personal, individual action is preserved and the rewards are allotted to those "who make the dreams come true".

Steel Exporters Facing Many Problems

BY VICTOR E. KARMINSKI

MANY and varied are the present-day problems of the steel export houses. Changes are occurring so rapidly and so suddenly that the successful house must be on the job every minute 24 hours a day, every day in the week. Victor E. Karminski, treasurer and general manager of the W. J. Crouch Co., Inc., 253 Broadway, New York City, in an interesting analysis of the steel export situation, divides the principal present problems of steel merchandizing overseas into four main groups, as follows: Co-operation, transportation, financing and insurance.

Taking up the question of "co-operation", Mr. Karminski said that the passage of the "Webb bill" is all-essential before real co-operation among steel producers can be effected. "There is small doubt but that presently something in the nature of the German 'Kartell' will have to be attempted," he said, "so as to safeguard American exporters from the baneful effect of after-war competition. If we want to retain the export trade so providentially placed in our hands, something more will be required than mere ability to supply foreign markets—close co-operation among manufacturers and exporters to prevent undercutting, so as to make this branch of our export trade not merely another channel for getting rid of surplus production but to make it a source of real benefit to manufacturer and laborer alike. I may state here that the spirit of the steel mills now is such as to elicit the finest efforts on the part of the exporter. Both mill and exporter have come to realize that co-operation is of vital importance and that ultimate success cannot come without mutual assistance and understanding."

Transportation Most Important

The problem of transportation and shipping, Mr. Karminski said, is perhaps the most important and at the same time the easiest problem to solve, provided of course, that the matter is handled with proper sympathy and understanding. "While the matter of railroad traffic has been taken in hand with energy befitting the occasion," he said, "it is probably too early to expect much in the way of additions to overseas shipping at present. It is gratifying, of course, that steps have been taken to remedy the present shortage and put America in the front rank of maritime powers. Something more, however, is required than mere tonnage. Legislative restrictions which hitherto have hampered the shipping and shipbuilding industries must be removed. This accomplished, it is safe to say that the American mercantile marine will hold its own with all other nations. In time, no doubt, American exporters of steel will see more and more the advisability of operating their own ships to the countries where they have developed a market for their products, a step taken by European countries in the past, with resultant effective stifling of American export business."

Taking up "financing" Mr. Karminski pointed out that although the United States is the richest nation in the world, engaged in an unparalleled foreign trade, its banking facilities offered for this huge overseas commerce are still only those of a third class power. "True, a few banks have had the commendable enterprise to open branches in foreign countries and thereby facilitate American foreign trade," he said. "But anything in the nature of a broad extension of credits for foreign business still is comparatively unknown. Whenever long term credits are required, recourse must be had to foreign banks. This condition is not auspicious for the retention of the trade we now possess, for our present favored condition as regards supplies some time will pass. While there is yet time we should place our banking system on a basis that after the war will enable us to compete on equal terms with the steel exporters of

other countries. German export merchants, with the assistance of their bankers, readily granted credits of six to 12 months and it is idle to pretend that if we are to stick to our present methods of cash against bill of lading we will retain any appreciable part of the business we now have. In this connection the lack of accurate credit information is an obstacle. The well known commercial inquiry agents of this country are poorly or not at all equipped to pass on risks in foreign countries. The facilities built up by some of the banks are incomplete and not readily available to those who are not customers of such banks. This is a problem going hand in hand with proper banking facilities and one which must be solved."

Marine Insurance Field Neglected

Still another problem confronting the export house is the lack of proper insurance facilities, both to cover our ships and their cargoes and, incidentally, the credits which we extend. "To every loyal American business man it should be a source of deep mortification that we have no American 'Lloyds'," said Mr. Karminski. There is surely enough enterprise in this country to have an institution here undertaking marine insurance and general re-insurance on a large scale. The lack of it is no considerable hardship right now, but it will be as soon as the war is over. To give an idea of the magnitude of marine insurance business, I will cite a few figures. The official report of the superintendent of insurance in New York discloses that marine and inland insurance written in this country in 1916 amounted to about $21,500,000,000, on which premiums of more than $100,000,000 were collected by the underwriters. While this business was almost evenly divided between American and foreign companies, a very large part of the risks written by American companies was re-insured by foreign companies. It can, therefore, be said that most of the profits of the marine insurance business of the United States on hulls and cargoes find their way into the treasury of foreign concerns. There is surely enough enterprise in this country to have an institution here undertaking marine insurance and general re-insurance on a large scale.

"Such, in a brief way," he concluded, "are the problems facing us at the present time. They are, none of them, of a nature which baffles solution. Some of the questions which call for legislative action are assured of a sympathetic hearing in Washington. Others can be solved by the simple expedient of co-operation among steel manufacturers and exporters. None of them is insolvable, for while it would be idle to pretend they are matters of easy sailing, once we put our shoulders to the wheel the difficulties in the way will disappear as mist before the sun. We want to hold what we have and to add to it by all means. Let us act then and show the world what American enterprise really can achieve."

Pressed Steel Plants Will Receive War Orders

Co-operation of the 200 members of the pressed steel war service committee with the government is to result soon in the placing of approximately $75,000,000 in war orders with these manufacturers. To expedite the distribution of war orders a meeting of the manufacturers was held Feb. 14 and the country divided into 11 districts with a chairman in charge of each district. Later these chairmen held meetings in their respective districts at which plans were studied and estimates made as to those in position to do the work and the daily production that could be expected. At these meetings suggestions were advanced that individual contracts be made with the government; that one manufacturer assume the general contract and sublet the work; and that a company or a group of manufacturers be formed which would assume responsibility for the entire contract. All production data together with suggestions pertaining to the letting of contracts were forwarded to the committee's Washington office, 509 Seventh street N. W. Government officials and pressed steel engineers are considering the submitted information at conferences now being held in Washington.

Following are the names of the 11 district chairmen of the war service committee together with the names of the companies they represent:

B. S. Gier, the Gier Pressed Steel Co., Lansing, Mich.; J. R. Jones, the Bossert Corp., Utica, N. Y.; Mr. Sinyard, the A. O. Smith Corp, Milwaukee; A. F. Schroeder, the Globe Machine & Stamping Co., Cleveland; Mr. McNeil, Conrad & McNeil, Kokomo, Ind.; W. W. Galbreath, Youngstown Pressed Steel Co., Youngstown, O.; C. H. L. Flinterman, Detroit Pressed Steel Co., Detroit; J. F. Savage, American Tube & Stamping Co., Bridgeport, Conn.; C. E. Hunter, Hale & Kilburn Co., Philadelphia; Mr. Hill, the Crosby Co., Buffalo; E. A. Wright, the Jewett Car Co., Columbus, O.

Smaller Demand

For Coal Tar Products Has Little Effect on Market

New York, Feb. 16.—Strength in the prices of the principal coal tar products continues despite the fact that demand of late has been smaller. This is due to the curtailment of production resulting from the scarcity of coal. The railroad situation also has made it difficult to deliver.

The principal sales during the past week, as usual, have been of benzol. This business involved mostly spot shipment but a few contracts were closed. The market on pure benzol continues unchanged at 35 to 40 cents per gallon, both for spot and contract. Toluol continues in great demand, but as rapidly as this product accumulates, the government commandeers it for plants making trinitrotoluol. No toluol yet has been released for other than government consumption. Business in solvent naphtha continues light but prices are firm at 18 to 22 cents per gallon. Despite an active demand for phenol production is so limited that makers have a hard time making contract shipments, and as a result current sales comprise only occasional spot carloads. Spot continues at 53 to 55 cents per pound.

The license system has not resulted in any change in the methods of doing business in sulphate of ammonia. As one producer puts it, the license system simply is an instrument by which the government can regulate this product in accordance with its requirements for making high explosives. So far only one distribution of government orders for sulphate of ammonia has been made but others are expected. Only occasional spot sales continue at $5.10 to $5.35 per 100 pounds at seaboard.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.53 to .55

Per 100 Pounds at Seaboard

Sulhate of ammonia (nominal)	$5.10 to 5.35

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia	nominal

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JAMES WILLIAM McQUEEN, who since 1902 has been vice president and general sales manager of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has been elected president to succeed Waddill Catchings. Mr. Catchings resigned as president recently to pursue his duties as a partner in the banking firm of Goldman, Sachs & Co., 60 Wall street, New York, but remains a director. Mr. McQueen has been affiliated with the Sloss-Sheffield Steel & Iron Co. continuously since 1891, when it was the Sloss Iron & Steel Co. He was born in Society Hill, S. C., in 1866 and located in Eutaw, Ala., when still a boy. He went to work at the age of 14 and a few years later was a telegraph operator for the Alabama Great Southern railroad. He moved to Birmingham in 1890 and a year later was given a minor position with the original Sloss company. by steady promotion he rose to the secretaryship. He became, in turn, secretary and treasurer of the Sloss-Sheffield company, second vice president and general sales agent, and later first vice president and general sales manager. He has been actively identified with the development of the iron and steel industry in the south for more than a quarter century and has seen that district grow as a leading producing center. He is interested in many Birmingham enterprises and is a director in the American Trust & Savings bank.

A. P. Beuter was recently appointed Portland, Oreg., representative of the Baldwin Locomotive Works to succeed A. W. Hinger.

A. C. Lanphear is now affiliated with the sales department of the Trumbull Steel Co., Warren, O., in the New York office. He will cover the New England territory.

George C. Brainard has been made general manager of the pressed steel plant of the Hydraulic Pressed Steel Co., Cleveland. H. F. Pettee was elected secretary to succeed Major Ben P. Bole who is in the government's service.

D. H. Oskin, who resigned recently as Chicago district sales manager for the Trumbull Steel Co., Warren, O., will be affiliated with the American Zinc Products Co., Greencastle, Ind., in a similar capacity.

Henry W. Johnson has been placed in charge of the gray iron foundry of the Theisen-Braithwaite Co., Port Huron, Mich. He was formerly general manager of the Fairview Foundry Co., Detroit.

C. McKew Parr, general sales manager of the Hart & Hegeman Mfg. Co.,



JAMES WILLIAM McQUEEN

Hartford, Conn., has been granted a leave of absence and has volunteered his services to the war trade board at Washington.

George M. Hendee, president of the Hendee Mfg. Co., Springfield, Mass., is now located in Paris, in charge of the Y. M. C. A. post office, handling mail for more than 1200 workers of that organization.

F. K. Vial, chief engineer of the Griffith Wheel Co., Chicago, delivered an address before the New England Railroad club, at the Hotel Brunswick, Boston, the night of Feb. 12, on the manufacture and use of chilled iron wheels.

J. C. F. Yarnell will continue as western sales manager for the Clark Bros. Bolt Co., Milldale, Conn., at 2671 West Grand boulevard, Detroit, Mich. The company's former western office was at 5730 South Park avenue, Chicago.

A. R. Johnson, who for several years has been district manager for Follansbee Brothers Co., Pittsburgh, in New York and latterly in Chicago, has been made Chicago district manager for the Trumbull Steel Co., Warren, O., to succeed D. H. Oskin, resigned.

G. R. Lewis, who for 20 years has been connected with the New York Central system, latterly as division freight agent for the Big Four railroad at Indianapolis, has been appointed manager of supplies and traffic for the Standard Forgings Co., Indiana Harbor, Ind. His headquarters will be in the Railway Exchange building, Chicago.

William G. Hammerstrom has been made general superintendent of the Lynchburg Foundry Co., having served as chief engineer for some time. His headquarters will be Lynchburg, Va., but will have charge of all engineering matters for the company's three plants at Lynchburg, Radford, Va., and Anniston, Ala.

J. B. Henry, general superintendent of the Union Steel Casting Co., Pittsburgh, has been elected vice president to succeed J. P. Allen, whose promotion to the presidency recently was announced. Mr. Henry will continue to discharge the duties of the superintendent's office. W. C. Eichenlaub, secretary, also has been appointed manager of sales.

W. N. Thornburgh, who has held the position of vice president and general manager of the Harrison Railway Specialties Co., Sandusky, O., will now give his entire time to the duties of president and treasurer of the William N. Thornburgh Co., manufacturer of steel and wood dust guards and dealers in used rails and rolling stock, with headquarters at Chicago.

George O. Draper, who for many years has been in the mechanical department of the Draper Corp., Hopedale, Mass., has received a captain's commission in the aviation section and has reported for duty at the Massachusetts Institute of Technology, Cambridge, Mass. He will instruct aviators as to the mechanical parts and construction of airplanes.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

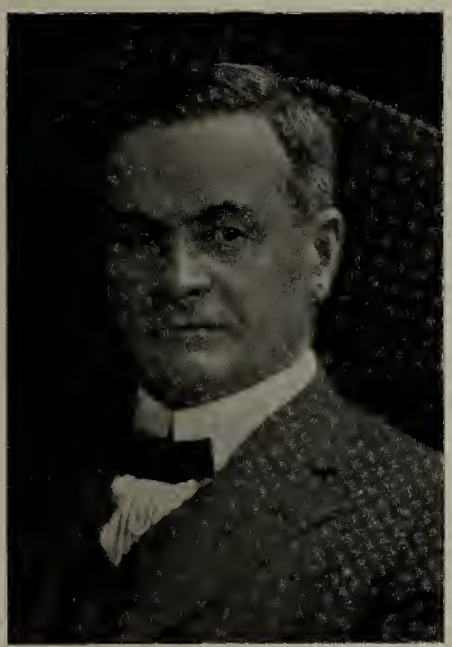
CHARLES D. DYER, made president of the American Pig Iron association recently when J. G. Butler Jr. was elected life chairman of the organization, occupies a prominent position in the pig iron industry. As vice president of the Shenango Furnace Co., Pittsburgh, and as an official of W. P. Snyder & Co., Pittsburgh, his career has been marked by his identification with large market transactions. Mr. Dyer has taken a representative and active part in all general movements in recent years affecting the interests and betterment of the whole pig iron industry. He is serving as a member of the sub-committee on pig iron, iron ore and lake transportation of the American Iron and Steel institute, which has had in hand questions of prices and production in these lines under government regulation. He represents the Pittsburgh district as a member of this body.

The first part of Mr. Dyer's business life was spent in the freight department of the Pennsylvania railroad at Pittsburgh where he occupied important positions. In 1902 he became traffic manager of W. P. Snyder & Co., the Shenango Furnace Co. and the Clairton Steel Co. and later traffic manager for the receiver of the Clairton Steel Co and general freight agent of the Crucible Steel Co. of America. He was made assistant to the president of the Shenango Furnace Co. in January, 1905 and vice president of the Shenango Furnace Co. in February, 1906.

Charles H. Krauss, who for many years was superintendent of the Lorain Steel Co., Johnstown, Pa., and affiliated with the Kilby Frog & Switch Co., Birmingham, Ala., in a similar capacity recently has been made general superintendent of the Louisville Frog & Switch Co., Louisville, Ky. The latter is the successor to the W. M. Mitchell Co., Inc.

H. S. Cooper, who for several years had charge of the New York branch of the Independent Pneumatic Tool Co., Chicago, has been elected vice president and general sales manager, with headquarters in the Thor building, Chicago. R. T. Scott, whose position in charge of the Pittsburgh office has been taken by H. F. Finney, succeeds Mr. Cooper at New York.

W. S. Sanders has been made office manager for the Midvale Steel & Ordnance Co., New York, to succeed William F. Vosmer, who recently resigned to become general manager of sales of the Donner Steel Co., Buffalo. Mr. Sanders became affiliated with the Cambria Steel Co.'s New York office in 1903, prior to its amalgamation with the Midvale company.



C. D. DYER

Charles D. Jenks, who has been affiliated with Edwin S. Woods & Co., Chicago, railway supplies, since 1912, resigned recently to become president and director of the Damascus Brake Beam Co., with headquarters at Cleveland. He formerly was in the operating and sales departments of the Pressed Steel Car Co., Pittsburgh and Chicago, and western sales manager of the Standard Coupler Co.

Frank Baackes Jr., son of the vice president and general sales agent of the American Steel & Wire Co., Chicago, has been promoted to the rank of captain on the staff of Major General George H. Bell, Camp Logan, Houston, Tex. Before taking the course at the Fort Sheridan training camp for officers last summer Captain Baackes was affiliated with the American Steel & Wire Co.

W. J. Strassburger is president of the recently organized Iron Trade Products Co., Farmers bank building, Pittsburgh, dealer in ore, pig iron, alloys, refractories, iron and steel products, sand, coal, coke, etc. A. M. Moreland has been appointed treasurer. Mr. Strassburger recently resigned as president of the Iron & Fuel Trading Co., Pittsburgh, and disposed of his interests therein.

James W. Hubbard, who was elected president of the United States Switch Co., Eau Claire, Wis., upon its organization several months ago, resigning as general manager of the McDonough Mfg. Co., Eau Claire, manufacturer of sawmill machinery, where he was connected for 21 years, has accepted the position of general manager of the new company to succeed T. C. Hubbard, resigned.

W. L. Lindsley, who has been district sales manager in charge of the Detroit office of the Trumbull Steel Co., Warren, O., has been transferred to the New York sales force. The Detroit office will be in charge of a representative from the home office. The sales arrangement maintained in Denver, Colo., with the John S. Worthington Co., has been discontinued and no further arrangements there have been made.

C. D. Eadie, formerly in charge of southern territory, for the Cleveland Osborne Mfg. Co., Cleveland, has been made manager of the Chicago branch to succeed A. T. Atwood. E. W. Cannell, formerly advertising manager, has been appointed assistant to Mr. Eadie. F. P. Spratt, formerly assistant to Mr. Atwood at Chicago, has been transferred to the New York office to succeed J. McKeith, assistant manager, who resigned recently.

Lewis D. Rights, secretary-treasurer of the war service committee of the steel fabricators of the United States, now maintains an office in the Munsey building, Washington, D. C., where his committee will operate as a selling and distributing agency for the bridge, building and plate fabricators of the United States. Mr. Rights was contracting manager at 45 Broadway, New York, of Lewis F. Shoemaker & Co.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Plan Better Financing of War Business

WASHINGTON, Feb. 19.—Creation of a war finance corporation, as urged by Secretary McAdoo in a bill now before congress, while frowned upon in some financial circles but heralded as a wise plan in others, is expected to receive favorable support from manufacturers who have considerable funds tied up in raw materials, improvements, etc., and who have government contracts requiring speedy fulfillment. The government itself gave proof of this last week when the war department announced its war credits board had advanced nearly $150,000,000 to corporations engaged in producing war supplies.

Manufacturers who have exhausted their cash outlay and who have found banks reluctant to further finance war projects without consent of the federal reserve board's capital issues committee, which then resorts to private financing to meet the requirements, still are seeking government financial assistance. This, however, is obtained at the time of or shortly after contracts have been made. In the face of government purchasing department's being slow of pay for materials delivered under contract, this plan does not afford relief without embarrassment and further delays to the manufacturers.

Under the McAdoo bill providing $500,000,000 capital with turnovers up to as much as $4,000,000,000, it is expected the relief to be offered will be spread over the period of the contract and will eliminate the possibility of having early issues tied up through unexpected and necessary purchases, wage increases and additional plant expansions. Large financial interests, who have been reluctant to openly indorse the plan, are now coming to the front with their approval.

The government's desire to control new financing has been met, in a way, through the federal reserve board's capital issues committee. This committee, with subcommittees in the federal reserve districts, acts upon proposals of $500,000 and larger, not with absolute authority to prevent such issues as it does not approve but with sufficient power to make them almost impossible. As nearly all the banks capable of handling issues of that size are directly or indirectly connected with the federal reserve system, mere refusal of the committee to sanction an issue carries with it the almost certain fact that no bank would go over the committee's head.

These various finance-controlling branches of the reserve bank act chiefly on private issues, such as proposed by muncipalities, states, public utilities, etc. It does not touch smaller issues than $500,000, nor go into the question of lending money to the manufacturer whose funds may be tied up so that he may have to shut down unless relief is obtained. For this particular function the war department, the navy and the shipping board have made advances under the powers granted by congress.

The war department's financing board is headed by Col. Samuel McRoberts, formerly vice president of the National City Bank, New York. Lieut. Col. M. W. Thompson, a financial expert, Lieut. Col. Edward Clifford, an investment broker, and B. W. Jones, as secretary, a New York banker, constitute the board. It has the assistance of a committee of financial lawyers and bankers who are in the military service or still in civil life.

Financial Opinion Favors War Financing Bill

Financial opinion has been veering more and more in favor of Secretary of Treasury McAdoo's bill to create a "war finance corporation", in order to assist essential industry. The statement of Thomas W. Lamont, of J. P. Morgan & Co., arguing in the interest of the measure was received with much interest. Mr. Lamont said that in his judgment the plan "was well calculated to afford the situation the relief which it needs". The corporation is to be empowered to make advances to banks which have rendered assistance to essential industries, such advances amounting to a possible maximum of 100 per cent. In exceptional cases the corporation may even make loans to the essential industries themselves. In view of the present difficulties many companies are experiencing at present in swinging important government contracts, it is vital that some machinery be created speedily to remedy a situation that might impair the progress of some of our war activities. Wall street is frankly puzzled over some of the further workings of the McAdoo bill, but is inclined to believe that the passage of the bill would help the stock market.

One year ago a proclamation of the President extending absolute government control to all branches of America's foreign trade would have had a profoundly depressing effect upon financial sentiment. The possibility of the loss of our new trade with the neutral world, won during the first years of the war, would have been considered a voluntary abdication of our new position of world trade leadership. How sentiment has changed since this country entered the struggle is indicated by the stock market's response with a sharp advance in prices following the proclamation.

It now more clearly is recognized that the paramount necessity is to win the war, while all financial and other considerations are subordinate.

Donner Steel More Than Doubles Earnings

Over twice as much as it earned in 1916 was netted from its operations in 1917 by the Donner Steel Co. Gains in practically all items from income to property account are revealed by the 1917 report, which shows earnings of $1,444,152 after $346,526 was reserved for income and excess profits taxes, as against $696,689 the 1916 net.

After payment of $358,750 in preferred dividends the company had $1,085,402 for common. This is equal to 40 per cent a share on the $2,521,500 common which was outstanding up to Dec. 31, when it was increased to $4,521,500. A 1 per cent dividend of $25,000 was paid in June. In 1916 the amount earned on $2,500,000 common outstanding after preferred disbursements was 21 per cent a share. No common dividends were paid in 1916.

President W. H. Donner, in his message to stockholders, said in part:

"During the second year of its operation the company's business has been confined largely to the manufacture of pig iron and semifinished steel. A new blast furnace, six new open-hearth furnaces and the 84-inch plate mill have been put in operation during the year. Congestion due to the large amount of construction work at the plant, together with the lack of adequate dock facilities, has added to the difficulties and materially increased the cost of production." As to the prospects for 1918, President Donner said that fuel, labor and transportation problems will undoubtedly continue to limit production and increase costs. The output of iron and steel is inadequate to meet present demands, despite the curtailment of many lines of business, he says. The company's production of pig iron and steel should be about double that of 1917 and its capacity for finished steel several times greater than last year, according to Mr. Donner.

Assets in 1917 increased to $20,214,989 from $11,670,234 where they stood Dec. 31, 1916.

The comparative income account follows:

	1917	1916
Net earnings after op. exp. subsid. bond int., etc...	$2,631,705.91	$1,166,058.41
Depreciation	716,026.70	350,242.51
Net earnings	1,915,679.21	815,815.90
Bonded interest...	125,000.00	119,126.51
Prov. inc. and ex. profit tax	346,526.41	.....
Net income	1,444,152.80	696,689.39
Dividends	383,750.00	149,226.42
Bal. to surplus...	$1,060,402.80	547,462.97

Again Extend Tax Return

Corporations operating on the fiscal year basis have been given their third extension of time in which to file their income and excess profits tax reports. Internal Revenue Commissioner Roper last week extended the time from March 1 to April 1 because the forms on which returns are to be made have not yet been drawn up and printed. This extension applies to all tax returns whether for the fiscal or calendar year 1917. Originally corporations were expected to file their reports within 60 days after the close of the fiscal year. This later was extended to Feb. 1, then to March 1, and finally to April 1.

American Can Co. Enjoys Its Largest Year

With net earnings of $21,975,042, the American Can Co., New York, experienced the most profitable year in its history during 1917, practically doubling its 1916 earnings of $11,091,048. An equivalent of 12.87 per cent on outstanding shares of common stock was left, or $5,309,674 after all deductions, including preferred stock payments had been made. Preferred dividends paid during 1917, including the regular 7 per cent, and 8.9675 of arrearages, amounted to $6,583,184, as compared with $2,886,331 paid in 1916. One million dollars more than in 1916, or $3,500,000, was charged off for depreciation, and $6,000,000 was reserved for war income and excess profits taxes. After all deductions had been made, the surplus totaled $5,309,673, as against $5,076,650 in 1916. The following is a comparative income account:

	1917	1916
Net earnings	$21,975,042	$11,091,048
Depreciation	3,500,000	2,500,000
Int. on deb.....	602,183	628,067
Reserve for taxes.....	6,000,000	.....
*Preferred dividends...	6,583,184	2,886,331
Balance to surplus....	5,309,673	5,076,650

*The dividends on the preferred paid during the year include the regular 7 per cent and 8.9675 of arrearages.

American Locomotive Has Big Net Earnings

The American Locomotive Co. reports net profits for the six months ended Dec. 31, 1917, amounting to $6,010,000, an increase of $556,675 compared with the corresponding six months of 1916. The company has set aside $2,040,758 for United States income and excess profits taxes and Canadian business profits tax. The report showed that the 1917 gross earnings were less by $1,904,468 than in 1916, but that the manufacturing and administrative expenses were less by $2,475,449. The comparative statements for the six months in 1917 and 1916 are as follows:

	1917	1916
Gross earnings	$35,959,126	$37,863,594
Oper. exp., dep., etc.	29,851,294	32,326,743
	$6,107,832	$5,535,851
Bonded interest.....	97,823	83,517
Profit	6,010,009	5,453,334
Excess profit tax and Canadian tax.....	2,040,758	1,822,500
Profit	3,969,251	3,630,834
Prfd. dividend	875,000	875,000
Com. dividend	625,000	625,000
Surplus profit	2,469,251	2,130,834

Chairman Sylvanus L. Schoonmaker, in his letter to shareholders, says that of the $6,010,009 of net profits, $439,376 was derived from munitions business and the remaining $5,570,633 from the regular locomotive business of the company. He reports that on July 24 the company received a contract for 150 locomotives from the United States government, the same to be used in France for the transportation of our troops and supplies. These locomotives were completed during September and October. Regarding the Russian government contract for 250 locomotives, Mr. Schoonmaker says the same had to be adjusted by the United States government.

It is also announced that at the beginning of the current year the company had unfilled orders on its books amounting to $75,624,849.

Winchester's Net Down

The Winchester Repeating Arms Co. reports total income for 1917 amounting to $2,979,048, against $4,448,851 for 1916. Of the 1917 earnings, $1,464,789 was charged to depreciation and $100,000 for "contingency reserve". The surplus after all charges was $595,443, equivalent to $59.54 a share on the $1,000,000 capital stock. Stockholders of the company at their annual meeting increased the directorate from nine to 10 members by the addition of L. K. Kiggett, president of the United Drug Co. The retiring directors were re-elected.

First Report Favorable

The first report issued by the Superior Steel Co., since it was organized in its present form, shows a gross profit of $3,488,662 in 1917. To this was added $29,895 earned from the time of reorganization in December, 1916, to Jan. 1, 1917. The company reserved $931,278 for federal taxes, after paying administrative expenses amounting to $704,186 and setting aside $885,883 to meet sinking fund requirements. The balance after dividends had been paid was $466,926. The balance sheet showed that nearly 8500 shares of the 35,000 shares of first preferred stock issued when the corporation was formed were retired during 1917. Among the assets at the close of the year were $2,008,430 cash and $549,800 Liberty bonds.

Earnings Drop Sharply

Almost $2,000,000 less was Niles-Bement-Pond Co.'s net profit for 1917 than for 1916. For the year ended Dec. 31, 1917, the aggregate net profit was $3,133,633 as compared with $5,090,259 for the previous year. The total income was $58,884,785 as against $7,311,001 for 1916 and the surplus for 1917 was $1,867,843. In 1916 it was $4,120,571.

Tool Deliveries Show Improvement

Organization of Machine Tool Industry on War Footing Reflected in Tendency Toward Better Deliveries—Tool and Crane Requirements of Several Navy Yards Still Unfilled—Speeding Up Payments

DELIVERIES of machine tools are improving. Reports from various districts indicate that the rearrangement of builders' manufacturing facilities and other equally important expedients which have been fostered by the machine tool section of the war industries board, largely are the cause of the improved condition. Railroad embargoes, however, have proved to be a deterrent influence in the matter of deliveries. Shipping permits which are necessary in many cases in addition to priority numbers have been the source of a great deal of needless confusion to buyers of tools. Manufacturers have lost delivery preference through difficulties in securing shipping permits. Many builders have been hampered in carrying on production by their inability to secure prompt payment for machine tools sold to the government. This condition has been recognized by the National Machine Tool Builders' association, which is endeavoring to assist builders in overcoming their difficulties.

Government machine tool requirements occupy the major part of dealers' time. The tool needs of the Brooklyn, Boston and Charleston navy yards still are unfilled. Fully 40 tools are needed for the Charleston yard. An inquiry for 100 tools, between 50 and 75 of which are lathes, has been revived by a Long Island company and dealers in the New York market are revising bids. Further buying for the Rock Island arsenal has been deferred.

Dealers are working on lists of cranes for the Philadelphia and Washington navy yards. The time for bids on the latter list of approximately $600,000 worth of cranes has been extended. An interesting feature of the market is a sale of cranes to a Japanese steel works.

Markets Quiet Pending Anticipated New Buying

LESSENING of the tension in the machine tool market in the east is gradually becoming more perceptible. Not only is inquiry somewhat lighter, but some manufacturers are able to offer better deliveries than in recent months. However, this is only a tendency, as builders still are sold up many months ahead in most lines, while there is a good volume of business being done in sales of one to a few tools each. The railroad embargoes have rendered the situation all the more complex, for manufacturers now not only have to consider priority numbers, but shipping permits. For example, a manufacturer may have a machine to deliver under a certain priority number. But the buyer is unable to get a shipping permit, whereupon the builder must stock the machine. There have been cases where under such conditions another buyer has approached the builder with an advanced priority number yet had a shipping permit and accordingly, he has been given the machine. Thus the buyer who did not get the permit may have to wait months longer for the machine he was entitled to previously

Fewer Tool Lists Are Issued

Only a few large lists of machine tools have been issued in the east recently. The navy department has supplied the larger proportion of these, including lists for the Brooklyn, Boston and Charleston navy yards. The last named includes about 40 machines. The war department has issued a list for the general engineering depot, at Washington. The Aeronautical Engine Co., formerly the General Vehicle Co., Long Island City, N. Y., but now owned by the government, has issued a list of more than 100 tools, of which about 50 to 75 are lathes. This is part of a list issued several months ago by the General Vehicle Co., on which nothing ever was done. Sellers have been revising their bids. The Savage Arms Co., Utica, N. Y., which has been in the market for about a month, continues to buy heavily. The American Bronze Co., Berwyn, Pa., will build a foundry. The New Britain Tool Co., New Britain, Conn., has purchased the plant of the New Britain Mfg. Co. The Newark Engineering & Refrigerating Co., Newark, N. J., will build an extension to its machine shop.

Many Cranes Needed for Navy Yards

ALTHOUGH considerable crane business is expected to develop shortly as a result of additional huge projects now being gotten under way by the government, the crane market continues to reflect the dullness of the past few weeks. The government's crane requirements for its navy yards at Washington and Philadelphia are perhaps the largest business pending. Bids on one lot under specification 2775, involving approximately $600,000, for the Washington yard, are to be received until Feb. 25, but now it is understood that this date may be extended. Another lot, comprising one 20-ton, one 25-ton and two 10-ton electric cranes, under specification 2734, also is to be purchased for this yard. A 30-ton electric crane, under specification 2809, is to be bought for the Philadelphia navy yard. The Du Pont Powder Co., Wilmington, Del., is inquiring for eight locomotive cranes. The requirements of Whittlesey & Whittlesey, New York, who are to purchase the equipment needed for the Southern Shipbuilding Co., Charleston, S. C., again are receiving the attention of builders. The General Electric Co. continues to negotiate on two 20-ton, one 7½-ton and one 5-ton crane for its plant at Lynn, Mass. The inquiry of the Foundation Co. for a 5-ton crane still is before the market. Included in business recently placed are two 10-ton electric cranes, each with 60-foot span, which went to the Milwaukee Electric & Mfg. Co. for use in the yard of the Pensacola Shipbuilding Co., Pensacola, Fla. The Cleveland Crane & Engineering Co. has been

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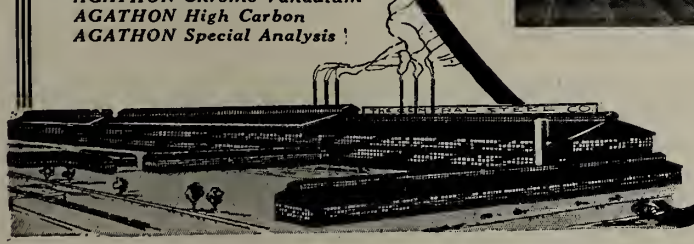
Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd. C. H. Beach, District Sales Manager.

Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager.

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awarded three electric cranes by the Blaw-Knox Co., Pittsburgh. It is understood that the Virginia Shipbuilding Co., Alexandria, Va., has practically contracted for two of the four 5-ton electric cranes recently inquiried for. The Brooklyn Rapid Transit Co., New York, has awarded a contract for a 100-ton electric crane for use in its new Williamsburg power plant. The Magor Car Co., 30 Church street, New York, has bought two 10-ton cranes.

Deliveries Continue to Improve

REPRESENTATIVES in the Pittsburgh district of machine tool interests are gratified at the vigorous efforts being made by the government to assure shipments when producers are ready to make deliveries. Shipments have already shown considerable improvement and indications are that the situation will be much better within a week or 10 days provided present weather conditions prevail. Domestic buyers are not making inquiries freely, due to high prices and slow deliveries. While better deliveries are in prospect, makers say they see no likelihood of prices being reduced. They point out that the high cost of labor and materials militate against such a probability. The Duff Mfg. Co., Pittsburgh, has closed for some second-hand equipment, including two engine lathes and two turret lathes. The Alliance Machine Co., Alliance, O., has sold some crane equipment to the Kiusku Steel Works Co., of Japan. Figures have been asked on a crane list put out by the French government.

Government Buying is Reported Postponed

MOST machine tool business at present consists of small lots which are purchased for supplementing the equipment of shops already in operation. There has been a lack of large inquiries for several weeks. It is hinted that the Rock Island arsenal probably will not be in the market for much more equipment. The same condition prevails in other prospective government buying of machinery. A Chicago concern is said to have taken a contract for building 155-millimeter gun carriages and has bought some equipment and will require more. A Chicago engineering company is preparing to build the plant. The list of the Buda Co., asking for about $75,000 worth of machinery, which has been pending several weeks, is still active and some equipment is being bought from time to time. Warmer weather has permitted better deliveries of machinery to be made. Second-hand machinery is moving slowly and no important offerings are being made; most shops having full use for all the equipment in their plants. The H. Mueller Mfg. Co., Decatur, Ill., has been inquiring for 75 turret lathes. Henry E. Pridmore, molding machine manufacturer, Chicago, is building a machine shop 50 x 60 feet, with crane and equipment, part of which has not been bought. The Roth Mfg. Co., Chicago, is about to build a plant.

Collects Valuable Machine Tool Data

EFFORTS of the machine tool section of the war industries board to expedite the production of machine tools and to utilize the nation's machine tool resources in the most effective way are greatly in evidence. Dealers in the Cleveland district are supplying the machine tool section with data pertaining to past sales. One dealer, for illustration, has compiled a list of sales of 24-inch lathes which were made during the past 10 years. A prominent builder of planers similarly has supplied a list of sales made covering a period of 20 years. Further assistance is being given to the government by dealers in furnishing the former with lists, at stated intervals, of machine tools in their warehouses. Difficulties which have been experienced by many builders in securing prompt payment for tools sold to the government have been productive of a movement on the part of the National Machine Tool Builders' association to collect information calculated to aid the trade in securing a more expeditious handling of these claims. Inquiries for tools are small and scattered. The Dayton Fare Recorder Co., Dayton, O., is in need of several lathes. Some new equipment also is needed by the Hydraulic Pressed Steel Co., Cleveland. Equipment requirements of the Cleveland Furnace Co., Cleveland, include the following tools: One 54-inch vertical boring mill; one lathe with a 6 or 8-foot bed, and a 10 or 12-inch swing; one punch with a 12 or 16-inch throat. An inquiry for plate shop equipment has been made by the King Bridge Co., Cleveland. The A. E. Williams Machinery Co., Toronto, Ont., is in the market for a used 68 x 48-inch x 14-foot planer and an 84 x 84-inch x 32-foot planer. The Middletown Machine Co., Middletown, O., has inquired for a used 36 x 36-inch x 12-foot planer. A used lathe with an 18-inch swing is required by the Timken Roller Bearing Co., Canton, O.

Demand for Coal-Handling Equipment Increases

Orders for small lots of locomotive cranes continue to be placed in the Cleveland market by the government and several large contracts are pending. Considerable interest is manifested in coal-storing equipment by a large number of manufacturers who are desirous of forestalling further fuel shortages. Orders are being taken on a three to six months delivery basis; buyers understand, however, that the government may take this machinery and that builders cannot be held to delivery promises.

Trade Announcements Are Varied in Kind

FORMAL announcement has been made by the Goldschmidt Detinning Co. and the Goldschmidt Thermit Co., 120 Broadway, New York, that hereafter the business of both companies will be conducted by the Metal & Thermit Corp. at the address previously named.

The Wellman Pattern Supply Co., Cleveland, maker of wood and metal patterns and screw machine parts, announces that a change of name to the Wellman Products Co. has been made.

Representation in San Francisco has been secured by the Nagle Corliss Engine Works, Erie, Pa., air compressors and vacuum pumps. The Vincent Whitney Co., 802-806 Hearst building, San Francisco, is the new agent.

The Pittsburgh Wood Preserving Co., the Ohio Wood Preserving Co. and the Michigan Wood Preserving Co. have moved their general offices to the Century building, Pittsburgh.

Offices of the Superior Sand Co., Cleveland, have been removed from the Cuyahoga building to room 511, Guardian building.

The Farm Tractor Co., Fond du Lac, Wis., has changed its name to the Fond du Lac Tractor Co.

The Stack Heater Co., Worcester, Mass., is removing its factory to 112 Portland street, Boston.

Announcement has been made by the Cooper Hewitt Electric Co., Hoboken, N. J., of the removal of its Cincinnati office to larger quarters in the First National bank building Cincinnati.

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Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The International Iron & Steel Co. has been incorporated with $250,000 capital by N. N. Leavitt and Ernest L. McLean.

AUGUSTA, ME.—The Missouri Valley Refrigerator Car Co., capitalized at $100,000, has been incorporated by E. M. Leavitt and Ernest L. McLean.

BOSTON.—The Brophy Mfg. Co. has been incorporated with $10,000 capital to make tires, inner tubes and motor vehicle equipments. Incorporators are J. A. Sullivan, George P. Brophy, Auburndale, Mass., and T. M. Nelligan.

BOSTON.—The Frank B. McGrane Co., with $25,000 capital, has been incorporated as a general machine shop by Frank B. McGrane, Somerville, Mass., Charles E. Boisvert and L. A. Brimmer.

BOSTON.—Work has been started on the erection of an oil station near the Parkway at Forest Hills for the Gulf Refining Co. It will comprise nine oil tanks, each with a capacity of 13,000 gallons; a brick garage, 60 x 120 feet, two stories; a brick warehouse 70 x 113 feet; filling and wagon sheds and a 2-story stable, 30 x 60 feet. The tanks will be constructed of steel. The plant will be surrounded by a brick wall, 100 feet long and 7 feet high and a concrete wall, 18 feet high and 200 feet long.

BROCKTON, MASS. — Reid & Thomas, Inc., has been incorporated to deal in steel, iron and other metals. The capital stock is $10,000 and the incorporators are John I. Reid, Herbert M. Thomas and F. M. Reid.

EAST SPRINGFIELD, MASS.—The Wire Wheel Corp. of America has awarded the general contract to E. J. Pinney, 264 Main street, Springfield, Mass., for an extension to its plant.

HUDSON, MASS.—Plans are being drawn by Densmore & LeClear, Boston, architects, for a reinforced concrete, 1-story, 40 x 100-foot addition to the factory of the Hudson Boring Machine Co.

NEW BEDFORD, MASS.—Plans are being prepared for the construction of a 1-story, 98 x 126-foot brick and steel power station on Mill street for the Union Street Railway Co., 314 Purchase street. Cost of building and equipment is estimated at $300,000.

ROCKLAND, MASS.—The Diamond Tack Co. has purchased the machinery used in the Stevens & Willis tack factories in South Braintree, Mass., and is moving it to its Rockland plant. It also has bought out the Anderson Tack Co., Rockland.

WORCESTER, MASS.—The Buckner Process Co. has been incorporated with $20,000 capital to manufacture chemicals. Harry L. Buckner, Joseph W. Gorman and A. D. Harrington are incorporators.

$10,000 damage by fire.

BRIDGEPORT, CONN.—The Lock Steel Chain Co. has been incorporated in this city with $600,000 capital. Among the incorporators are S. D. Locke, D. W. Hagerty, and John S. Fullman.

DANBURY, CONN.—The factory of Rundle & White was damaged by fire Feb. 5; loss is estimated at $50,000.

HARTFORD, CONN. — The Smith-Worthington Co. has let the contract for a 4-story, 16 x 16-foot addition to its plant on Sigourney street.

NEW BRITAIN, CONN.—The Adjustable Guide Mfg. Co., with $50,000 capital, has been incorporated to build wire making machines, by James E. Williams, George W. Earley and Arthur B. Carley, the latter two of Hartford, Conn.

NEW HAVEN, CONN.—The New Haven Iron & Steel Co. has been incorporated with $9000 capital by William Alderman, Max A. Alderman, Charles Merberg, A. N. Alderman and others.

NORWICH, CONN.—The Norwich Waste Metal Co. has been incorporated with $20,000 capital by Moses Goldfaden, Fred Herman and Charles Sedar, the latter two of Danielson, Conn.

WALLINGFORD, CONN. — The Wilbur Mfg. Co. has been incorporated to make hardware with $50,000 capital by John E. Burghoff, John B. Wilks and Edward H. Slach, New Haven, Conn.

Along the Middle Atlantic Seaboard

BATAVIA, N. Y.—Plans are being prepared for a new plant including central power plant for Hesseo Co., 210 West Adelaide street, Toronto, Ont. The plant will cost about $150,000.

BROOKLYN, N. Y.—Charles Pfizer & Co., 11 Bartlett street, has awarded to Peter Guthy, the general contract for the construction of a $15,000, 1-story boiler house addition.

BROOKLYN, N. Y.—Plans have been completed for a 6-story factory building, 60 x 110 feet, to be erected by the National Lead Co. William Higginson, 21 Park Row, New York, is architect.

BROOKLYN, N. Y.—The Brooklyn Union Gas Co., 176 Remsen street, will make alterations to its gas house, to cost $40,000. The Berlin Construction Co., 220 Broadway, New York, is in charge of the work.

BROOKLYN, N. Y.—A $40,000 warehouse, one-story high, 125 x 165 feet, will be erected by the Merserole Realty Co., 892 Broadway, New York. H. J. Nurick, 955 Broadway, New York, is architect.

BUFFALO.—The Sizer Forge Co., 244 Larkin street, let a contract for a plant consisting of 1 and 2-story brick, steel and reinforced concrete forge shop with concrete foundation, machine shop, heat treatment building and administration building to Huntley & Derdenger, Electric building to cost about $500,000.

BUFFALO.—The Buffalo Forge Co., 493-501 Spring street, will erect an addition to its 2-story steel factory to cost about $25,000.

BUFFALO.—The Young Men's Christian association plans to enlarge and improve its 3-story club house, 75 x 150 feet brick and steel building at Main and North Pearl streets. The addition will cost about $100,000. Address J. E. Mueller, Main and Virginia streets.

BUFFALO.—The J. P. Devine Co. has awarded the general contract to the Charles Berricks Sons Co. for a $6000 addition to its metal working plant.

FULTON, N. Y.—The Fulton Steel Corp. contemplates the erection of a foundry addition at its plant.

GENEVA, N. Y. — The Standard Optical Co. plans to build a 2-story brick factory on concrete foundation here to cost about $25,000. Bids are to be received in March by Gordon and Madden, architects, Sibley building, Rochester, N. Y.

JAMESTOWN, N. Y.—The Crescent Tool Co. is preparing plans for a power station and concrete coal storage bins and will shortly be in the market for one 1000 kilowatt steam turbine generator set and boilers, also a 1500 horsepower gas producer.

MECHANICSVILLE, N. Y.—The George A. Fuller Co., 175 Fifth avenue, New York City, has received the general contract for an extension to the plant of the West Virginia Pulp & Paper Co. in this city. It is stated that four or five new buildings will be erected.

NEW YORK.—The A. S. Welding Works has been chartered with a capital of $25,000 to carry on a commercial welding business. H. E. Sears, 308 East 142nd street, is in charge.

NEW YORK.—C. C. Galbraith & Son,

OHIO STEEL CASTINGS

OUT in the wheat fields of the Great Northwest, where they harvest the Nation's grain, time is just as important as in the busiest factory.

Plowing, planting, reaping, threshing must be done on Nature's schedule. Mistakes or loss of time can never be made up. It is imperative that every machine and implement used be absolutely reliable.

The fact that Ohio Steel Castings are sought for use in tractors and other types of farm machinery, is proof of their quality.

Quality PLUS Service

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Plants:

Springfield, Ohio Lima, Ohio Bucyrus, Ohio



Say you saw it in THE IRON TRADE REVIEW

Inc., has been organized with $250,000 capital to manufacture shipping supplies and marine hardware. The incorporators are C. S. Galbraith and L. A. Mills, 311 West Ninety-fifth street.

NEW YORK.—Plans for a $75,000 silk mill and power house for Ernest & Herman Levy, Fourth avenue and Nineteenth street, are being held up. Frederick A. Phelps, Newark, N. J., is architect and engineer.

NEW YORK.—The bureau of yards and docks, Washington, will purchase coal handling equipment shortly for the Brooklyn navy yard.

NIAGARA FALLS, N. Y.—Bids are desired by B. Noyes, engineer, Union street, for a 1-story reinforced concrete steel and brick packing plant and factory on concrete foundation for Union Carbide Co., Union street to cost about $250,000.

OSWEGO, N. Y.—J. H. Seeber, architect, is drawing plans for a $25,000 factory addition, to be three stories high. The owner's name is being withheld.

ROCHESTER, N. Y. — The Symington-Anderson Co., Cutler building, let a contract for an ordnance plant consisting of four 1-story reinforced concrete steel and brick buildings on concrete foundation to Crowell Lundoff, Little Co., Cleveland. The plant will cost about $500,000.

ROCHESTER, N. Y.—The city has awarded to the Seneca Engineering Co., Montour Falls, N. Y., a contract for the construction of a bridge over the Genessee river, to cost $258,000.

SYRACUSE, N. Y.—Plans are being prepared by J. A. Randall, architect, S. A. & K. building, for a 2-story brick and reinforced concrete for the home for the aged. About $100,000.

SYRACUSE, N. Y.—The board of public works had plans prepared for the erection of a 2-story, 75 x 180 feet brick and reinforced concrete police station. About $65,000. H. C. Allen, city hall, is the engineer in charge.

SYRACUSE, N. Y.—The board of public education is having plans prepared for Franklin school on Butternut street, 2-story, 125 x 140 feet brick and reinforced concrete to cost $250,000. The architects are Sacket and Parks, Syracuse Savings Bank building.

SYRACUSE, N. Y.—The board of public education receives bids about April 1 for a 2-story, 80 x 110 feet, brick and reinforced concrete building for the Prescott school on Willow street to cost about $125,000. A. L. Brockway, Third National Bank building, is the architect.

ALIQUIPPA, PA. — Damage estimated at between $150,000 and $200,000 was occasioned by a fire which destroyed the entire plant of Hubbard & Co. at Aliquippa, Pa. The company manufactures shovels and has been engaged on government work.

ALLENPORT, PA.—The Pittsburgh Steel Products Co., Pittsburgh, has awarded to the Wilson Construction Co., of that city, contract for erecting two tube mills in Allenport, to cost $75,000. One building will be 178 x 860 feet and the other, 236 x 660 feet. G. Willis McCook, Frick annex, Pittsburgh, is president of the Pittsburgh Steel Products Company.

ALLENTOWN, PA. — The International Motor Co. has awarded contract for a brick, steel and reinforced concrete factory involving 180 cubic yards concrete, 160 tons steel, 80,000 brick, 315 square feet hollow tile and 30,000 feet B. M. timber, to Austin Co., 14230 Euclid avenue, Cleveland. The building will cost about $61,000.

CLIFTON HEIGHTS, PA.—Architect F. E. Hahn, 1112 Chestnut street, Philadelphia, will receive bids shortly on the construction of a $50,000 boiler house and power plant for the Kent Mfg. Co.

CONSHOHOCKEN, PA.—Ford & Kendig will receive bids about March 1 for a 1-story foundry and machine shop. A. E. Wood, Philadelphia, is president of the company.

GLENSHAW, PA. — The Glenshaw Glass Co. will replace the part of its plant recently damaged by fire, by two 1-story buildings, 50 x 100 feet and 75 x 150 feet, respectively.

LINFIELD, PA.—Bids will be received shortly for the construction of a $25,000 warehouse for the Sanitary Co. of America. The proposed structure will be three stories, 40 x 180 feet. A. S. Kepmer, Pottstown, Pa., is architect.

MILLERSBURG, PA. — Plans have been completed for a $15,000 machine shop for Brubaker Bros. The building will be one story, 75 x 100 feet.

PHILADELPHIA. — The Enterprise Mfg. Co. has awarded a contract for a foundry addition, costing $5575, at its plant, at Dauphin street and Susquehanna avenue.

PHILADELPHIA.—The Sterling Iron & Steel Co. has completed plans for a new building to be erected at its plant, at Tenth and Hamilton streets.

PHILADELPHIA.—The Standard Construction Co. has been awarded the contract for the construction of a $10,000, 50 x 200-foot storage building for the Standard Roller Bearing Co., Fifteenth street and Lancaster avenue.

PHILADELPHIA. — Alterations, costing $25,000, will be made to the plant of the Philadelphia Paper Mfg. Co.

PHILADELPHIA. — Erection of a $6000 machine shop is contemplated by S. A. Ashman & Son. William J. Gruhler & Co. are drawing preliminary plans.

PITTSBURGH.—A charter has been granted by the state of Delaware to the Duff Car & Gear Wheel Co., capitalized at $500,000. The incorporators are John T. Duff Sr., H. Y. B. Duff, Pittsburgh, and M. E. Harriston, Parnassus, Pa.

READING, PA.—The Jackson Rope Works has been severely damaged by fire, with a loss of several thousand dollars to building and machinery. The company has been engaged on war contracts.

SCRANTON, PA.—Bids will be received about Feb. 15, by G. M. Edson, architect, for the erection of a $25,000 warehouse for David Sprucks. The structure will be one-story high and 100 x 150 feet.

WILKINSBURG, PA. — A charter was granted to the Barker Motor Devices Corp., capital $10,000. The incorporators are Harry W. McKalip, Guy A. Barker, R. G. Bostwick, Wilkinsburg.

YORK, PA.—Plans are being drawn for the construction of a 200-foot steel bridge between the city and Cumberland county, to replace the wooden structure which collapsed recently.

HARRISON, N. J.—Two 4-story buildings of the plant of the Driver-Harris Wire Co. recently suffered $700,000 damage by fire. The plant is engaged in manufacturing wire specialties for use by firms having war contracts. Operations have been resumed and the damaged portions of the plant will be repaired immediately.

HOBOKEN, N. J.—The Union Iron Works is having plans revised for a $12,000 fabricating shop. Max Beyer, 79 River street, is architect.

LAUREL HILL, N. J.—The board of freeholders of Hudson county, Jersey City, N. J., will receive bids shortly for a power house to be erected here. Percie A. Vivarptas, 110 Fourth street, West New York, N. J., is architect.

TRENTON. N. J.—The John E. Thropp Sons Co. plans to erect a $50,000 foundry, one story, 100 x 350 feet. J. L. Osborne Hunt, 114 North Montgomery street, is architect and engineer in charge.

NORFOLK, VA.—The National Concrete Boat Co., Inc., contemplates the erection of a $50,000 shipbuilding plant. D. F. Mitchell, architect, is drawing plans.

PENNIMAN VA. — The E. I. duPont deNemours Co., Wilmington, Del., has started on preliminary work in connection with the $2,000,000 shell loading plant which it will erect.

RICHMOND, VA.—C. E. Bolling, city engineer, has awarded to Weinbrun & Kelley, 640 North Sixth street, contract for the erection of a reinforced concrete viaduct to cost $73,000.

Activities in the Central States

APPLETON, WIS.—A 1-story repair shop addition, 30 x 50 feet, will be erected by the Appleton Automobile Co. W. W. DeLong, architect, is preparing plans and will receive bids after Feb. 20.

BELOIT, WIS.—The N. B. Gaston & Sons Co., manufacturer of scales, is building additions and adding to the equipment of its forge shops, machine shop and foundry.

CEDARBURG, WIS. — The Northwestern Rope & Mfg. Co., Milwaukee, has purchased the plant of the Mueller Foundry Co. It has also bought a stretch of land adjoining the foundry where, it is understood, they intend to build an addition to the plant. The new concern, which is capitalized at $500,000, will manufacture rope and an engine for oil wells.

DE PERE, WIS.—The Western Steel & Iron Co. will build an addition to cost $25,000.

JANESVILLE, WIS.—Joseph A. Denning, 60 South Franklin street, has been awarded the contract for erecting a 1-story shop addition, 60 x 100 feet, for the Townsend Mfg. Co., maker of farm engines, farm tractors and other farm machinery.

MILWAUKEE.—The Auto Lamp & Radiator Co., 186 Fifth street, has incorporated its business without change of name. The capital stock is $5000 and the incorporators are Howard P. Haberla, M. A. Haberla and Harry R. McLogan.

MILWAUKEE.—The Illinois Steel Co. will immediately build a chemical and experimental

"OHIO SPECIAL"
Cold Drawn Seamless Steel Tubing



THE OHIO SEAMLESS TUBE Co.
SHELBY OHIO

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laboratory costing $10,000, to replace the building and equipment damaged by fire two weeks ago. R. B. Charlton is general superintendent.

MILWAUKEE. — The Western Rope & Mfg. Co., main offices, Tulsa, Okla., with a large branch plant in Milwaukee, has acquired the plant of the Mueller Foundry Co., together with adjoining acreage, at Cedarburg, Wis., and will enlarge the capacity about 50 per cent by the erection of an addition and the installation of new gray-iron furnace capacity. B. M. Gessel is general manager of the Western Rope & Mfg. Co.

MILWAUKEE.—The Clum Mfg. Co., 23 Erie street, manufacturer of automobile and electric devices, has increased its capital from $10,000 to $100,000 and will build additions.

SHEBOYGAN, ILL.—The J. J. Vollrath Mfg. Co., plumbers' supplies, will build a 1-story plant 126 x 300 feet of brick and steel construction for use as an enameling shop at a cost of $50,000.

UNION GROVE, WIS.—F. E. Kaminski, Watertown, Wis., has been awarded the contract for constructing and equipping a municipal sewage system and disposal tank at a contract price of $15,000.

BAY CITY, MICH.—The Industrial Works will build an addition to its foundry and add a shop, 24 x 100 feet, at a joint cost of $50,000.

DETROIT.—The Larned Tool & Die Co. has been chartered with $15,000 capital. Incorporators are William C. Weiske, Charles V. Ketts and H. J. Labean.

DETROIT.—The Detroit Shipbuilding Co., a subsidiary of the American Shipbuilding Co., Cleveland, will build a foundry and boiler shop.

HIGHLAND PARK, MICH.—Bids will be received until March 1 by the village clerk for an addition to the filtering plant and pumping station at the waterworks costing $250,000. J. Whitsitt, Gerald avenue, is city engineer.

MARQUETTE, MICH.—The alcohol refining plant, the primary building, and several condensers of the Pioneers Iron Furnace Co., owned by the Cleveland Cliffs Iron Co., Cleveland, were damaged by an explosion followed by a fire. The loss was estimated at $100,000.

PORT HURON, MICH. — The American Machine Corp., recently incorporated with E. G. Armstrong as manager, will build a plant.

OWOSSO, MICH.—The Independent Stove Co. plans to erect an addition to its plant and to install additional manufacturing equipment.

OWOSSO, MICH. — The Owosso Boiler Works has had plans prepared for the erection of a plant addition, in which new equipment will be installed.

OWOSSO, MICH. — The American Malleables Co. plans to increase its manufacturing facilities by the erection of an addition to its foundry and the purchase of new equipment.

SAGINAW, MICH.—The Erd Motor Co. has increased its capital stock from $150,000 to $500,000 and will build an addition of 201 x 404 feet, giving an additional floor space of approximately 48,000 feet. The company manufactures kerosene motors for tractors.

BLOOMINGTON, ILL.—A new building will be erected at once by the Bloomington Delivery Co. to replace the one which was ruined by a collapse of the roof caused by heavy weight of snow.

CAIRO, ILL. — The Menominee Electric Mfg. Co., offices Holliday House, has awarded a contract for a new plant to cost $60,000.

CARLINVILLE, ILL.—A new coal shaft will be sunk before July 1, 1918, by a company now being formed by C. G. McIntosh, president of the Carlinville Clay Co.

CARLINVILLE, ILL.—The Standard Oil Co. has purchased 235 acres adjoining this city upon which several shafts will be sunk as a basis for the future coal supply of the company.

CHICAGO. — The Western Brass Mfg. Works, 2007 Marshall boulevard, has plans prepared for a 1-story addition.

CHICAGO.—The United States Rail Joint Co. has been incorporated with $100,000 capital by S. E. Wagner, J. H. Schulman and William J. Dillon, 155 North Clark street.

CHICAGO.—The Corning Steel Co., with a nominal capital of $5000, has been incorporated by William F. Caspers, Charles S. Corning and others.

DECATUR, ILL.—The Leader Iron Works plans to build a machine shop, 50 x 200 feet, for which contract will be let shortly.

DuQUOIN, ILL.—A new mine tipple and an office building will be erected by the Colliery Co. of St. Louis at its mine at Dowell, Ill., near this city.

JACKSONVILLE, ILL.—The board of education has instructed the buildings and grounds committee to have plans prepared for the installation of a new boiler house. The services of a consulting engineer will be employed if found necessary.

PEORIA, ILL.—Plans are being pushed by the Peoria Life Insurance Co. for the erection of an 11-story building at the corner of Main street and Jefferson avenue.

PEORIA, ILL.—The Joint Mfg. Co. has been incorporated with $25,000 capital by Jacob Wamsgans, William H. Wamsgans and Max W. Ross.

ROCKFORD, ILL.—The Rockford Milling Machine Co. is building an addition to its machine shop.

FRANKFORT, IND.—The Stewart Wire Wheel Co. is building an addition to its plant.

INDIANAPOLIS, IND.—The Acme-Evans Co. will build an 8-story building at Blackford street and Washington avenue to replace one damaged by fire. Estimated cost $90,000.

JEFFERSONVILLE, IND. — Dr. D. C. Peyton, superintendent of the Indiana reformatory, which is one-half in ruins following a fire estimated to have done $500,000 damage, says that immediate steps will be taken to rebuild the structures which were burned.

MARION, IND. — The Marion Machine, Foundry & Supply Co. has taken over the plant, business and good will of the Planet Steam Specialty Co. The company will manufacture soot blowers and all types of boilers.

UNION CITY, IND.—The Titan Engineering Co., recently incorporated, is building a plant to manufacture starting, lighting and ignition systems for automobiles. W. F. Roberts, Anderson, Ind., is president.

CINCINNATI.—A charter of incorporation has been granted to the Evaporating & Drying Machine Co., capitalized at $125,000. The incorporators are John G. Miller and Charles F. Ellerhorst.

CINCINNATI.—The Harvest Furnace Co. has been incorporated with a capital of $5000. The incorporators include David M. Levy, John P. Hanna, W. T. Hanna and others.

CLEVELAND.—The Cleveland Electric Illuminating Co. has filed plans with the city building department for a 2-story and basement addition to the present power station at 720 East Seventieth street. The building, 105 x 161 feet, will cost approximately $1,000,000.

CLEVELAND.—Plans have been filed by the American Steel & Wire Co. for the erection of a benzol manufacturing plant to cost $57,000, at Campbell road and the Ohio canal. The building will be 1-story high and 96 x 111 feet in size. The company maintains general offices in the Western Reserve building.

CLEVELAND. — The Upson-Walton Co., 1310 West Eleventh street, recently increased its capital from $500,000 to $1,500,000 to provide for the erection of a new plant on a tract it has purchased adjoining its present plant. The company manufactures rope and cordage.

CLEVELAND.—The Valco Co. has been organized by P. R. White and W. D. White. The company is capitalized at $10,000 and will manufacture heating appliances. Address Phillip R. White, Engineers building.

CLEVELAND.—A permit has been granted to the National Steel Barrel Co., 1027 Engineers building, for the erection of a 1-story factory building 96 x 310 feet in size at East Ninety-first street and the Erie railroad. The structure will cost about $50,000. Plans are being prepared by the Allen-Osborn Co., architect and engineer, Rose building.

MARION, O.—Clifford & Owens contemplate the erection of a 1-story, 100 x 200 foot foundry and a 50 x 100 foot pattern shop on Cheney avenue, to cost jointly about $100,000.

SPRINGFIELD, O.—The Robinson-Meyers Co. plans to erect a power plant on Nelson street to cost $100,000. C. F. McGilvrey is president. The architect has not yet been selected.

SPRINGFIELD, O.—Plans have been filed by Charles I. Schauffer for a plant addition to be two stories high and 38 x 60 feet in size. The plant will be of reinforced concrete construction. R. C. Getwald is architect.

TOLEDO, O.—The Toledo Electric Steel Co. will shortly begin on the erection of a 98 x 350-foot building for the manufacture of high speed tool steels. The company has recently been incorporated with a capital of $750,000.

YOUNGSTOWN, O.—The American Sintering Co. is having plans prepared for a plant to cost $100,000 which will be erected on Poland avenue to replace the one damaged recently by fire. C. B. Kelley, Stambaugh building, is manager of the company.

FITCHBURG, KY. — The Old Dominion Oil Co., with a capital of $500,000 has been incorporated by Claude A. Balthia, Henry J. Scherirch, William E. Massey, George C. Summers and Robert V. Beard.

GLASGOW, KY.—The Beech Haven Oil Co. has been incorporated with capital of $150,000. Incorporators include J. W. Howard, C. M. Duggers and C. S. Hays.

LEXINGTON, KY.—The Badger Oil Production Co., capitalized at $500,000, has been incorporated by A. L. Stengel, G. W. Rankin, W. D. Jones and E. B. Urvin.

LEXINGTON, KY.—The Mammoth Producers Oil Co., capitalized at $100,000, has been incorporated by G. G. Pratt, William A. Carter, August W. Axthelm and W. A. Hall.

LEXINGTON, KY.—The Gordon Oil & Gas Co., with a capital of $100,000, has been incorporated by Max Gordon, Robert Mitchell and M. M. Lasky, Detroit, Mich.

CHARLESTON, W. VA.—Bureau of yards and docks, navy department, Washington, received bids Jan. 21 for the building of a reinforced concrete pit for a furnace in the treatment shop at the naval projectile plant.



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17 Ton Buckets,* capacity 1,250,000 tons per season; *15 Ton Buckets,* capacity 1,000,000 tons per season; *10 Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8 Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton; (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron Bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Clevcland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melt'g steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	24.00 to 26.00
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	28.00 to 28.50
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.50 to 20.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	21.50
Stove plate, Birmingham	19.00 to 21.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$22.00 to 23.00
Boiler plate, cut, No. 1, St. L.	25.50 to 26.00
Bundled sheets, Cincinnati	20.00 to 20.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	37.50 to 38.00
Steve plate, Chicago	22.50 to 23.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.9 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	75.0 cents
Pacific coast (tin plate)	75.0 cents

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	30.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	28.00 to 29.00
Cast borings, New York	17.00
Cast borings, eastern Pa.	23.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	19.00 to 19.50
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	35.00
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	21.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chgo.	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	34.50 to 35.00
R. R. wrgt. No. 1, Birming.	29.00 to 33.00
Wrought pipe, Buffalo	39.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$37.50 to 38.00
Angle bars, steel, St. Louis	31.50 to 32.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	39.00 to 40.00
Busheling, No. 1, Chicago	25.50 to 26.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.00 to 26.50
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.50
Machine turnings, Cinci.	15.50 to 16.00
Machine turnings, St. L.	17.25 to 17.75
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	24.50 to 25.00
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	33.50 to 34.00
Steel car axles, St. Louis	43.00 to 43.50

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, eastern Pa.	34.00 to 35.00
Cast, No. 1, Birmingham	24.00 to 26.00
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1, Chicago	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	24.00 to 24.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00
Malleable railroad, Chgo.	30.00
Malleable, agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	24.50 to 25.00

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	32.00 to 33.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, February 28, 1918 *No. 9*

Works Production Still Lagging

Progress in Restoring Normal Conditions Disappointing in Certain Lines—Coke Situation Disturbing Factor Owing to Erratic Car Supply—Nonwar Business in Steel Slumps—Ready to Make Ore Contracts

DISAPPOINTING progress is attending the vigorous efforts being made to re-establish normal iron and steel production. Coke remains an uncertain factor, for while deliveries have shown initial improvement, car supply again is receding below needs and expectations. The Pennsylvania railroad facilities in the Connellsville region especially are in poor shape. Eastern steelmakers are operating from 50 to 75 per cent of capacity. A Coatesville plate mill has resumed after two weeks' idleness, but other eastern plants still are shut down. Steel Corporation plants show a better operating record with blast furnaces at 75 per cent, steel works at 85 per cent, and finishing mills at 80 to 85 per cent of capacity. It is estimated authoritatively the government is taking from 75 to 80 per cent of present steel output. General domestic demand for steel has fallen off sharply during the past two weeks.

Commandeers Coke Tonnage

A more vigorous policy continues to be shown by the government in distributing raw material where the need is most pressing, in order to sustain or increase production. Connellsville coke in excess of 20,000 tons monthly has been commandeered by the fuel administration for the Midvale Steel & Ordnance Co. Recently eastern merchant furnaces vigorously protested against such governmental procedure in behalf of the Midvale and Bethlehem Steel companies. A smaller tonnage of coke also has been directed to Pottstown, Pa., where low phosphorus iron is being made by government order. A further lot of 15,000 tons of low phosphorus ore has been acquired in Cuba by those in charge of pig iron distribution. This will be brought in and converted by eastern furnaces into low phosphorus iron for gun forgings.

Sellers of Lake Superior iron ore are ready to contract. They have incorporated a new clause providing for a readjustment of the price to meet the action taken in the future by any authorized federal agency. The heavy reservations which have been made will now be translated into contracts, but considerable tonnage remains for sale. Labor conditions in the mining districts are unsatisfactory, the supply being insufficient and the time lost being on the increase.

Gain Little on Orders

Many furnaces have been able to make little progress in cutting down the large volume of 1917 business they were obliged to carry over into this year. This is a factor of importance in the shortage of future iron which grows steadily. A northern Ohio steelmaker, unable to supply his needs with nearby furnaces, is manifesting a willingness to pay virtually a $3 per ton premium because of the freight by seeking 72,000 tons of last half basic in Alabama. The American Bridge Co. has obtained 50,000 to 60,000 tons at Pittsburgh for eastern delivery and the Lukens Steel Co. has increased recent purchases to 50,000 tons or more. A tremendous uncovered future demand for basic remains in the market. In some districts, notably Chicago, the furnaces are holding silicon limits to the lowest possible point in order to increase production. A surprising result reached by an important valley and lake seller after a comprehensive investigation is that 80 per cent of the foundry and malleable grades now being shipped to its customers is going into direct and indirect war work. The impression has been general that the foundries were not nearly as extensively engaged along essential lines. The government is having allocated a lot of 17,000 tons of special malleable for a large car wheel maker in the middle west. This iron is for car repairs.

Confusion growing out of the inequalities in the original differentials fixed on iron and steel scrap is expected to be cleared away by the superseding schedule put out in the week. Prices have been carefully adjusted to chemical and physical qualities and to consumptive uses. The question of sales commissions still is to be settled.

The Iron Trade Review

EDITORIAL

Country Faces Iron Famine--Government Must Act

SANE and careful valuation of all factors points to the positive conclusion that the country is moving steadily toward a famine condition in pig iron which is likely to exceed in acuteness any past period of similar stringency. Already some of the largest merchant producers, particularly in lake and valley districts, have virtually sold themselves out of the market for the last half. And these bookings, though very large, appear to have effected no appreciable diminution of the huge requirements that are pressing forward daily to be satisfied and must be turned aside. The shortage in steelmaking grades especially is large and widespread. It is not uncommon to hear furnacemen declare they could book the full last half output of their plants in a single day were they able or willing.

Several circumstances have contributed strongly to create the serious condition that now obtains. Crippling of furnace operations by winter weather of unparalleled severity and by an extraordinary inadequacy of transportation and fuel needs during the past three months alone, is shown definitely and accurately to have caused an irreparable loss of from 1,500,000 to 2,000,000 tons of production. As the cumulative result of unfavorable operating conditions of many weeks' duration, a great tonnage of orders originally entered for 1917 delivery, has been carried over into this year. With many furnaces, this has amounted to from 15 to 20 per cent of last half output. This overflow must be provided for out of 1918 production. This physical handicapping of the industry has come at a time when the natural dislocation and realignment of all business enterprise arising from a war situation, where iron and steel are fundamental, have extended far.

As the iron market has become restricted to free buying, the government has been forced by war necessities to exert greater direction correspondingly in the matter of distribution. Its allocations of tonnage for consumers with war contracts who have been unable to supply their own needs, have been increasing steadily. This process promises to be maintained indefinitely with an ever-widening train of effects upon consumption and upon the whole industry. Carried to its logical conclusion, it means conscription of tonnage and finally the endless confusion of pyramiding essential requirements. The result would be disastrous both to war production and to other business, directly or indirectly connected with the iron industry.

The government must act to forestall such an outcome. To do so, its present methods of erratic interference with regular distribution, exercised as necessity dictates, will not be sufficient. Greater and more systematic supervision not merely over the end of distribution or delivery but at the beginning when the sale is made, is necessary. Under all circumstances it would be far better for nonwar industry to know exactly where it stands when it appears in the market to buy iron for future delivery. If it is able to buy, it should thereby be entitled to a reasonable assurance that it will get delivery as agreed. Otherwise it is operating on chance and speculating with its very existence. Its just due is the opportunity to obtain a proper appreciation of its own position so that it can make all necesasry adjustments in ample time. It should not be left under the present hazards of buying iron today, only to have it taken away from it tomorrow. The best way to safeguard the established business enterprise of the country is for the government to exercise a comprehensive regulation of raw material sales in the open market which would be guided by the requirements of war. To continue the merchandising of iron on the old regular-customer, or "first-come-first-served" plan, only means disappointment and probable disaster for many consumers.

Clearing Up a Confused Situation

PERHAPS the most comprehensive branch of the iron and steel industry is that which embraces the marketing of scrap. An understanding of the various market factors and trade customs requires an experience and a broad and general knowledge whose scope covers practically all other branches of the iron and steel industry. Therefore, the fixing of maximum prices on scrap is a large undertaking. It calls for an exact appreciation of the requirements of each consuming industry, and of the complicated conditions of supply. For the reason that all factors had not been taken into consideration, the four base prices announced by President Wilson, together with the differentials which later were fixed by the American Iron and Steel institute, did not constitute a sufficiently comprehensive schedule. Several gaps

EDITORIAL

were left which gave opportunity for uncertainty and dissatisfaction.

As an illustration, one of the most confusing points was with reference to the price on No. 1 machinery cast for use in foundries. To this grade the maximum price of $30, delivered, was applied, but the wording of the announcement lacked definiteness and the trade consequently was left in doubt as to whether $30 was the maximum price on this grade only when sold as a substitute for heavy melting steel, or whether it was to be regarded as the absolute maximum to all consumers. As a result of the many inquiries which resulted, a ruling was made that $30 should be regarded as the maximum on No. 1 machinery cast, no matter to whom sold. This ruling aroused many protests since it did not take into consideration the fact that No. 1 machinery cast always had brought several dollars more per ton when prepared for and sold to foundries than when sold to steel works. Later expressions from high authorities created doubt as to whether this ruling was considered even by its authors as being final. As a result, many scrap dealers felt justified in selling No. 1 machinery cast to foundries at $33 to $34, delivered.

This situation, of course, was an intolerable one and it resulted a few weeks ago, as previously reported in THE IRON TRADE REVIEW, in the appointment by the American Iron and Steel institute of a new, larger and more representative subcommittee on iron and steel scrap. Elsewhere in this issue is published an announcement by the institute of a new schedule of scrap prices which last week was reported by the new subcommittee and approved by the committee on steel and steel products, and which now is in effect. The new schedule is complete and clearly worded and opportunities for doubt and misconstruction no longer exist. For this happy condition all scrap producers, dealers and consumers, constituting practically the entire iron and steel industry, are deeply indebted to the new subcommittee, which achieved it after a great deal of hard work and personal sacrifice.

A notable feature of the schedule is the application of prices and differentials to gross tons. The inconvenience of constantly translating these prices into terms of net tons reasonably can be expected to reduce to a minimum the transactions of business on a net ton basis. This provision of the new schedule undoubtedly will result in making the gross ton the universal scrap unit in this country, which it is believed will be an advantage to all concerned.

War's Effect on the Storeroom

WAR has taught the American people the absolute necessity for saving. This means not only saving food and currency but various materials necessary for keeping the cogs of our great iron and steel industry turning as well. All sorts of material, such as nuts, bolts, pipe fittings, and a thousand and one other supplies usually carried in the store room of iron and steel plants are becoming scarcer each day. Many shelves which before the war sagged under their load, now are bare.

Previous to the war workmen were urged to practice economy lest the "cost of repairs" would show an increase over previous reports. This was drilled into them daily but in spite of that fact they often were exceedingly extravagant in the use of material. They set out to do a repair job with the expectation of completing it in a specified time. Probably the job was that of removing nuts and bolts from a machine or a cast iron elbow from a pipe line. Remembering that saving time is one of the things required of them, they discarded all thoughts of economy and removed the nuts by means of a cold chisel and sledge or broke the cast iron elbow with a ball pein hammer. In either case the damaged material was doomed to the stock pile.

Workmen are not always to blame for this waste. It has been said that "a good man does what he is told"; and if this is true those directly responsible for the wasteful practice outlined largely are to be found in higher positions. But foremen are taking a different attitude toward saving since the shortage of material has become prevalent.

There were times when stocks and stores were easily and quickly replenished but this is not the case today. As a result, material is being dealt out over the store room counters more sparingly. Mill managers realize the time is ripe to impress upon the minds of their men the need of using old material. It would be to the company's advantage to appoint a "reclamation clerk" whose duties would include a daily inspection trip through the mill for the purpose of looking after all discarded material. This should be removed to his department for assortment, no matter whether it is a ¼-inch pet cock or a standard size car wheel. The material should be issued from this department whenever possible and thus would be overcome to a great extent the demands usually made upon the store room. All of which goes to show that there are many ways of making money without spending it.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 578

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, delivered	$250.00
Spiegel, 20 per cent fur	60.00
Spiegel, contracts, furnace	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.80c to 4.90c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	5.715c to 6.215c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black (Per cent off)	Galv. (Per cent off)
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products February 27, average for January, 1918, average for November, 1917, and average for February, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Feb. 27, 1918	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Bessemer pig iron, Pittsburgh	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	33.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	31.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	34.50
Malleable, Chicago	33.50	33.50	33.50	31.25
**Southern, No. 2, Birmingham	33.50	33.50	33.50	24.50
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	33.00
Basic, eastern Pa.	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace	33.50	33.50	33.50	29.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	32.00
Ferromanganese, delivered	250.00	250.00	247.00	265.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	62.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	62.50
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	62.50
Open-hearth billets, Pitts.	47.50	47.50	51.00	62.50
Steel bars, Pittsburgh	2.90	2.90	2.90	3.00
Steel bars, Chicago	2.90	2.90	2.90	3.15
Iron bars, Philadelphia	3.50	3.648	4.335	3.259
Iron bars, Cleveland	3.64	3.64	4.00	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Feb. 27, 1918	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Iron bars, Chicago mill	$3.50	$3.50	$4.10	$3.00
Beams, Chicago	3.00	3.00	3.00	3.38
Beams, Pittsburgh	3.00	3.00	3.00	3.25
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.75
Tank plates, Chicago	3.25	3.25	3.25	3.94
Tank plates, Philadelphia	3.435	3.435	3.435	5.009
Sheets, blk., No. 28, Pitts.	5.00	5.00	5.30	4.56
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.60	4.37
Sheets, galv., No. 28, Pitts.	6.25	6.25	6.50	6.50
Wire nails, Pittsburgh	3.50	3.50	3.50	3.00
Connellsville furnace coke	6.00	6.00	6.00	8.00
Connellsville foundry coke	7.00	7.00	6.60	6.50
Heavy melting steel, Pitts.	30.00	30.00	29.60	21.87
Heavy melting steel, eastern Pa.	30.00	29.80	27.50	20.50
Heavy melting steel, Chicago	30.00	29.70	28.50	21.65
No. 1 wrought, eastern Pa.	35.00	35.00	35.70	27.00
No. 1 wrought, Chicago	35.00	35.00	35.00	27.00
Rerolling rails, Chicago	35.00	35.30	35.70	25.63
Car wheels, Chicago	30.00	30.40	27.50	18.31

(For Additional Prices See Page 578)

Demand For Basic More Insistent

Steel Plants Strive to Cover For Future But Encounter Shortage of Unsold Tonnage —Ohio Melter Seeks 72,000 Tons of Basic in South—American Bridge Co. Gets Tonnage—Production Disappointing

Philadelphia, Feb. 25.—Purchases of basic for eastern consumption during the past week are reported at fully 75,000 tons. The American Bridge Co. is understood to have arranged for 50,000 to 60,000 tons for second half shipment from the Pittsburgh district to its Pencoyd plant. The Lukens Steel Co. has increased its purchases of basic and altogether during the past two weeks is understood to have bought at least 50,000 tons, all for second half. The Penn Seaboard Steel Corp.'s inquiry for 4000 to 7000 tons per month over the second, third and fourth quarters has not yet been closed. Among new inquiries for basic is one from a Pittsburgh district consumer for 5000 to 10,000 tons per month over the second quarter. Outside of the sales of basic, transactions of the past week comprised principally small tonnages of off foundry, high silicon and high manganese foundry, off malleable, off bessemer, etc. Numerous inquiries for 1000 tons or more of foundry for second half and several for bessemer and malleable are out, but none of the furnaces is able to quote on them apparently. In general, inquiry is of very much smaller proportions than it would be if supplies were to be had, but all consumers understand the situation and realize that in most cases it is a waste of time and effort to try to locate iron at this time.

Huge Tonnage is Unsatisfied

Cleveland, Feb. 26.—Sellers say they could dispose of 500,000 tons of various grades of iron were it available. This is not surprising in view of the tremendous tonnage that is seeking acceptance, especially in steelmaking iron. The estimate of obtainable business expresses the severe shortage which is steadily growing more pronounced. One northern Ohio works unable to get accommodations from nearby makers is inquiring from Alabama makers for 72,000 tons of basic for last half. Another northern Ohio consumer has revised an inquiry for 20,000 tons for second half; and a steel foundry interest is sounding the market on a round forward tonnage. The request for 75,000 to 100,000 tons for last half from a melter in the Pittsburgh district still is open. Other buyers of basic are in the market. A steelmaker in this district who was seeking 40,000 tons or so of basic and bessemer, is reported to have placed some tonnage with nearby makers. Leading producers in this district are virtually sold up for last half. One of them disposed of about 150,000 tons in February. A local interest continues to sell freely of last half malleable and foundry to regular customers. The Westinghouse Electric & Mfg. Co. has closed for 12,000 to 15,000 tons of last half malleable and foundry largely with Cleveland and valley makers. Southern makers of iron are able to ship more liberally to this district. Among government matters the largest piece of business concerns the allocation of 17,000 tons of carwheel malleable for February-June delivery to an important wheel foundry of which 15,000 tons are for the Chicago and 2000 tons for the Boston district. This iron is for car repairs. A 2000-ton lot of basic to go to St. Louis will be furnished from eastern Ohio and Chicago. A lot of 1000 tons of charcoal for an Illinois arsenal has been reduced to 100 tons and placed. Another inquiry for 1000 tons of foundry for the Italian gov-

ernment is up. A leading lake seller has made a comprehensive survey of his customers to whom shipments now are being made and finds that 80 per cent of the malleable and foundry iron being furnished is for direct and indirect war work.

Chicago Market Tighter

Chicago, Feb. 26.—Placing of contracts for last half pig iron continues to be done steadily in this district and by far the greater portion of last half production is well under contract. Some restrictions are being placed on tonnages accepted by sellers and past contracts are being taken as the basis of present buying. Considerable restriction is also being placed on analysis and production of silicon is being limited with the view to turning out as heavy a tonnage of iron as possible. Contracts will not be made by the leading interest here for basic iron containing silicon over 1.25 per cent and silicon in foundry iron is being held down to the lowest possible point. Inquiry continues widespread and practically all consumers are seeking to cover their last half requirements. There is also considerable inquiry for prompt iron and for second quarter delivery. The latter class of inquiry is meeting small encouragement as there appears to be almost nothing available this side of mid-year. Producers of Lake Superior charcoal iron probably will have their entire output covered in a short time. One important interest has sold practically all its last half iron and another larger producer which has not yet opened its books probably will contract its entire last half tonnage within a few days, when it is ready to accept contracts. Silvery iron has been difficult to obtain but a Tennessee stack is now willing to sell iron containing silicon from four to ten per cent with phosphorus 1.50 to 2.25 per cent for last half delivery. Southern producers continue to contract, but some are practically sold up on standard grades and have little to offer. One large southern producer is offering some No. 2 and some No. 3 while another large southern maker has withdrawn for the present on No. 2 foundry.

Wholesale Shutdowns Threatened

Boston, Feb. 25.—The pig iron situation in this territory is fast approaching a crisis and if consumers do not soon get larger shipments, a wholesale shutting down of plants may follow. Consumers,with few exceptions, can see the bottoms of their stock piles and with nothing on the way, the need of new supplies is acute. Meanwhile, there are inquiries for lots ranging anywhere from 100 to 1000 tons from melters who underestimated their probable needs and not a ton is being offered to meet these inquiries. The probabilities are that matters are looking up in the matter of deliveries, but it is hard to find anybody among the iron trade who will go on record as saying when there will be any improvement. The drive to relieve the coal shortage in this section is using many cars for coal that otherwise would be available for the transportation of iron and other raw materials. The word from producing sections is that the furnace operations have increased but until the transportation tangle is unwound, New England seems likely to suffer in the matter of shipments. Quite a little business has been booked for Connellsville coke for six and twelve months, beginning July 1. This business comes from brass foundries, which are unable to secure much crushed coke since the local by-product maker has sold quite freely for domestic purposes to help out the coal scarcity. This demand has reduced the amount available for the foundries, using crucibles. Government prices applied on the Connellsville business.

Foundries in Trouble

Buffalo, Feb. 26.—Though the scarcity of cars still is serious and is causing some producing interests to pile iron, the railroad situation appears to be gradually clearing, Buffalo producers say. Fuel is moving a little more freely though there is room for great improvement. Some furnaces are running as low as 50 per cent of capacity and an average would probably put production at 65 to 70 per cent for this district. Improvement in the rail situation is noted in the fact that roads are accepting shipments they would not touch two weeks ago. One producer estimated that one-half of the embargoes in effect at the height of the tie-up are off. Most of the iron being made is for government purposes either directly or indirectly, leaving little general purpose metal available. What is left is being eagerly sought after but producers are in no great hurry to contract business. Inquiry is very fair, one interest which is not quoting reporting an aggregate demand for 22,000 tons of foundry and malleable during the past week for delivery in the last half. Coke difficulties practically have barred this interest from the market, so the business was passed. Another interest likewise is turning down inquiry. The capacity of this furnace is taken till July. Still another seller contracted for 500 tons of foundry. Foundries are crying for coke and pig iron, indicating that stocks are very low. The transportation situation stands in the way for the producers have the iron but lack cars. Foundries have been urged to appeal to the government.

Southern Foundry Active

Cincinnati, Feb. 25.—Makers of southern foundry iron have practically the whole stage to themselves. Buyers for last half shipment are still plentiful and quite a number of sales were made last week. Some of this iron runs high in silicon and a nearby foundry is understood to have purchased about 750 tons with silicon ranging from 3.25 to 3.75, at the usual advances for this grade. Some sales of southern foundry iron running from 1.75 to 2.25 per cent in silicon have been made to Kentucky and Indiana melters at $33 at furnace for last half shipment. Second quarter business is confined to small sales, mostly of high sulphur iron. Shipments from the south are moving at a better rate, although many points north of the Ohio river are still embargoed. A slight increase in production is being maintained in southern Ohio, but the furnaces there are far behind in shipments on contracts. In a measure this is due to the railroad situation. There is a good demand for the Ohio silvery irons, but none to be had for any shipment. A few cars of Virginia iron are being disposed of in this vicinity.

Buyers Fear Shortage

St. Louis, Feb. 25.—A good, scattering demand for pig iron was in evidence this week but the sustained inquiry of two weeks ago seems to have disappeared. The letting down on the part of consumers is not due to any diminution of their needs but mainly to the fact that producers are out of the market. Northern and eastern furnaces are offering nothing at the moment. One southern maker sold about 1000 tons this week in small parcels but other business was inconsequential. Both consumers and sellers in this district have a well defined belief that a real scarcity is in sight. The demands are far in excess of production at present and no change in this condition is visible for the future. Mills and foundries on the east side have turned down important orders for summer delivery because of the extreme dubiousness of the raw material market. Another potent factor at the moment is the scarcity of coke. One manufacturer said today that he was experiencing much less difficulty in securing pig iron than coke to melt it with. Many other users are in a similar position.

The open weather has done wonders

in relieving terminal congestion and cars are moving freely from mines in the Illinois district.

Sellers Move Cautiously

New York, Feb. 26.—Pig iron sales in the New York district during the past week have consisted largely of small tonnages of high silicon and off-foundry grades for prompt shipment. Second half sales by northern furnaces are made up of only occasional tonnage which circumstances force them to accept from regular customers. Round tonnages for last half also are being sold in this district by the Alabama furnaces. Very little additional second-half selling by eastern makers is expected prior to the action by the government on prices for second quarter delivery dating from April 1. Large quantities of iron could be sold if it were available.

Production is Disappointing

Pittsburgh, Feb. 26.—Receipts of coke at blast furnaces have shown a slight falling off during the past week and the expected increase in pig iron production has been either so slight as to be practically negligible or has actually shown a decline in this district. The Carnegie Steel Co., which had 40 furnaces in operation on Wednesday of last week, had 41 making pig iron today, but owing to the shortage of coke, it may be necessary to bank one or two tonight or tomorrow. The Jones & Laughlin Steel Co. has six of its 11 furnaces in operation, making no gain in production during the past week. Inquiries for iron, particularly for steelmaking grades, still are numerous but have shown a decrease, some consumers apparently withdrawing from this market because of their inability to cover requirements. While there is a distinct shortage of iron of all grades the most acute lack is in basic. Two inquiries, each for 5000 tons of bessemer for prompt shipment, have come out but it is doubtful if the prospective buyers will be able to obtain the iron from sellers in this district. A local steel producer is understood to be in the market for almost any quantity of basic iron that it could obtain. It needs 75,000 to 100,000 tons for last half. Foundries also are making pressing inquiries and it is reported that if a number of them do not cover their needs soon, they will be forced to suspend.

Commandeer Coke Tonnage

Government Directs 20,000 Tons Monthly to Midvale Plants and Other Lots—Car Supply Drags—Adopt New Plan

Pittsburgh, Feb. 26.—More vigorous action has been taken by the government to divert fuel to plants where it is most sorely needed. The fuel administration has commandeered in excess of 20,000 tons monthly for the furnaces of the Midvale Steel & Ordnance Co., and also a smaller tonnage for the Eastern Steel Co., at Pottstown, Pa., where a furnace recently was put on low phosphorus pig iron by the government. Eastern merchant furnaces previously had protested to the government against the commandeering of tonnage for eastern steel works.

Despite the fact that favorable weather for railroading has prevailed for approximately three weeks, the supply of cars in the Connellsville coke region continues to be entirely inadequate. No one appears to be able to give well defined reasons why the extreme shortage should continue to exist. The supply yesterday on the Monongahela railroad was 60 per cent and today 30 per cent. A 30 per cent supply is promised for tomorrow. Some large oven interests whose car rating is as high as 25 a day were unable to receive a single car today. The shortage on the Pennsylvania railroad is especially acute. The shortage of cars has put some consumers in a serious situation. Neither producers nor consumers are taking a hopeful outlook for immediate relief. However, improvement in the quality of coke, some believe, will follow the institution of the plan determined upon by which the car rating of coke plants in the Connellsville region is to be based on the number of ovens available for service and the actual producing capacity of the mines serving such ovens. At present the rating is based on the number of ovens actually in blast. The fuel administration has approved the plan and railroads are preparing necessary tariffs to be filed at once with the interstate commerce commission. The commission will be asked to permit the schedules to become operative in five days after being placed on record. By the new plan it is proposed that coke be produced on a uniform basis and be drawn every 45 and 72 hours instead of under the present system by which it is burned from 96 to 120 hours and even longer. Production for the week ended Feb. 16 totaled 240,772 tons, comparing with 224,145 tons during the preceding week according to *The Connellsville Courier.*

Last Half Foundry Sold

Philadelphia, Feb. 25.—For the first time in some months, sales of beehive foundry coke are being made here for forward delivery. A good many thousand tons have been sold for second half delivery and offers continue to be made. No sales of furnace coke are reported. Spot coke continues unobtainable.

Apprehensive Over Supplies

St. Louis, Mo., Feb. 25.—Activities among coke dealers are confined to taking care of contracts, there being virtually no new business. A thorough canvass of leading dealers elicited the information that aside from a few scattering cars, no sales have been made. The demand continues as urgent as ever and there is no user who has one car due him who would not jump at two or more cars. This attitude of users is an excellent gage of their idea of the future. Absolutely no confidence is felt in future supplies and this feature is having a detrimental effect on activities. Not much improvement is reported in the transportation situation. Cars are scarce, and deliveries on outside contracts will hardly average 50 per cent. Inquiries continue heavy. There was one this week for a considerable tonnage from El Paso, undoubtedly meant for Mexican consumption. Arizona and New Mexico also have sent appeals for even a few cars, and reports from that general region indicate the most acute shortage thus far experienced.

Controversy Checks Production

Birmingham, Ala., Feb. 26.—A little deflection is noted in the coke production in Alabama for home consumption. Independent producers, not at outs with their employes, have been able to get a fairly good supply of coal and all ovens are going on full pace. The cessation of work on the part of several thousand men during the past week affected the coal production of two of the larger makers, which consume this make in their own plants. The trouble is in reference to an alleged noncompliance with the Garfield proposals or agreements for operators and employes. The employes have returned to work generally and have asked the fuel administrator to send a representative here to look into the controversy.

New Prices Greeted Warmly

Buyers and Sellers Welcome Elimination of Uncertainties and Inequalities of Original Schedule—Market Activity Broadens

FOR COMPLETE SCRAP PRICES SEE PAGE 578

Philadelphia, Feb. 25.—Announcement by the American Iron and Steel institute of the revised and amplified schedule of maximum prices on iron and steel scrap, has been received here with great satisfaction. The inclusion of prices on grades not before specifically covered, and the clearly worded definitions as to just what material comes under each price, are expected to eliminate the confusion which heretofore has prevailed with respect to certain grades. One particular source of satisfaction to the trade here is the fixing of $35, delivered, as the maximum price on heavy cast scrap for foundry use, thus differentiating it from cast scrap for steel mills. It is felt the establishment of differentials for each grade will serve as a stimulus to sellers to meet exact specifications. As a result, it is expected, there will be fewer rejections, and the shipping situation will benefit correspondingly. Greater activity has characterized the market. Most of the selling has been by the yards and small dealers, to the large brokers. The latter are eager to get scrap to fill old contracts. Consumers also are showing more interest. The shipping situation has shown a vast improvement during the past week.

Transportation is a Drag

Boston, Feb. 25.—There is no lack of demand for the various grades of scrap but the railroad situation, despite the lifting of embargoes and the lessening of congestion, still is far from normal. There is not the activity nor volume of business there undoubtedly would be with full transportation facilities. Prices, meanwhile, are firm for stocks are not burdensome. Wholesale dealers' paying price per gross ton, f.o.b. shipping point follow: Wrought No. 1, yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $21 to $22; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $27 to $28; steel rails, $26 to $27; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $13 to $16; cast borings $16 to $17; drop forge trimmings, $21 to $22; and cast iron car wheels, $35 to $37.

More Business Brought Out

New York, Feb. 26.—Although permits are more easily obtainable for the shipment of scrap in this district, the difficulty now confronting dealers is that of obtaining cars. Under present conditions several permits may be necessary for the shipment of one lot of material. This scarcity of cars is due principally to the continued heavy movement of coal. Nevertheless, the situation generally, with regard to the handling of scrap, is improving steadily. This improvement, in turn, is bringing out business which has been held up for weeks as a result of the railroad congestion. Prices generally are very firm and in some instances advances have been made. No. 1 machinery cast, New Jersey points, is up 50 cents to $1 and stove plate and grate bars, New Jersey points, $1. With the official announcement of new differentials the haze of misunderstanding which surrounded the original price schedule appears to have been cleared away.

New Classifications Interest

Pittsburgh, Feb. 26.—Dealers in this district have shown much interest in the new scrap prices and classifications just announced. Apparently the two chief points receiving the attention of dealers relate to the reduction of the price of No. 1 busheling from $35 to $32 a ton, and the question as to whether or not the 3½ per cent commission which dealers have been allowed to charge in excess of scheduled prices. Some still maintain the price of No. 1 busheling should be as low as or lower than for No. 1 heavy melting steel. It is known, however, that the price of No. 1 busheling was set above that of No. 1 heavy melting for the purpose of protecting the interests of iron bar mills. It has been pointed out that open-hearth consumers have been taking large quantities of this grade to the detriment of bar mills, but under the new price classification no scrap to be used for remelting into steel shall be dealt in at a price in excess of the maximum base of $30. Obviously, this would prevent the payment by open-hearth consumers of $32 for No. 1 busheling which it is claimed now can be devoted to bar mills. The opinion is expressed here that the commission of 3½ per cent for dealers still is allowable, although a contrary view is voiced from some other quarters.

Consider Zone Distribution

Buffalo, Feb. 26.—The scrap sky shows up a little brighter due to a stretch of good weather with the prospect that the worst part of the winter has gone. The car situation is a little better and permits are being obtained a trifle more freely. Dealers are gratified at the action of the government in fixing scrap prices inasmuch as it is hoped that it will prove a stabilizer for the market. The immediate result of the revisions will be a clearer classification of the various grades. The staple commodities affected in this district are railroad malleable which is now $35 instead of $30 and No. 1 railroad and machinery cast scrap which is $35 instead of $30. One of the serious questions which is understood to be now under consideration by the American Iron and Steel institute is how isolated plants which must pay heavy freight rates are to obtain scrap under the new prices. It has been suggested that zones be created to take care of this difficulty and this plan is now said to be under consideration. Another question is the disposal of the surplus of certain kinds of scrap, produced in excess in certain districts or for some reason not used by plants of that territory. The problem is whether the dealer must accept a lower price for this scrap or whether the consumer must pay a differential.

Still Expect Commission

Cleveland, Feb. 26.—Scrap iron and steel dealers in this district who awaited the announcement of the institute's subcommittee with more or less trepidation, have scanned the new prices and classifications and are virtually unanimous in the belief that not so much as a ripple will be caused by them. The cut in No. 1 busheling was expected. In some quarters the advance of cupola-size cast scrap above the government pig iron brings the fear that foundrymen may prefer the latter; others point out the pig iron shortage dispels such a belief. Most dealers do not look upon the omission of reference to the 3½ per cent commission as an indication it has been cut off. If they are denied the commission, dealers declare they might as well shut up shop. Direct selling is making its appearance greater than ever before in this market and some fair-sized lots of scrap have changed hands in

this way. With shipments near normal, the great majority of tonnage moving is on contracts entered in November and December. About 1000 tons of low phos have been offered here.

Dealers' Stocks Growing

Cincinnati, Feb. 25.—Dealers' stocks are increasing, but at a very slow rate. Railroad embargoes still prove very embarrassing, and make the sale of scrap for prompt shipment almost an impossibility. There is not much scrap being bought for shipment later on, except in a few cases where melters desire to add to their previous purchases. Prices are slowly nearing the government's schedule, which on some grades are not up to the maximum allowed.

New Prices Not Digested

Chicago, Feb. 26.—Trading in scrap iron and steel in the Chicago market has been delayed for some time, principally on account of lessened operation on the part of consumers. Another factor which has had some effect is the probability of fixed prices being changed and announcement this week has made this a reality. Some surprises are met in the new maximum prices, but, inasmuch as they were compiled by a representative committee, it is believed they will be received with better grace than the former announcement.

Sufficient time has not yet been given to allow dealers to adjust themselves to the new conditions. Some weakness has been manifested in a few items, brought about principally by dealers offering some tonnages at forced sale under the spur of light demand. Somewhat better offerings are being made by railroads, as more open weather allows scrap to be moved. The Santa Fe offers 2300 tons; the Chicago, Burlington & Quincy, 2200 tons; the Rock Island, 1600 tons, and the Monon, 225 tons.

Expect Wholesome Effect

Birmingham, Ala., Feb. 26.—Southern scrap iron and steel dealers talk more confidently of the market and while quotations show but little change there is a belief that the new schedule of the government will have a wholesome effect. The government level of prices has never been reached in the southern market as yet but the grading here is somewhat different than elsewhere. Heavy melting steel has reached a level of $27.50. The strike for an 8-hour day among metal trades employes, including molders, machinists, patternmakers, electricians and others, has caused more or less deflection at foundries.

Steel Needs More Urgent

Necessities Drive Consumers to Vigorous Efforts to Get Material—Sheet Bars Especially Scarce and Finished Production Suffers

Pittsburgh, Feb. 26.—Increased production of billets and sheet bars in this district has resulted in a number of new inquiries coming out, but so far as reported no offerings are being made in the open market. In view of the extreme shortage of steel it seems improbable that semifinished material can be bought freely in the near future. Most producers are using all of their output and some are seeking tonnages from other sources. Supplies for sheet and tin plate mills are somewhat better but operations still are far below normal because of a shortage of sheet bars. Demand for wire rods is active. One inquiry from a Canadian consumer calls for 500 tons for early shipment. Some makers in this district are entirely out of the market and others are not actively soliciting business. Tonnages are said to have been tied up at seaboard because of a scarcity of cargo space and are being offered for resale. Requirement by the government of licenses for imports and exports promises to restrict further sales for foreign delivery.

Sheet Bar Supply in Doubt

Youngstown, O., Feb. 27.—Sheetmakers are in doubt concerning second quarter supplies of open-hearth sheet bars but are making every effort to meet their needs. They are not having much success and are finding it hard to obtain even bessemer sheet bars. One mill manager states he has scoured this and the greater Pittsburgh districts for both open-hearth and bessemer bars and is unable to locate any tonnage which is available immediately or in the near future. The leading valley maker of open-hearth sheet bars reports he has no bars to sell at this time and that his books for this material will be closed indefinitely since the government is requiring practically the entire output of his open-hearth department for shell steel, plates, etc.

Need Steel Urgently

Cleveland, Feb. 26.—The shortage of semifinished steel, especially sheet bars, is pressing more heavily upon consumers and the latter are making more urgent efforts to obtain even small lots of steel to tide them along. Some of them also have renewed negotiations for larger and more extended requirements, including one lot of 10,000 to 12,000 tons for a northern Ohio mill. Recent loss in steel output has caused some makers to refrain from selling discard material and they are using the latter for their own purposes. The government has had before local mills this week additional tonnages of slabs and billets, which the former have been asked to furnish if possible.

Auto Builders Seek Strip

Pittsburgh, Feb. 26.—The market for cold rolled strip steel remains unchanged. Mills are operating more heavily and inquiries are being made by manufacturers of pleasure automobiles for tonnage. Most of the business being done is either directly or indirectly for the government.

Low Output

Still Shown by Tin Plate Mills—Priority Order Ineffective

Pittsburgh, Feb. 26.—Operations of tin plate mills throughout the country are estimated at about 60 per cent of capacity. Restriction of output continues to be occasioned by a shortage of sheet bars and the traffic situation. Tin plate was recently put on the list of products given preferential shipment but was placed in the last class. It is reported but not verified that the railroad administration now has moved tin plate up to the third class. The large stocks stored have been little affected by the priority order and many mills still are suspended. Good-sized shipments have been started recently to the salmon and condensed milk trade in the west but some of them have been held up at Chicago. Not many eastern shipments are being made. A conference will be held Thursday in Washington with a representative of the railroad board with a view to having shipments expedited in both directions.

To Bring in Cuban Ore

Washington, Feb. 26.—Arrangements have been made with the war industries board and the shipping board for the immediate importation of 15,000 tons of low phosphorus ore from Cuba for smelting in eastern furnaces for the production of pig iron to go into an order for gun forgings placed to the account of the war department.

Implement Buying Active

Partial Priority to Agricultural Tool Industry Enables It to Get Bars More Freely—Rewritten Contract Matter Persists

Chicago, Feb. 26.—Agricultural implement makers are inquiring actively for soft steel bars, and inasmuch as this industry has received at least partial preference at the hands of the government, they will be given what they require as the need arises. Most of these buyers are being covered by the leading interest, which has had the bulk of this business in the past. Comparatively little other inquiry is being received for soft steel bars except such as the government is placing for its own purposes. Buying of bar iron is being done steadily in small tonnages and inquiry seems to be increasing. Some difficulty is being met by mills in obtaining sufficient fuel as bar-iron makers are not preferred coal buyers. Present bookings are practically all for spot delivery and mills have obligations running practically 60 days. Hard steel bars are not in much demand but implement manufacturers are taking some tonnage to fill in for soft bars which they are unable to obtain promptly enough for their purpose. These mills are running on small future bookings and some have not more than a fortnight's business before them.

Mills Catching Up

Pittsburgh, Feb. 26.—Demand for steel bars is fairly active and makers are behind on deliveries due to a curtailment of output. Operations have increased considerably, however, since the railroad situation improved and mills are making headway in catching up on orders, and some of them are now able to take additional bookings for domestic consumers for second half delivery. The government is taking good-sized tonnages of soft steel bars and there is also heavy demand for shell steel. Makers of iron bars are well committed on contracts, mostly for the government. It is understood they are not taking new business from domestic consumers.

Government Buys Many Bolts

Cleveland, Feb. 26.—Further renewed efforts of nut and bolt makers to induce the mills to rewrite to government prices old steel bar contracts taken at higher prices have proved equally as unsuccessful as former attempts. Requests along this line have been made to high steel officials. Some of these matters have been brought more to the front of late, owing to the placing of large orders for bolts by the government at the fixed prices in which local makers shared liberally. Some of these makers will fill their steel needs on this business by taking out the needed tonnage against old bar contracts which had been placed originally to cover commercial business. The 55,000,000 bolts for the quartermasters department still are unplaced. Heavy orders for automobile tractors have directed a large demand in such lines as bearings upon the manufacturers and some of the latter in northern Ohio now are doing double time. An inquiry for 500 tons of reinforcing bars for dam construction over the Miami river is current. New government inquiries of the past week have included several hundred tons of 16 to 23-inch dock spikes, and a considerable quantity of nickel and special bars for the navy.

Bolt Plants Ship Better

Pittsburgh, Feb. 26.—Makers of nuts, bolts and rivets report that shipments from their plants are being made more freely and steel bars are being received with much less difficulty than was the case recently. Business is brisk, but most of it is for the government either directly or indirectly. No large orders are said to have been taken by makers in this district during the past week.

Government Buys Shafting

Pittsburgh, Feb. 26.—Tonnages of cold rolled shafting continue to be taken by the government in fair-sized quantities. The domestic market is quiet.

Hoop Buying Light

Pittsburgh, Feb. 26.—Commercial requirements for hoop steel have shown a falling off and the principal buyer is the government. Makers are well sold up for several months ahead, and have lost considerable tonnage by reason of the shortage of steel. The market for bands is dull.

Stocks Are Depleted

Boston, Feb. 25.—Boston jobbers still report matters to be quiet in the structural end of the business, but that they are doing a good, everyday business in those lines essential to plants engaged on war orders. The activity in the latter is at the expense of warehouse stocks, for as yet there has been no appreciable improvement in the deliveries from the mills. Stocks of angles, beams and bars are considerably depleted, but dealers are hopeful that before long transportation conditions will have improved sufficiently for them to secure prompter deliveries on the orders they have placed.

Heavy Bookings

In Lap Weld Pipe From all Sources—Expect War Orders

Pittsburgh, Feb. 26.—Makers of iron and steel lap weld pipe report that the market has become active and bookings are rather heavy. Orders are being taken from railroads, oil country interests, jobbers, mines and mills. Deliveries on assorted lots for jobbers in carloads can be made promptly but on large requirements shipping terms provide a much longer time and in some cases are to be made at the convenience of the mills. Operations are considerably increased and tonnages being shipped have relieved conditions considerably. Some warehouses had become well filled with pipe and caused some producers either to close down altogether or to curtail production greatly.

Government Buying is Light

New York, Feb. 26.—Private inquiry for cast iron pipe continues to hold up well in the east, although few single large tonnages are involved. This demand is augmented by the further placement of small orders by the government. Perhaps the largest order to be placed recently by the government is that calling for 1000 tons of 8, 10 and 12-inch pipe for its new ammunition plant at Keesport, N. J., which went to the United States Cast Iron Pipe & Foundry Co. Considerable new business from the government is in prospect including the requirements of the explosive plants to be erected by the Du Pont interests and the Thompson-Starrett Co. There also is the $37,000,000 gasmaking plant to be constructed at Edgewood, N. J., and the various new munition plants and other projects which were outlined in Washington recently by the war department. As soon as the pipe specifications for these projects are definitely settled upon heavy buying is expected. This demand will be further increased by purchases for the government's housing program. Municipal work remains scarce. Buffalo has placed 1000 tons with

the United States Cast Iron Pipe & Foundry Co. Export business although active in inquiry has developed few orders. Prices appear firmer. Although they have been maintained generally at the government maximum there have been some concessions.

Some Cities Buy

Chicago, Feb. 26.—Somewhat better activity is noted in cast iron pipe for cities, although the tonnage on inquiry is nothing like that ordinarily entertained at this season. The United States Cast Iron Pipe & Foundry Co. is low bidder on 500 tons at Milwaukee and probably will be awarded the business. Bids will be opened March 2 at Manitowoc on 100 tons and March 5 at Saginaw, Mich., on 135 tons.

Better Operations

Shown by Wire Mills, But Labor Disorganization is Troublesome

Pittsburgh, Feb. 26.—Operations of wire mills continue to show much improvement since more steel and better transportation service became available. These factors, however, continues to be important obstacles in the way of satisfactory production and are aggravated by the disorganization of working forces since some of the men went to other occupations during the recently prolonged idleness of mills. Demand for wire and wire nails is fair and most makers are committed for the second half and in some cases have had to greatly defer shipments on contracts. Business being taken from domestic consumers as a general thing provides for delivery at the convenience of mills. Government requirements are said to be only moderate.

Bolt Wire Closed

Cleveland, Feb. 26.—Local boltmakers who participated in the recent distribution of a large bolt order for the engineers' depot have covered for the requirements of bolt wire for this business. This need was filled largely by drawing against old contracts for steel on makers' books, although some new material was bought. Operations of the American Steel & Wire Co. in this district continue to be restored gradually, but at present production does not exceed 75 per cent of steel capacity.

The western office of the Ohio Corrugating Co., of Warren, O., at 208 South La Salle street, Chicago, has been made selling agent for a line of steel drums for shipment of by-product liquids produced from coke oven gas.

Canada Gets Big Tonnage

American Government Understood to Have Assured 300,000 Tons of Plates and Other Forms For Ships—Production Drags

Buffalo, Feb. 26.—Inquiries on the part of Canadian shipbuilders for material, which were before the market recently have been withdrawn. The Canadian government has come to the rescue of the builders by negotiating directly with Washington for requirements estimated at 300,000 tons. The American government is understood to have guaranteed to procure this tonnage and export restrictions have been removed for the free passage of the material. A mill which is rolling plates for the Emergency Fleet corporation last week took on a small additional commitment.

Production at Low Ebb

Philadelphia, Feb. 25.—Output of plates by eastern Pennsylvania mills in no case appears to be above 50 per cent of capacity, and in some cases the precentage is a good deal less, and there seems to be no promise of any immediate improvement. Although coke and steam coal deliveries are better, shipments of gas coal continue as much delayed as at any time in recent months, and the supply is utterly insufficient to insure continuity of operations. In the meantime, demand shows an increase. Consumers all through the country are inquiring for large tonnages, but on these the mills are unable to quote. The only orders of size placed with eastern mills during the past week were from the Emergency Fleet corporation, and these constituted a fairly large total.

Car Shops at 70 Per Cent

Pittsburgh, Feb. 26.—No car orders were placed in this district during the past week. Builders are receiving sufficient supplies of plates and operations are at the rate of about 70 per cent of capacity. So far as known no plates are being offered in the open market and inquiries are not numerous.

Want Vessel Steel

Cleveland, Feb. 26.—Inquiries are appearing for the material which will be needed to restore and reinforce the approximately 10 or 15 lake vessels which are to be cut in two and shipped through the Welland canal for ocean service. It is estimated that probably 10,000 tons of material will be needed for this purpose. Buyers are finding it more difficult to get deliveries from the mills because of the crippling of output which the latter recently have sustained. Practically only war business is being entertained.

Award Much Ship Material

Chicago, Feb. 26.—Awards by the government of large tonnages for shipbuilding purposes continue to be made to all finished steel producers. Most of this tonnage recently has been for plain material to be furnished fabricating shops to go into the new style of ships now being erected at Atlantic coast and gulf points. Although this tonnage is given out in small lots, it aggregates enough to make a large tonnage both for mills and for the bridge shops which fabricate it. Some demand for plates

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Car Buying

Practically at Standstill Pending Action at Washington

New York, Feb. 26.—Pending developments in Washington, the buying of cars for domestic use remains of small volume in the east. A few inquiries from private companies are noted but that is practically all. Included in inquiries from these sources are 50 special cars for the Phelps Dodge Co. and 75 tank cars for the Butterworth-Judson Corp. Of the 4500 cars of miscellaneous types, inquiries recently by the government for use of the American expeditionary forces in France, action on approximately 1000 cars, comprising an equal number of box and low side gondolas, is yet to be taken.

The railroad administration has placed 200 cars of miscellaneous types for the domestic use on American roads.

The Baldwin Locomotive Works last year manufactured 2748 locomotives valued at $36,455,574 and completed shell contracts valued at $21,000,000, which, with other work, brought total production to $98,263,865, according to President Alba Johnson in his annual report.

Buys Standard Spikes

Pittsburgh, Feb. 26.—The New York, New Haven & Hartford railroad has taken 2900 kegs of standard spikes from a manufacturer in this district, prompt delivery being made. Jobbers are actively seeking small spikes and

mills taking contracts are promising delivery in three to four months. Shipments have been held up by railroad embargoes. Inquiries for light rails are being made rather freely and while some mills are not making any offerings, others are able to make early shipment and are supplying tonnages from discard steel. The market for standard rails is quiet.

Structural Total Slumps

January Lettings Drop Away to 53 Per Cent From 114 Per Cent in December—Powder Buildings Up For Action

New York, Feb. 26.—Structural bookings dropped off heavily during January to 53 per cent of shop capacity, according to the regular monthly report of the Bridge Builders and Structural society. This compares with 121 per cent in December when bookings were the second largest in volume in the history of the society. In tons, it is equal to 95,400, a decline of 109,800 tons from the preceding month. Although bookings in January were comparatively light, considerable tonnage, chiefly for government account, was under consideration, as reflected by the temporary allotment of 2500 airplane shelters for the American expeditionary forces in France which was quietly made around the end of the month. These shelters originally called for 87,500 tons, but later revision of design raised this amount to approximately 100,000 tons. This business continues under negotiation. A comparative statement follows:

Month	Per cent	Approx. tonnage
January, 1918	53	95,400
December, 1917	121	205,200
November, 1917	77	138,600
October	61½	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Demand in the eastern structural market during the past week has improved. The E. W. Bliss Co., which several weeks ago withdrew an inquiry for a 5000-ton addition has placed 2500 tons. A similar tonnage is expected to be awarded later.

Government Work Impends

Philadelphia, Feb. 25.—The structural market now is at the lowest ebb known so far as new business is concerned. Government work, in fact, comprises all that now is coming out. No action yet has developed with respect to the 2500 airplane shelters for erection in France, but it is believed awards will be made soon. Sales of plain shapes also are at a minimum.

Fabricating Market Dull

Pittsburgh, Feb. 26.—The fabricating market is dull. Most of the business being taken is for the government. Operations are somewhat heavier than they were recently and deliveries have shown slight improvement. The Pittsburgh Steel Car Co. is asking bids for its proposed plant at Greenville, Pa., requiring approximately 4500 tons.

Bridge Shops Filling Up

Chicago, Feb. 26.—Fabricating shops in the west find themselves in much better condition than at the beginning of the year, as the total of ship fabrication and other government work has given them much better bookings. Some shops which entered the year with comparatively little business ahead are now nearly filled up for several months and are unable to take more business except subject to delay. The government is placing structural material for four large powder plants, most of which has been awarded to eastern shops but part of which is being placed in the west.

CONTRACTS PLACED

Submarine boat plant for the Ford Motor Co., Detroit, 6000 tons, to the American Bridge Co.

Bank building, Winston-Salem, N. C., 300 tons, to Barber & Ross.

Building in Tennessee, for Tennessee Valley Iron & Railroad Co., 400 tons, to Hansell & Elcock, Chicago.

Explosive plant in West Virginia, 1100 tons, placed with independent shop by the Thompson-Starrett Co.

Government shop in Philadelphia, 2200 tons, general contract to McClasky & Bahls.

Plant extension for E. W. Bliss Co., Brooklyn, 2500 tons, to Hedden Iron Construction Company.

Addition to Western Electric Co.'s Hawthorne plant, near Chicago, 2710 tons, to American Bridge Co.

Elks club, Jersey City, 500 tons, to Hedden Iron Construction Co.

Building for T. Eaton, Ltd., Toronto, 6000 tons plain material to Bethlehem Steel Co.; fabrication Dominion Bridge Co.

Telephone building, Washington, 1500 tons, to Bethlehem Steel Co.

CONTRACTS PENDING

Dam construction, Miami river, Miami, O., 500 tons reinforcing bars, bids to be taken March 1.

Additions to Hawthorne plant, buildings Nos. 24, 26 and 27, for the Western Electric Co., Chicago, 2710 tons, to American Bridge Company.

Alderpoint bridge over Eel river, Alderpoint, Cal., Humboldt county, Cal., 183 tons, to Pacific Rolling Mill Co.

Warehouses for Quartermasters department, 2300 tons, bids being taken.

Plant at Greenville, Pa., for the Pittsburgh Steel Car Co., 4500 tons. Bids asked.

Sheet Demand is Unfilled

Mills Unable to Supply Heavy Tonnages Wanted For First Quarter —Eastern Contracts Provide For Cancellation

Youngstown, O., Feb. 27.—Inquiry for all grades of sheets among the mills in this district is exceedingly heavy. The tonnages wanted are in nearly every case for first quarter delivery. The mills are in no condition to sell on this basis. Consequently vast tonnages are unsatisfied and buyers are going into such districts as can supply their immediate needs. A notice to the effect that western freight rates will be advanced March 15 has stimulated inquiries to such an extent that they are pouring in daily. Western buyers who placed tonnages with the valley mills sometime ago are clamoring for the mills to make shipments before the freight rates advance. Sales managers state they are dispatching western shipments faster than they have been for some time. The railroads are supplying box cars at the government's request so that a large supply of these cars will be available for grain shipments east. It now develops that the 12,000 tons of black and galvanized inquired for some time ago by the government, have been placed with fabricators with directions where to allot the sheets in multiple tonnages. The valley mills expect to share in these allotments.

Second Quarter Contracting

Philadelphia, Feb. 25.—Considerable second quarter contracting has been done by the leading eastern maker of blue annealed. These contracts are practically nothing more than reserva-

tions, as they allow either the buyer or the seller to cancel in case the government establishes a price that is unsatisfactory. Government orders for sheets are being placed almost daily and they constitute good-sized totals. Some government tonnage has been placed for shipment as far ahead as next July. Middle western makers continue to offer black, blue annealed and galvanized sheets for shipment in two to three months.

Sheet Shortage Harasses Mills

Pittsburgh, Feb. 26.—Shortage of sheet bars and of cars continue to cause sheet mills to operate at low schedules, which probably do not exceed 50 per cent of capacity. Producers are making diligent efforts to obtain increased sheet bar tonnage but are meeting with only moderate success. The government is still buying sheets in good volume and domestic consumers are asking for tonnages which have been allotted. There is a heavy demand for galvanized sheets for second quarter. It is generally conceded that the output of all grades is not going to be sufficient to take care of requirements. A number of makers have been forced to defer shipments on contracts.

Little Spiegel

Available for First Half and Prices Stiffen—Ferro is Strong

New York, Feb. 26.—Spiegeleisen rapidly is becoming more difficult to buy for first half delivery. Most of the makers no longer are able to quote on anything prior to July 1. As a result, the market is exceedingly strong and none of the makers are quoting less than $3 per unit at the furnace, equivalent to $60 for 20 per cent metal. Inquiry for spiegeleisen has broadened out to a total of 5000 to 6000 tons. One consumer wants 3000 tons for second and third quarters. It is understood that both the Whitaker-Glessner Co. and the Inland Steel Co. have closed their recent inquiries.

Inquiries for small tonnages of spot ferromanganese are more numerous. At the same time, spot delivery is getting more difficult to obtain. Inquiries for forward delivery involve some 1500 to 2000 tons. While there has been an improvement in the immediate supply of ore, the maintenance of the supply in the future constantly is viewed with greater apprehension. As a result, ferromanganese market is strong and no quotations of less than $250, delivered, are heard.

Demand for ferrochrome is quiet. Spot may be quoted at 35 to 45 cents per pound, furnace and contracts at 31 to 34 cents. Demand for ferrotungsten also is quiet. The market is at $2.20 to $2.25 per pound, furnace for 70 per cent, and $2.35 to $2.40 for 80 per cent.

Ferrosilicon in Demand

Pittsburgh, Feb. 26.—Fairly brisk demand exists for 50 per cent bessemer ferrosilicon and some makers are asking from $15 to $25 a ton more for prompt shipment than for second quarter which they quote at from $170 to $175, delivered. For second half these producers ask from $20 to $25 less than for second quarter. A recent inquiry for 500 tons for the remainder of the year was not taken by sellers in this district so far as known. Demand for limited lots of ferromanganese continues and where quotations are made the price is $250, delivered.

Now Ready to Sell Iron Ore

Sellers of Lake Superior Ore Are Receiving New Contracts—Provisions for Price Adjustment—Best Ores Reserved

Cleveland, Feb. 26.—Sales of Lake Superior iron ore for 1918 delivery will be made within the next few days. New contracts will be printed and delivered to the ore sellers within a day or two and the ore selling movement will open immediately afterward.

The contract as finally approved by the ore sellers carries this year an additional clause providing for a price adjustment to meet any future change authorized by the government. This rider in full is as follows:

The price named in the contract, dated ..... of which this rider forms a part, is named in accordance with the base price directed by the war industries board of the United States government and, so far as applicable to iron ore shipped from the mines thereunder after March 31, 1918, is named upon the agreement that in case any authorized agency of the United States government shall increase or decrease the said base price, then the price named in said contract shall be likewise changed to conform to the maximum price permitted by such authorized government agency at the time of such shipment.

This clause is designed by the ore trade to meet the peculiar conditions arising from the action of the government late in December, in requesting that contracts based on the Jan. 1 scale of prices be not extended for deliveries beyond March 31. The ore business conducted as it has been, on a 12-month basis, was upset by this ruling. As a result, the selling movement has been delayed until now.

The iron and steel committee of the American Iron and Steel institute has had under consideration a plan to secure from the war industries board a special ruling sanctioning the carrying on of the ore business upon the 12-month basis. This committee, it is understood, will continue its efforts in the hope that when the April 1 price scale is announced, the ore prices set will be definitely understood as operative throughout the 1918 season unless affected by subsequent developments now unforeseen.

The new ore contract contains several additional changes, largely those including war and insurrections among the unavoidable causes of delay in delivery, for which the seller is relieved of responsibility.

The selling movement now will be active but in a great many cases will be merely the formal ratification of reservations made some time ago. Most of the choice Lake Superior ores have been reserved but a considerable tonnage of ore remains to be disposed of.

Despite the great delay in making definite sales, the ore producers have generally pushed mining operations this winter in order to insure a sufficient tonnage being available during the 1918 navigation season.

A restrictive factor in ore production has gained importance during the past few weeks. This is the unsatisfactory labor situation in the Lake Superior district. The shortage of labor has increased somewhat but the most disturbing element has been the growing tendency of the workmen to work only part time. The underground mines are particularly affected, one mine for instance being forced this week to cut in half its estimate of 1918 production. Last year when the labor shortage in the large industrial centers was growing more acute, the mining districts suffered little loss in output from any scarcity of workmen. Present disturbing conditions in the mining districts thus introduce a new factor into the question of insuring a sufficient ore supply this year.

The sharp decline in pig iron production, however, as emphasized on page 530, will sharply curtail the tonnage of Lake Superior ore required this year. Labor developments to date, therefore, are not taken to indicate any prospects of the ore mines being unable to forward as heavy a tonnage as will be required.

Iron and Steel Are Millions Short

Heavy Losses of Production in Recent Months Intensify Problem of Supply For All the Country's Needs—Large Tonnage of Iron Business Deferred From 1917 —Growing Government Allocations Complicate Situation

TWO months or more of the most demoralizing operating conditions in the history of the industry have cut deeply into the production of iron and steel. In pig iron this has amounted to from 1,500,000 to 2,000,000 tons; in steel it has been equally as great. The total may run much greater, since normal conditions still are far from being restored.

The severity of the recent curtailment of plant activity as the result of unprecedented weather, traffic and fuel obstacles, is forcibly expressed by the statistics of output. In November, according to the monthly compiled data of THE IRON TRADE REVIEW, furnaces were producing coke and anthracite pig iron at the rate of 38,400,000 tons for a twelve-month period; in December the annual rate had dropped to 33,800,000 tons. January, when operations reached the climax of dislocation, showed a precipitate further decline to 28,800,000 tons yearly. In November and December, 1916, and in January, 1917, production was at the respective annual rates of 39,800,000, 38,200,000 and 27,900,000 tons. The country's output of coke and anthracite pig iron for the full calendar year of 1917 was 38,150,000 tons. In January, therefore, the furnaces were running on the basis of a loss of 9,350,000 tons over last year.

Bessemer and open-hearth plants in November were making steel at the rate of about 43,200,000 tons of ingots, based upon reports of the American Iron and Steel institute showing returns from slightly more than 88 per cent of capacity. December shows this total shrunk to about 37,200,000 tons and January to 30,000,000 tons. The ingot output of the country in 1917 was approximately 42,200,000 tons. The January production, consequently, was at the rate of 12,200,000 tons less than the calendar year of 1917.

What is likely to be the results of this far-reaching and irreparable loss of iron and steel, especially at the time when the war and the conditions it has created, are demanding every ton that the works of this country can produce?

The December-February stoppage output cannot be recovered. Even were the works to be favored for the remainder of 1918 with the most perfect operating conditions, which the inadequacy of transportation facilities, measured by present traffic demands, forbids, this loss cannot be made good. In 1917, at least two-thirds of the year were passed with a reasonably normal operating situation. This was before the requirements of the ever-growing war machine were choking the railroads, or the prompt dispatch of ships had become a major problem. In 1916, the industry ran a reasonably normal course, and was unhampered by the congestion incident to a domestic war situation, since the country was at peace. It was in this year that the industry achieved its highest level of production. Even if the operating conditions of 1916 and for the greater part of 1917 could be restored quickly, it is improbable that in the present war situation sufficient additional output could be forced to make up for the lost tonnage of the past two or three months. Therefore it must be regarded that the industry is laboring under a present and probable permanent shortage—considering only the last few months—in excess of 1,500,000 tons of both iron and steel. The year 1918 is moving forward under this handicap.

Since steel is the real basis for all war preparation and prosecution, it is a fundamental proposition that the government needs must and will be supplied. This means not only the direct and indirect requirements of this country, but also those of its allies. What these requirements will amount to in tons during the next 12 months is an open question. There is no way of definitely ascertaining what the government and its allies will call for from the mills and furnaces. The indirect tonnage especially does not admit of estimate, but each day its ramifications extend further and further through every strata of national business. The entire war tonnage is tied up inseparably with the question of ships. How many ships will be available to transport steel and its products and how many new vessels the country will be able to build largely will determine this unknown quantity. The supply of ships is a variable proposition, depending as far as new construction goes upon conditions in the labor and land transportation fields, and also in a large measure upon the fortune of war itself.

In the matter of pig iron, more so than in steel, there is cause for grave contemplation. Already there have been unmistakable signs and enough concrete cases to prove that the overwhelming pressure of demand, long-continued, has become greatly intensified by the recent interruptions of furnace activity. One important effect has been the carrying past the prescribed date of delivery of quotas of sales contracts, by practically all furnaces. This means a stringing out of this business and a displacement of future tonnage which had not been bargained on. And this promises to be a factor that will exert much influence in the matter of satisfying all consumptive needs. It is estimated from reliable and definite data that the merchant furnaces, particularly in the north, carried over Jan. 1, on the average from 15 to 20 per cent of the tonnage booked for shipment in the last half of 1917. In one district alone, this has amounted to 100,000 tons. Individual companies report notwithstanding the pursuance of very conservative sales policies last year, they found themselves on Jan. 1 with the greatest deferred tonnage in their history. It may be stated with approximate accuracy that fully 500,000 to 700,000 tons of merchant business accepted for 1917 delivery must come out of 1918 production. It is manifest that because of the shattered operations of the furnaces in January and in most of February, the net postponed tonnage has not been reduced. In all probability it has been further increased. Stocks have been so lean that little tonnage except that of current make has been shipped. Another further load upon the merchant furnace capacity is that non-merchant producers will attempt to make up losses in output by purchases in the open market.

There are some compensating conditions which have accompanied the unprecedented backing up of old business. These arose from the fact that the demoralization that attended production in recent months, to a large extent also curtailed consumption, since plants of all descriptions were suspended. Furthermore, the fuelless days benefited the

furnaces, since, as a class, they were exempted. As a matter of fact, however, because of the delay in fuel reaching them, this advantage was more theoretical than actual.

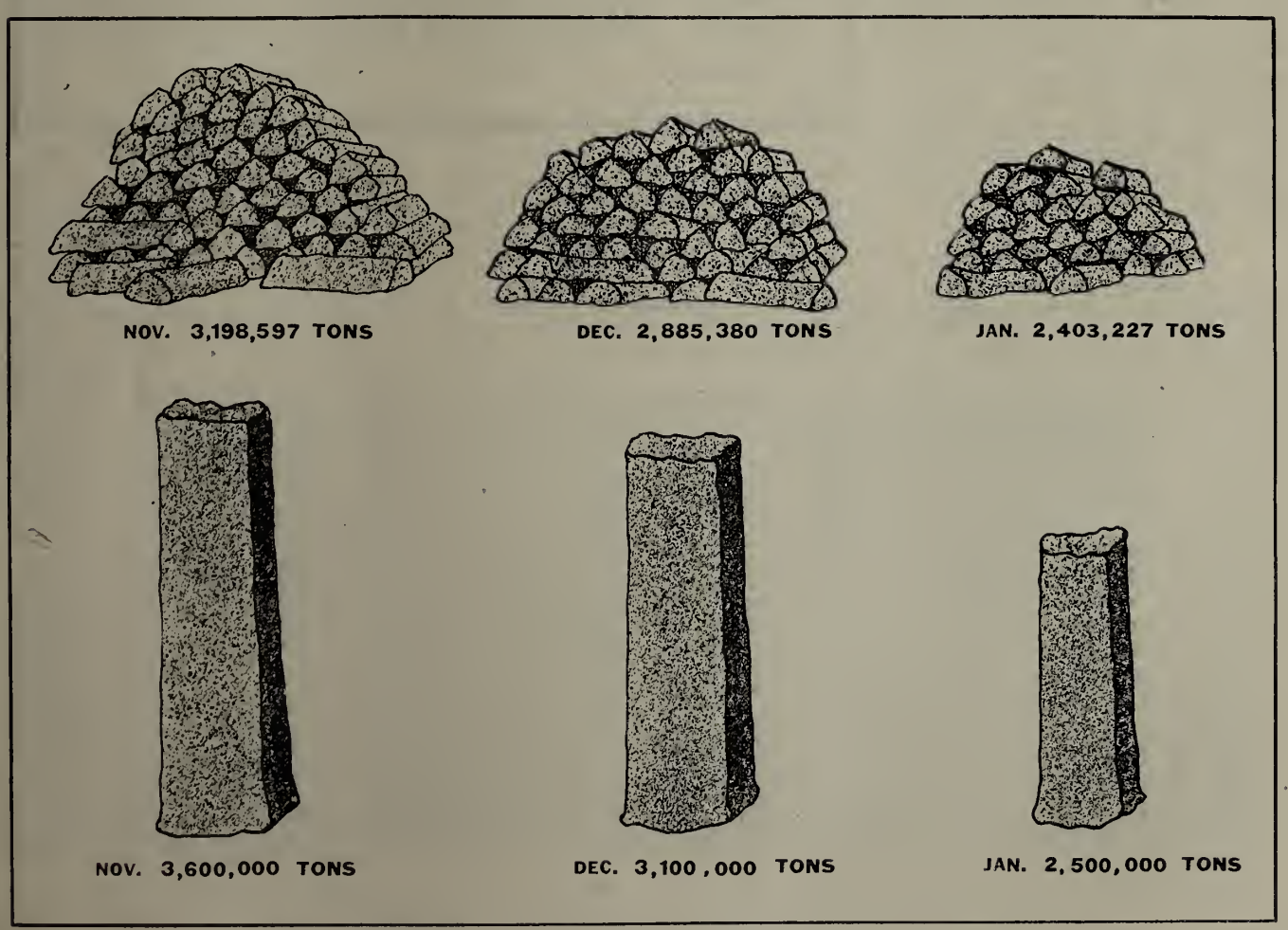
As matters now stand, the furnaces find themselves with much heavier obligations and with far less production for 1918 delivery than they had counted on. On top of this, many of them, yielding to the pressure of buyers, have booked heavily for the last half of this year; in fact, not a few of them already find themselves sold up within a small margin of their normal output for the final six months, and they are obliged to reject thousands of tons of additional business. This is especially true of basic, where a huge requirement still is to be covered. It has been estimated by prominent sellers that they readily could dispose of 500,000 tons of last-half iron of various grades if this were available.

Further complicating the whole problem of supply and demand, the government is projecting into the market weekly thousands of tons of new and insistent demand based on war business for which priority is claimed and secured. This is being allocated to various furnaces and in most cases it is displacing former orders placed by consumers in the routine fashion. From all indications, these allocations will grow steadily. They are resulting not only in interrupting regular deliveries, but have caused a switching of grades in furnace output, thereby blocking the needs of consumers who had been depending on these stacks for their supplies of a different character.

The pig iron situation, in consequence of all these conditions is upset as never before, not only by a serious loss of production, but by abnormal distribution. That a tremendous shortage of iron and a radical realignment of industrial operations will be produced some time after July of the present year is becoming the common belief of those who have carefully analyzed the situation. Those engaged in the non-war lines of manufacture by reason of the character of their business will be affected most severely.

The steel side of the problem is less evident as to its future results because of its greater flexibility. This is due to the fact that finishing mill capacity is in excess of that of steel works. Whatever form the heaviest war needs of the government may take relatively, in the way of finished material, will determine where the dislocation to outside business will be most sweeping. In just what lines the largest percentage of mill capacity will be absorbed for war purposes is not yet clearly established, although it may be assumed from developments to date, plate and shell bar and billet plants will be called upon in the largest degree. Where finishing mill capacity is most pressed by war demands, the diversion of ingot tonnage from the lines of normal division will be greatest. Inasmuch as the industry starts the year with a shortage of 1,500,000 tons or more of ingots which is beyond recovery, the readjustments of rolling schedules under war distribution will make the total effect upon other business all the more severe. One source of possible equalization for this situation as against conditions in 1917 and 1916 is the tighter rein that has been placed on exports of iron and steel. As shortages grow at home, they are likely to have the effect of restricting the licensing of foreign shipments. With an export tonnage of over 6,000,000 during the past two years, this is an important factor.

The threatened shortage of pig iron is intimately related to that of steel. Since war needs largely are in terms of steel rather than of direct pig iron, the tonnage of the former material that will be required will determine what lines pig iron production and government influence will follow.



HOW IRON AND STEEL PRODUCTION HAS SHRUNK IN RECENT MONTHS

Await War Buying Changes

Overman Bill Will Allow President to Delegate Board Powers— Will Stettinius Receive Greater Authority?

WASHINGTON, Feb. 26.—The war department has adopted the policy of the navy in favoring publicity relating to contracts and military purchases. This step follows developments in the army, concerning purchases of uniforms and overcoats, which brought dangers of secret contracts.

The department's announcement says:

"The secretary of war directs that hereafter the practice be adopted of freely making public the names of all contractors for military supplies."

This supplements the following announced policy of the committee in supplies which is said to have caused the so-called purchasing scandal:

"It is our judgment that the government's business should be done on the same plane as that of the private concern, and they do not advertise their doings either before or after the fact. It is absolutely impossible to do a good merchandise job upon the former publicity methods."

Against this self-obliterated policy has been the navy's:

"It has been found unnecessary to throw any veil of secrecy around the navy's business, whereas out and out publicity insures in advance a deal square and true to each bidder, present or absent."

What Stettinius Will Do

This policy and the hints given out from the office of Secretary Baker that Edward R. Stettinius will be made second assistant secretary with supervision of all "industrial and commercial" activities of the department are suggestive of the department's solutions of its internal troubles and the answer to the paramount question, "What is Stettinius to do?" But that still does not solve the problem of coordinating the purchases for the army, the navy, the shipping board and the allies. And there the issue hangs.

When Mr. Stettinius was brought to Washington and made "surveyor general of all army purchases", the possibility arose that he would be named "munitions director", or, at least, chairman of the war industries board, with broad powers. Where those powers were to come from was not definite, but now it is seen they would be given him by the President under the broad authority to be authorized in the Overman bill.

Now Mr. Baker says his bill in congress for two additional assistant secretaries will enable him to appoint one man for "industrial and commercial" duties, and another for non-military activities. This latter post is believed awaiting Raymond B. Fosdick who has been in charge of training camp affairs. Benedict R. Crowell, present assistant secretary, will become first assistant and in effect Baker's understudy.

Incorporate Subsidiaries

Birmingham, Ala., Feb. 26.—Filing of incorporation papers for four subsidiaries of the Tennessee Coal, Iron & Railroad Co., establishes an identity for the developments that are being placed at Fairfield, adjacent to Ensley in the Birmingham district and for the shipbuilding plant at Mobile. On the latter the Steel corporation will spend upward of $30,000,000. The capitalization of each corporation has been placed at $50,000. G. G. Crawford, president of the Tennessee company, is president of all four subsidiaries, with H. C. Ryding as vice president, and L. T. Beecher, secretary-treasurer. The Fairfield Steel Co. will cover the Fairfied development. The papers give the right to construct and acquire steelmaking plants, shipbuilding, and to produce steel, coal and coke, etc. The Chickasaw Shipbuilding Co. will operate the shipbuilding plant being put in at Mobile.

Sell Foundry Iron

Pittsburgh, Feb. 27. (by wire).—Sales aggregating approximately 25,000 tons of foundry iron have been made during the last few days and 15,000 tons more are under negotiation by a furnace interest for last half delivery. With commitments already made, this will take the entire output of this furnace for the delivery named.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Feb. 26.—The metal markets have been duller the past week if anything, than at any other time this year. Prices have changed but little and developments have been few and far between. Producers of grade "A" spelter, sheet zinc and zinc plates, have received formal notification of the new fixed prices agreed upon by producers and the war industries board and approved by President Wilson. These prices are as follows: High grade spelter 12c, f. o. b. St. Louis; sheet zinc 15c f. o. b. mills; zinc plates 14c f. o. b. mills. Regular extras and discounts will be allowed.

The fixing of these prices has had no effect upon the market for prime western and brass special grades, for which there has been little commercial demand. There has been so little call for brass special that in many cases sellers have been shipping this grade on prime western orders in order to dispose of it although in the past brass special has commanded a premium of ½c and more over prime western. Prime western quotations follow: Prompt, February, March, April shipment, 7.70c to 7.75c, St. Louis.

Traffic conditions continue to handicap the movement of lead from the west with consequent scarcity of supplies in the east. The American Smelting & Refining Co. today advanced its price $5 a ton to 7.25c, New York, per pound. Spot lead has been commanding a premium of about ¼c. Outside sellers have been quoting on the same basis as the American Smelting & Refining Co., and advanced today with the leading interest.

The tin scarcity is as pronounced as ever and the market situation presents many complex tangles which are keeping both buyers and sellers in the hot bed of uncertainty. Small lots of spot Straits have been sold as high as 99c here this week, while spot Chinese 99 per cent and spot A. S. & R. 99 per cent grades have sold at 85c New York.

Copper distribution is proceeding satisfactorily under the fixed price schedules of 23.50c for carloads and 24.67½c for less than carloads. Production is steadily being increased and no complaint is heard of the scarcity of copper.

Due to the transportation troubles, spot aluminum is commanding considerable premium over the regular quoted price of the Aluminum Company of America. This interest's true price is 38c but as high as 40c is being paid by consumers for metal out of stock. Although it announced sometime ago that the war industries board was to meet with representatives of the leading aluminum interests to fix a price, this meeting was postponed and no action has yet been taken. Consequently, the price of the producer to the government remains 27c and to the general trade 38c. The producer's contract price on sheets is 46c, while in the outside market spot and contract sheets are quoted 55c to 60c. Exceedingly little inquiry is noted for aluminum, except for government work.

There have been some attempts to stir up interest in the antimony market but these have not been productive of much result from the market standpoint. Plenty of antimony is being held in New York warehouses and the metal is available at 13.75c duty paid, New York.

How Heavy Structures Are Moved

How a Blast Furnace Weighing 500 Tons Was Lifted and Realigned—Moving Ore Unloaders, Car Dumpers, Standpipes, Office Buildings, Storage Tanks, etc., to Other Locations With Ease

OWING to the unprecented demand for iron and steel products in the past few years vast extensions and changes have been made necessary at most of the plants to increase their output and insure maximum economy and efficiency. Some of these alterations taxed the best ingenuity of engineers and contractors. Where adjoining ground space was available the problem was not a difficult one, but in many cases where space was lacking, every foot of ground had to be utilized and the proposition assumed a more difficult aspect. When originally these plants were erected the grouping and arrangement of the various buildings and other structures were usually constructed to meet the normal demand for their particular products, but the present unusual conditions were entirely unexpected and no preparation had been made to meet them. This brought into more activity than ever before the services of contractors who make a specialty of moving, raising or lowering heavy structures and objects.

The possibilities in this particular line were not generally recognized, with the result that in many instances buildings or other structures were dismantled and re-erected in close proximity to present sites, so as to make room for the additional work. This caused much inconvenience, a great outlay of money and consumed much valuable time. It is true that in some cases this was the only practical method, but in many others if an expert in this particular business had been consulted, perhaps, a more advantageous and satisfactory solution would have resulted.

The John Eichleay Jr. Co., Pittsburgh, has made a specialty of this line of work with exceptional success. Its activities have extended over a considerable territory, as far east as New York, to the west as far as Milwaukee, south to Goldsboro, N. C., and north to Buffalo. Performances of this company at iron and steel plants, as well as in connection with other operations throw an interesting light on what has been and can be done in the way of changing, enlarging or moving industrial or other works. In each of the following cases cited the Eichleay Company was the contractor.

Blast Furnace Aligned

The Struthers Furnace Co., Struthers, O., found that its furnace, together with the skip, downcomer and dust catcher, was gradually moving out of plumb owing to the cracking and spreading of the foundation. The cracks also permitted the escape of the hot metal. The mantle of the furnace was shored up with 15-inch steel I-beams. These were supported on eight wood bents which consisted of 8 x 16-inch timbers. Under these bents 100 screw jacks were placed on cribbing built up a few feet from the ground. The entire furnace, skip, downcomer and dust catcher were then jacked up sufficiently so as to free the cast iron columns from the base plates. The latter were then removed and the salamander, which had formed in the hearth, was dynamited out. The old foundations were removed and new ones built. The columns thus held suspended were then easily lined up and the furnace again lowered to a new foundation. The weight was approximately 500 tons.

The Jones & Laughlin Steel Co., Pittsburgh, found it necessary to erect additional open-hearth furnaces adjoining the old ones at the Soho works. To make the old and new superstructures symmetrical it was nesessary to raise the roof of the old building to the proposed elevation of the new one. To dismantle, extend the columns and reconstruct the roof meant a serious inconvenience. Not only would furnace operations have been interfered with but the workmen and the furnaces would have been exposed to all sorts of disagreeable weather, the work being

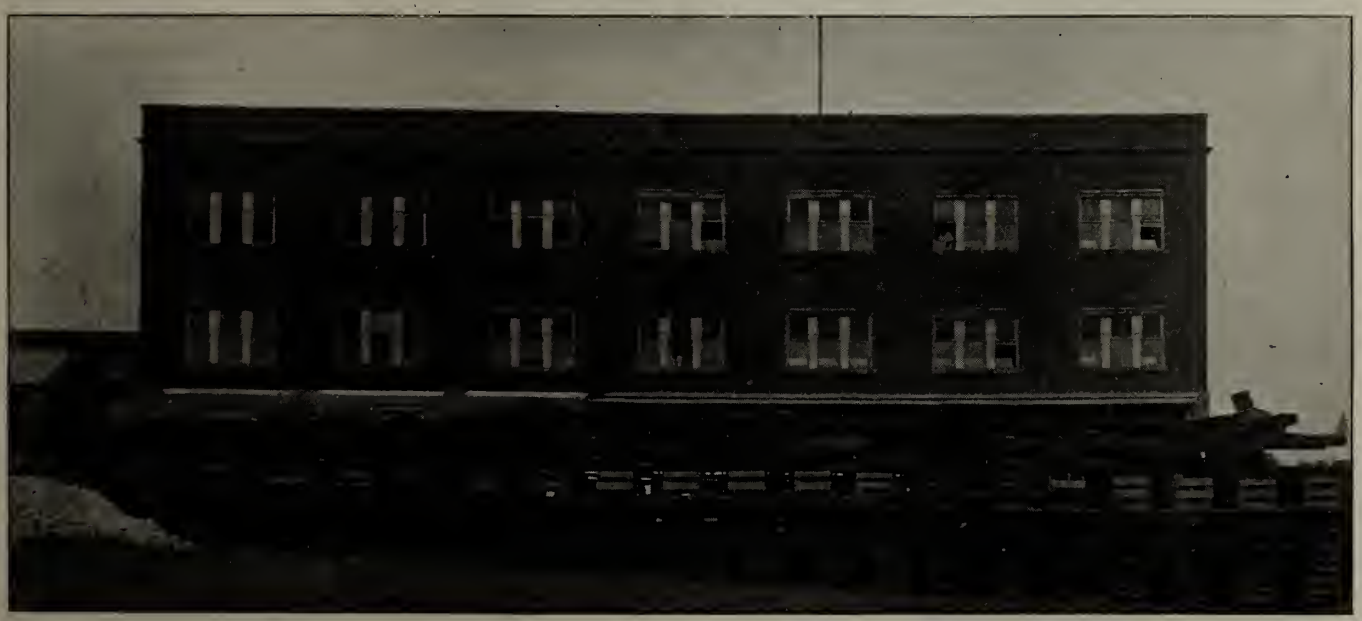


FIG. 1—A 2-STORY BRICK OFFICE BUILDING, 48 x 100 FEET, WHICH WAS MOVED 1100 FEET WITHOUT INTERRUPTING THE WATER, GAS, SEWER OR ELECTRIC CONNECTIONS

undertaken during the winter months. To escape all these drawbacks and to avoid shutting down the plant the entire roof, approximately 125 x 250 feet, was raised 6 feet with screw jacks and the steel columns spliced and extended. While this work was being done the furnaces and cranes were operated as usual. Special provisions were made to guard against any high winds. The furnace stacks, which extended about 75 feet above the roof, were braced so they would not be overthrown while the roof was being raised. The time required for this work was comparatively short compared with other methods that might have been used. Another roof over a mill building, 145 x 212 feet, for the same company was raised 10 feet.

Car Dumper Moved Successfully

A most interesting engineering feat was accomplished in Cleveland for the Erie railroad on account of the high-level Detroit-Superior viaduct over the Cuyahoga river. It was necessary to move a Hulett car dumper 214 feet up stream. Proposals from three firms were received for moving the dumper, and all but one contemplated its dismembering at the old site and its reconstruction at the new site. One contemplated moving the dumper, engines, boilers, boiler stack, engine houses and coal pockets as a single unit. Time proved to be lacking for any but the latter method. This method was unprecedented so far as is know, but after careful investigation relative to its possibility, the contract was awarded to the Eichleay company.

Many difficulties were experienced. The car dumper with the pan elevated is 116 feet high, and the boiler stack 111 feet high. The superstructure is only 38½ feet wide between front and rear columns and 56 feet long between upstream and downstream columns. The weight on the front columns is, with the pan elevated and the car cradle suspended, about 250 tons, while the weight on the



FIG. 2—RAISING A BLAST FURNACE WEIGHING 500 TONS

rear columns is only about 80 tons. The engines and machinery weigh about 140 tons and the boilers and their brickwork encasement about 200 tons. These together with the coal pockets, the engine houses and the necessary supports for moving made a structure practically 40 feet wide, 108 feet long and 116 feet high weighing 800 tons which had to be moved 214 feet. For 98 feet of this distance the structure was moved over a platform dock, built in 1910-11. This platform, 28 feet wide, was supported by transverse pile bents placed 6 feet, center to center, each bent consisting of five vertical and three batter piles. The material in the rear of the dock is hard clay.

To distribute the load evenly each vertical pile would have to carry about 9 tons, a load well within its power; and, the batter piles would have to keep the weight on the clay so as to prevent the dock from overturning. The method of procedure was as follows:

Excess Weight Counteracted

The two front columns were caught up by means of four 24-inch, 80-pound I-beams. These were 16 feet long and were placed parallel to the center line of the machine or transversely with the dock line. The lower flanges of the I-beams were placed under the bed plate of the columns and the upper flanges were cut to fit close to the columns. Each pair of beams was clamped to the column with 1-inch bolts. The front, center and rear columns were caught up by 12 x 12-inch timbers lashed on each side of the columns and projecting beyond the column lines. The engines and machinery were caught up on a system of cross bracing, composed of 12 x 12-inch timbers, which were connected with and braced to the column supports to form a single grillage under the entire structure. This threw the weight to the rear of the structure and counteracted the excess weight on the front columns.

The brick work of the three Stirling boilers was held in place by steel I-beams and the boilers then were



FIG. 3—AN ORE UNLOADER IN TILTING POSITION CAUSED BY THE SUDDEN FAILURE OF THE DOCK PILING. THIS APPARATUS WAS MOVED SUCCESSFULLY 400 FEET

jacked up enough to get timbers under them. The timbers were then connected to the main grillage. The coal pockets were also jacked up and their supporting timbers were made a part of the main grillage, which was thoroughly braced to prevent shifting or distortion. The whole system was then elevated up a distance of 35 inches, sufficient to clear all foundation bolts, the front columns being raised 6 inches higher than the rear to throw the center of gravity back from the front of the structure. Under the front and heaviest section of the grillage, longitudinally of the structure, several 12-inch, 31½-pound I-beams were placed and acted as bearings for the rollers. In front of and under the coal pockets several 12 x 12-inch timbers were used as top bearings for the rollers and under the remainder of the grillage at the center and rear, longitudinal timbers were used as top roller bearings.

Cribs for the roller runways were placed at the proper height on both the old and new foundations. On the dock platform cribs were also built high enough over each pile-bent to engage the bottoms of several 20-inch 65-pound I-beams. The latter were 30 feet long and were placed over each bent transversely with the dock, the front end of them resting on the front and high piles of the dock. The beams which extended across the dock and reached under the middle line of roller bearings, and were braced to prevent shifting or overturning. Crib work was placed under the rear line of roller bearings, high enough to bring the 12 x 12-inch transverse timbers level with the tops of the transverse I-beams.

Placing the Roller Runways

On top of the transverse I-beams under the front row of columns and roller bearings, several 10-inch, 25-pound I-beams were placed. These extended the full length of the dock and rested on the old and new foundations. They were used for roller runways. Cribbing was placed on top of the transverse I-beams and 12 x 12-inch timbers. The 6 x 8-inch oak runways for the middle and rear bearings were installed on this cribbing. On top of all runways 1-inch surfaced oak planks were placed to diminish friction. About 350 wooden rollers, 8 x 48 inches, were placed on top of these planks. Two hundred and thirty screw jacks were required to raise the structure, which was done in 2½ days.

The motive power consisted of two winches, with a team of horses hitched to each. A cable with two blocks was fastened to each winch. The cables were rigged five and five in turn and attached to the grillage on which the car dumper rested. After being moved to its destination the structure was again set on screw jacks and lowered to the previously prepared concrete foundation where it engaged the several hundred anchor bolts perfectly.

The Central Steel Co., Massillon, O., wished to extend its plant to meet the increased demand for its products, but a new 2-story brick and reinforced concrete office building, 100 x 48 feet, was so situated that it was necessary to remove it to a new site about 1100 feet distant. On account of the size and weight of the building it was planned to move it intact. The Eichleay company was awarded the contract. The building was moved 400 feet, lowered about 15 feet, given a quarter turn, moved again 700 feet and set on new foundations without interrupting the office work or affecting the water, gas, sewer and electrical connections. Ingress and egress to and from the building were maintained during the entire progress made on the work.

An exceedingly delicate job was successfully executed for the Detroit Iron & Steel Co., Detroit. Two ore conveyors of the old fashioned type were used to convey the ore to the trestle bins. The dock on which the conveyors operated was built on wood piling. A 21-foot section of the dock upon which the conveyors were standing slipped into the river and caused one conveyor to tilt at a dangerous angle. The operating end of the conveyor, 32 x 32 feet and 50 feet high, including the operating machine, weighed approximately 400 tons. If the dock movement had continued the conveyor probably would have collapsed. This would have resulted in a handicap to the operation of the furnaces and an enormous loss of money. There was one chance in a hundred of saving the conveyor. However, it was undertaken to move it to the solid portion of the dock. The apparatus was jacked up, made level and plumb, moved a distance of 400 feet, and was ready for operation within three weeks after the slipping occurred. Precaution was taken to keep the bridge, which was 175 feet long, from becoming de-



FIG. 4—A CAR DUMPER WHICH WEIGHS 800 TONS AND WAS MOVED 214 FEET



FIG. 5—THESE TANKS WEIGHING 200 TONS WERE MOVED FROM CHICAGO TO MILWAUKEE, A DISTANCE OF 88 MILES

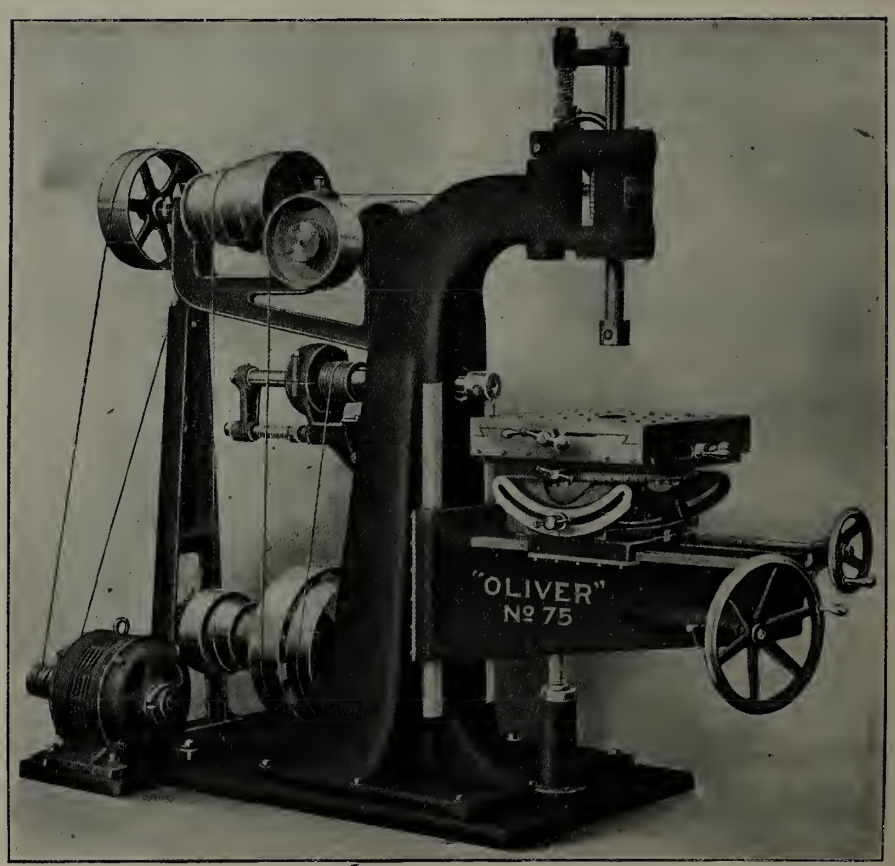
tached from the main superstructure. This was avoided by means of wire rope and steamboat ratchets.

A most unusual contract was undertaken for Armour & Co., Chicago. Two steel grain tanks, 40 feet in diameter and 80 feet high, weighing about 100 tons each, were to be taken from Chicago to Milwaukee to be utilized there for storage purposes. As only 55 feet in height were desired, the top or roof and five rings were taken off and the roof replaced. The tanks were then jacked up, placed on a timber frame and moved onto a steel scow. Care had to be taken in moving on to the scow to avoid listing and possible overturning. This was avoided by placing long timbers from the dock across the entire width of the scow. The tanks were then lowered as much as possible on the scow and anchored by means of steel rods and steamboat ratchets. When weather conditions were favorable the scow, with its strange load, was towed to Milwaukee, a distance of 88 miles, where the tanks were unloaded and moved onto foundations previously prepared for them. The job was carried out successfully without the slightest mishap.

The Brier Hill Steel Co., Youngstown, O., in making extensive additions to its plant found it necessary to relocate a steel stand pipe, 16 x 100 feet, to a new location about 150 feet distant. A carrying frame consisting of 15-inch I-beams was placed directly under the anchor bolt lugs. The pipe was then raised with ten 15-ton jacks, placed on steel rollers and rails, and moved about 100 feet where it was necessary to raise it about 5 feet so as to bring it to the elevation of the new foundation, 50 feet away. The height and small diameter of the stand pipe made it a delicate job to handle. Guy ropes had to be attached to the standpipe in order to keep it as plumb as possible.

Improves Wood Miller

Several improvements have been made by the Oliver Machinery Co., Grand Rapids, Mich., to its wood-milling machines which are designed for general pattern shop work. Illustrated on this page is the smaller model, which has been improved by the addition of a table so constructed that it may be tilted in any plane and rotated about a vertical axis. The compound cross slides are placed above the double swivel and tilting mechanism so that these slides will operate irrespective of the position of the other members of the table. The old table had only a single slide. Another feature of the improved machine is a broader and stiffer column as well as a larger base, all of which help to reduce vibration. Both horizontal and vertical spindles run on ball bearings and may be operated at a maximum speed of 5000 revolution per minute. Core box cutters up to 3 inches in diameter are supplied as regular equipment, although larger core boxes may be cut. By using the vertical spindle, work up to 19 inches in diameter may be turned when the revolving table is used. Similarly, by using the horizontal spindle and the revolving table, work up to 48 inches in diameter may be turned. A special dividing head enables the operator to cut spur and bevel gears up to 24 inches in diameter. The model illustrated on this page may be equipped for belt or motor drive.



IMPROVED WOOD MILLER FOR THE PATTERN SHOP

Efficiency Test of a Large Turbine

Peculiarities Revealed by Efficiency Curves Indicate New Characteristics of Operation as Larger and Larger Turbo-Generators Are Placed in Service—Unusually High Hydraulic Efficiency Was Obtained

BY H. G. STOTT AND W. S. FINLAY JR.

THE determining factors in the selection of power-generating equipment, either for an original installation or replacement purposes, present about as many variables as there are installations. Engineering experience has practically standardized the electrical considerations. The steam engine, on the other hand, does not seem to have been capable of such standardization, as engineers do not agree upon the most desirable superheat, pressure, etc., which must be considered both from the standpoint of reliability and boiler and engine economy. This thought is more than ever pertinent at this time, as it appears that we are on the eve of the employment of higher pressures and perhaps even new systems of power generation.

Further, the capacity of the machine to be selected and the relation of point of best steam consumption to maximum continuous load and provision for heavy overloads for limited periods are all dependent on load factors, diversity factors, etc., which present a new problem for every installation.

No Hazards Involved

Without detailing at length the considerations which led to the selection of three 30,000-kilowatt units for the Seventy-fourth street station of the Interborough Rapid Transit Co., New York, a brief summation of the main questions involved will possibly be of interest and serve to classify the installation properly. The prospective daily plant load, as was subsequently demonstrated, could be best provided for by units of 30,000-kilowatt maximum continuous capacity. At that time there was assurance that machines of this capacity could be constructed, and furthermore, by the employment of the two-speed compound principle, no hazards were involved, nor in fact would there be any departure from well-tried principles of construction. Ample steam supply was available by reason of development in the matter of relative boiler capacity coincident with the increase in efficiency of prime movers since the original construction of the plant in 1902. Economic considerations warranted the withdrawal of the horizontal-vertical, double cross-compound, engine-generator sets installed at that time, and their replacement by more efficient and larger units.

Two Element Turbines Selected

In the development of turbine design, at the time the installation was being considered, possibly the simplest type of machine in many ways was the single-shaft, single-rotating-element turbine, which was a natural outgrowth of the generally accepted type developed in smaller capacities. Certain structural features, however, inherent with the larger capacity tended to favor the division of the unit into two elements.

In a steam turbine, maximum centrifugal stresses are encountered at the exhaust end, where the greatest steam volume requires the greatest blade area. In the high-pressure blading which uses steam of small specific volume, the best velocity ratio conducive to high economy cannot be met by the rotating speed as determined by the exhaust end. To avoid a compromise the conditions seem to be more readily satisfied by carrying out the expansion in two separate elements and avoiding congestion, due to the high specific volume of the steam at 1-inch absolute exhaust pressure, by the use of the lower speed, longer blades and the double-flow principle. Reliability also seemed better served in the double-element machine by the shorter shaft and reduction of danger from temperature strains. Furthermore, there was the possibility, in an emergency, of operating either element of the unit alone, and that at a fairly high efficiency, the low-pressure element being available for service simply by the use of a by-pass. The use of the high-pressure end alone in the case of a bad breakdown on the low-pressure end was to be obtained by removing the low-pressure rotor and closing the shaft openings with special covers.

An extremely important consideration, favoring the divided unit in this particular instance, was the matter of the weight of the parts to be handled by the crane, which, in the case of the single unit, involved provision for additional crane capacity beyond that then available at the plant. To take care of such additional requirements would have necessitated the installation, not only of a new crane, but of reinforcements of the steel work of a most elaborate nature and far in excess of that required for use in connection with the double unit. In the matter of efficiency, the double unit offered desirable possibilities in the relative flatness of its water-rate characteristic.

One of the complete units is shown in Fig. 1. The high-pressure element with its governing apparatus is in the foreground. This element is practically a typical single-cylinder reaction turbine, containing 38 rows of blades. The low-pressure element shown in the background of Fig. 1 is a turbine of the double-flow type. The casing is possibly unusual in its size and details of reinforcement. The rotor of the low-pressure turbine is shown in Fig. 2, and the interior of the lower half in Fig. 3. No blading is mounted directly in the casing but through the intermediary of rings secured to it, as shown in Fig. 3. The central portion of the low-pressure rotor consists of a drum to which are bolted two cast-steel shaft ends. These shaft ends have disks mounted upon them, carrying the last rows of blades.

Spring Jacks Carry Load

Inasmuch as the high-pressure rotor was inherently of small diameter, it was possible to design it to operate at the maximum speed possible for 25-cycle service, that is, 1500 revolutions per minute. The low-pressure turbine was designed for the next lower synchronous speed, namely 750 revolutions per minute, utilizing a four-pole generator.

The surface condensers which occupy most of the open space beneath the foundation framework each consist of two shells containing 25,000 square feet of condensing surface. The condenser shells are connected directly to the turbine outlets without an intermediate expansion joint. The weight of the condensers is carried by means of lugs, cast as a part of the shell, resting upon a number of spring jacks, which are adjusted to carry the load without appreciable strain upon the turbine exhaust nozzles. Practically no restraint has been put upon longitudinal expansion of the low-pressure turbine by the circu-

A paper presented at the December meeting of the American Society of Mechanical Engineers. Mr. Finlay is construction engineer and Mr. Stott, superintendent of motive power, of the Interborough Rapid Transit Co., New York.

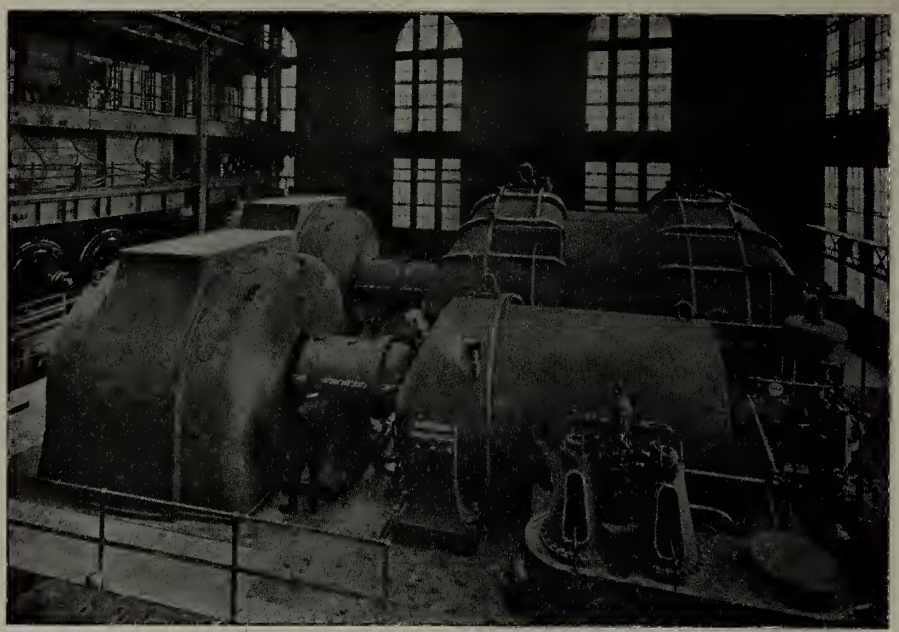


FIG. 1—30,000 KILOWATT, CROSS-COMPOUND STEAM TURBINE

lating water piping, which is fitted with rubber expansion joints. There is one expanison joint of copper in the steam-equalizing pipe between the shells.

The Auxiliaries

The condenser auxiliaries were selected and installed with the prime factor of reliability continually in mind. The turbine-driven tri-rotor circulating pumps of 37,500-galion per minute capacity were installed in duplicate. The reliability consideration was augmented by one of efficiency in the matter of the relative requirements for winter and summer use; during the winter months with cold water, one pump is sufficient, but during the summer months high water temperatures necessitate two units in service.

The hot-well pumps were also installed in duplicate. A single rotary dry vacuum pump was provided for each unit, with sufficient capacity to handle the dry air from two units, cross-connections being provided for the purpose.

The turbines are equipped with water-sealed glands. The gland water system has a small centrifugal turbine-driven pump for each unit, the piping for all of which is cross-connected through a common header. The water used for the turbine-oil coolers returns the heat which is thus regained in the feed-water heaters.

Operation of Feed-Water Heaters

The exhaust from the auxiliaries has been carried into the feed-water heaters which operate at low pressure. The shortage or excess of heat in this heater system, as the case may be, is compensated for or utilized by means of heat-balance valves operating between the auxiliary exhaust lines and the receivers between the turbine elements. For test purposes one unit was selected as representative of the installation. Tests were made upon this unit by the use of standard methods, special provisions being taken to secure accuracy. Some of the precautions are outlined in the following paragraphs.

High steam pressures were observed by the use of gages, in duplicate where of importance, such gages being calibrated before and after each test. Temperatures were observed by carefully calibrated thermometers immersed in iron pipe wells filled with mercury or oil, depending upon conditions. Wells were of ample depth and correction was made for immersion. Low pressures were observed by the use of mercury manometers. Vacuum readings were made with mercury columns provided with a vernier reading to 0.01-inch. The mercury in these columns was regularly cleaned and its specific gravity determined before and after test series, and corrections made accordingly. Temperature corrections on mercury columns were provided for by the use of thermometers set in each column casing; additional corrections were made for specific gravity, meniscus and barometer reading. The barometer used on the test was calibrated by reference to the U. S. weather bureau.

The condensate was weighed in tanks mounted upon two carefully calibrated platform scales. Platform scales were also used to measure drips and leakage. The unit was isolated so far as water and steam outlets were concerned. The large atmospheric relief valve necessarily remaining connected to the exhaust system was water-sealed, the seal being kept under continual observation by means of a window in the valve cover and interior illumination by electric light. The unit output was obtained by means of three single-phase rotating standard watthour meters, one connected to each phase.

The Electrical Loads

Each test was of three hours' duration with about a half hour preliminary operation under test conditions. The load was controlled from the switchboard, the turbine operating upon the governor with hand throttle wide open. This subjected the turbine to the full swings of the railroad load, as observed by means of a graphic wattmeter which furnished an interesting index of such load variations. At light loads these variations were pronounced, approxi-

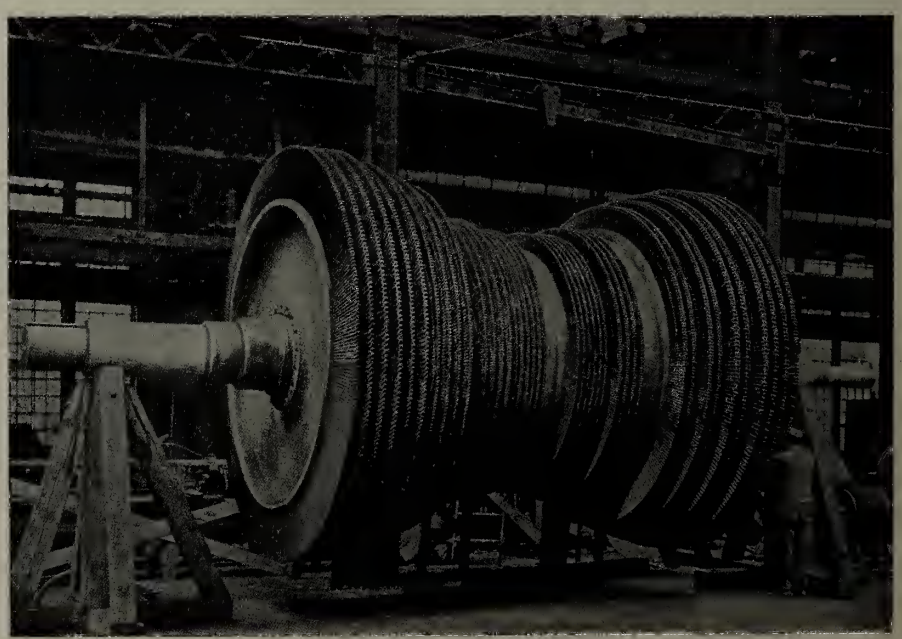


FIG. 2—ROTOR OF LOW-PRESSURE TURBINE

mating frequently 5000 kilowatt either side of the average. A variation of 10,000 kilowatt total in half a minute was not uncommon, especially on loads of 16,000, 18,000 and 20,000 kilowatts.

The test results have been shown graphically in Figs. 4, 5 and 6, upon bases of load and water rate, load and thermal efficiency, and load and rankine-cycle efficiency ratio. In conducting these tests, naturally every effort was made to maintain certain standard conditions under which guarantees had been given, and the test results as tabulated were corrected to such standards. These standards represent what is probably the average of operating service, and fortunately it was possible to carry out the tests under conditions but little removed therefrom, making the corrections, therefore, a matter of small consideration. Corrections for variation from standard conditions were based upon curves based upon calculations and the known results of previous practice.

With due allowance for scale of ordinates the performance curves may be considered unusually flat, naturally conducive to high plant efficiency. The dip in the curve between 22,000 and 26,000 kilowatts is a peculiarity which was received at first rather skeptically, but which was later remarkably checked by repetion of tests throughout the range, including a special series under steady load made three months subsequent to the original series. Various theories have been advanced in connection with this dip, and a series of special tests was made to investigate the relative action of the receiver between the two cylinders as a separator and the velocities of the steam passing through it, with the idea that this might have some direct bearing upon the dip. Unfortunately, winter load demands terminated further research work in this direction without any definite results having been obtained.

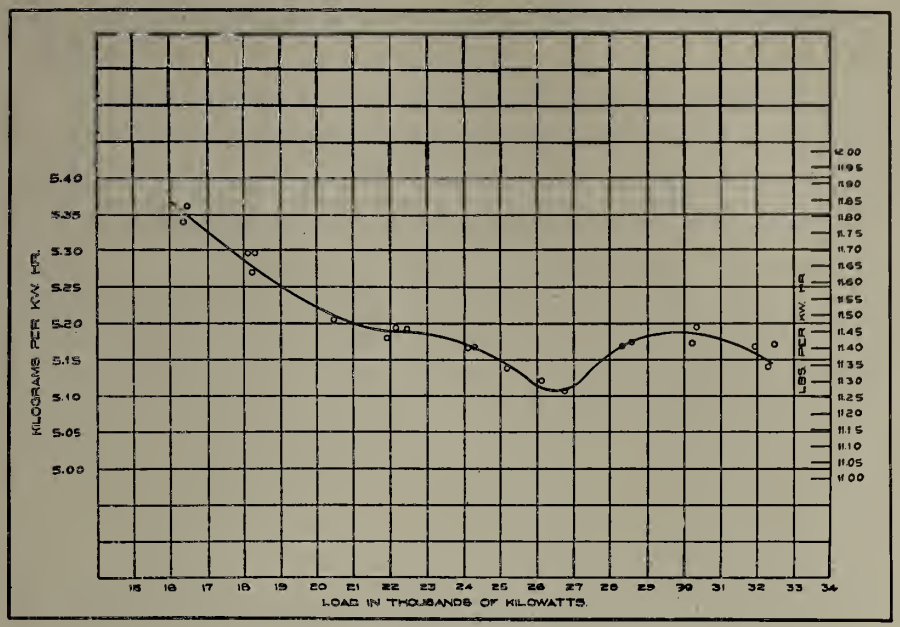


FIG. 4—WATER-RATE CURVE OF 30,000-KILOWATT TURBINE

The turning up of the curve between 30,000 and 32,000 kilowatts is another peculiarity, accounted for by the turbine designer as follows:

"Concerning the supposed inconsistency in these tests, that is, the turning up of the efficiency curve between 30,000 and 32,000 kilowatts, consideration and figuring indicate that this is actually not an inconsistency, but a new experience. This turbine was designed for higher hydraulic efficiency than probably any machine heretofore built, thus approaching the crest of the efficiency curve. The overload capacity of the machine is small, or, in other words, the amount the turbine is by-passed when the secondary valve opens is small, and the velocity ratio, therefore, is very little lower when full steam pressure is applied to the secondary inlet than when such pressure is applied to the primary inlet. Further, the hydraulic efficiency is nearly the same, so that the rankin cycle at 32,000 kilowatts should not be more than 1 per cent lower than at the point of best efficiency, namely, 26,000 kilowatts. The efficiency at the intermediate overload, say, 30,000 kilowatts, is somewhat worse than this, for while the blading and hydraulic efficiencies remain as high there is a loss due to a certain portion of the steam expanding through the secondary valve to a lower pressure without doing work."

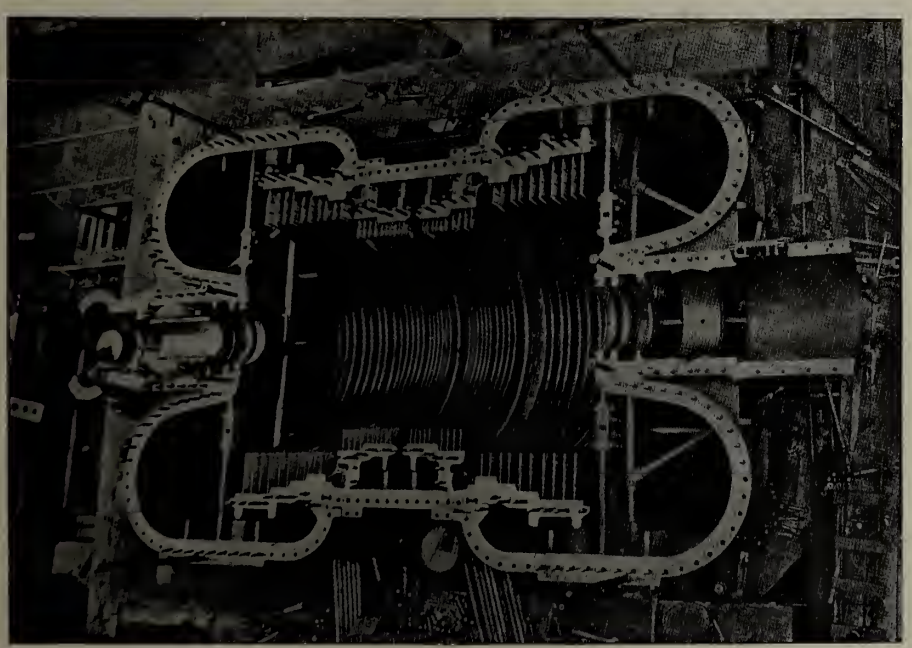


FIG. 3—INTERIOR LOW-PRESSURE TURBINE

A number of tests were made upon the condensers and auxiliaries, separate and individual guarantees having been made upon the condenser proper, circulating pumps, dry-vacuum pumps and hot-well pumps. Publication of the test data upon the pumps would simply show good, efficient performance without unusual features. The results of the tests upon the condenser, however, have been given simply as a matter of information and interest in connection with the installation as a whole. The guarantees were based upon operation under maximum load, namely, about 32,000 kilowatts, and the test was made with the turbine carrying as near that load as was possible. The duration of this test was three hours, and of the preliminary operation under test conditions, 30 minutes. The results are shown in the accompanying tables. No corrections were made in this test, as operating conditions approximated the guaranteed conditions very closely, with

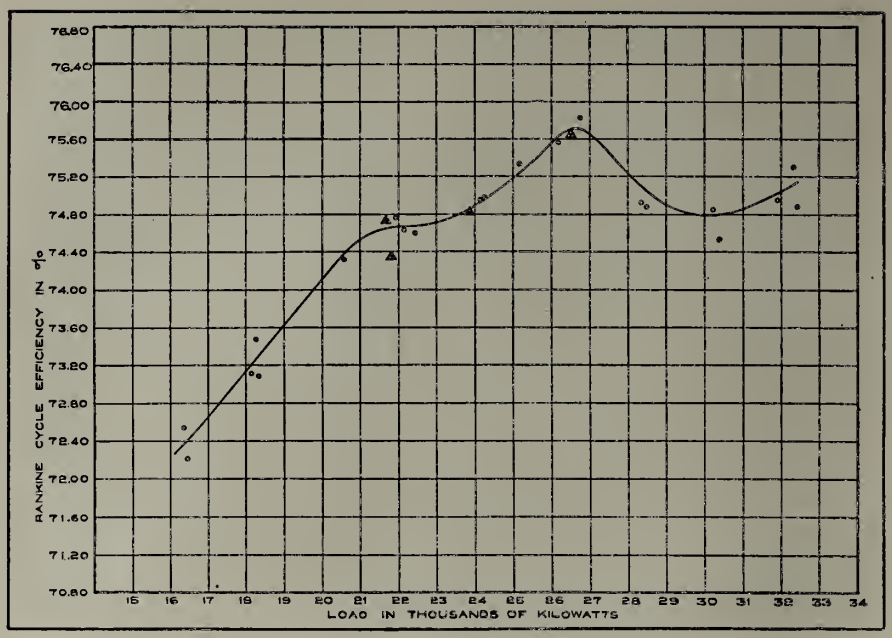


FIG. 6—RANKINE CYCLE EFFICIENCY CURVE OF 30,000-KILOWATT TURBINE

the exception that air leakage was high. The tests were made very shortly after the installation of the machine and little opportunity had been given under operating requirements properly to eliminate this leakage, which has since been done. A permanent gasometer has recently been installed in connection with each unit, in order to observe air leakage at regular intervals and aid in its elimination.

Two minerals not heretofore known to science have been discovered at Crestmore, Cal., according to a bulletin issued by Prof. Arthur Eakle, department of geology, University of California. Professor Eakle has christened the discoveries respectively "crestmoreit" and "riversideite." The first is described as a new hydrous basic orthosilicate, containing small amounts of other oxides in place of silica. The latter is a hydrous lime sulphate.

Less Swedish Ore Moved

Less iron ore was exported in 1917 from Sweden than in 1915 and 1916, according to report of Consul General William Coffin at Stockholm. He states that the *Stockholms Dagblad* of Dec. 16 gives the totals for 1914, 1915, 1916 and 1917, Jan. 1 to Dec. 15, as 663,000; 1,238,000; 1,459,000 and 1,175,000 tons, respectively. While destinations are not given it can safely be assumed that practically all of the shipments went to Germany.

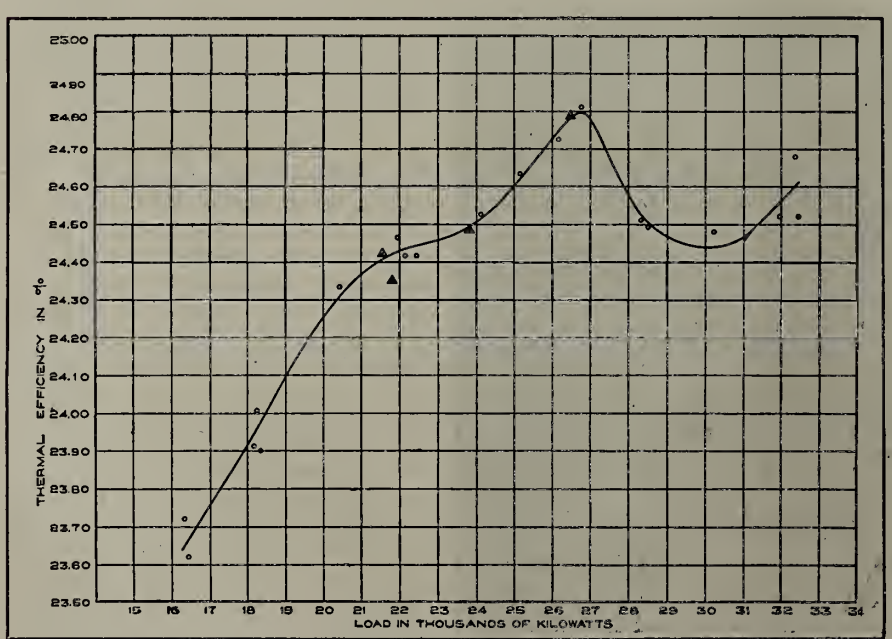


FIG. 5—THERMAL EFFICIENCY CURVE OF 30,000 KILOWATT TURBINE

Electric Furnace Presents Unusual Features

Patents on an exceedingly interesting arc type electric furnace, designed to provide a simple and effectual means of securing a uniform distribution of current, were recently issued to Carl Hans Vom Baur, Douglaston, N. Y. The entire furnace is a radical departure from any other unit at present on the market, the electrodes in particular bringing new ideas into play.

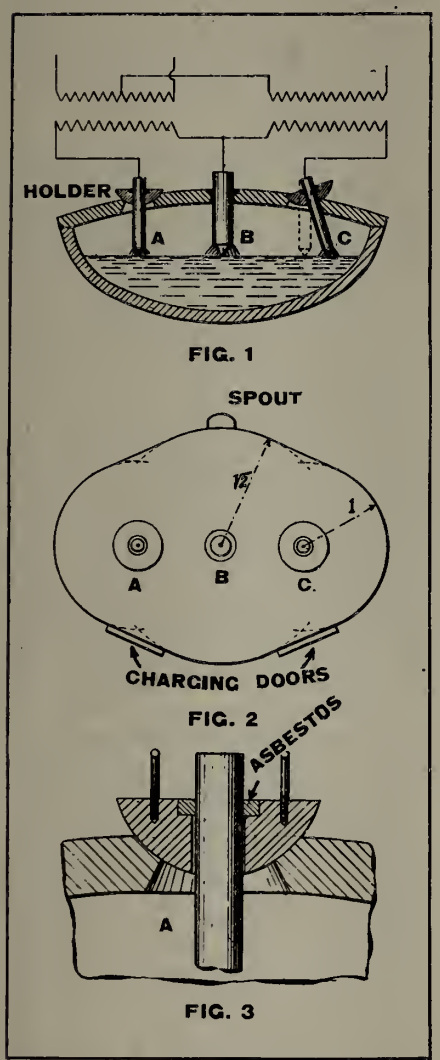
The electrodes pass through the roof of the furnace, which is made of any suitable refractory material. While they are normally in vertical position, arrangements may be made for adjusting the lateral electrodes, indicated at *a* and *c* in Fig. 1, so that their lower ends may be brought nearer to or farther away from the end walls. With this arrangement heat can be brought directly against any cold metal sections. For the purpose of such adjustment, the electrodes pass through holders of tubular structure, best illustrated in Fig. 3, and are held in place by means of washers. It is said that a direct fitting of the electrodes to the holders is impossible because the former are not made commercially in uniform diameters. The holders have spherical surfaces and are seated in sockets fitted into the roof of the furnace surrounding the openings made for the electrodes. They can be adjusted by means of handles which swing the electrodes into the desired position as indicated at *C*, Fig. 1. The side walls of the furnace are integral with the base. The central electrode is adjustable preferably only up and down, so that it is always in a vertical position.

The furnace is provided with a discharge spout, indicated in Fig. 2, and secondary doors designed for inspection, charging, patching, rabbling off slag, etc.

The two lateral electrodes receive like amounts of current, while the central electrode, preferably of larger diameter, receives current in the ratio of 1.41 to 1 to that of the lateral electrodes. The side wall is so shaped that it receives at every point approximately the same amount of current through the molten charge when the electrodes are in normal position. For this purpose the electrodes are arranged normally in the same plane and the distance from their lower ends, when in the vertical position, to the respective nearest points of the side wall are approximately in the same ratio as the amounts of current which the electrodes receive.

The position of the large electrode in the center is said to have pronounced advantages. Inasmuch as the cold metal is generally piled largely in the center of the furnace the manifest ad-

vantage of securing the most heat at that point is evident. Later when the charge becomes molten the position of this electrode will aid materially in keeping the bath in circulation. Again, by having the hottest portion of the charge furtherest from the side walls, the refractory material in the walls will not be subjected to such a severe strain.



SECTIONAL VIEWS OF NEWLY INVENTED ELECTRIC FURNACE

Valuable information pertaining to Lake Superior iron ore is contained in the booklet on ore analyses for 1918, issued by the Shenango Furnace Co., Pittsburgh. Beside giving the analyses of the ore produced and sold by the company, tables showing the methods of computing iron ore prices according to chemical variations and miscellaneous statistics of lake ore traffic are presented. Monthly bessemer and basic pig iron averages for a period of years also are shown.

The Pittsburgh district saved 400,000 tons of coal due to the five-day shutdown in January, according to figures supplied to the office of Fuel Administrator D. W. Kuhn.

Blast Furnace Preheater

A Preheater of Novel Design With Which a More Even Temperature and Reduced Fuel Consumption Are Claimed by the Inventor

A PROCESS patent applicable to blast furnaces has been granted E. E. Marshall, president of the American Manganese Mfg. Co., also independent operator of the Juniata Furnace & Foundry Co., Newport, Pa., and Lochiel Furnace, Harrisburg, Pa. The principle of this patented process is to take air coming from the blast engines and pass it through a preheating device, prior to its admission into the standard fire-brick stoves and from there into the blast furnace.

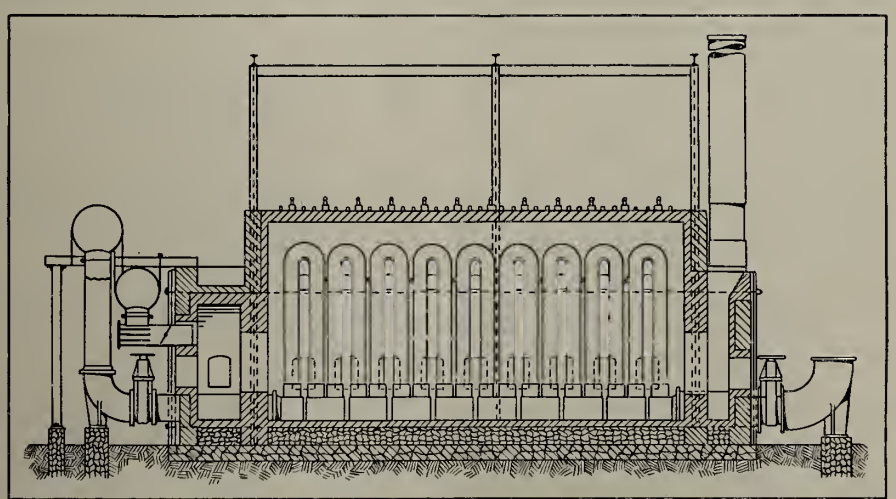
The advantage to be gained by this method of treating the blast for the furnace is to create a more even temperature in the blast going into the furnace, thereby decreasing fuel consumption. This increases the tonnage, as the furnace drives more uniformly, and it also reduces the number of hot blast stoves required for operation.

The construction of the preheater is the same as that of the old iron-pipe stoves that were used in blast furnace practice prior to the invention of the modern fire brick stove. It consists of a combustion chamber, a pipe chamber, and a draft stack chamber. The gas and blast are admitted at the same end of the preheater, or in other words in parallel. This is done to keep the first row of pipes cool by the incoming blast, which prevents the gas flame from warping and burning them out. The cold blast line from the engines is blanked by means of a valve. The cold blast to the preheater is admitted to the blast main, on the stove side of the blank or valve, and into the fire brick stoves through the cold blast valve on these stoves.

The blast is heated to any predetermined temperature in the preheater up to 900 degrees Fahr., which is the maximum for safety to the pipes, before admission to the fire brick stoves where it is finally raised to the required temperature for use in the furnace.

The action of the preheater on the stoves is as follows: The fire brick stoves coming off of gas are put on the furnace. The preheated blasts is admitted through the cold blast valve on the stoves. As the preheated blast has attained a rather high degree of heat in transit through the preheater, the heating surface of the stoves is not cooled off as fast as it would be if cold blast direct from the blast engines were being admitted to this same heat-surface. Therefore the reduction in stove temperature during the period that the stoves are on the furnace is not as great with the preheater attachment as without it. Consequently the blast has a more uniform degree of heat, with only a slight variation from the time the stoves are put on the furnace until they are taken off. Because of this small variation in the blast temperature, it is claimed the fuel is reduced per ton of metal produced and the tonnage increased, as the furnace drives more regularly, due to the fact that the temperature is more uniform. Another condition that it is said has been found to exist with the preheater connection on the stoves, is that the checkers in the stoves do not accumulate the dirt, as they do without this attachment. At Newport, after a six months' run on ferro-manganese, the stoves were opened and the checkers found to be almost as clean as when the furnace was started.

At Newport and Lochiel, with only two stoves at each plant, the Newport plant being equipped with modern Roberts stoves, and the Lochiel plant with two old Whittwell stoves, which prior to the preheater installation could never produce over 1050 degrees, on a ferro



PREHEATER SHOWING COMBUSTION, PIPE AND DRAFT STACK CHAMBERS

furnace, the temperatures have been averaging 1450 to 1400 degrees constantly. There have been occasions, it is said, where repairs on one of the stoves have necessitated the operation of one stove and preheater alone for 20 hours with a loss of only 350 degrees in the blast temperature.

The cost of the preheater installation is about one-third of that of a fire brick stove, and on a plant where there are three or four stoves such an installation would allow one or two stoves off continually for repairs, without reducing the output of the plant or cost of production. Furthermore, on a plant such as the Newport or Lochiel it would have been impossible to manufacture ferromanganese on a profitable basis without building more fire brick stoves.

Portable Welding Panel

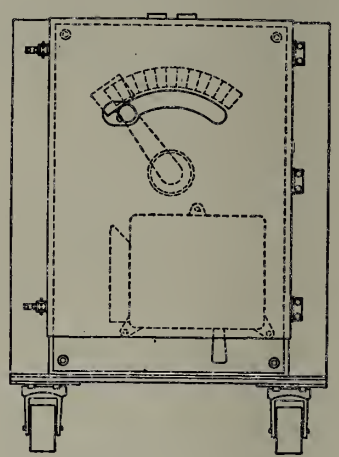
For an electric welding outfit to be of its maximum service, it must be so arranged that it can be taken to the work no matter where it may be located. One solution of the problem would, of course, be to locate a panel outlet of a suitable type wherever it is anticipated that electric welding might be desired. This would be a rather expensive proposition and many improvised means of solving the question have been proposed. A recently developed portable outlet panel manufactured by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., seems to meet the situation.

Two types of portable equipment are furnished, both being mounted on light trucks. They consist of a control panel mounting a handle trip railway type circuit breaker having overload release with magnetic blowout and a 13-point face plate connected to a register mounted in the rear of the panel. The face of the panel is protected by a metal cover through which the handles of the rheostat and circuit breaker project. The resistor is made up of grids and is protected by a cage of expanded metal.

In installing an electric welding system using these portable panels, the best method is to place an arc welding motor-generator set at some central point. Where suitable low resistance ground connection can readily be made throughout the shop, as for instance, where metal floors or cast-iron bedplates are in general use, or in a railway shop where the track system can be used, only one connector need be extended to the various receptacles. These receptacles should be conveniently placed throughout the shop.

Boiler Efficiency Test

In order to determine the efficiency of a 150-horsepower Brownell horizontal return tubular boiler an exhaustive 23¼-hour test was recently made with this unit at the plant of the Powdered Coal Engineering & Equipment Co., Chicago. Powered coal was the fuel used and considering the fact that the test was conducted in zero weather a good efficiency record was hung up. It is stated that the test was



WELDING PANEL DEVELOPED BY WESTINGHOUSE ELECTRIC & MFG. CO.

witnessed and verified by representatives of the Chicago city smoke inspection bureau, the city efficiency engineer, public utility corporations, and steam railroads.

The boiler furnace was served by two 12-inch powdered coal burners. It is stated that a high-ash coal together with screenings with a heating value of 10,158 British thermal units were employed. As burned under the boiler, the coal dust had a moisture content of 2.94 per cent. A screening test showed that 98.8 per cent passed through a 100-mesh and 90.5 per cent through a 200-mesh screen.

The steam pressure by gage was 135.1 pounds; temperature of feed water entering boiler, 145 degrees Fahr.; percentage of moisture in steam 0.95 per cent.

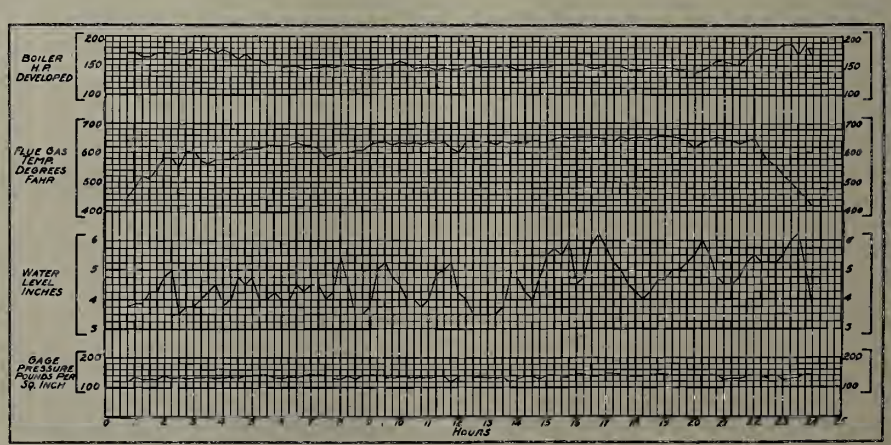
By weight, 17,625 pounds of coal were fired. Allowing for 2.94 per cent moisture, the total weight of dry coal consumed was 17,107 pounds. Ash and refuse were 22.09 per cent, or 3679 tons.

The total weight of water fed to the boilers, corrected for moisture in the steam, was 116,715 pounds. For each pound of coal fired, 6.69 pounds of water were fed. The equivalent evaporation from and at 212 degrees Fahr. was 7.59 pounds.

Final results showed the calorific value of one pound of dry coal to be 10,158 British thermal units; one pound of combustible, 13,039; and the efficiency of boiler and furnace 72.5 per cent. The accompanying illustration is a reproduction of the CO_2 chart, obtained over a period covering the duration of the test.

From the standpoint of thermal efficiency operating conditions were unfavorable. The powdered coal was lighted under a cold boiler three hours before the test was started, the average temperature of the air fed with the powdered coal being approximately 4 degrees Fahr. The ash and slag produced in the test, it is said, contained only a trace of combustible, less than 0.1 per cent, whereas bituminous coal of 18 per cent ash under ordinary conditions of grate firing will usually be found to produce an ash containing from 16 to 18 per cent combustible.

The horsepower developed during the test was recorded by a General Electric flow meter. This record of the water evaporated was checked by weighing the actual amount of water delivered to the boiler on automatic water scales. The results by the two methods agreed within a few per cent. The percentage of CO_2 in the flue gases was recorded by a Simmance-Abady precision combustion recorder. Checks were taken at intervals on samples analyzed in an Orsat apparatus.



RESULTS OF 24-HOUR TEST ON 150-HORSEPOWER, HORIZONTAL, RETURN-TUBULAR BOILER

War Converges on French Iron Ore

Possession of French-Lorraine and Adjoining Deposits Largely Will Determine Question of Victory and Economic Position of France or Germany in Future Years—German Industrial Powers More Boldly Demand Their Retention

BY FRANCIS MILTOUN

Paris Correspondent of THE IRON TRADE REVIEW

IRON as a prime necessity of warfare is lacking to Germany. France owns the most accessible available supplies—the Bassin de Briey and the Bassin de Longwy. Momentarily they are in the possession of the invader. This accounts for much of the progress of the German powers on all fronts. It accounts for many of the difficulties which for three years and a half France has struggled so hard to surmount.

In Germany six big industrial and economic organizations, chiefly those concerned with the metal trades—in a word all the big industries of Germany—have addressed a memorial to Hindenburg and Hertling, an echo of that previously addressed some months since to Bethman-Hollweg, urging the means of economic victory of after-the-war, and this is only to be brought about by the holding of the vast French iron deposits of Lorraine and the eastern frontier of France.

Bismarck's Foresight Faulty

The treaty of Frankfort did not provide for this nearly half a century ago, because at that time not even the astute Bismarck foresaw the vast possibilities of these eastern ore fields of France. Part was lopped off and given to Germany when the region of Metz was proclaimed the Reichsland, but his foresight did not go far enough. The bulk of the after-developed deposits still remained across the French border. France made much of them but she did not make the most of them, and she made the fatal mistake of swapping iron ore for German coal instead of developing her own coal fields to the limit. Today, with the pounding of bombardment at the pits' mouths France is actually mining more coal than she ever did before. We are not getting much of it for heating purposes in Paris, and what we do get is costing approximately $50 a ton, but the French armament and ammunition industries are getting their shares and that is something.

Lord Northcliffe, in his Atlantic City speech, dwelt with insistence on the economic war which was to come after and urged upon the allies to make no mistake as to the measures which Germany was already taking toward securing an economic independence. Not the least of these efforts is that which tends to control the French-Lorraine iron ore deposits.

This second memorial which has just been launched by the German industrial powers is far more explicit than that which went before. It comes out squarely for the "annexation of the Bassin de Briey and the Bassin de Longwy, indispensable, first of all, because of the dependence which Germany will otherwise have on a foreign power for her provisioning in this mineral."

A Frenchman of authority, Francois Lebon, has just called the attention of the French government and the French metal industrial world to this latest German move which might be momentously disastrous for France. The presumption of the retaining of these ore fields contemplates the moving of the French frontier to the eastward of what it was before this world war began. This we hardly believe to be possible, but the trick has at last been played and it now only remains to be seen who holds the high cards.

The value of these deposits is immeasurable for Germany—or for France. Quoting again the words of the German manifesto—"absolutely necessary in case of a future war". If necessary for Germany it is equally necessary for France. The more this affirmation of the importance of these mineral deposits is considered the more understandable becomes the present silence of Germany on the Alsace-Lorraine question. A simple financial calculation confirms this: First, with respect to the deposits which Germany attributed to herself as a result of the operations of the war of 1871. In that portion which came to Germany as a result of the Treaty of Frankfort at that time there is estimated that today there remain 3,000,000,000 tons available. Operating profits at 2 francs a ton would give German operators a return of 6,000,000,000 francs, or $1,200,000,000.

The Coal Bassin de Sarrebruck is another rich territory for Germany. At the geological convention of Canada, held in 1913, it was estimated that Germany here possessed coal deposits of 16,000,000,000 tons as reserves of this one deposit alone, and this only in that portion already under exploitation by the Bavarian government and that of Prussia, including also a very few private operations. If France abjures any territorial conquest she may not acquire this property, but within all her rights she may very well claim its underground exploitation as an indemnity of war as it directly attacks the German government, not the individual. Should this come about these coal reserves, at the nominal figure of the equivalent of $4 a ton, will represent a capital of $64,000,000,000. This will go a long way to help repair the damages of war. Even the profits on operating should pay the bill, including the three French loans which have been launched since the war.

Secret of Verdun Offensive

It is within the bounds of possibility that the projected German offensive will seek to push back the lines still farther from these Saarbruck, Briey and Longwy coal and iron deposits, even to the gates of Verdun, indeed this was the whole theme of the struggle around Verdun since the beginning. It is for this reason alone that the Germans still persist in bombarding Nancy and holding tight on Saint Mihel, the two flanks which keep the allies at bay.

It is even reasonable to suppose that if Germany can hold these important, vital even, mineral holdings she would be willing to evacuate northern France and Belgium up to the forts of Liege. The objects of the war for Germany are summed up in two words—economic expansion, but at the expense of other nations. To date the war has proven this and the after-war procedure will not be far different. Iron is the incomparable necessity for a warlike nation. Take away its ability to get it readily in excess of genuine economic needs and the risk of a hardheaded disloyal competitor running amuck is reduced.

For this reason, it is necessary that the allies retake Briey and Longwy, or at least see that they ultimately come back to the control of France. They are distant from the fighting front but 12 to 20 miles along their whole length. A combined action on the west and south east would probably change the whole face of things if it succeeded. To carry this objective, to separate these resources from the

(*Concluded on page* 548)

Causes of Split-Heads in Rails

Examination of Rails Which Have Failed in Service Indicates That Split Heads Are Caused by Streaked and Seamy Metal—This Defect May Be Traced to Ingot Conditions

TRAVELING at a speed of 35 or 40 miles an hour, a passenger train on a single track branch of the Pennsylvania railroad near Newark, N. J,. was derailed by a broken rail. The accident was investigated and a report prepared under the supervision of the chief of the division of safety of the interstate commerce commission. This report contains some interesting general engineering and metallurgical features. In part, it is as follows:

The rail which broke and caused the derailment was a 60-pound rail, rolled by the Cambria Steel Co. in March, 1887, and laid in the track in the following June. It bore the brand marks, "Cambria Steel 87 III."

The type of fracture was a split head. Failure took place in the receiving half of its length. About 3 feet of the rail, at its immediate receiving end, remained intact. Beyond this part there was a broken section, 8 feet 4 inches long, followed by an unbroken section, 18 feet 8 inches long, completing the length of the rail, 30 feet. The unbroken section was locally bent at the time of the derailment. Forty-eight fragments of the broken section were recovered.

The appearance of the recovered fragments is shown in Fig. 1, some of the fragments being assembled in their relative places, while others were laid in a row, their places in the intact rail not having been established.

The top of the rail showed an increase in width of 0.18 inch, as nearly as could be judged when the fragments were put together. This increased width corresponded substantially with the width of opening of the seam in the head, a relation generally found in splithead rails.

How the Head Was Formed

Lateral flow of the metal occurred in the shallow zone between the running surface of the head and the upper edge of the seam. The formation of a split head is attributed to the wedge action of the steel in this affected zone, reaching streaked metal, starting an incipient seam where the metal of the head in a crosswise direction is deficient in strength or in ductility, or both. The incipient seam gradually develops in length and in depth until there is complete separation of the head.

Longitudinal seams or lines of rupture with serrated surfaces were shown on the fragments of this rail. The head was split along the greater part of the 8-foot 4-inch broken section.

Serrated Rupture Formed

Fig. 2 is a view of the top of the head, the fragments comprising this part of the rail being placed approximately in their relative positions. Fig. 3 shows the under side of the head showing a serrated portion below the running surface of the outside half of the head. This part of the ruptured surface had been hammered comparatively smooth by the passage of trains over the rail, evidence of the progressive character of its failure.

A microscopic examination was made of a full cross section of the rail near the broken portion, followed by a microscopic examination of the steel in that vicinity. The microscopic appearance of the rail is shown in Fig. 4, representing a cross section after it had been polished and etched with tincture of iodine. There were zones of dark-colored dots near the periphery of the head, and adjacent to the under surface of the base. At the junction of the head and web, in the web, and near the upper surfaces of the flanges these markings appeared as lines. The changed appearance of the markings at different parts of the cross section is attributed to changes in shape which the metal undergoes in its reduction from the rectangular form of the bloom to that of the finished rail. In the earlier shapes from the ingot the markings are dots which are changed into dashes by the draft of the rolls in forming the rail. The unsymmetrical dark zone at the junction of the head and web is taken to indicate that the ingot from which this rail was rolled was laid on its side to cool.

Figs. 5 and 6 illustrate magnified images of a portion of the head and of one of the flanges, each in cross section.

A series of photomicrographs were made to show the micro-structure in different parts of the rail. The average structure at the middle of the head

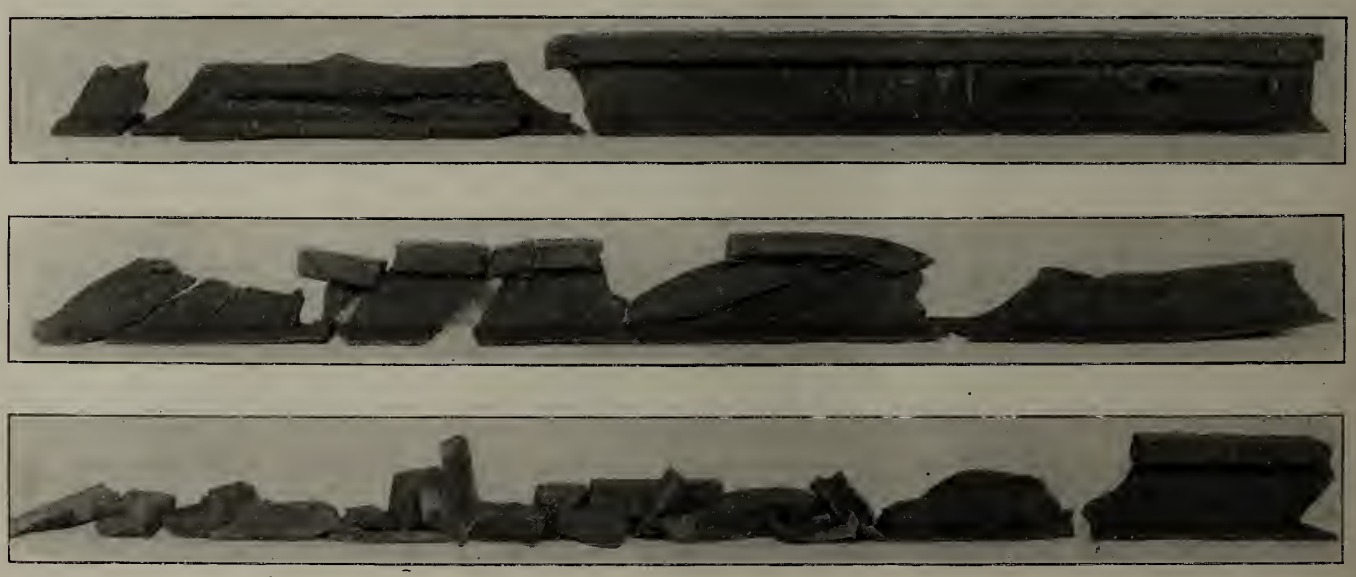


FIG. 1—VIEWS OF FRAGMENTS OF RAIL-PIECES IN THE FIRST AND SECOND LINES ASSEMBLED IN APPROXIMATE POSITIONS. PIECES IN THIRD LINE PLACED AT RANDOM

shows coarse-grained pearlite which appears with thick irregular ferrite network. Low-carbon metal was found in a zone about ⅛ inch below the running surface.

The effect of wheel pressure is to cause a distortion of the grain of the steel immediately below the running surface of the head of the rail. In a crosswise direction the metal yields and flows toward the side of the head, taking the path of least resistance. Longitudinally, the tendency of the surface metal to flow is effectively resisted. The grains are flattened but do not show longitudinal drift. Whereas, the lateral flow of the metal tends to develop split heads, in a longitudinal direction, the inability of the metal to flow, except at the extreme ends of the rail, results in the introduction of internal strains of compression, the presence of which promotes the formation of transverse fissures in the interior of the head where the opposite strains of tension prevail.

Cause of Split Head

The longitudinal streaks in the metal of this rail are believed to have had a direct influence on the formation of the split head. Examples of split heads have been witnessed in different stages of development, and incipient seams have been found to coincide with and follow the paths of interior streaks. The quest for the primary cause of the presence of streaked metal leads back to the ingot. Efforts to introduce streaks by heat or mechanical means have been unsuccessful. Conversely, their removal by heat or mechanical means has not been accomplished. Sudden quenching of hot steel will cause the formation of thermal cracks, but such cracks are of a different order to the streaks and seams under consideration. These are present in steel which has cooled slowly.

Mass segregation occurs in the cooling of ingots, shown in the chemical analysis of the metal. There are slag or other nonmetallic inclusions in different parts of the ingot and blowholes are also found. The primitive condition of the ingot exercises its influence over the structural state of the finished rail. The large reduction in sectional area given the metal of the ingot orients these structural conditions and leads to the formation of longitudinal streaks in the rail. Lengthwise the rail this structural arrangement seldom affects its serviceability. In a crosswise direction, however, the character of the streak becomes an important factor, especially when service stresses approach the limit of endurance of the steel.

The streaks brought to view upon etching with tincture of iodine differ in their characteristics, each variety assuming greater or less importance, depending upon the severity of the service stresses. There are streaks which represent metal enriched in carbon; others in which ferrite predominates. In these streaks the continuity of the metal is not lost. The welding of blowholes may be partial, the efficiency of which in a degree depends upon the composition of the steel. The presence of slag is a barrier against welding and at such inclusions the continuity of the steel is interrupted.

Wheel pressures which cause lateral flow of the metal in the head of the rail differentiate the properties of these streaks. Whenever evidence is presented of permanent flow having taken place, the rail problem has evidently passed beyond the stage in which the elastic limit of the steel is a controlling factor. The rail is practically certain to fail in course of time, under a repetition of these overloads. The life of the rail may be prolonged or its type of failure changed by the elimination of streaks. It is highly desirable that structural soundness be attained as nearly as the art of steel making permits. A margin in strength should be maintained between working loads and the ultimate resistance of the rail in which structural soundness is an essential factor.

Supplementary tests were made on two sections of the rail, for the purpose of illustrating the changes in the internal strains which may be accomplished by bending loads, independent of the cold rolling action of the wheels. One section was bent downward; that is, with the head on the concave side, straining the flanges in a tenside direction. The flanges were left in a state of initial compression. The result of giving the rail a slight permanent set in this direction was uncertain, on account of doubts attaching to the magnitude of the primitive strains. The second section was bent upward, that is, with the head on the convex side, straining the flanges in a comprehensive direction. This bending resulted in a reversal of the primitive strains, the flanges being changed to a final state of tension. It was thus shown that the normal strains of compression in the flanges may be reversed and tensile strains introduced by cold bending, although the permanent set given the rail is of slight amount.

Rail failures are usually traceable to definite causes upon which the rails themselves furnish reliable evidence. The fractured surfaces are the written pages upon which the data are recorded. The incipient point of rupture, whether located in the head, in the web, or in the base, the progressive development of fatigue fractures, referring to the type of transverse fissures; the direction in which the fracture traversed the cross section of the rail; distinctive marks differentiating primary and secondary lines of rupture; all of these features are commonly shown by the fractured surfaces.

In the examination of a fractured



FIG. 2—VIEW OF THE TOP OF THE HEAD OF THE RAIL-FRAGMENTS ASSEMBLED IN APPROXIMATE PLACES



FIG. 3—VIEW OF THE UNDER SIDE OF THE HEAD OF RAIL-SERRATED SURFACE OF FRACTURE HAD BEEN HAMMERED COMPARATIVELY SMOOTH

rail, interest primarily centers upon the metal at the immediate point of origin. At this place the structural state or physical properties of the steel or the conditions of service reach a maximum and become responsible for its failure. The failure of the present rail was undoubtedly precipitated by the seamy state of the metal in the head. The steel was of medium hardness in respect to its chemical composition. Wheel loads had not distorted the general shape of the head except at the broken section.

Repeated impulses along different elements of the head, their paths varying according to the lines of contact made by wheels of different contours of threads, had effected a hardening of the surface metal covering a width of 2 inches.

Internal strains were introduced, amounting to many thousand pounds compression, measured in the direction of the length of the rail. Lateral flow had taken place in the metal next the top of the head, shown at the surface by a flattening of the grains, and necessarily exerting an effect on the interior metal. Under the influence of lateral flow, it is believed that an incipient crack was started in the interior of the head, this effect reaching some line of structural weakness, or place where the continuity was interrupted by a slag or other seam.

A measurable increase in the width of the head, in rails which have otherwise maintained their primitive shape, commonly signifies that a seam is in



FIG. 5—CROSS-SECTION OF A PART OF THE HEAD OF THE RAIL-MAGNIFICATION, FOUR DIAMETERS

progress in the interior. Very soft rails may show increase in width without a split head necessarily being in process of development. The deformation may be confined to the formation of a fin along the side of the head. The detection of a split head in the very earliest stage of its development does not appear feasible. In its more advanced stage the general increase in width of the head, or droop at the under side, or a discolored line along the running surface, are the recognized indications of the presence of a split head. By reason of the difficulties attending the detection of a split head before it has reached an advanced stage, and the possibility of error in judgment in interpreting the significance of the first visible indications, every effort should



FIG. 4 — CROSS-SECTION OF RAIL-MARKINGS SHOWN BY POLISHING AND ETCHING WITH IODINE

be made to eliminate the presence of streaks from the steel.

Rolling Modifies Streaks

The sequence of the passes in the rail mill, in the reduction of the bloom, is shown to be favorable in respect to the modification of the form of the streaks which are located in the different parts of the cross section of the finished rail. The streaks have an acicular formation in the more critical parts of the head and the base, one which probably minimizes their influence in leading to split heads and some kinds of base fractures. The draft of the rolls converts these acicular lines into seams of considerable width in the metal of the web and at the junction of the web with the head and the base. Structurally, these seams are more detrimental than the acicular lines, but they are located, fortuitously though it may be, where their presence is seldom felt.

A careful examination of the metal at different stages from the ingot to the finished rail is essential for a thorough exposition of the subject of streaks. Blowholes and shrinkage cavities disappear from view in the early passes of the blooming mill. Slag or other nonmetallic inclusions, found in globular form in the ingot, are drawn into acicular lines in the finished rail, modified in shape at the web, as above stated. Regions differing in chemical composition from the surrounding metal appear as bands of varying width and thickness. These structural variations are frequently of such an order that the results of chemical analysis do not adequately indicate the state of the metal. Drillings for chemical analysis taken at a streak are so diluted by the surrounding metal that the characteristics of the streak are obscured. If the seaminess is due to an incompletely welded blowhole, structural rather than chemical manifestations should be looked for. Microscopic examination offers a promising method of test in this connection.

All rails are subjected to internal strains, which are not negligible factors, as the magnitude of their values indicates. If it were feasible to furnish rails initially free from internal strains they would not remain so. The cold rolling of the wheels in the track promptly introduces strains at the running surface of the head. No grade of steel has been examined which has resisted this action of the wheels.

Another feature may be mentioned in connection with the introduction of internal strains, and which results from the application of overstraining loads. It has reference to the impairment of the primitive values of the elastic limit, both in tension and in compression, and has an influence upon what might be termed the state of saturation of the steel for internal strains. An overstraining load in either tension or compression has been found to lower the elastic limit of the steel in the opposite direction. In acquiring further information upon the phases through which the metal passes in reaching rupture, this feature will require consideration.

There was a notable difference in the behavior of the strips which were de-



FIG. 6—CROSS-SECTION OF A PART OF THE FLANGE OF THE RAIL-MAGNIFICATION, SIX DIAMETERS

tached from the head of a 125-pound rail. The strip from the gage side of the top of the head assumed a concave shape, while that from the outside sprung into a convex shape, each with reference to the running surface. Both strips showed a mean state of compression as previously stated. The springing of a strip into a curved shape is evidence that the intensity of the internal strains is variable, changing at different depths from the surface. It further appears, in the case of these

two strips, that the changes in one were in reverse order to those of the other, this reversal occurring in passing from the gage side to the outside of the head, a distance less than three inches. These and other variations witnessed in rails, after a term in service, stand as records of what has occurred in the track, and furnish a partial answer to the querry sometimes made, why all rails do not fail when some do.

Portable Radial Grinder

Adapted for general light grinding and buffing, a self-contained flexible grinder of the portable type has been marketed by the Mummert-Dixon Co., Hanover, Pa. In this grinder the wheel is driven by a motor mounted at the rear end of the tubular arm. Power is transmitted from motor to grinder wheel through a shaft and a single set of spiral gears. The head, arm and motor are carried on a two-wheeled ball-bearing trolley, which rolls on a steel track and is kept in alignment by a rack and gear on the side of the carrying frame. By attaching the tubular arm at its center of gravity to the trolley, the head and the motor are kept in equilibrium. The grinder is full radial and the head may be twisted completely around.

Moisture in Coke

Extensive experiments have recently been completed by Arno C. Feildner and Walter A. Selvig, bureau of mines Washington, D. C., for the purpose of ascertaining the most rapid and simple method for determining the moisture in coke. The results of these experiments are presented in a bulletin issued by the bureau, from which the following is abstracted.

A series of tests were made to ascertain whether the circulation of dry air through the oven is necessary to remove the maximum amount of moisture. Twelve samples of different metallurgical cokes from various sources were prepared by crushing the air-dry coke to 60 mesh. Moisture determinations were made in duplicate by the standard method used by the bureau of mines for determining moisture in coal. Samples weighing one gram were placed in porcelain capsules and in sets of 12 heated for one hour to 105 degrees Cent. in a constant temperature oven. A current of air dried by concentrated sulphuric acid was passed through the oven and over the samples rapidly enough to change the total volume of air in the oven two to four times a minute. At the end of the heating period, the capsules were covered with closely fitting flat aluminum covers and cooled in separate desiccators over concentrated sulphuric acid.

Experiments on the direct determination of moisture in 1-inch lumps and also 4-mesh coke at various temperatures were made in the following manner:

A large sample of coke was taken from a pile that was wet from a recent rain and was crushed to 4-mesh size. This sample was then thoroughly mixed and divided into three representative portions, *A1*, *A2* and *A3*, which were treated as described below.

Sample *A1* was air-dried to constant weight at 30 to 35 degrees Cent., then rapidly crushed to 10 mesh by passing it through crushing rolls. The 10-mesh product was quickly reduced on a riffle sampler to 400 grams and then pulverized to 60 mesh in an air-tight porcelain Abbe ball mill containing flint pebbles. The 60-mesh sample was then reduced to 60 grams on a small riffle sampler and placed in a rubber stoppered bottle. The residual moisture in this air-dried sample was determined at 105 degrees Cent., as previously described.

Sample *A2* was dried to constant weight at a temperature of 105 degrees Cent. in a Freas electrically heated oven without dry air circulation. Sample *A3* was similarly dried to constant weight in an ordinary gas-heated oven at a temperature of 150 degrees Cent. The maximum variation in the different samples was 0.12 per cent.

Brazilian Manganese Land

A contract recently has been entered into between two Norwegian companies and the state of Maranhao, Brazil, for the leasing of mining properties. Large manganese deposits are reported in the region of the land leased. The property is in northern Brazil on a peninsula of the Atlantic coast. The manganese deposits are thought to exist occasionally over about 20,000 acres. The property which is about 190 miles from Para and 150 miles from Maranhao, is held under an old grant dating back to 1806, given by the governor and confirmed by the King of Portugal. Numerous natural water channels intersect the property and a 200-tons lighter can approach within three miles of any point in the district.

Counsel George H. Pickerell at Para, Brazil, reports that a manganese deposit estimated at 300,000 tons crosses the above tract. The ore is black, partly hard and compact, and partly crystallized and is mixed with iron to some extent. It analyzes about 48 per cent metallic manganese. Other outcrops exist throughout the property and some give as high as 62 per cent manganese. It is reported that supplies and labor may be had cheaply, and that timber and fuel exist in quantities nearby.



PORTABLE RADIAL GRINDER DESIGNED FOR GENERAL LIGHT GRINDING AND BUFFING

Truck Division Expands Into New Company

After an existence of nine years as a department of the Chicago Pneumatic Tool Co., Chicago, the motor truck interests of the company were taken over, Jan. 1, by a new organization known as the Little Giant Truck Co. The new company will continue to build motor trucks ranging in capacity from one to five tons and equipped with a carburetor which permits the use of kerosene and distillate. Officers of the Little Giant company, which are the same as those of the parent company, follow: President, W. O. Duntley; secretary, W. B. Seelig; treasurer, L. Beardsley, and sales manager, T. J. Hudson. Headquarters of the company will be maintained in the Little Giant building, 1615 Michigan avenue, as heretofore.

War Converges on French Soil

(*Concluded from page* 543)

enemy, will be to dictate terms of peace rather than be dictated to. It will be an allied peace, not a German peace. This is individual expression, not necessarily that of the military chiefs, but it seems plausible, and since there are apparently some hundreds of thousands of people who believe the same, and not a few notabilities of the French metal industries who know it, we may yet see it accomplished.

Asks Foundry Saving

The milling division of the United States food administration has requested foundries and other users of flour for industrial purposes to eliminate such consumption entirely or to curtail it to a minimum. The following letter has been sent to foundries: "In the milling regulations there has been an allowance made for the commercial uses of low-grade flours, recognizing the economic function which they perform, but we are taking this opportunity of writing you concerning this point, in hopes that if you are using in your foundry work, flour which could be consumed as food, that you take the necessary steps to confine your purchase of flour for foundry purposes to low grades.

Study Action of Caustic on Steel

INTEREST in the effect of caustic liquors on steel plates has become evident simultaneously in England, Holland, the United States and Germany. In a recent paper before the British Iron and Steel institute, Dr. Wolff, of Holland, referred to the failure of a marine boiler which had been dosed with soda for some time. He called attention to the tests made by Prof. Parr and detailed in a bulletin of the University of Illinois.

In these tests, samples of steel were immersed in caustic soda solutions kept at 212 degrees, 356 degrees, and 536 degrees Fahr., respectively. From time to time over a period of 30 days, samples were removed and tested on the fatigue testing machine in comparison with a sample of the same quality steel which had not been treated with the solution. The results, which were expressed in percentage of the untreated sample, showed a reduction of tenacity of about 20 per cent after treatment.

In a recent issue of *Engineering*, London, C. E. Stromeyer, chief engineer of the Manchester Steam Users' association, approves of the method of conducting these later tests except in the fact that the test samples were not under stress while being treated with the caustic soda. He reports further a series of tests which he is conducting, in which stress is kept up in the test pieces so far as possible.

Stressed Rings Tested

Several pairs of rings were cut from a solid plate. Some were tapered on their inner and some on their outer circumferences. They were then placed one above the other and driven together, so that the inner ring was under compression and the outer under tension. There were seven rings used in these tests. One ring was not stressed, but was boiled for some time. One pair of rings was annealed and the other two pairs were not annealed. One annealed pair of rings and one unannealed pair were then placed in a caustic evaporator and exposed for four months. At the end of this time all of the rings were sawed in pieces and of each ring one short piece was bent inward and the other outward. The results reported were consistent.

All of the untreated samples, and also all of those which were in compression, when exposed to the caustic, bent double without cracking. The two rings, both annealed and unannealed, which were under tension when treated with the caustic, cracked in a number of places when bent. These cracks appeared both on the surface, which had been in contact with the caustic and on the unexposed surface pressing hard against the compression ring. The influence had therefore penetrated through ¼ inch of metal.

Test Flattened Springs

It was decided to deal with the problem on more comprehensive lines. Accordingly, four sets of bars were obtained, namely, open-hearth steel both acid and basic, bessemer steel and wrought iron. They were cut into 10-inch lengths, curved in boiler rollers and placed back to back between two stout iron plates. End screws were provided which were screwed down, so the samples were nearly flattened. One each of the four sets of samples was then placed in vessels containing varying solutions of caustic soda and hermetically sealed. These vessels were placed in the steam space of a Babcock & Wilcox boiler and left for four months.

On removing and opening the vessels it was found that the treatment had entirely removed the spring of the samples, the least turn of the bolt nut allowing it to be slacked back entirely. The samples therefore had not been kept in a stressed condition, and on testing by bending, it was found that their ductility had not been impaired. This experience was disconcerting, and, Mr. Stromeyer states, may account for the results obtained by Professor Parr, who could detect no effect due to straining. The experience is not without practical interest, as it points to a possibility that caustic liquor may cause a slacking back of rivets and caulked edges, and lead to leakages.

The caustic liquor produced a marked effect on the samples. The samples as bent and exposed were too wide for the testing machine used, and had to be sawed in two. The band saw would not cut them, and milling cutters, which were then used, had to be run at the slowest speed, and even then teeth were broken. Yet the original bars could be cut quite easily at the highest speed.

It will be no easy matter to devise tests which will maintain the samples in a strained condition, for in the experiments noted the stress was produced by the elasticity of the material, and if that fails, the stress disappears. The case is different in a boiler, for there the stress is due to the boiler pressure, and though the caustic may relieve some stresses, as is shown by the flying off of rivet heads, the average stresses will be maintained, and some local stresses may even be increased.

A committee of the Chicago city council is drafting an ordinance to impose an annual tax of $500 on all wholesale junk and scrap dealers and of $250 on retail dealers. At present no license fee is paid by wholesalers while $50 annually is paid by the retail dealers.

E. N. Breitung & Co., Cleveland, have issued an attractive booklet containing a complete list of the various grades of iron ore mined and shipped by their subsidiary companies. An analysis of each grade also is given.

Mining Men Discuss War Problems

American Institute of Mining Engineers at New York Meeting Considers Manufacturing, Employment and Coal Conservation Questions With Particular Reference to Making Country's War Plans More Effective

WAR, labor and conservation problems divided the attention of the mining engineers at their annual meeting at New York last week. The meeting was the 116th held by the American Institute of Mining Engineers. The program included an unusually able series of papers discussing problems of interest not only to the mining fraternity but to the country at large. Several sessions were especially devoted to a consideration of employment problems, these meetings attracting a large number of delegates.

Interest in iron and steel manufacturing difficulties, as enhanced by the war, was clearly reflected in the close attention given to the presentation of the paper by Dr. Henry M. Howe on "The Erosion of Guns". Dr. Hudson Maxim presented this paper in a comprehensive resume. The war has forced American manufacturers to take careful introspection of their limitations and possibilities and this study has led particularly to a consideration of improving present methods of munitions manufacture. This fact was demonstrated by the wide discussion which followed Dr. Maxim's remarks.

Conservation as a factor in giving greater vitality to this country's war efforts was an undertone during most of the proceedings. This was true particularly at the special sessions given over to a study of coal problems, in which discussion centered largely around the need of greater economies in the production and consumption of both bituminous and anthracite coal.

Labor problems as emphasized by the war were considered at two sessions, the papers ranging from studies of accident and sickness prevention to better training for workmen and to making a place in industry for soldiers crippled in the war.

Other sessions were given over to a consideration of the metallography of steel, geology and ore deposits, mining and milling, petroleum and gas, and nonferrous metallurgy.

Sidney J. Jennings was elected president of the institute. He is a mining engineer of broad experience. His work in the gold fields of South Africa had attracted wide attention before his return to this country. He now is vice president of the United States Smelting, Refining & Mining Co.

The annual banquet was held on Wednesday, Feb. 20, at the Biltmore. The retiring president, Philip N. Moore, discussed the conduct of the war. He pointed out the restrictive factors which have hampered the efficiency of various departments at Washington. He praised highly the dollar-a-year volunteers who have sacrificed everything to put themselves at the call of the nation. Bainbridge Colby of the shipping board, outlined the necessity for greater speed in ship production. He predicted that the tonnage of ships produced this year in the United States will be the greatest ever turned out by any nation. W. O. Hotchkiss, of the war minerals board, Dr. W. G. Miller of the bureau of mines, Ottawa, Can., and Captain E. E. Delieux of the French army, also spoke.

The delegates were taken on the opening day to the new subway workings in New York and Brooklyn. On Thursday the ground aviation school at Princeton, N. J., was inspected. The student battalion gave an exhibition drill and various points of interest about the university itself were inspected. President Hibben of the university delivered an address.

Iron and Steel Manufacturing Problems

IRON and steel manufacturing problems were given close attention at two sessions, on Tuesday afternoon and Wednesday morning. The former was devoted to general iron and steel practice, the second to the metallography of steel.

In his synopsis of the paper by Dr. Howe on "The Erosion of Guns", Dr. Hudson Maxim gave some interesting information on the importance of improving methods of gun manufacture. Dr. Maxim told how at one of the first sessions of the naval consulting board, the group of citizen advisers appointed by Secretary Daniels, of the navy department, Admiral Strauss, of the ordnance bureau of the navy, had stated that the solution of the problem of erosion was the most important question facing the navy. At that time Dr. Maxim appealed to steel manufacturers and to Dr. Howe to begin an intensive study of the subject, since he realized the difficulties to be confronted.

The united attention given this problem has already resulted in making possible the results attained at a recent test when 250 shots were fired from a 14-inch gun, or considerably more than ever achieved before. It is now possible, Dr. Maxim pointed out, for the big navy guns to fire as much ammunition as a battleship can carry. "Before Dr. Howe began his investigation," Dr. Maxim stated, "it was thought that the Germans knew more about steel than we did. We know better now. They not only did not know more, but were ignorant of much that we knew."

Rear Admiral Earle, present chief of the bureau of ordnance of the navy, discussed Dr. Howe's paper. He stated that generally erosion with the consequent enlargement of the bore, caused irregular wearing away and scoring. In the discussions, one suggestion advanced for solving the problem was to conduct practical tests with screwed plugs of different metals and alloys, and thus determine the material best adapted for use.

"Transverse Fissures in Steel Rails" were discussed by J. E. Howard, engineer-physicist, interstate commerce commission, Washington. He gave an exhaustive study of the results obtained in an investigation of

a rail failure on Aug. 25, 1911. Mr. Howard presented an extract from a report submitted to the National Association of Railway Commissioners, which summarized 25 causes ascribed as responsible for the formation of transverse fissures. Mr. Howard pointed out that "neither chemical analysis nor microscopic examinations have shown a definite cause for the development of transverse fissures". They have been found in rails of many types, manufactured by different methods and subjected to various classes of service. They have occurred in rails manufactured at widely different periods of time. He said:

The latter fact should remove doubts concerning any peculiar conditions having found their way into modern mill practice influencing this type of failure. On the other hand, traffic has increased, wheel loads have increased and speeds have increased; and transverse fissures are in general found where these conditions are well advanced. The girder strength of the rails has been increased, while the impinging pressures of the wheels still remain without amelioration. It is a disquieting matter that rails of the heavier sections recently laid have displayed transverse fissures. Mere increase in weight of section has not brought with it immunity from failure in this matter. It gives emphasis to the need of acquiring further data upon the features which have been discussed in this report.

The conclusion seems well founded, that transverse fissures are fatigue fractures, and that they develop in rails which are structurally free from any known defect. It is a modified type of fatigue fracture in which there is a compressive component in the rail next the running surface of the head. The presence of this compressive component accounts for the interior origin of the transverse fissure. It constitutes the difference which the introduction of the term "transverse fissure" was intended to emphasize over the common type of fatigue fracture in which this component is absent and which in consequence thereof has an exteror origin.

The discussion disclosed that the Bethlehem Steel Corp. will soon complete the development and construction of a special type of machine designed to test full-sized rails. Representatives of rail manufacturers pointed out the need of rail consumers discontinuing the practice of using rails of high hardness. This class of rails was developed to meet severe service conditions on curves. For this purpose, these rails have given satisfaction, but their performance has not shown their adaptability for other classes of service. Suggested remedies for transverse fissures advanced in the discussion were to support the rail more firmly, to decrease the loads and to increase the rail section.

At the session on the Metallography of Steel, S. W. Miller, Rochester Welding Works, Rochester, N. Y., discussed "Some Structures in Steel Fusion Welds". Mr. Miller presented microphotographs of some of the unusual structures he had encountered while examining welds made in steel by the oxyacetylene and the electric arc processes. He stated that these particular structures deserve special attention, first because of their probable practical importance in connection with the strength of welds, and second, because of their probable theoretical importance in connection with the deformation of iron and steel.

"Grain-Size Inheritance in Iron and Carbon Steel" was presented by Zay Jeffries, director of research, Aluminum Castings Co., Cleveland. "The Time Effect in Tempering Steel", by A. E. Bellis, metallurgist, Springfield armory, was published in THE IRON TRADE REVIEW, Feb. 7, and "The Effect of the Presence of a Small Amount of Copper in Medium-Carbon Steel", by Carle R. Hayward, assistant professor, mining, engineering and metallurgy, Massachusetts Institute of Technology, and A. B. Johnston, graduate student of this institute in THE IRON TRADE REVIEW, Jan. 31. A. L. Feild, assistant metallurgist, and P. H. Royster, assistant physicist, bureau of mines, presented papers on "Temperature-Viscosity Relations in the Ternary System," CaO-Al_2O_3-SiO_2," and "Slag Viscosity Tables for Blast Furnace Work."

Conserving the Country's Coal Supply

THE opening session on Monday, Feb. 18, was devoted to coal problems. Particular interest was aroused in the coal meeting by the paper on "Review of the Coal Situation of the World", by G. S. Rice. An abstract of this paper was presented in THE IRON TRADE REVIEW, Jan. 31. Mr. Rice illustrated his paper with maps showing the comparative resources of the present coal producing countries of the world. He outlined the problem of the fuel administration, which he stated "is not only a problem of production but also one of transportation." He emphasized that "the mechanical capacity of the mines in this country is amply able to take care of all its needs, but to obtain this capacity, the mines must have sufficient railroad cars regularly to ship this output and the loss of a day's output is one that cannot be made up." He concluded that there are enough men to produce coal if they could and would work every day. "Could" means railroad cars and mine supplies; "would" means willingness to stay on the job every day. He pointed out that:

Without sufficient coal, the railroads cannot transport the fuel and munitions of war; the munitions cannot be manufactured, and the shipping cannot obtain its fuel for transport of sailors and supplies. It calls for some sacrifice on the part of everyone in the home to conserve his own fuel supply and avoid unnecessary heating; on the part of the operators not to spare supplies, and the investment of funds to increase facilities, although he may have a small margin of profit. It calls for the miners to forego pleasures which will keep them out of the mine during working hours—in other words, not to loaf but to stay on the job, for which they will receive full benefit by increased earnings at the highest rate that labor has ever known. This country has drafted its young men for the greatest sacrifice that a man can make. Is there any logical reason why all able-bodied males should not be compelled to do at least eight hours work every working day until this war ceases, for which they will be paid far beyond what the man who makes the greatest sacrifice is paid? The enemy recognizes no restrictions of labor or time, so that the least that those of us who are at home can do is to stay on the job and put our hearts into it. The consumer may have to take a quality of coal that seems to him inferior, and it may cause him added expense to use it, but it must be remembered that any checking of the day's output for any reason is a loss which cannot be replaced.

Mr. Rice in his extemporaneous remarks pointed out that the use of liquid oxygen in the manufacture of explosives will be rapidly expanded. It is being used in Germany. The war industries board at Washington has been giving considerable thought to this question and at the present time is relying upon the active cooperation of the explosive manufacturers to bring this branch of their industry to the scale of production required.

A method of briquetting anthracite coal was discussed by W. P. Frey, fuel engineer, Lehigh Coal & Navigation Co., Lansford, Pa. This method has been employed by the Lehigh company and is designed to handle silt which had previously been regarded as almost valueless.

The extensive coal and iron deposits of the Pen-hsi-hu district of Manchuria were described at considerable

length in a paper by C. F. Wang, mining engineer. Mr. Wang outlined the nature of the deposits, the mining methods employed, and the operations at the concentrating, briquetting and smelting plants. The paper was presented in the Feb. 14 issue of THE IRON TRADE REVIEW, as a preprint.

Additional papers presented at the coal session included "The Drifton Breaker", by E. P. Humphrey, assistant superintendent, the J. S. Wentz Co., Upper Lehigh, Pa.; "The Economy of Electricity Over Steam for Power Purposes in and about Mines", by R. E. Hobart, mechanical superintendent, Lehigh Coal & Navigation Co., Lansford, Pa.; "Heating of Coal in Piles", by C. M. Young, assistant professor of mining research, University of Illinois, Urbana, Ill.

Employment Problems and Miscellaneous Papers

EMPLOYMENT problems were under discussion at two separate sessions on Wednesday, this subject being the only one which was considered at more than one meeting. The keen interest held at this time in labor and employment problems was clearly reflected in the time allotted for their consideration as well as by the number of delegates in attendance at both sessions.

Thomas T. Read, of the technical department of the New Jersey Zinc Co., New York, discussed "The Employment Manager and the Reduction of Labor Turnover". He emphasized the fact that the labor turnover in industry is so large as to justify the adoption of almost any means to bring about its reduction. His paper was presented in the Feb. 7 issue of THE IRON TRADE REVIEW. His conclusions are recapitulated as follows:

1. The cost of labor turnover in industry is large enough to justify extensive measures to reduce it.
2. Centralized hiring is the most effective means to reduce labor turnover.
3. Hiring by the foreman is a relic of outgrown industrial conditions.
4. Centralized hiring does not impair the authority of the foreman; he hires his men from the employment office and discharges them back to it instead of to the street.
5. Relieving the foreman of the labor of looking for men gives him more time for the performance of his proper duties and improves his efficiency.
6. The employment manager, being a specialist, is able to devote special skill and knowledge to the art of selling employment in his organization to the workman.
7. The employment manager is able to give the foreign workman the special attention he requires.
8. The employment manager also tends to restore the former conditions of direct relations between employer and employe and hence brings about a better *esprit de corps* in the organization.
9. The methods used by employment managers are much along the same lines in every industry, as human nature is much the same everywhere.
10. The results that have been attained through centralized employment speak for themselves.
11. The employment manager must be given sufficient rank, otherwise he cannot work effectively. A high type of man is required and the saving he is able to make justifies the cost of securing such a man.

"Industrial Accidents as a Labor Problem" was the title of a paper presented by H. M. Wilson, director of the department of inspection and safety of the Associated Cos. In this paper, which was published in THE IRON TRADE REVIEW of Feb. 14, Mr. Wilson points out that "there is a close relation between contentment in employment and good health, on one hand, and accident prevention on the other. A contented mind gives the worker an opportunity to think about and to know his work. It is the distracted man, the so-called 'star gazer', whose mind is elsewhere than on his work, who is the most unsafe worker. A strong physical body and an alert, healthy mind are among the best safeguards against accidents."

Dr. Thomas Darlington, chairman of the welfare committee of the American Iron and Steel institute, discussed "Illness in Industry—Its Cost and Prevention". This paper also was presented in the Feb. 7 issue of THE IRON TRADE REVIEW. "Social and Religious Organizations as Factors in the Labor Problem" was presented by E. E. Bach, sociological director of the Ellsworth Collieries Co., Ellsworth, Pa. This paper was published in THE IRON TRADE REVIEW Feb. 7. Mr. Bach emphasized that "this is a comparatively new field of research. The recognition of the human factor in industry, in whatever form, is bound to become more important as labor conditions become more acute. This is especially true where the foreign factor predominates."

"Training of Workmen for Positions of Higher Responsibility" was the subject of a paper by F. C. Stanford, chief electrician, Cleveland-Cliffs Iron Co., Ishpeming, Mich. This paper also was published in the Feb. 7 issue of THE IRON TRADE REVIEW. He concludes that "the workman should be afforded an opportunity to make up his deficiencies of undirected or misdirected youth through having access to some form of education which will fortify him in his chosen work. Industry has no greater asset than an intelligent workman."

Prince Hrebilianovich addressed the delegates on the necessity of "Getting the Foreign Workman's Viewpoint". He pointed out that this country's labor supply has come from two distinct groups of Europeans. The English, Scottish, Irish and Scandinavian immigrants were workers who came to this country to find new homes. On the other hand, the Lithuanian, Polish, Finnish, Russian, Slav, Austrian, Hungarian and Balkan immigrants were largely farmers who had been led by glowing descriptions of this country's wealth, to seek in America speedy financial independence, with the intention of returning to their farms in Europe rather than of settling in the United States.

As a result, he stated, the latter group of immigrants suffer disappointment and disillusion from the moment they land at Ellis island. He drew a further distinction between the two classes. The former group use their money in maintaining a good standard of living conditions while the latter send the money they earn back to Europe and retain barely enough to live on. The former class, by its earlier training, is individualistic. The latter is led by his cooperative training abroad to follow similar lines after reaching America.

Louis E. Rebner, dean of the extension division of the University of Wisconsin, and now serving in the department of labor at Washington, sketched the work of the employment service which that department has inaugurated. He stated that there were three great causes of labor unrest. The first is improper housing conditions, and this he stated will be met. The second is the standardization of wages. Lack of such standardization is responsible, he pointed out, for the present enormous turnover of labor. The third cause was the lack of proper training.

The employment service, as Mr. Rebner pointed out, is really an adjustment service. The aim is to secure through voluntary registration an accurate knowledge of the qualifications of each workman and to place him in the place for which he is adapted. The department of labor, he stated, does not intend to take men from essential industries but from nonessential industries. He urged manufacturers of nonessential commodities to recognize the need for sacrifices in order to expedite war work.

At the session of nonferrous metallurgy, consideration was given to six

papers. These included "Notes on the Disadvantages of Chrome Brick in Copper Reverberatory Furnaces", by Francis R. Pyne, assistant superintendent, United States Metals Refining Co., Chrome, N. J.; "Fine-Grinding and Porous-Briquetting of the Zinc Charge", by Woolsey McA. Johnson, Hartford, Conn.; "High-Temperature Resistance Furnaces with Ductile Molybdenum or Tungsten Resistors", by W. E. Ruder, Schenectady, N. Y.; "Zinc Refining", by Leland E. Wemple, metallurgist, American Zinc, Lead & Smelting Co., St. Louis; "Bone-Ash Cupels", by Frederic P. Dewey, assayer, bureau of the mint, Washington; and "An Automatic Filter at Depué", by G. S. Brooks, assistant superintendent, Mineral Point Zinc Co., and L. G. Duncan, Mineral Point Zinc Co., Depue, Ill.

At the session on mining and milling, the following papers were presented: "Some Practical Hints in Bucket-Elevator Operation", by A. M. Nicholas, Brisbane, Queensland, Australia; "Recent Tests of Ball-Mill Crushing", by C. T. Van Winkle, Salt Lake City, Utah; "Notes on Theory and Practice of Ball-Milling Particularly Peripheral Discharge Mills", by Pierre R. Hines, Milwaukee; "A New Method of Separating Materials of Different Specific Gravities", by Thomas M. Chance, Washington; "The United Eastern Mining and Milling Plant", by Otto Wartenweiler, Los Angeles; "Otis Passenger Elevator at Inspiration Shaft", by C. E. Arnold, Miami, Ariz.; "Branch Raise System at the Ruth Mine, Nevada Consolidated Copper Co.", by Walter S. Larsh, underground mine superintendent, Nevada Consolidated Copper Co., Ruth, Nev.; "Incline Top-Slicing Method", by W. G. Scott, superintendent Coronado division, Arizona Copper Co., Ltd., Metcalf, Ariz.; "Canvas Tubing for Mine Ventilation", by L. D. Frink, superintendent, North Butte Mining Co., Butte, Mont.; and "Measures for Controlling Fires at the Copper Queen Mine", by Gerald Sherman, superintendent, mine department, Copper Queen branch, Phelps Dodge Corp., Bisbee, Ariz.

Geology and ore deposits were taken up at the session on Wednesday afternoon. The papers presented included: "The Chilean Nitrate Industry", by Allen H. Rogers, Boston, and Hugh R. Van Wagenen, Pioche, Nev.; "Genesis of the Sudbury Nickel-Copper Ores as Indicated by Recent Explorations", by Hugh M. Roberts and Robert Davis Longyear, E. J. Longyear Co., Minneapolis; "The Relation of Sphalerite to Other Sulphides in Ores", by L. P. Teas, Ithaca, N. Y.

Every Ton of Iron Needed

Great Britain Stretches Its Output to Meet War Demands—High Grade Bars and Special Coated Sheets Advanced

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 8, 1918.

THE pig iron industry continues as busy as possible, with every ton of iron going immediately into consumption. Smelters are very careful how they book orders, generally undertaking only small parcels. Production is restricted by scarcity of ore, fuel, lime and practically every material employed in connection with the blast furnace. The spell of wet and snowy weather had a very material effect on the output of ores and various furnace materials. A week of mild weather has enabled the canals and railroads to clear themselves of a good deal of traffic and the strain on the coal industry is a little relieved. It is reported that the arrangement recently adopted for pooling the tap cinder through a Birmingham firm of merchants is working satisfactorily, although certain difficulties have been met with. Scarcity of pig iron is a continuous difficulty; blast furnaces are in course of erection especially in Wales. Labor, however, is scarce, and these furnaces will be in operation some months later than was originally intended. There is a growing scarcity of steel-making irons and the supply is a matter of very considerable concern. At the Birmingham markets, Northamptonshire houses reported fairly brisk sales and as a tight hand is now kept on all exports home demands are getting a little better attention. Derbyshire houses are still booking very cautiously and applying the rationing principle by doling out supplies in small quantities. In Cleveland, though, there is rather more disposition to do business, shipments are greatly restricted. In the hematite branch, two furnaces have been added to those producing basic iron. Coke is scarce and is very carefully doled out.

High Grade Bars Advanced

A rather unexpected development this week was the addition to the price of marked bars. These high-class irons, very largely in demand for cable material, have been advanced 10s ($2.40) per ton, making the maximum basis £16 ($76.80) per ton. For the present unmarked bars are left untouched, the recognized price being £13 15s ($66) per ton. Everyone expects there will be a revision of prices at an early date. The chief interest of this advance lies in the fact that the ministry of munitions has not attempted to apply the subsidy system in this case. It is quite useless as an expedient for keeping down wages, and the advance will probably help to allay the bitter unrest over wages in the finished trade, because it will enable the sliding scale to give automatically the rise in wages to which the men consider themselves entitled.

The various iron works have issued notices this week pointing out that the wages board is pressing forward as quickly as possible with the scheme for paying the 12½ per cent advance and this announcement has undoubtedly prevented a general outbreak of the men who were threatening to strike for higher wages. The task of applying to the peculiar conditions of the iron trade an award framed rather for engineering conditions, has been difficult.

The Staffordshire Tinned Sheet association have put up the prices of tinned sheets £3 ($14.40) per ton, while lead coated sheets have been advanced £1 ($4.80) per ton. The principal reason is the great rise in the price of tin now well over £300 per ton. Large quantities of these sheets are used in aeroplane and automobile construction.

The supplies of steel continue insufficient, and, owing to a dispute in South Wales, the customary consignments of billets and bars have been considerably interrupted. On this account makers of plates and tin sheets have had to suspend delivery. The black country works are still full of orders, but the volume is not quite so heavy as it was, the general reason assigned being that recent developments in Russia have practically shut down that market as a destination for British war material. The most pressing demand at the moment is for scrap of which only small quantities can be got. Any good foundry scrap will realize the price of the finest qualities of machinery scrap. The government has this week applied to Birmingham merchants to do their utmost, by special efforts to supplement, the ordinary supplies.

Stockholders of the Baldwin Locomotive Works will hold their annual meeting in Philadelphia, March 7.

New Scrap Schedule Put in Effect

Recommendations of General Iron and Steel Committee Harmonizes Discrepancies in Original Announcement and More Clearly Classifies Grades—Some New Gradations of Prices Fixed—Commission Allowances Ignored

MODIFICATIONS of official scrap prices to equalize disparities between grades which had developed from the original schedules, and more complete definition as to the character of different grades are contained in the complete new announcement of iron and steel scrap prices and classifications, made by Chairman E. H. Gary, of the steel and steel products committee of the American Iron and Steel institute.

Some of the important changes put into effect by the latest announcement are, the reduction of the maximum price of No. 1 busheling from $35 to $32; the permission to charge $5 per ton for preparing cast scrap to cupola size; an advance of $5 per ton for cast iron borings and machine turnings for consumption in chemical plants; a reduction from $30 to $25 for heavy axle and forge turnings; an advance to $35 for malleable scrap for foundry use; fixing of a new grade of low phosphorus scrap at $35 a ton, and of special sheared wrought at $40 a ton.

No specific reference is made to the 3½ per cent commission which dealers in the past have been allowed over and above the maximum prices.

The announcement is dated Feb. 21, when the new schedule became effective.

NO. 1.—NO. 1 HEAVY MELTING STEEL:

No scrap to be used for remelting into steel shall be dealt in at a price in excess of the maximum base, $30. This shall include all steel, wrought iron, cast iron car wheels, malleable scrap or other grades to be melted in basic open-hearth furnaces (except as noted in clauses 2, 3 and 4).

NO. 2. — LOW PHOSPHORUS STEEL SCRAP:

(a) To be used only in plants operating acid open-hearth furnaces, crucibles or electric furnaces. This grade, which shall consist of billet, bloom, bar and plate crop ends, axle butts and new mill plate shearings, ¼ inch thick and heavier, no piece to weigh less than 10 pounds, all in charging box shape and which will analyze 0.04 and under in both phosphorus and sulphur, may be dealt in at a differential of not exceeding $10 a ton over the base price of heavy melting steel. Maximum, $40.

(b) All other grades of low phosphorus steel scrap to be used in such plants, which will analyze 0.04 and under in both phosphorous and sulphur, may be dealt in at a differential of not exceeding $7.50 a ton above the base price of heavy melting steel. Maximum, $37.50.

(c) Special steel, for use in such plants, but which will not analyze under 0.04 in phosphorus and sulphur, may be dealt in at a differential of not exceeding $5 a ton above the base price of heavy melting steel. Such special steel shall include steel knuckles and couplers, rolled steel wheels, railway steel springs, carbon tool steel and similar material in quality and character, suitable for mills of this kind. Maximum, $35.

Note. — Material under this classification may not be dealt in for use by basic open-hearth plants using charging boxes at a price in excess of the maximum allowed for heavy melting steel ($30).

No. 3.—Steel Rails, structural steel or similar scrap which has been especially sheared to short lengths for use in cupolas, hand charging furnaces or for rerolling purposes may be dealt in at a differential of not exceeding $5 above the base price of heavy melting steel. Maximum, $35.

Note.—Material under this classification may not be dealt in for use by basic open hearth plants using charging boxes at a price in excess of the maximum allowed for heavy melting steel $30).

No. 4.—Standard section old steel tee rails, free from frog, guard and switch rails, 56 pounds a yard and heavier, 5 feet and over in length, suitable for and to be used only for rerolling purposes, may be dealt in at a differential of not exceeding $5 a gross ton over the price of heavy melting steel. Maximum, $35.

NO. 5.—NICKEL STEEL:

Nickel steel scrap, excluding turnings, and containing not over one-half of 1 per cent of chrome, may be dealt in at the maximum price of heavy melting steel plus a differential of not exceeding $4 a ton per unit on the nickel content.

NO. 6—NO. 1 RAILROAD WROUGHT:

(a) No. 1 railroad wrought scrap may be dealt in at a price of not exceeding $35 a gross ton.

(b) When wrought scrap is especially sheared or prepared for piling or faggoting purposes to lengths of not under 10 inches or over 24 inches, it may be dealt in at a differential of not exceeding $5 a ton over the base price of No. 1 railroad wrought, but this may not include short wrought or other material which has not been especially prepared. Maximum, $40.

(c) Wrought iron railroad angle or splice bars, iron or steel shafting, suitable for rerolling, old iron rails, iron boiler plate cut apart in sheets and rings, wrought iron bridge scrap cut apart and similar wrought iron suitable for making sides and bottoms for box piling, may be dealt in at a differential of not exceeding $5 over the base price of No. 1 railroad wrought. Maximum, $40.

(d) No. 1 yard wrought, railroad track scrap and short wrought, also wrought iron and steel pipe, when 1 inch and over in diameter, 2 feet and over in length, free from dirty, painted, enameled or coiled and bent material, may be dealt in at a maximum of $1 a ton under the base price of No. 1 railroad wrought. Maximum, $34.

(e) The commodity known in the trade as No. 1 busheling scrap, when suitable for and to be used only by mills manufacturing bar iron, may be dealt in at a maximum of $3 a ton under the base price of No. 1 railroad wrought. Maximum, $32.

(f) Ungraded wrought iron and steel pipe and tubes, steel boiler plate cut apart in sheets and rings, country wrought and soft steel mixed, may be dealt in at a maximum of $5 under the base price of No. 1 railroad wrought scrap. Maximum, $30.

No. 7. Iron and steel railway axles, arch bars and transoms, old locomotive tires smooth inside and sheet bar crop ends, when suitable for and to be used only for rerolling purposes, may be dealt in at a differential of $12.50 a ton over the base price of No. 1 railroad wrought. Maximum, $47.50.

NO. 8.—CAST IRON SCRAP:

(a) All cast iron scrap, whether broken or unbroken, including unbroken cast iron car wheels, may be dealt in at a maximum price not exceeding that of heavy melting steel, except as noted in clause b. Maximum, $30.

(b) Cast iron scrap in cupola shape, in pieces not exceeding 150 pounds, including broken cast iron car wheels, when suitable for and to be used only in cupolas or in puddling furnaces, may be dealt in at a differential of not exceeding $5 a ton over the maximum priee of heavy melting steel. Maximum, $35.

(c) Malleable scrap of all kinds may be dealt in at not exceeding the maximum price of heavy melting steel. (Exception as noted in clause d). Maximum, $30.

(d) Malleable scrap in cupola shape, in pieces not over 150 pounds, when suitable for and to be used only in malleable works, may be dealt in at a differential of not exceeding $5 a ton over the maximum price of heavy melting steel. Maximum, $35.

Note.—Cast iron scrap or malleable scrap of any description may not be dealt in for use by basic open hearth furnaces at a price in excess of the maximum allowed for heavy melting steel ($30). Maximum, $20.

NO. 9.—MACHINE SHOP TURNINGS:

(a) The term "machine shop turnings" shall apply to all grades of iron or steel turnings except as noted in clauses b and c.

(b) Heavy axle and forge turnings, or their equivalent, may be dealt in at a price of not exceeding $5 a ton over the maximum price of machine shop turnings. Maximum, $25.

(c) Nickel steel turnings containing not over one-half of 1 per cent of chrome may be dealt in at a price of not exceeding $5 a ton over the base price of machine shop turnings, plus a differential of not exceeding $4 a ton per unit on the nickel content. Maximum, $20.

NO. 10.—CAST IRON BORINGS:

This classification shall cover all grades of cast iron borings (except for the special purpose indicated in clause 3).

(a) Cast iron borings and steel turnings, when suitable for and to be used only by chemical plants or plants operating for purposes other than the remanufacture into iron or steel products, may be dealt in at a differential of not exceeding $5 above the base price. Maximum, $25.

All the above prices and differentials are per gross ton of 2240 pounds, and in all cases include all freight and charges delivered f. o. b. cars at the consuming mill.

Mixed Condition

As to Car Supply Prevails in Refractories Industry—Output Curtailed

Shortage of cars is holding up shipments of refractories in Pennsylvania districts, and there does not seem to be any sign of immediate improvement in this direction, despite the moderated weather conditions that have been prevailing for almost three weeks. Embargoes also continue to be put into effect and lifted intermittently, and difficulty is being experienced in obtaining supplies of lime and coal. Deliveries are deferred all the way from one to six months. Some producers are in a position to take new business, although the majority of them are so fully committed that they are unable to consider inquiries coming out.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.

(First Quality)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK

(Second Quality)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 160.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK

(Per Net Ton)

55 per cent	$40.00 base
76 per cent	100.00 base

It is estimated that operations of kilns in the Pittsburgh district are about 70 per cent of capacity. Prices quoted remain unchanged.

An Ohio producer of fire brick reports that the past week has brought the removal of several embargoes and that the further anticipated improvements in transportation facilities contribute to an outlook which is the most promising in weeks. This company is practically unable to ship from its Pennsylvania plant, however, where the situation is so acute that only one car has been received on its siding during a period of 15 days. In Ohio the situation is far from normal, but apparently much better than that of Pennsylvania. One Ohio maker states that following the sharp curtailment of production made a few weeks ago, plant operation is now only 50 per cent of normal.

Britain Advances Prices

Great Britain has established new prices on bar iron and copper sulphate, according to advices from Consul General Skinner at London. The bar iron price was increased from $68.83 per ton, f.o.b. works, to $69.45 per ton for standard quality, ordinary sizes and merchant lengths. This price became effective Feb. 15. On copper sulphate the following quotations have been established for deliveries in the months named: $238.28 per ton, January and February; $244 per ton, March and April, and $253.72, May to August, inclusive.

Consul Skinner also reports that he has arranged, after futile efforts for better concessions, for the release of all American goods detained under bond on condition they be sold by the London chamber of commerce under the terms of cost plus 10 per cent to be paid to the importers and the excess to go to charity. This decision of the imports controller at London is not compulsory and election may be made to continue the goods under bond.

To Build Steel Ships

Exclusively devoted to complete steel ship construction, a shipyard will be established at Green Bay, Wis., by the recently organized Northwest Engineering Works, Inc. H. G. Barkhausen, who for many years was affiliated with the Interstate Coal & Dock Co., and L. H. Barkhausen, formerly with Greiling Bros. Co., formed the new company and purchased the yards, plant and business of the Hartmann-Greiling Co. from Carl Hartmann. The latter will remain with the company for the present but contemplates opening an office and warehouse in Green Bay for jobbing new and used machine tools and foundry equipment. Shipbuilding capacity will be trebled so that six ships may be under construction at one time. Machine and boiler shops will be enlarged and a new shop designed for the fabrication of steel for ship construction will be added. The company plans to lay the keels for two boats immediately.

The Carlin Steel Products Co., Philadelphia, which recently took a contract from the government for 1,150,000 shrapnel heads, has sublet this to the Endicott Forging & Mfg. Co., Endicott, N. Y.

Explosive Making

Exerts Dominating Influence on Market for Coal Tar Products

New York, Feb. 23.—The outlook in benzol is uncertain due to lack of definite knowledge as to whether and how soon the ordnance department of the army will begin to requisition this product for picric acid. Present dependence on toluol, it is felt, will not long be considered practicable, since the output is inadequate to our high explosives needs, and the latter are expected to increase right along. In the meantime stocks of benzol are growing large. While current sales involve large quantities, they are not sufficient to strengthen the market. The latter may be quoted at 35 to 40 cents per gallon. It is certain, however, that large contracts could be closed considerably lower.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52 to .55

Per 100 Pounds at Seaboard

Sulhate of ammonia (nominal)	$5.10 to 5.35

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia	nominal

In toluol, the shortage is most acute and manufacturers of dyestuffs who are depending upon old contracts are having great difficulty in securing deliveries. The output is not more than 60 per cent of normal. Hence between old contracts by manufacturers of high explosives and the requirements of the government, which are being allotted as fast as supplies become available, there is very little toluol for other purposes than the manufacture of trinitrotoluol.

In solvent naphtha the market has decidedly improved as to statistical position. Difficulty was encountered this week in securing quotations on a spot inquiry for 200,000 gallons. It was found that total stocks at producing plants are not much in excess of this figure. Both spot and contract continue to be quoted at 18 to 22 cents per gallon.

Will Limit Industrial Use of Coal

Fuel Administration Directs That Requirements for Present Year be Carefully Gaged and Production for 1919 Delivery be Restrained—Policy of Reducing Nonessential Output Will Be Continued Vigorously

WASHINGTON, Feb. 26.—Announcement of the fuel administration that it has returned to the policy of curtailing nonessential industries came almost simultaneously with another that the fuelless Mondays have been discontinued in New England. These were the most important developments in the fuel situation last week and are regarded as frank admission of the failure of fuelless days to produce the desired results as economic fuel conservers.

In announcing that the production of window glass this year will be cut to a saving of 500,000 tons of coal which, with less glass to be transported, will save the equivalent of 18,000 carloads of freight, the fuel administration says it has taken "the position that in the present condition of shortage no fuel must be used to manufacture any greater quantity of finished products than will be needed this year; that factories cannot be permitted fuel, transportation and labor to manufacture a surplus of products to be piled up for sale next year."

Consumption Will be Limited

The administration is conferring with representatives of industries to learn the requirements of each this year. It is the plan to agree on a percentage production satisfactory to manufacturers and labor for 1918's needs only. "It is through these methods of reducing consumption that a repetition of this year's shortage is to be absolutely prevented", the administration says. It is through this system of scientific limitation that the fuel administration expects to supplement the production of coal this year.

While fuel has been moving more freely into New England under the coal conservation plan of fuelless days which had been continued there longer than elsewhere in the Union, the main reason for discontinuing the order was that labor, working only five days east of the New England-New York state line, was migrating westward where six days' employment was offered. This movement began to be felt in New England factories and it was only after manufacturers strenuously objected that the ban was lifted.

"This flow of labor applies with particular force to western Connecticut, which is in such close contact with corresponding industrial activity in New York state," says a letter from the New England administrators. "We have accordingly decided that pursuant to the authority conferred on us we will permit our industries to continue in operation as best they may according to their individual fuel conditions without interference from the application of any general rule."

Window glass production this year was scheduled for 8,000,000 or more boxes, according to the fuel administration. The actual requirements are said to be less than 5,000,000 boxes. Competitive conditions would lead to this overproduction, it was pointed out, and Dr. Garfield said he has obtained practically a 100 per cent agreement with the window glass manufacturers to curtail their production in the interests of each other. To make it effective he accordingly issued an order, violation of which may invoke the penalties of the fuel bill.

Bituminous Distributor Named

A. W. Calloway, president of the Terminal Railroad & Coal Co., Pittsburgh, and the Davis Coal & Coke Co., Baltimore, has been appointed distributor of bituminous coal by the fuel administration as a member of the staff to be established by J. D. A. Morrow, manager of apportionment and distribution under Dr. Garfield. Manager Morrow and Distributor Calloway next Friday will meet with railroad officials and members of the staff of Director General McAdoo and take up the question of supplying railroads with fuel this year. This is expected to be an important conference.

Rifle Production Reaches Record Level

WASHINGTON, Feb. 26.—Production of army rifles is exceeding estimates of ordnance officers despite inability to obtain desired deliveries of steel, caused by fuel shortage, and a scarcity of skilled labor, Secretary Baker declares in an official war office statement. Since war was declared more than 700,000 rifles have been manufactured and lately, according to the secretary, production has been better than 70,000 a week. This rate is said to be sufficient to arm 14 army divisions each month.

Figures given by the secretary show that in the week ending Feb. 9 three arms manufacturing companies and two government arsenals turned out 71,192 rifles, 46,792 of which represent the week's production of Springfield and modified Enfield rifles. The remainder, 24,000, was manufactured for Russian account, but has been requisitioned by the American army. In the week before 50,872 Enfield and Springfield and 21,280 Russian guns were produced.

Record Production Claimed

This, the war department believes, is "a greater number of rifles than any nation ever produced in equal time." The production at that time, weekly, was "four times as great as the weekly production of rifles in Great Britain after ten months of war, itself an excellent achievement, and twice as large as the production of Great Britain after two and a half years of war."

The companies manufacturing these rifles are the Winchester Repeating Arms Co., the Remington Arms Co. and the Eddystone Munitions Co. The two government plants engaged in this production also are the Springfield armory and the Rock Island arsenal. These producers, up to Jan. 1, manufactured 345,460 rifles, according to Senator Weeks. This was an average of 1,365 daily, which compares with a daily production of 13,031, almost 10 times as much, in the two weeks given by the secretary.

Senator Weeks said the Eddystone company's production on Jan. 1 was

500 daily or a total of 128,124; the Springfield armory 350 daily, or a total of 87,324; Winchester, 300 and 78,538; Rock Island, 115 and 17,060; and Remington, 100 and 34.414. The secretary's announcement contains no similar tabulation for any period, but he said the 700,000 guns manufactured since April 6 is 100,000 more than were available when we went to war, giving a total today of more than 1,300,000 service rifles which include 160,000 Krags, 280,000 training rifles, 100,000 Russian guns and 20,000 Ross rifles.

Huge Force at Work

The ordnance bureau has spent or obligated itself for $400,000,000 for rifles and ammunition, the secretary said. This is keeping 200 officers, 80,000 men and 10.000 exclusively engaged in their manufacture, according to the statement, and is under the administration of the small arms division, ordnance bureau, of which Col. John T. Thompson is chief. Under him are Maj. L. P. Johnson, his assistant; Maj. J. T. Kenyon, chief inspector of small arms; Lieut. Col. J. E. Monroe, chief inspector small arms ammunition; Lieut. Col. Charles Elliott Warren, procurement section; Maj. E. A. Shepherd, finance section; Maj. Hayden Eames, production section; Maj. M. G. Baker, purchase section; and Maj. L. O. Wright, engineering section.

Secretary Baker says the actual needs of the army have been met and while there has been delay in satisfying these requirements the final results justify the tardiness. Decision to modify the Enfield rifle, being manufactured for England when this country went to war, came after consideration of the need of preserving manufacturing organizations, the secretary said. The department "was conscious of the responsibility resting upon the decision to standardize the rifle, but estimated that the standardizing of parts would compensate the lost time when manufacturing was brought to quantity basis." The secretary says present production fully confirms the "correctness of that calculation."

Fuel Oil Industry is Put Under License Control

Washington, Feb. 26.—In consequence of the pending fuel oil shortage, President Wilson has issued a proclamation which places under license as of Feb. 11 all manufacturers and distributors of fuel oil with annual sales of more than 100,000 barrels. Mark L. Requa, head of the oil division of the fuel administration, has charge of oil distribution which so far does not include gasoline and kerosene. Fuel Administrator Garfield has compiled the following list of activities which will have the preference in receiving oil supplies. Railroads and bunker fuel; export deliveries or shipments for the United States army or navy; export shipments for the navies and other war purposes of the allies; hospitals where oil is now being used for fuel; public utilities and domestic consumers now using fuel oil, including gas oil; shipyards engaged in government work; navy yards; arsenals; plants engaged in the manufacture, production and storage of food products; army and navy cantonments, now using oil for fuel; industrial consumers engaged in the manufacture of munitions and other articles under government orders.

Lack of transportation facilities is given as the chief reason for the inauguration of the licensing system and the use of tank cars and tank ships for other purposes has contributed to that shortage. Because of his wide experience in and intimate knowledge of the oil fields, T. A. O'Donnell, Los Angeles, has been appointed by Oil Director Requa to take charge of the oil production section.

Will Direct Licensing of Imports and Exports

Washington, Feb. 26.—Henry B. Van Sinderen has been made director of exports by the war trade board, succeeding C. A. Richards, who has been appointed chairman of the contraband committee, a new division of the Board. Mr. Van Sinderen, formerly with the American Trading Co., New York, has been assistant director under Mr. Richards. Mr. Richards' committee will be a general supervisory board over the import and export sections of the war trade board, according to popular interpretation of the order creating the division. It is to expedite the issuance or refusal of either import or export licenses and to act as the appellate body of the two license divisions.

Under Mr. Richards will be P. Chauncey Anderson, counsel of the import bureau; W. Kingsland Macy, assistant to Beaver White, the food administration's representative on the board; George J. McCarty and Richard A. Strong. G. K. Bell is secretary of the committee. Edwin F. Gay, dean of the Harvard school of business administration, selected by the shipping board to adjust import problems to available tonnage, has been made a member of the war trade board, the second member named by the shipping board. The other is Frank C. Munson. The trade board recently created the position of controller and named Herbert N. Strauss to the place.

Change Administration of Nonferrous Metals

Washington, Feb. 26.—Appointment of Pope Yeatman, New York metallurgist and consulting engineer, as director of the nonferrous metals division of the war industries board, is expected to be given heartier acclaim in the trade than was the selection of his predecessor, Eugene Meyer Jr., New York. Mr. Yeatman has been more closely identified with the production of metals than Mr. Meyer. For 10 years he was connected with the Guggenheim interests. He has been assisting Mr. Meyer, who has been made assistant commissioner on the staff of B. M. Baruch, chief of the raw materials section of the war industries board. Mr. Meyer has been engaged in special work for Secretary Baker and will continue for some time.

Notice was sent to the trade by Mr. Baruch last Thursday that immediately upon their receipt the zinc prices announced a week ago would become effective. This procedure differs from that of other price-fixing announcements under which the prices became effective upon their promulgation. Under this new plan delay in the mails may work to the advantage or disadvantage of the particular recipients, as the case may be.

At the office of L. L. Summers, director of chemicals and explosives, it was stated last week that the sulphuric acid supply will be adequate for all requirements if transportation facilities and labor supply are available. It was said that the reported commandeering of certain quantities of the acid by the government was only an interpretation of the general custom of government orders taking precedence over all others.

Japan's Iron and Steel Imports Are Heavy

Washington, Feb. 26.—Increases in Japan's foreign commerce in 1917 are reflected in her importations of iron and steel rather than of nonferrous metals. The value of iron and steel ingots, blooms, billets and slabs admitted to the empire was more than $12,500,000, an increase of $4,500,000 over 1916. Bars, rods, sheets, plates, wire, etc., advanced $50,275,000 over the $33,106,000 valuation of the year before. Imports of tin exceeded 1916

by nearly $1,000,000, aggregating $1,889,000. Construction materials admitted were valued at $4,850,000, more than eight times that of the preceding year. Machinery imports reached $15,437,000 compared with $8,135,000 in 1916.

Antimony imports dropped from $3,500,000 to $2,571,000. Lead fell from $3,750,000 to $2,900,000 and nickel declined from $1,000,000 to $498,000. Bronze and brass also fell off to $5,000,000 from $7,000,000. Ore receipts advanced from $8,081,000 to $8,533,000 and ammonium sulphate imports more than doubled, reaching $1,430,000. Copper exports, showed gains, as did zinc, the former reaching $43,750,000, $10,750,000 more than in 1916, and the latter going to $10,470,000 from $9,625,000.

Japan's total foreign commerce in 1917 was $1,315,441,000, divided as follows: Imports, $516,343,000; exports, $799,098,000. These three sums compare with $839,122,000, $377,079,000 and $562,043,000 in 1916.

Rulings Give Protection to Enemy Creditors

Washington, Feb. 26.—New financial rulings of the war trade board provide for protection of persons holding enemy paper; authorize payment of patent office fees on patents, trademarks, etc., of an enemy by any one holding power of attorney granted by the enemy, and permit collection of coupons for foreigners without first obtaining license, all with certain restrictions, however. The first ruling authorizes "all persons in the United States holding notes, checks or drafts, upon which an 'enemy' or 'ally of enemy' appears, or the handling of which involves in any way trading with, or for, or on behalf of, an 'enemy' or 'ally of enemy', to perform such acts as may be necessary to perfect their right against those secondarily liable on such notes, checks or drafts, in the event that acceptance or payment is refused", but only under license from the board.

Approval of Alien Property Custodian Palmer must be had before payment can be made of "United States patent office fees requisite for the filing, prosecution, registration and preservation of patents, trademarks, prints, labels or copyright of an 'enemy' or 'ally of enemy', by any person within the United States, where such person is the holder of a power of attorney granted by such 'enemy' or 'ally of enemy'." The war trade board authorizes "banks and others having coupons to collect, which were due prior to Jan. 1, 1918, for foreign individuals, firms, corporations or others, to make such collections without obtaining license from the war trade board or authority from the federal reserve board", on condition that the funds received, if believed to be the property or in the interest of an "enemy" or "ally of enemy", be held in separate account under notice to Mr. Palmer.

Capital Odds and Ends

The increase of 470 in the number of deaths in the coal mining industry last year over 1916, the total being 2695, was due to spasmodic speeding and retarding of coal production because of car shortages and uncertainties, and to the substitution of inexperienced for experienced miners called to arms, according to Secretary Lane.

* * *

Complaint has been made by the Independent Bridge Co., Pittsburgh, against the Pennsylvania railroad that an overcharge of $173.62 on a consignment of wrought iron annealing boxes to the Phillips Sheet & Tin Plate Co., Weirton, W. Va., was due to an existing rate of 7.9 cents while an adequate rate of 4.2 cents applies on cast iron annealing boxes.

* * *

A dealer in France has placed an order for $48,250 worth of alarm clocks manufactured in the United States. There is said to be a great shortage in Europe, and that if these clocks prove satisfactory many more will be purchased here.

* * *

Bids received by the post office department for five airplanes for aero mail service were as follows: United Eastern Airplane Co., delivery 80 days, $59,000; Standard Aero Corp., 63 days, $68,000, and West Virginia Aircraft Co., 90 days, $72,500.

* * *

The George A. Fuller Co. has been awarded a contract to construct an aviation concentration camp on the James river near Richmond, Va., at a cost of nearly $4,000,000.

* * *

The war department has announced it will not undertake the redistilling of confiscated liquors for the recovery of alcohol. It is said the expense would be too heavy when it is realized that only 5 per cent of the liquor is thus recovered.

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The department of justice has determined that the $400,000 fire at the quartermaster's depot at Port Newark Terminal, N. J., Jan. 26, was due to gross carelessness on the part of contractors constructing the wharf and has recommended civil proceedings to recover damages.

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The welfare plan of the army and navy is to be extended to the shipyards for the entertainment and enlightenment of the shipbuilders.

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In his latest plea for conservation of ammonia, Food Administrator Hoover declares the United States will require 20,000,000 pounds this year. He also says that one pound of ammonia is sufficient for 20 hand grenades. Mr. Hoover is going to ask large consumers of ammonia to report monthly.

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The bureau of foreign and domestic commerce is urging American manufacturers to prepare for Serbian trade after the war. The board says among the chief needs will be demands for pig iron, iron and steel bars, tin plate, galvanized sheets, rails, nails, chains and many fabricated products.

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The United States government is planning the constructon of an acetic acid plant at a cost of nearly $6,000,000. A site at Shreveport, La., is under construction as is also a plan to build an addition to an existing Canadian plant.

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Under arrangement said to be made with the war trade board, domestic graphite will be substituted largely for that now imported from Madagascar and Ceylon.

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Carriers have asked restriction in routing pig iron by way of the Louisville & Nashville railroad, Gadsden, Ala., and the Tennessee, Alabama & Georgia railroad from Oxmore, Ala., to Boyce, Tenn., and Chattanooga.

* * *

The Denver & Rio Grande railroad asks cancellation of the carload rate of 8.25 cents per 100 pounds on manganese ore, Red Cliff, Belden and Rock Creek to Pueblo, Minnequa and Blende, Colo.

* * *

The Delaware, Lackawanna & Western railroad seeks a rate of $2.60 per ton on pig iron, carload, from designated points on its line to destinations on the Grafton & Upton railroad.

* * *

The Missouri Pacific railroad asks an increase in the class and commodity rates, Alton and Edwardsville, Ill., to stations on its line, South Point to Osage, Mo., to the East St. Louis-Jefferson City basis, 45 cents per 100 pounds first class and 14.5 cents per 100 pounds agricultural implements.

* * *

The Pennsylvania railroad has applied for cancellation of the rates on rolling mill rolls, iron and steel, Allegheny and Pittsburgh to New Philadelphia, O., by way of Massillon and the Baltimore & Ohio railroad.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

POPE YEATMAN, consulting mining engineer, 111 Broadway, New York, has been placed in charge of the nonferrous metals department of the raw materials division of the war industries board, succeeding Eugene V. Meyer Jr., who retains his place with the war board, but who now is engaged on special service for the secretary of war. Mr. Yeatman takes up his new duties with a comprehensive knowledge of what these duties involve, as he had been acting as consulting engineer to the board ever since midsummer. In this capacity he gave the board much technical advice, especially with regard to the fixing of prices for nonferrous metals. Mr. Yeatman is regarded as one of the highest authorities in the world on mining affairs and properties. He was born in St. Louis in 1861 and, following his graduation from Washington university, St. Louis, in 1883, he engaged in mining work in Colorado and Mexico, later transferring his activities to Africa, where he acted as manager of a number of important properties. Later he returned to this country and was for 10 years connected with the Guggenheim interests. He left his position as chief consulting engineer for the Guggenheims about two years ago to take up independent practice as consulting mining engineer, in association with Edwin S. Berry, who now is a captain of a company of the Twenty-seventh engineers, the mining regiment. Messrs. Yeatman and Berry have given up their offices and their practice until after the war. Mr. Yeatman will have his headquarters in Room 813 Council of National Defense building, Eighteenth and D streets, Washington, where he will move his office staff.

C. B. Lihme, Chicago, has been elected president of the Matthiessen & Hegeler Zinc Co., La Salle, Ill.

Charles H. Moyer resigned recently as vice president of the Pennsylvania Shipbuilding Co., Philadelphia and Gloucester, N. J.

O. M. Hibler, with the Mahoning National bank, Youngstown, O., has been made treasurer of the Liberty Steel Co., to succeed Edward F. Clark, who has served as both president and treasurer since the company's organization. Mr. Hibler will assume his new duties April 1.

John E. Bradley, president of the Osgood Bradley Car Co., Worcester, Mass., is enjoying a vacation at Palm Beach, Fla.

William A. Viall, works manager of the Brown & Sharpe Mfg. Co., Providence, R. I., was recently elected president of the Rhode Island society, Sons of the American Revolution.



POPE YEATMAN

F. C. Hossie recently sold his interest in the J. R. Stone Tool & Supply Co., to become president of the General Mfg. Co., Detroit, tools and jigs.

E. F. Carry, president of the Haskell & Barker Car Co., Michigan City, Ind., was recently elected a director of the Continental & Commercial National bank.

William M. Brouse, a prominent business man of Brockville, Ont., will move to Ottawa, having been appointed assistant manager of the International Harvester Co., there.

Ernest L. Teich, who for many years has been head of the pattern-making department of the P. & F. Corbin division of the American Hardware Corp., New Britain, Conn., has been made mechanical superintendent to succeed William S. Trask, resigned.

Charles F. Olin has been appointed a member of the department of public information, and expects to be called to Washington. He is advertising manager for the New Departure Mfg. Co., Bristol, Conn.

John K. Graham has been appointed general manager of the Sun Shipbuilding Co., Chester, Pa., having resigned his position as vice president and general manager of the Virginia Bridge & Iron Co., Roanoke, Va.

Charles H. Gifford has been appointed vice president and general manager of the Southworth Machine Co., Portland, Me. He was formerly vice president of the American Blower Co., Detroit.

J. L. Price, who for some time has been assistant to the chairman of the board of directors of the Chicago Pneumatic Tool Co., Chicago, was recently elected vice president in charge of finances.

Waldo C. Bryant, president and treasurer of the Bryant Electric Co., Bridgeport, Conn., was recently named civilian production manager of the ordnance department for Connecticut and western Massachusetts, with headquarters at New Haven, Conn.

D. McCall White, vice president of the Cadillac Motor Car Co., Detroit, has been named one of the three members of the aircraft board's supervisory committee to pass upon improvements in the liberty aircraft engine.

Edward P. Quinn was appointed superintendent of the foundry department of the Bilton Machine Tool Co., Bridgeport, Conn., upon his resignation as manager of the Turner & Seymour Mfg. Co. foundry at Torrington, Conn.

Griffith Coit, formerly purchasing agent for the Lake Torpedo Boat Co., Bridgeport, Conn., has been made general purchasing agent for the American Shipbuilding Corp. and the Chester Shipbuilding Co. His offices will be in the Finance building, Philadelphia.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

SIDNEY J. JENNINGS, who was elected president of the American Institute of Mining Engineers at that organization's 116th meeting, held in New York last week, is vice president and director of the United States Smelting, Refining & Mining Co., Boston and New York, and for some time had charge of exploration and mining investment for that company. He was vice president of the institute the past year. At the institute's 1917 meeting, he was defeated for the presidency on a letter ballot by Philip N. Moore, St. Louis, whom he now succeeds. As a consulting and mining engineer, he has had a wide experience, his work in the South African Transvaal gold fields attracting much attention, since he spent many years there. He becomes head of the American Institute of Mining Engineers under auspicious circumstances, since during 1918 geologists, metallurgists and mining engineers the country over will be called upon to conserve and utilize to the best possible advantage, the country's metal resources.

John W. Harrington, of the Harrington & Richardson Arms Co., Worcester, Mass., is doing war service in Paris, driving a motor truck, according to letters received.

Thomas G. Bennett has been elected president and treasurer of the Winchester Repeating Arms Co., succeeding Winchester Bennett, who is to take up special work for the company.

R. H. McNall, who as president of the Gilbert & Barker Mfg. Co., gas and fuel oil furnaces and oil storage apparatus, has maintained offices in New York, will until further notice have his headquarters at the works office, Springfield, Mass.

Roger W. Babson, president, Babson's Statistical Organization was recently made chief of the industrial relations division of the commission on public information. He will inform manufacturers as to the status of the labor division's war work.

Lester J. Adams, Lewiston, Me., district agent for the Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of leather belting, has been appointed a second lieutenant in the ordnance department and has reported for duty at Washington.

Earl B. Morgan, safety engineer of the Norton Co., Worcester, Mass., for two years in charge of the safety engineering department has resigned and after March 1 will be affiliated in a similar capacity with the Liberty Mutual Insurance Co., Boston, specializing in workmen's compensation insurance. Prior to joining the Norton organization, he had charge of the safety engineering and employment departments of the Commonwealth Steel Co., St. Louis.



SIDNEY J. JENNINGS

Jesse G. Vincent, affiliated with the engineering staff of the Packard Motor Car Co., Detroit, and who was one of the designers of the Liberty motor has been promoted to the rank of lieutenant-colonel as a recognition of his services with the war department.

William F. Vosner, formerly office manager in New York for the Midvale Steel & Ordnance Co., is now general manager of sales for the Donner Steel Co., Buffalo, having resigned his New York connection Feb. 1.

Clark H. Tenant, who has been affiliated with large machinery and foundry concerns in West Allis, Wis., and Milwaukee, for several years, has been made assistant general superintendent of the naval ordnance works, East Moline, Ill., established by the Root & Vandevoort Co.

John C. Spence, superintendent of the Norton Grinding Co., Worcester, Mass., was recently elected president of the Superintendents' club connected with the Worcester branch of the National Metal Trades association. The members of the club will be the guests of the Simonds Mfg. Co., Fitchburg, Mass., March 14.

C. E. Middleton, who recently succeeded Walter S. Bickley, retired as first vice president of the Penn Seaboard Steel Corp., Philadelphia, has charge of ingot and plate output. H. J. Klaer, formerly general manager, succeeds Mr. Middleton, as second vice president and will have charge of the production of castings.

Lieut. W. H. Chapman, who graduated from Princeton university and became research engineer for the Norton Co., Worcester, Mass., has been ordered to France as a member of a commission of 10 under command of Major Ulian Collidge, formerly of the Harvard university faculty. It will make an investigation and research in aerial bombing.

Julius S. Holl, who was recently appointed assistant head of the department of shipyard volunteers of the United States shipping board, was advertising manager for the Link-Belt Co., Chicago. He has been active in the enrollment of 250,000 volunteer skilled workers for shipyards and has an office at 207 National Theater building, Washington.

Colonel Charles N. Monsarrat, prominent Canadian bridge engineer, has been elected a director of the Canada Foundries & Forgings Co. In 1889 he became structural draftsman for the Canadian Pacific railway and eight years later was made engineer in charge of designing and erection of important structures in British Columbia and elsewhere. Later he became engineer of bridges, but resigned in 1911 when he was appointed chairman and chief engineer of the Quebec Bridge commission.

Northwest Teeming With Industry

Shipbuilding is Foundation for Tremendous Activity of Iron and Steel and Auxiliary Plants—Many New Yards Being Built—New Steel Plant in Prospect —Market Conditions in Seattle and Vicinity

SEATTLE, Wash., Feb. 21.—The present high tide of industrial activity here is founded upon the shipbuilding industry which has come to be of first consequence; employing in Seattle alone at the present time approximately 23,000 men. This number will be greatly increased during the coming months through the efforts of the government. It is quite likely that before the summer is over at least 30,000 men will be employed in Seattle yards. Steel shipyards are doing the bulk of construction and will probably continue to do so, nearly four-fifths of the men now employed being attached to these yards. State Director Robert Moran of the public reserve service finds that the government call for enrollment is very satisfactory. Activity is also quite pronounced at Tacoma where both steel and wooden ships are under way.

The government is the chief builder of ships in northwest yards as well as elsewhere. At the present time yards at Seattle are under contract to construct for the shipping board 47 steel and 18 wooden vessels. The cargo fleet contracted for in this city aggregates 469,000 tons deadweight, 406,000 tons in steel ships and 63,000 tons in wooden ships. A recent contract was that awarded to the Skinner & Eddy Corp. for fourteen 8800-ton steel ships, making a total of 19 of this type which the company has contracted to construct for the government.

Many Shipyards Building

Numerous wooden ships are being constructed on Grays Harbor in southwest Washington and in the Oregon section with Portland as its center, approximately 14,000 men are employed in construction of both steel and wooden ships. The Standifer Construction Co. at the present time is building a large steel yard at Vancouver, Wash., where it will construct ten 9500-ton steel ships for the government. Vancouver, British Columbia, is witnessing an extensive revival in shipbuilding. C. J. Coughlan & Sons are getting under way in constructing a large yard for building steel ships and other activity is going forward. Everett, Wash., also is entering the list. The Norway Pacific Construction & Dry Dock Co. has been organized by M. G. Tholme, W. A. Stockbridge and others. A site for the plant has been purchased. Building ways will be provided for five steel and two wooden ships. This company has succeeded in placing orders in the east for steel and other equipment for its yard.

In the matter of operation, the larger yards of the northwest are running three shifts and allied industries such as machine shops and foundries are running three shifts in some instances and in others, two. Those running one shift would run more if they could get the men. The climate in the northwest is mild enough to permit continuous operation and no time is being lost on account of snows and other weather conditions.

Finance New Steel Plant

In the matter of materials for construction, the wooden ship presents no great difficulties as the timber is close at hand and transportation is ample. A thing which will have a tendency to stabilize steel shipbuilding in the northwest is the proposal to erect a large steel mill on Puget Sound. B. L. Thane, manager of the Alaska-Gastineau mine and others have financed the plant and taken every necessary step to secure its construction and operation. It is proposed to begin erection of this mill in the near future.

The coke situation which caused considerable worry during the past few weeks is somewhat improved, although the anticipated aid from the Crows Nest coal fields in British Columbia did not materialize. Properly selected coal from this field produces coke that compares favorably with Connellsville coke but it has not been forthcoming and it required the greatest skill and expedition on the part of those having the coke situation in hand to prevent the closing down of a number of foundries. While shipments of coke from the east are not arriving in a satisfactory manner, the Wilkeson or local supply is about back to the normal of production since a cavein occurred at the mine some weeks ago and by careful distribution and handling there will be no necessity for shutting down any of the foundries. The great majority of the latter are engaged almost exclusively on work that enters into the building of government ships. The Wilkeson coke does not meet the requirements alone but when the British Columbia field is placed in a state of development where the right quality of coal can be had, this fuel probably will be used in increasing quantities, thus reducing to the minimum the danger of having plants shut down in the future. The British Columbia field is not in a condition at the present time to supply this coal.

In the matter of pig iron the situation is not so serious. No. 1 foundry pig iron selling at $50 a ton delivered, based on the government price of $33, furnace. Very little pig iron is being produced in the northwest. The Pacific Coast Steel Co., Seattle, is producing a limited amount at Irondale, but this is consumed at its own plant. Iron therefore, must be shipped in from the east or south. Foundrymen state that they are now getting pig iron for the last half of the year at figures based on the government price. The price of good machinery cast iron scrap is running at $35. The price some months ago was as high as $40, but has been gradually going down. Scrap dealers were unable to hold the market at the high figure. The tonnage of steel scrap is furnished largely by the railroads. The government price prevails for all classified grades of steel scrap. There are small quantities that are furnished by the scrap dealers under the head of unclassified scrap, commonly called mixed scrap. These dealers bought steel scrap last fall as high as $34 a ton. Then the drop in the market came and the price became a matter of barter, ranging from $20 to $29 a ton. Good steel scrap is now being bought for $25 a ton.

Structurals for Shipbuilding

Such structural shapes as are being produced in the section are for domestic use, largely for shipbuilding, on all of which the government prices prevail. Very few licenses are being issued for export, which reduces exports to a very small matter. The only product in which there has been any considerable activity for export purposes is steel bars and during the past month there has been considerable inquiry, particularly from Japanese sources. A fair amount of tonnage was placed at 3.90c to 4c, 3.90c being the price the buyers were able to get from eastern mills. Local steel mills by being able to make quicker delivery, secured the better price. There is promise of more activity in this line as coast mills are filling up with orders and delivery is being placed further into the future. Imports are practically nil, the largest consignment

for several months being 1121 tons of pig iron from China last October.

On the point of labor there is a shortage of skilled mechanics which does not seem to be in the way of a quick adjustment. The trouble has been that so many of the men coming in are not skilled mechanics. The government is trying to relieve this situation by the drive now going on for shipyard workers. While there is some talk of a strike in the lumber camps and considerable expression in favor of increase of wages in the shipyards on account of the increased cost of living, there is no prospect of serious trouble. The government adjustment of wages dated from August, 1917, and the cost of living has gone up in Seattle 8¼ per cent since October 10. Under the government adjustment the wages were less than the demands of the worker's and less than the scale paid by the Skinner & Eddy Corp., one of the largest of the steel yards. Under the wages decided upon by the government for the shipyards machinists were to have $5.25 plus 10 per cent if they worked 48 hours a week; molders, $5.25, patternmakers $6.50, blacksmiths $5.35, coppersmiths $6, sheet metal workers, $6 and boilermakers $5.25, with the 10 per cent additional if they worked 48 hours during a week. On February 1, this 10 per cent automatically became a part of the wage scale. Now the molders outside the shipyards are getting $6 and better and in some instances asking for 10 per cent on this. Under the government scale, pattermakers would be entitled to $6.50 plus 10 per cent and many of them are drawing as high as 7.50 to $7.75. There are about 5000 men employed in the machine shops, foundries and miscellaneous shops of Seattle.

Castings Prices Have Risen

There is no uniform price for castings. Prices have risen generally but during the past two months the markets for gray iron machinery castings have not materially risen. It has been largely a matter of adjustment between seller and purchaser running from 7 to 8 cents per pound and on into higher figures depending on whether or not the work on the casting is complicated. Steel castings run all the way from 10 to 45 cents per pound, depending on the nature of the casting. As with the iron, there is no uniform price and it has been a matter of negotiation.

On the whole the industrial situation of the northwest is one that gives satisfaction. The growth has been remarkable as indicated by the bank clearings which are 97 per cent higher than they were a year ago at Seattle and by monthly payrolls at the shipyards which are in excess of $2,000,000. While Seattle and vicinity are witnessing the most activity, industrial growth is evident in an ever increasing degree in every port of the northwest and there is probably not a machine shop foundry or steel mill in the entire section that is not doing work to its full capacity in assisting the government in its war

To Spend Millions

After a tour of inspection of the Sparrows Point, Md., plant of the Bethlehem Steel Co., where $25,000,000 recently was expended on improvements, Charles M. Schwab stated that $25,000,000 more will be put into extensions. It is the intention, he said, to make the Maryland works one of the finest steel and shipbuilding plants in the United States. Mr. Schwab said that the object of his visit was to inspect the new improvements, especially the tin plate mill, which has been placed in operation since his visit last July.

Obituaries

ROWLAND G. HAZARD, 63, died of heart failure recently at Santa Barbara, Cal. He served as chairman of the board of the Semet-Solvay Co. and the Solvay Process Co., and was a director of several other large corporations. Other positions held by him at the time of his death were president of the Peace Dale Mfg. Co., Peace Dale, R. I., manufacturer of woolens; president of the Narragansett Pier Railroad Co.; vice president of the Mechanics National bank, Providence, R. I.; and director of the American Exchange National bank, New York City.

William H. Stewart, president of the Brownell Co., Dayton, O., manufacturer of boilers and engines, died recently at his home in Cincinnati, where he had other business connections, at the age of 65.

W. J. Miller, who built the Aurora, the largest wooden vessel on the Great Lakes, which was sunk in Lake Erie in 1905, died recently in Cleveland, where he made his home. He also built the first steel vessel constructed on fresh water, the steamer J. K. WHITE.

Edwin L. Gates, who was superintendent of the Worcester Wire Co., Worcester, Mass., since it was organized until it was absorbed by the American Steel & Wire Co., died recently at his home in that city after a long illness, at the age of 84.

George Summers, who for 10 years was salesman and steel statistician for the Carnegie Steel Co., going there from the Allison Mfg. Co., Philadelphia, but lately affiliated with the Federal Export Corp., New York, died recently at his former home in Philadelphia of pneumonia.

Floyd Clarke Coon, member of the firm of Hinds & Coon, dealers in mill supplies and beltings, Boston, died at his home in Brookline, recently. He was born at Cornwall-on-the-Hudson, N. Y., June 8, 1867, and moved to Cambridge, Mass., with his parents, when he was 13 years of age.

Arthur I. Jacobs, who for 15 years has been president and treasurer of the Jacobs Mfg. Co., Hartford, Conn., drill chucks, died in a hospital in that city recently, after a paralytic stroke. He was 59 years old and at the time of his death was likewise a director of the American Industrial Bank & Trust Co., in Hartford.

Lieutenant Walter L. Foulke, who before he joined the officers's reserve corps of the army, was manager of the C. Pardee Works, Perth Amboy, N. J., died recently at Camp Kelly, San Antonio, Tex. He was a graduate of Princeton university. Before his death, the commanding officer at the camp had recommended his promotion to the rank of captain.

H. A. Bayfield, Canadian wharf construction engineer, died recently at Ogden Point, B. C., where he was in charge of the government assembling plant for munitions. He at one time was engaged extensively in wharf construction at St. John, N. B., and other eastern ports, and more recently was government superintendent of dredges for British Columbia.

Fred H. Forman, who in 1901 became general sales manager for the Pittsburgh Steel Co., but who retired in 1913, because of the condition of his health, died recently of pneumonia in South Pasadena, Cal., after a short illness. His first business connection was as treasurer for the St. Louis Wire Co., and when the Consolidated Steel & Wire Co. was organized he was placed in charge of sales in its Louisville office, where he remained until the formation of the Pittsburgh Steel Co., about 17 years ago.

Chaser Plant

Begun by Ford at Detroit—First Keel Is Laid

Detroit, Feb. 26.—The Ford Motor Co. has begun the construction a shipyard on the site of its proposed blast furnace, on the River Rouge, which will cost $2,000,000 and employ 15,000 men. The plant will cover a square mile and will turn out a new type of submarine "chaser", built of steel, 200 feet long and equipped with a device for dropping depth bombs. They will be turned out at the rate of one a day and will be sent to salt water under their own power with full crews taken from a naval barracks to be maintained on the site which will house 2000 "jackies".

There will be five buildings, all of which are to be completed by May 10 or 75 days. The steel fabricating shop will be 150 by 450 feet and three assembling plants, 100 x 1500 feet each. Another building, housing the transfer tables, will be 100 x 1500 feet. They will cost $1,000,000. The plant is being erected from plans prepared by Albert Kahn, Detroit architect, who designed most of the buildings for the United States army cantonments and aviation fields.

Secretary of the Navy Daniels has been in Detroit several times inspecting the plants of the Ford company, as the guest of Henry Ford. Rear Admiral David W. Taylor, of Washington, head of the navy department bureau of construction, is also supervising the work.

The first vessel is being assembled at the plant while construction of the shipyard is under way. While the company is doing a vast amount of war work, it is continuing production of motor cars on a curtailed schedule. To what lengths the Ford company may go in war work can best be judged by the fact that the Detroit plant alone covers 350 acres with 88.32 acres of floor space. In addition there are 39 branches and assembly plants occupying, in the aggregate, 164 acres. Under normal conditions 46,000 men are employed in the various plants. In the last fiscal year the plant turned out 785,432 cars requiring 325,000 tons of steel; 3,500,000 lamps; 12,775,000 feet of vanadium steel shafting and axles; 88,016,880 feet copper tubing; 9,800,000 pounds of steel for magnetos; 6,300,000 square feet of galvanized metal for gas tanks; 59,458,000 square feet sheet metal for guards and fenders and 22,471,680 feet of tubular radius rods.

The Michigan Copper & Brass Co., of Detroit, operating one of the largest plants in the west producing thin gage copper and brass, has installed 16 sets of new high speed rolls in its new plant addition. This gives the mill a capacity of 60,000 pounds of thin gage metal a day, much of which is used in the motor car industry. The new additions represents an expenditure of $300,000. The company at its annual meeting Feb. 13 re-elected all officers and directors, with D. M. Ireland, president, and Alonzo P. Ewing, general manager. Net earning on $991,350 common stock outstanding were $596,819 for 1917. Surplus is $1,434,000.

The Murphy Iron Works, Detroit, has let a contract to the Cooper-Widman Construction Co., for the erection of factory building 80 x 80 x 89 feet.

The Anderson Forge & Machine Co. is having a $10,000 forge and die factory erected by C. Keller & Co.

The Fisher Body Co., Detroit, has let a contract to W. E. Wood for the construction of an aeroplane factory at West End avenue and Fort street.

Quick Work

Done by Canadian Government in Starting Standardized Shipbuilding

Toronto, Can., Feb. 25.—No time has been lost by the Canadian government in putting into effect its recently announced policy of extensive ship construction. Contracts have been awarded for the building at the Canadian Vickers shipyards of a cargo steamer of 8200 tons dead weight, the keel of which will be laid before the end of the present month, and another of 4350 tons, dead weight, to be commenced shortly afterwards. These will be the first of a fleet of about 30 steamers varying in size from about 3000 tons dead weight to 8200 tons. The majority of the smaller sized vessels will be constructed on the yards bordering on the Great Lakes, so as to enable them to pass through the canal locks. Every ship will be built to a standard set of plans and specifications so as to facilitate construction, the important thing being to get the vessels in commission as quickly as possible. The marine department has succeeded in arranging for a full supply from the United States of all the plates and shapes which will be required until June, 1919. By that time it is anticipated that large rolling mills will have been established in Canada from which the subsequent demand will be supplied. With the exception of these plates and shapes every part of the ships will be of home manufacture.

An investigation by the marine department has shown that the following shipyards will be available at some time during the present year: Canadian Vickers, Montreal; Davie Shipbuilding Co., Levis, Que.; Collingwood Shipbuilding Co., Collingwood, Ont.; Polson Iron Works, Toronto, Dominion Shipbuilding Co., Toronto; Port Arthur Shipbuilding Co., Port Arthur; Midland Shipbuilding Co., Midland; British American Shipbuilding Co., Welland; Allis-Chalmers Co., Bridgeburg, Ont.; Nova Scotia Steel & Coal Co., New Glasgow, N. S.; Wallace Shipyards, Ltd., Vancouver, B. C., and Tidewater Shipbuilding Co., Three Rivers, Que. Some other shipyards at present fully occupied which may be available later are not as yet taken into account. There are at present only three berths vacant in these yards at which the Canadian government ships can be built, but a number of the contracts now on hand will be completed during the spring and summer leaving room for the government work.

J. Scollen, general manager for the Canadian Allis-Chalmers Co., announces that contracts have been signed for the building of four large lake steamers at that company's plant near Bridgeburg, Ont., which was formerly operated by the Canada Foundry Co. Electrical machinery is now being manufactured for the plant.

The Montreal Locomotive Works has received an order for 20 locomotives for the Chilean State Railway. This plant also is filling an order for 20 locomotives for the government railway of the South African commonwealth.

The government has created a war trade board consisting of Sir George Foster, minister of trade and commerce; Frank P. Jones, Montreal; John W. McConnell, Montreal; James H. Gundy, Toronto; Charles B. McNaught, Toronto, and Joseph Gibbons, Toronto, the latter representing the labor interests. The board is given wide powers including direction of licenses for export and import, supervision of all industrial and commercial enterprises to prevent waste, to investigate the stock of raw materials and products and direct distribution, and to work in co-operation with the Canadian war mission at Washington.

It is officially stated that the Steel Co. of Canada now is ready to start on the contract for 75 millimeter shells placed with it by the American government. It is also still busy on 4.5-inch shells. A good export trade is being done with South Africa, New Zealand and Australia.

To Fix War Labor Policy

Important Joint Conference of Representatives of Employers, Employes and Public Begins at Washington—Expect Far-Reaching Decisions

WASHINGTON, Feb. 25.—That capital and labor must change their minds and maintain a right attitude toward each other was the way Secretary of Labor Wilson summed up the first meeting of the joint conference of employers and labor leaders today. These parleys which may extend over a period of weeks, have for their purpose the elimination of much of the misunderstanding which exists between employers and the government and between employers and their workmen. The goal sought is an arrangement which will assure for the duration of the war maximum production of everything necessary to the maintenance of the American army at home and abroad. At the initial gathering, Secretary Wilson stated that on the basis of the agreement to be reached, the government will lay down a national labor policy to continue in force until the war ends and will, if necessary, seek legislation to enforce it. He believed, however, that once an agreement is reached, both capital and labor will arrange to keep its provisions, although it is realized that no agreement would entirely prevent labor dissatisfaction and strikes.

Many Disputes Before Conference

Fifty-nine separate disputes which are at present upon the labor department's conciliation list, confront the conference. These include the following: Empire Steel & Iron Co., Catasauqua, Pa.; Canton Stamping & Enameling Co., Canton, O.; Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; Remington Arms Corp., Bridgeport, Conn.; Continental Can Co., Syracuse, N. Y.; Kerr Turbine Co., Wellsville, N. Y.; Curtis Aeroplane Co., Buffalo; General Electric Co., Schenectady, N. Y.; and the B. F. Sturtevant Co., Boston.

At the suggestion of Secretary Wilson, whom President Wilson directed to formulate a labor program for the war, the national industrial conference board named five representatives of employers to attend the conference as follows: Loyall Osborne, New York, vice president of the Westinghouse Electric & Mfg. Co.; Charles F. Brooker, Ansonia, Conn., president of the American Brass Co.; W. H. Van Dervoort, East Moline, Ill., president of Root & Van Dervoort Engineering Co.; L. F. Loree, New York, president of the Delaware & Hudson Railroad Co., and C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge & Iron Co. The representatives selected by the American Federation of Labor include: Frank J. Hayes, Indianapolis, president of the United Mine Workers; William L. Hutcheson, Indianapolis, president of the Brotherhood of Carpenters and Joiners; J. A. Franklin, Kansas City, president of the Brotherhood of Boiler Makers; Victor Olander, Chicago, representative of the Seamen's Union, and T. A. Rickert, Chicago, president of the United Garment Workers. Two representatives of the public will be named to make up the twelve members of the conference.

One problem expected to be hard to solve is that of the open or closed shop. Some officials believe it may be necessary to establish standard wages in districts to prevent the various industries engaged in war work from bidding against each other.

The conferees represent some 70,000 manufacturing plants working on government contracts and more than 2,000,000 union workers. Nonunion labor has no representation and neither have the railroad brotherhoods. Any arrangement reached will apply to unorganized labor but not to the railroad employes, whose claims are to be dealt with separately.

High-Paid English Workers Spending Lavishly

One by-product of the war in England which is finding its counterpart in many sections of the United States is the liberal spending for luxuries induced by high wages. This is particularly true in the steel centers, and shopkeepers of Sheffield are experiencing better business than has obtained for several years. The latter always have claimed that the most profitable and satisfactory class of business is with the working people, when employment is regular. Then money is spent with a prodigal hand by the workman and his family, all transactions are on a cash basis, and no haggling over price. While professional people, during the past year, have been compelled to observe the most rigid economy, the wage earners have been able to buy the best and most expensive of everything. Never before have tradesmen sold so many sealskin coats, furs, silk waists, etc., and most of this business has been with women with shawls over their heads, according to the *Sheffield Telegraph*. So common have furs costing 20, 30 and 40 pounds become among women mutioneers that well-to-do-ladies do not care to buy and wear them. A sealskin coat was purchased not long ago in Sheffield at a price of £120, and it was delivered at a house in the poor district where the rent would not exceed 7 shillings a week. Manchester, London and Bradford warehousemen report that their turnover in Sheffield has been phenomenal.

That this is not confined to wearing apparel is evidenced by like reports from butchers and provision dealers, who are disposing of their choicest products to the working classes. Vast sums are being spent on pianos, jewelry and high-grade furniture.

Labor Notes

Applications are being received by the navy department from women who are able to qualify as ship draftsmen. Salaries range from $4 to $6.88 a day.

Women are being employed in some parts of the Pennsylvania anthracite fields for weighing, since male labor has become so scarce.

On the Pacific coast the United States shipping board is giving a 10 per cent increase in the wages of night workmen in shipyards, in an effort to expedite production.

For the shipyard workers employed by the New York Shipbuilding Co., Camden, N. J., 250 houses are being built. This is the first operation in the scheme to house the nation's shipbuilders.

An appropriation of $500,000 has been asked by Secretary of Labor Wilson in order that funds for transportation expense may be advanced to labor bound to farms and shipyards. This is in harmony with the Australian system.

To train women for farm work, the government has under consideration a plan to establish a camp, to which they may be sent when recruited, since a period of instruction is necessary for those who have had no previous farming experience.

Fifty-seven stars were recently added to the 9 x 16-foot service flag unfurled recently by the Norton Co., Worcester, Mass., making the total 397. In the lobby of the company's administration building, a cabinet has been placed containing the names of each man in service, followed by the branch of service to which he has been assigned.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Reserve Board to Probe Capital Issues

WASHINGTON, Feb. 26.—The revised bill creating a war finance corporation, to be taken up by the senate, would control all security issues larger than $100,000 and place that control in the hands of the capital issues committee of the federal reserve board. This committee, already acting on issues larger than $250,000 without authority of law but with support of all federal reserve member banks, has reduced this sum to $100,000 and will continue approving or disapproving such new financing.

This decision of the committee was announced last week with the explanation that the majority of new issues, especially many of those it feels are unnecessary, are of amounts smaller than $250,000. The impression prevails that the committee acts only upon state, municipal or county issues, but this is erroneous because the plan fully covers any new financing undertaken by any public utility or industrial corporation the extent of whose new issue of security would top $100,000.

Complete Information Wanted

The committee points out no particular application form is required but it does want complete information as to the proposed issue of bonds, notes, shares, etc. The committee wants to know if the purpose of the new issue "is to refund, fund, pay or extend outstanding bond, obligations or indebtedness," the nature and character of the bonds, etc., to be refunded and the time or times and the general purpose for which unsecured indebtedness was incurred. It also desires to know if the issue is for war purposes or to raise capital in connection with war contracts or war supplies or to provide equipment, buildings or facilities for war work.

If war purposes are involved, the committee asks that reference be made to the proper governmental authorities at Washington and elsewhere to enable definite information and corroboration to be obtained directly by the committee. A clear exposition must be given if the issue is for private financial requirements and no public interests are involved and the issues must be fully described if believed necessary for public health, welfare, or necessity or are for the account of any governmental requirement, whether national, state, municipal or county.

In all explanations and applications, the committee requires a statement why the proposed issues cannot be postponed until after the war, or why the necessity is greater than the national needs in conserving financial resources, materials and labor.

Data to be Furnished

The committee asks the following information be given as fully as possible for any governmental issues:

"Names, amount, date, and dates of maturity and serial numbers of proposed bonds, notes or other securities.

"Amount of total authorized issue of which proposed issue is part.

"Attested copies of votes, ordinances or resolutions authorizing proposed issue.

"Attested copy of mortgage, deed of trust, or similar instrument under which proposed issue is made or by which it is secured.

"Last balance sheet of corporation and copy or charter and by-laws, if in print."

If the issue is of shares of stock, the committee asks:

"Total capitalization of company.

"Last balance sheet and copy of charters and by laws if in print.

"Total authorized issue of stock of which proposed issue is part.

"Amount of proposed issue, method and dates of issue, whether by offer to shareholders or sale or public subscription.

"Attested copies of votes authorizing proposed issue."

The capital issues committee, its advisory board and representatives of public utility commissions will meet here Thursday mainly to see if the commissions cannot urge postponement of construction and development work whether contracted for or stipulated in franchises, when the work does not directly contribute to winning the war.

Steps were taken last week to curtail roadbuilding unless they are actually war highways. More than $300,000,000 is spent in road construction annually and this sum is urged reduced as far as practicable. F. H. Goff, member of the capital issues advisory committee; L. W. Page, representing the federal bureau of public roads, and the following state road commissioners attended a conference at which this subject was discussed: G. P. Coleman, Virginia; A. D. Williams, West Virginia; Henry G. Shirley, Maryland; Thomas H. McDonald, Iowa; Thomas H. French, New Mexico; and Paul D. Sargent, Maine.

Steel Shortage Big Factor in Cutting Profits

How the shortage of steel which has prevailed universally during the past year has affected the railroads, equipment companies and business in general, is briefly but graphically outlined by President F. N. Hoffstot, of the Pressed Steel Car Co., in his annual report to stockholders. The company did a larger gross business in 1917 than in 1916, amounting to $44,034,000, as against $31,202,000 but net income was only $2,130,000 against $2,751,000 the year before. After all deductions the balance available for the common stock was only slightly over $10 a share, compared with $15 a share in 1916. This showing was due directly to the inability to get raw material and labor.

Delayed Supplies Cut Profits

President Hoffstot points out these facts in his statement to stockholders. He says: "It is a disappointment to your management that the percentage of profit has not been greater, but it is largely due to the two contingencies referred to in last year's report—the

inability to secure regular supplies of raw materials and labor.

"In the manufacture of steel cars it is necessary that component factors reach plants in proper proportion and regular order. For example, the average car requires for its construction approximately 50 per cent plate steel and 50 per cent steel in the form of shapes and bars. Until the middle of October there was received less than one-half the plate steel requirements, with the result that inventories were unduly increased to more than treble in value and double in units on account of large quantities of shapes and bars coming in regularly without plates, thus causing additional expense. In order to increase production, fill orders as nearly as possible on time, and minimize loss, there was purchased outside of existing contracts a large quantity of plate steel at a high average price.

"The establishing, however, of fixed prices prevented utilizing the steel due from the original source of supply at the time deliveries could be secured on basis of the delay in the receipt of complete material postponed the construction of some work over a period in which there were several increases of wages of day workers, and in this period shop supplies including fuel increased in the same ratio. This was serious, because a large percentage of the business was taken prior to Dec. 1, 1916.

Equipment and Terminals Needed

"It is our firm belief that if adequate provision had been made for equipment and terminal facilities in the past to keep pace with the country's increase in tonnage there would not have been this desperate freight congestion, nor would the cost of materials and labor have advanced so rapidly. For example, the tonnage capacity for steel ingots has increased from 30,000,000 tons in 1912 to 50,000,000 in 1917, and as far as we are able to definitely ascertain, there were less cars available in 1917 than six years ago. The increase in this kind of tonnage causes serious demands in the way of cars and locomotives by reason of the fact that six or seven tons of limestone, coke, pig iron and other materials are required to be hauled in the production of one ton of steel ingots.

"A matter of the gravest importance in the present crisis which it is hoped our government may promptly correct is the migratory disposition of workingmen, as to win the war it will require steady, sober application by every one. Labor conditions have been most difficult, and we can no better illustrate this than by the statement that during the year we employed four men for every job, that is, each employe averaged only three months' service with us. This changing of employment slows down production and tends to make high costs."

Breaks Quarter's Record

Steadily rising net earnings gave the Colorado Fuel & Iron Co., Denver, the record-breaking total of $2,334,763 for the final quarter of 1917. In the corresponding periods of 1916 and 1915, they aggregated $1,886,359 and $896,351 respectively.

Gross receipts of $10,297,600 in the last quarter of 1917, showed a gain of $1,139,792 over the corresponding quarter in 1916. The operating costs were $8,203,638 which was approximately $1,000,000 greater. Interest and taxes also increased, bringing the surplus down to $1,540,816, a total of $227,200 larger than the year before.

Allis-Chalmers Gains Much

That sales have been more than doubled and net profits have nearly increased four-fold since 1915 for the Allis-Chalmers Mfg. Co., Milwaukee, is shown by the annual report recently issued. Net profits for 1917 were $4,010,489 as compared with $3,165,020 the year previous and with $1,078,352 in 1915. A new sales record was made with an aggregate of $26,129,314, against $19,440,500 in 1916, and $11,666,413 in 1915. Orders on hand Dec. 31, 1917, aggregated $26,935,146 as compared with $13,424,486, Dec. 31, 1916. For the final quarter of the three years 1917, 1916 and 1915, the net profits were $1,187,957, $928,722 and $559,445 respectively. Sales for those periods aggregated $8,216,959, $5,741,678 and $3,770,148, respectively.

Bethlehem Steel Again is Winner in Court

A signal victory was added to the Bethlehem Steel Corp.'s legal triumphs over the General Investment Co., New York, when Federal Judge Rellstab, Trenton, N. J., denied the petition of the investment company that the corporation be prevented from guaranteeing the bonds of its subsidiary companies and from mortgaging property to secure such bonds. The particular case was that of the Eastern Coke Co., formed by the corporation when it purchased the Lehigh Coke Co., early in 1917 from the Pittsburgh By-Products Co., for $8,000,000, of which $7,000,000 was represented by the Bethlehem company's promissory note.

The court was asked to declare invalid the Steel corporation's guarantee of the Eastern Coke Co.'s bonds, which were purchased by the defendants in the case, the Mellon National bank and the Union Trust Co., of Pittsburgh. This the court declined to do on the ground that the liability incurred by the corporation in guaranteeing the bonds of subsidiary companies was not a risking of the former's capital in another's enterprise, but in aid of its own, and over which, through its subsidiary companies it had complete control.

The method of financing the purchase by the Bethlehem company of the Lehigh Coke property was to exchange for the promissory note 14-year 5 per cent bonds, of a like sum, which were issued by the new coke company organized to acquire the Lehigh possessions. This offer was accepted by banks with the provision that the bonds would be guaranteed by both the Bethlehem company and its parent, the Corporation.

Great Strides Made

Over five times the amount of net profits for 1915 was made by the National Enameling & Stamping Co., St. Louis, in 1917. The total last year was $5,618,548, compared with $2,731,183 for 1916 as against $1,066,242 for 1915. Total income for the three years was $6,460,780, $3,679,762 and $1,936,620 respectively, as shown by the following comparative statement:

	1917	1916	1915
Total income..	6,460,780	3,679,762	1,936,620
Net profits....	5,618,548	2,731,183	1,066,242
Bal. af. chgs..	4,245,555	2,417,803	913,742
Pfd. divs.	598,262	598,262	598,262
Surplus	3,647,293	1,819,541	315,480
Prev. surplus..	2,895,407	1,575,867	1,260,388
Total surplus..	6,542,700	3,395,408	1,575,868
Com. divs. ...	623,672	.....	.....
Gen. reserve...	.....	500,000	.....
P. & L. surp..	5,919,028	2,895,408	1,575,868

Continental's Gain Large

After all deductions, including $850,000 reserved for income and excess profits taxes, were made, the net earnings of the Continental Can Co., Syracuse, N. Y., were $3,280,977 for 1917, as compared with $2,143,554 for 1916, an increase of $1,137,423. The surplus available for the common stock of $10,000,000, after dividends on preferred, was equal to $29.36 a share as compared with $22.37 a share on $8,000,000 common stock the previous year. A comparative statement follows:

		For year ended	
Dec. 31:	1917	1916	1915
Net earnings...	4,531,369	2,510,665	1,457,965
Depreciation ..	400,392	323,111	132,127
Taxes	850,000	44,000	.....
Balance	3,280,977	2,143,554	1,325,838
Pfd. divs.	344,575	353,237	361,725
Com. divs. ...	450,000	400,000	200,000
Pfd. stk. red..	165,000	165,000	80,500
Surplus	2,321,402	1,225,317	683,613

New Army Projects Get Under Way

Two Ordnance Base Depots Are Among Latest Authorizations Given to Army—Government Prepares to Distribute Ordnance Contracts Aggregating $200,000,000—Sparrows Point Plant to be Enlarged

AUTHORIZATION for new army construction work totaling tens of millions of dollars has has been given to Gen. I. W. Littell, in charge of the department of construction. Included in the authorizations are two ordnance base depots to be built on the Atlantic coast at a cost of $4,000,000 and $6,000,000; various aviation projects which will entail the expenditure of $46,000,000, and a gasmaking plant which will be built at Edgewood, N. J., at a cost of $37,000,000. Equipment needs of these new projects, it is anticipated, will be felt in the crane and machinery markets. No definite announcement has been made as to when work will commence on these new projects. Negotiations are also being carried out by the government preceding the letting of contracts for field pieces and ordnance which will involve an outlay of approximately $200,000,000. The government is having difficulty in distributing contracts for machining shell forgings, owing to the inadequate capacity of the country for this type of work. The forging facilities of the nation, however, are more than sufficient for the present need. Arsenals and navy yards are insistent in their demands for machine tools and cranes.

Inquiries, except in rare instances, are not of great size. One list in which several hundred tools are itemized, is current in the New York market. Shipments and plant production are showing marked improvement. Used tools are being utilized to an unprecedented extent. Several old plants have been dismantled and the equipment transferred. One Chicago company which has been unable to secure lathes needed to complete its contract for recoil mechanisms has made plans to build these tools.

Lull in Tool Markets Becomes More General

MACHINE tool sellers report that both shipments and plant operating rates have improved greatly in the past few weeks. A number of plants now are operating at capacity. The crest of the government demand seems to have temporarily passed. Many of the big preliminary projects arising from our war preparations are well under way by this time. In many cases where it appeared that inability to get equipment would hold up progress indefinitely expedients have been resorted to which have assisted materially. An immense number of used tools has been pressed into government service. Entire plants have been bought and their equipment transferred to government contractors. Thus the Duesenberg Motors Corp., 120 Broadway, New York, which has been constructing a plant at Elizabeth, N. J., for building airplane and marine engines for the government, has been transferring the machinery of the Fiat Motor Co., Poughkeepsie, N. Y., whose plant it bought a month ago, to Elizabeth. The Federal Shipbuilding Co., 54 Dey street, New York, not long ago was reported to have bought about $100,000 worth of machines from a Long Island plant built by the late J. K. Stewart, for its shipyard in Newark Bay.

Boring Mills are in Great Demand

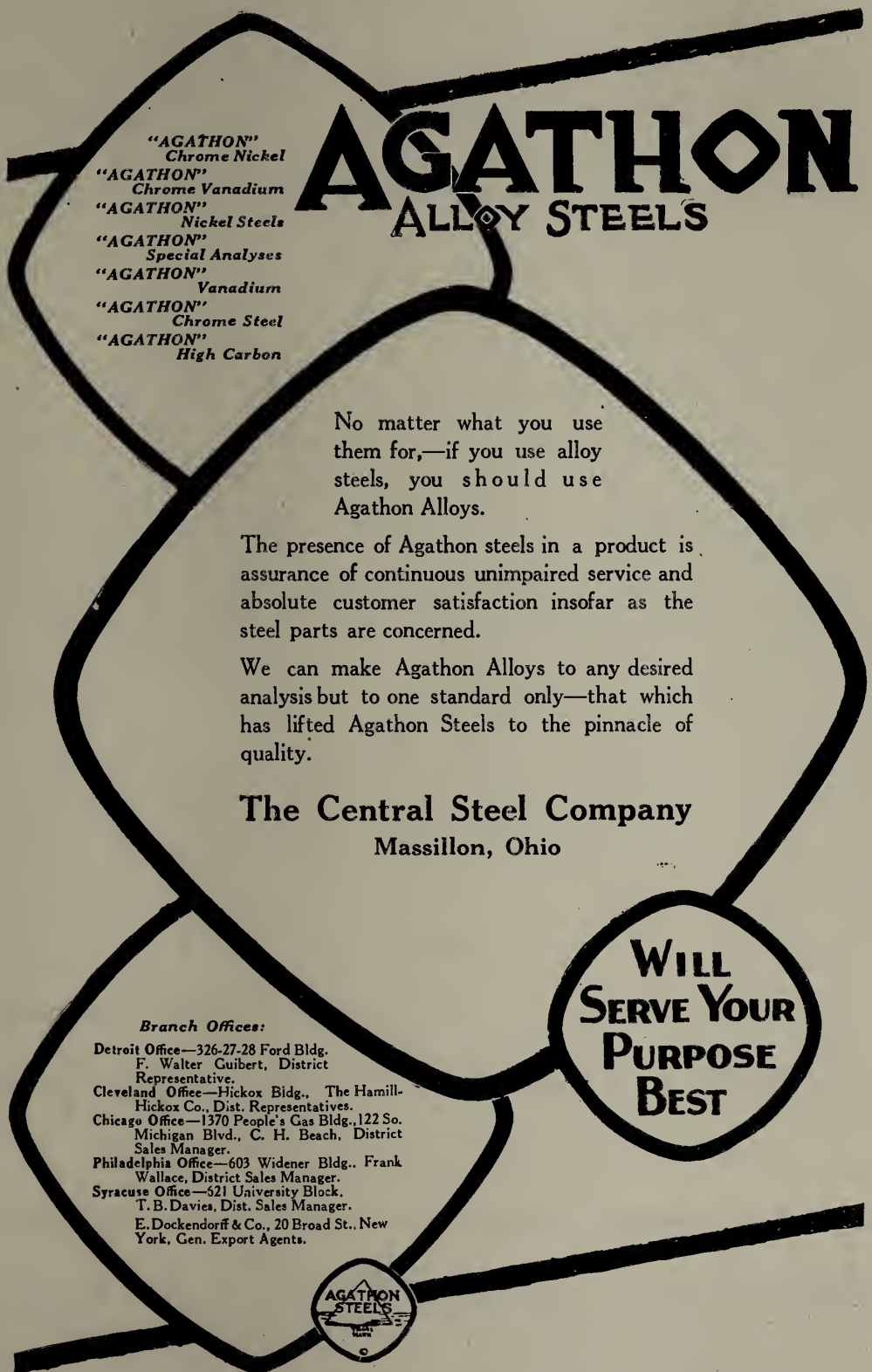
While several manufacturers of machine tools report a tendency toward better delivery dates on many types and sizes of tools, on some machines the time steadily is becoming extended. These include planers, on which makers now are promising deliveries of six to 12 months, according to size; 4, 5 and 6-foot radial drills, four to six months; and boring mills, on which the time averages about 12 months. Among the companies which have been trying to get such machines is the Submarine Boat Corp., which is inquiring for three 72-inch planers. The Brooklyn navy yard is inquiring for a number of tools. The Watertown arsenal, Watertown, Mass., again is in the market. The list of machines recently issued by the Aeronautical Engine Co., Long Island City, N. Y., was additional to the original long list issued several months ago and all these requirements are being held up pending action by the government. The Savage Arms Co., Utica, N. Y., is buying actively against the large list of tools it recently issued in preparation of expansion of its plant to approximately twice its present size.

Sparrows Point Plant to be Enlarged

Charles M. Schwab's statement last week, while on a visit of inspection at the Sparrows Point, Md., plant of the Bethlehem Steel Corp., that the company would spend another $25,000,000 in the near future for improving the plant, was received with much interest in the machine tool and crane trades. Last spring the company expended $25,000,000 for improvements and its purchases both of cranes and tools amounted to several millions. The Worthington Pump & Machinery Corp., which accepted a contract several months ago to manufacture pumps for submarine destroyers, is in the market for several hundred tools for the Deane Pump Works, Holyoke, Mass. The government still is distributing orders for shell forgings, but is experiencing difficulty in placing finishing contracts. It is estimated that negotiations are in progress for the placing of orders amounting to about $200,000,000 for field pieces and ordnance.

Government Buys Cranes for Explosive Plant

The lull in crane buying now is more marked than for some time. Few new inquiries are coming out and little business is being placed. Included in business still pending is that of the General Electric Co., Lynn., Mass., involving four electric traveling cranes, ranging from 5 to 20 tons in capacity. The inquiry of the Du Pont Powder Co., Wilmington, Del., for eight locomo-


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"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon
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No matter what you use them for,—if you use alloy steels, you should use Agathon Alloys.
The presence of Agathon steels in a product is assurance of continuous unimpaired service and absolute customer satisfaction insofar as the steel parts are concerned.
We can make Agathon Alloys to any desired analysis but to one standard only—that which has lifted Agathon Steels to the pinnacle of quality.
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Branch Offices:
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Cleveland Office—Hickox Bldg., The Hamill-Hickox Co., Dist. Representatives.
Chicago Office—1370 People's Gas Bldg., 122 So. Michigan Blvd., C. H. Beach, District Sales Manager.
Philadelphia Office—603 Widener Bldg., Frank Wallace, District Sales Manager.
Syracuse Office—621 University Block, T. B. Davies, Dist. Sales Manager.
E. Dockendorff & Co., 20 Broad St., New York, Gen. Export Agents.
AGATHON STEELS

tive cranes also remains before the market. It is understood that the Worthington Pump & Machinery Corp., which recently was inquiring for a 10-ton electric crane for its plant at Holyoke, Mass., is asking for specifications on several additional electric cranes for that plant. Perhaps the most interesting piece of business placed of late is that involving forty-nine 2-ton, hand power traveling cranes and twenty-one 2-ton chain hoists for the government's explosive plant No. 3 at Charleston, W. Va. This conveying equipment was awarded to J. N. McKinney, contractor, of Chicago. The Groton Iron Works, which recently was inquiring for four 5-ton electric cranes, with 80-foot span, has placed two of these cranes. It is believed that action on the remaining two cranes has been indefinitely postponed.

Cleveland Company Receives Large Tractor Order

AN order for tractors which it is estimated will involve the expenditure of $10,000,000 is reported to have been awarded to the Chandler Motor Car Co., Cleveland. According to latest reports the Chandler company will assemble these tractors—a plan which it has heretofore followed in the motor car field—and sublet contracts to parts makers. The effect of this contract, it is thought, will be felt in the local market in a greatly augmented demand for machine tools from parts makers. Preparatory to the production of tractors on a large scale, the Cleveland Tractor Co., Cleveland, has started construction work on the first quarter of its new plant. New tools have been bought from time to time, but the equipment requirements of the new plant will result in considerable new buying, it is said. Production work will be started by the Stearns Motor Car Co., Cleveland, about April 1 on its contract for 1500 Rolls-Royce aviation motors. According to the stipulations of the contract, these motors are to be completed by Sept. 1. Several lots of tools have been purchased by the Stearns company during the past few months. The latest inquiry emanating from this source is for turret lathes. A government contract has been awarded to the Ohio Shipbuilding Co., Cleveland, and the company has commenced construction work on a new plant. Part of the equipment needed has been purchased.

Dealers report business to be of good volume. One dealer states that his business during the month of January was better than that of any month during last year. Tools are moving freely from stock; dealers who are fortunate enough to have tools in stock are experiencing little difficulty in disposing of them. A disposition on the part of manufacturers who are engaged on government work to be slow in closing for tools has been observed by several dealers. This is attributed in great part to their difficulty in securing compensation for work already completed on these contracts.

Chicago Market Displays Continued Dullness

QUIET conditions continue in the Chicago market, inquiries and buying being of little importance compared with business done during most of last year. Miscellaneous lots and single tools make up most of the business now being booked, but there are some important projects on the way that may develop larger buying. Filling-in to round out equipment is being done by buyers who have covered their main needs, and small shops are taking a few tools. Even second hand tools are scarce as most owners have sufficient work to keep their machines busy and are not seeking to sell, even at the profitable prices that can be obtained. The Otis Elevator Co., Chicago, which has taken a contract for recoil mechanisms, has placed an order for some equipment and will manufacture its own lathes for turning cylinders. The Standard Steel Car Co., which is building a large shop at Hammond, Ind., to handle government work, has filled most of its requirements. The Northern Boiler & Structural Works, Appleton, Wis., will build an addition. The Universal Lock Nut Co., Portland, Oreg., will build a plant. The Warman Steel Castings Co., Los Angeles, Cal., will build a 100-foot extension to its plant at Huntington Park. The Premier Machinery Co., Oakland, Cal., will build an additional plant.

Pittsburgh Market Shows Improvement

SHIPMENTS of machinery and machine tools have become somewhat easier since the improvement in the railroad situation and sellers in the Pittsburgh district report that inquiries are slightly more numerous. The commercial market, however, is far from being brisk, due to high prices and deferred shipments. The government continues to place large orders and of course is given preference by manufacturers. The Cleveland Crane & Engineering Co., Cleveland, has sold three 10-ton cranes for the Hoboken, Pa., plant of the Blaw-Knox Co.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUBURN, ME.—The Mount Apatite Mining Co. has been incorporated to do mining, milling and smelting with $10,000 capital. Frank H. C. Reynolds, Walter I. Stevens and A. S. Greenlaw are interested.

PARIS, ME.—The Paris Machine Co. has been incorporated with $10,000 capital by Horace E. Edwards and A. Frank Goldsmith.

ATTLEBORO, MASS.—New plans are being drawn for a brick, mill-construction, 1-story, 100 x 160-foot addition to the pattern storage department of the Howard & Bullough American Machine Co. Cost will be about $50,000.

BEVERLY, MASS.—The M. D. Nichols Tool Co. Inc. has been incorporated with $25,000 capital by Myron D. Nichols, C. A. Olsen and A. E. Nichols.

BOSTON.—The Coe-Stapley Mfg. Corp. has been incorporated to engage in a general manufacturing business with $700,000 capital by H. B. Faxon, Brookline, Mass.; Robert H. Spare, Reading, Mass.; and F. R. Switzer, Brookline, Mass.

NATICK, MASS.—The Natick Building association will build a brick, 2-story, 67 x 86-foot factory addition to cost $25,000 for the New England Pressed Steel Co.

NEW BEDFORD, MASS. — The Union Street Railway Co. has let the contract to the J. W. Bishop Co. for a brick and steel, 2-story, 98.9 x 126-foot boilerhouse and turbine room to cost $150,000. The Harry M.

QUICK ACTION with ROLLING MILL JIM



Say fellows! If you want quick deliveries on steel castings send them to "Hubbard". They sure can get the stuff out quick and know how to make it too.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

Hope Engineering Co., Boston, is the engineer.

NEW BEDFORD, MASS.—The Continental Wood Screw Co. will erect an addition to its plant on Mt. Pleasant street. C. Hammond & Son, architects, are drawing plans.

SPRINGFIELD, MASS.—The Kero-Karburetor Co. has been incorporated to make carburetors with $100,000 capital by M. H. Alexander, Harold W. Alexander and John T. Clancey.

SPRINGFIELD, MASS. — Frederick T. Kellogg has awarded the general contract for a $15,000 plant addition to the Barrett-Curtis Construction Co.

WEST SPRINGFIELD, MASS.—The Boston & Albany R. R. Co. is building a brick, 1-story, 51 x 22-foot oxyacetylene generating house to cost $30,000. It will be equipped with a special roof which will blow up in case an explosion occurs, and the force of the discharge will be wasted.

WORCESTER, MASS.—The Crompton & Knowles loom works has let the contract for a brick addition to its foundry on Gardner street to be used for a cinder mill.

WORCESTER, MASS.—Contract for erecting a $20,000 1-story addition to the machine shop of the Crompton & Knowles Loom Works has been awarded recently.

BRIDGEPORT, CONN.—The General Machine & Mfg. Co. has been incorporated with $50,000 capital by A. H. Nilson, Mauritz Olson, John M. S. Anderson and David Hjorth.

BRIDGEPORT, CONN.—The Bridgeport Compressed Paper Box Co. will build a brick, mill construction, 2-story, 40 x 130-foot addition to cost $25,000 at its plant, 128 Thompson street.

BRIDGEPORT, CONN.—The Raybestos Co. has increased its capital from $1,750,000 to $2,000,000, to provide for extensions.

BRIDGEPORT, CONN.—The Pharo Mfg. Co. has been incorporated with $70,000 capital by R. D. Chapman, Gordon C. Pharo and W. R. Bassick, and will build a factory at Detroit.

MIDDLETOWN, CONN. — The Buckner Process Co., Worcester, Mass., manufacturer of leather belting, chemicals, etc., has let the contract for a branch factory to be built at Middletown.

NEW HAVEN, CONN.—The New York, New Haven & Hartford railroad has started work on the construction of a 1-story addition to its round house. The structure will be 97 x 238 x 486 feet in size.

NEW HAVEN, CONN.—The Sperry Engineering Co. has been awarded the contract for erecting a $30,000 plant, 1-story high, 51 x 51 feet in size, for the International Leather & Belt Co., 501 Fifth avenue, New York.

NEW HAVEN, CONN.—The William Hale Welding Co. has been incorporated with $50,000 capital by William Hale, Harry Hale and Sherman I. Graves.

Along the Middle Atlantic Seaboard

AMSTERDAM, N. Y.—The N. L. Merwin Co. has awarded to L. J. Callahan the contract for a $9000, 3-story plant addition.

BUFFALO.—Plans are being drawn for a $25,000 addition to the plant of the Linde Air Products Co., Broadway and the New York Central railroad.

COLLEGE POINT, L. I., N. Y.—The American Hard Rubber Co., 11 Mercer street, New York, has awarded the general contract for a $5000 addition to its College Point plant, to Marc Eidlitz & Son, 30 East Forty-second street, New York.

HUDSON, N. Y. — The general contract for a 1-story, 70 x 191-foot plant addition has been awarded to the Torrington Building Co., Torrington, Conn., by the Stewart-David Equipment Corp., of which Robert B. Stewart, 17 Battery place, New York, is president.

MT. VERNON, N. Y.—A charter has been granted to the Mt. Vernon Diecasting Corp., capitalized at $100,000, to manufacture hardware supplies. N. A. LeSavoy, 911 East 178 street, New York, is interested.

NEW YORK.—The Bordentown Steel & Tube Corp. has been incorporated with a capital of $250,000 to manufacture steel and iron tubing. The incorporators are L. H. Sanders, S. M. Lazarus, W. P. Riley, 2 Rector street, and others.

NEW YORK.—The Alloys Mfg. Corp. has been chartered with $250,000 capital to manufacture die castings and drop forgings. The incorporators include C. W. Lucas, H. C. Wing and M. M. Grunthal, 27 Cedar street.

NEW YORK.—The William F. Davis Machine Tool Co. Inc. has been chartered to manufacture machine tools with $200,000 capital. The incorporators include W. P. Davis and B. B. Ketcham, 85 Liberty street, and W. Allen, 149 Broadway.

NEW YORK.—The Rustproof Metal Seal Corp. has been granted a charter of incorporation. The company is capitalized at $100,000 and will manufacture metal seals, stoppers and crowns. Incorporators include D. Wallace, 772 St. Nicholas avenue, I. M. Katz and others.

OSWEGO, N. Y.—The Ames Iron Works plans to build a $25,000 addition to its foundry. Thomas Coon, Syracuse, N. Y., is in charge of the work.

ROCHESTER, N. Y.—The contract for a $50,000 plant addition has been awarded by the Wollensek Optical Co. to the A. Frederick & Sons Co. The proposed structure will be three stories high and 102 x 172 feet in size.

WESTFIELD, N. Y.—The village is having plans drawn for the rebuilding of its boiler works. Alterations under consideration will cost approximately $30,000. C. C. Hill, Northeast, Pa., is chief engineer.

YONKERS, N. Y.—The Continental Shipbuilding Co. will erect a 2-story, 50 x 1000-foot plant in this city. Thomas Bird, 30 East Forty-second street, New York, is engineer in charge of construction.

ALLENTOWN, PA.—L. S. Jacoby, architect, will take bids about March 1 for a machine shop. The name of the owner is being withheld.

BERWYN, PA. — The American Bronze Co. is receiving bids on the construction of a 1-story brick and steel foundry, 80 x 100 feet.

HURON, PA.—The Buckeye Coal Co. plans to develop mining property at a cost of approximately $2,000,000. This work will include not only extensive underground development but also the erection of a steel tipple and other structures.

MARCUS HOOK, PA.—Bids will be received soon by F. W. Van Loon, 4 South Eleventh street, Philadelphia, for an addition to the plant of the Benzol Products Co.

MODENA, PA.—Preliminary plans are being drawn by L. Z. Slawter, Coatesville, Pa., for a $15,000, 3-story plant for the Gerson Paper Stock Mill Co.

MORRISVILLE, PA.—The government will erect a large munitions plant on the Delaware river, between Morrisville and Tullytown, Pa. E. C. Hill & Co., 11 West State street, Trenton, N. J., are in charge of construction.

PHILADELPHIA.—A charter has been granted by the state of New Jersey to the Florence Pipe Foundry & Machine Co., capitalized at $1,000,000 and incorporated by Charles R. Wood, Spencer P. Hazard and Edwin J. Lane.

PHILADELPHIA.—The Nitrogenous Chemical Co. plans the construction of a plant at Thirty-seventh street and Tasker avenue. J. Louis Luckenbach, 119 South Fourth street, is engineer.

PITTSBURGH.—A charter was granted to Keating & Block, electricity, capital $5000. The incorporators are William A. Keating, Pittsburgh; Douglas C. Block, Dormont; R. G. Bostwick, Wilkinsburg.

PITTSBURGH.—A charter was granted to the Electrical Engineering Co., capital $30,000. The incorporators are Thomas C. Hodgdon, J. E. Mair, C. R. Hodgdon, Pittsburgh.

PITTSBURGH.—A charter was granted to the Bradford Gas Coal Co., capital $50,000. The incorporators are M. G. Voelker, Charles A. Royce, Buffalo; Robert L. James, Pittsburgh.

PITTSBURGH.—An application was granted to the Penn-Pitt Coal & Coke Co. for permission to construct a river tipple loading platform and two ice breakers on the north

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts, Washington:

Two wire feed screw machines, 1721, no date, Washington.

Four grinding machines, 1721, no date, Washington.

One motor-driven thread milling machine, 1721, no date, Washington.

Four motor-driven die-sinking machines, 1721, no date, Washington.

One motor-driven power punch, 3323½, March 1, Brooklyn.

One milling machine, 3323½, March 1, Brooklyn.

One steam hammer, 3323½, March 1, Brooklyn.

One steam drop hammer, 3340½, March 8, Norfolk.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

Farrell-Cheek
CASTINGS
for
Tractors, Trucks, Machine-tools



The terrific, pounding, racking strain under which motor propelled vehicles must operate, necessitates the use of castings of high resilient qualities in their construction.

Farrell-Cheek Castings are particularly adapted to this purpose because they are made after an analysis formulated especially for light castings of high resilience.

We also manufacture *Blank Gears;* Carbonizing Boxes; and Case Hardening Boxes.

Let us know your requirements.

Farrell-Cheek Steel Foundry Co.

SANDUSKY, OHIO

BRANCH OFFICES

NEW YORK PHILADELPHIA CHICAGO

bank of the Monongahela river, about three miles above lock No. 7, 85.3 miles above the mouth of the river, in Greene county.

TEMPLE, PA.—The Seaboard Steel & Manganese Co. is erecting an 11 x 18 x 80-foot skip-filled blast furnace. It has installed an additional stove, 20 x 70 feet and a new blowing engine.

UNIONTOWN, PA.—A charter was granted to the Uniontown Foundry Co., capital $10,000. The incorporators are E. R. Floto, Connellsville, Pa.; W. J. Doorley, Scottdale, Pa.; D. C. Evans, Uniontown.

WILLIAMSPORT, PA.—Bids are to be received in April for 3-span, 220-foot reinforced concrete bridge over Lycoming creek by the Lycoming Co. to cost about $50,000. The city is to bear part of the cost.

CAMDEN, N. J.—Titan Automatic Tool Co. has been chartered with a capital stock of $1,500,000 to manufacture tools, etc. Joseph P. Murray, Frank S. Muzzey and F. Stanley Saurman, all of Philadelphia, are the stockholders.

CAMDEN, N. J.—The Caloric Furnace Co. has been incorporated with $100,000 capital to manufacture furnaces. E. R. Lippincott and G. C. Chase, Collingswood, N. J., and J. H. Carr, Camden, are incorporators.

DELAWANNA, N. J.—Russell G. Cory, 39 Cortlandt street, New York, will receive bids shortly on the erection of a $250,000 addition to the plant of Worthen & Aldridge.

ELIZABETH, N. J.—The Duesenberg Motors Corp. will erect a plant addition, one and two stories high, 140 x 440 feet in size.

ELIZABETH, N. J.—Union Tire & Supply Co. has been chartered with $75,000 capital to manufacture automobiles, etc. The incorporators are A. G. Weinberg, Henry Weinberg, of Harrison; Joseph Berkenheimer, Newburgh, N. Y.

HANOVER FARMS, N. J.—The Atlantic Loading Co., 71 Broadway, New York, will erect a 1-story ammunition plant here.

HIGHTSTOWN, N. J.—The Borough council contemplates building a filtration plant to cost $19,000.

HOBOKEN, N. J.—Plans are being revised by the Union Iron Works for its proposed $12,000 fabricating shop. Max Beyer is the architect in charge of this work.

JERSEY CITY, N. J.—Mutual Iron works has been chartered with $125,000 capital to operate machine and other kinds of shops. The incorporators are: James McIlvrid Sr., E. V. Cotter, and James McIlvrid, all of Jersey City.

NEWARK, N. J.—The contract for a $6000 foundry addition, one story high and 46 x 69 feet in size has been awarded by Louis Sachs to Andrew Eitel.

NEWARK, N. J.—The Newark Engineering & Refrigerating Co. will start work soon on an addition to its machine shop, to cost $4500.

NEWARK, N. J.—The Hay Foundry & Iron Works, Plum Point Lane, will erect a 1-story brick and steel shop building, 86 x 165 feet, to cost $30,000.

NEWARK, N. J.—City commission contemplates erecting municipal ice plant at cost of $30,000. Address Mayor Gillen.

NEW BRUNSWICK, N. J.—The board of commissioners will receive bids on March 5 for the installation of a 275-horsepower water tube boiler. Asher Atkinson is city engineer.

RIDGEFIELD PARK, N. J.—The British-American Chemical Co., L. G. McNab, 52 Vanderbilt avenue, New York, secretary, contemplates the erection of several plant additions.

TRENTON, N. J.—The Structural Concrete Co. has been chartered with $75,000 capital to engage in structural concrete contracting. Kepple Hall, William Stroop and Charles Wuicht, Dayton, O., are incorporators.

TRENTON, N. J.—City Commission will erect a new municipal tuberculosis hospital at cost of $100,000. Klemann & Fowler, First National Bank building, are the architects.

BALTIMORE.—The Kelly Springfield Tire Co., Akron, O., will erect a plant in this city to cost about $1,000,000. The main structure of the proposed works will be three stories high. Edward Mercer Ulmer, architect, 507 Fifth avenue, New York, is drawing plans.

BALTIMORE.—The H. E. Crook Shipbuilding Co. has awarded to the McLain Construction Co. the general contract for erecting a $25,000 warehouse, one story high, and 160 x 500 feet.

Activities in the Central States

APPLETON, WIS.—The Reliance Motor Truck Co., Appleton, Wis., formerly of Racine, Wis., has awarded the general contract for the construction of the initial unit of its new plant in Appleton to the Hegner Construction Co. of that city. The building will be 75 x 300 feet in size, one-story, with saw-tooth roof, and will cost about $35,000 without equipment. A. Arthur Guilbert, Racine, is architect. T. M. Purtell is secretary of the company, with headquarters at 821 College avenue, Appleton.

APPLETON, WIS.—The Patton Paper Co. has purchased a site and 4000 acres on the Wolf river for its proposed new hydroelectric power plant, to be erected during the coming year. The company's engineers are preparing plans. The estimated cost is not given out.

BARABOO, WIS.—The E. F. Herfort Canning Co., Inc., will build a factory to cost $200,000.

PORT WASHINGTON, WIS.—The Turner Mfg. Co., manufacturer of gas engines, tractors and farm machinery, has increased its capital stock from $150,000 to $250,000 to provide for enlarging its plant.

MADISON, WIS.—The Benson Speed Signal Co. has been organized with $100,000 capital to manufacture signal and speed measuring devices by A. D. Campbell, H. R. Martin and Louis W. Wiedenbeck.

MARSHFIELD, WIS.—A $50,000 contract for veneer parts for aircraft has been placed with the Roddis Lumber & Veneer Co. by agents of the French government.

MARSHFIELD, WIS.—Blum Bros., box manufacturers, will spend about $15,000 in the erection of a factory addition and the installation of a complete veneer-cutting equipment to handle rough logs.

MILWAUKEE.—The Wisconsin Iron & Wire Works, 1660 Booth street, has leased its former plant at 186 East Water street, to the Eagle Knitting Co., 382 Broadway, which will remodel it into a knitting mill, driven by electric motors.

MILWAUKEE.—The W. Toepfer & Sons Co. has increased its capital from $50,000 to $100,000 to provide for expansion. Irwin G. Toepfer is president.

MILWAUKEE.—The Newport Mining Co., 1125 First National Bank building, a member of the Ferdinand Schlesinger group of iron ore, furnace, coke and gas and chemical from $1,500,000 to $4,500,000. The comproperties, has increased its capital stock pany is incorporated under the laws of Maine. The amount of the increase represented in Wisconsin is given as $58,500, in the application.

MILWAUKEE.—The Charles Jurack Pattern Works, 199-201 Oregon street, one of the largest firms of its kind in the northwest, has incorporated its business under the same name, with a capital stock of $50,000. The owners of the business are Charles, William R., and Charles G. Jurack, Jr. The plant is being enlarged.

MILWAUKEE.—John Loew, 449 Bartlett avenue, will erect a one-story machine and blacksmith shop, 50 x75 feet, on North, near Bartlett avenue, costing about $9000 complete. Leiser & Holst, architects, are taking bids.

MILWAUKEE.—The Milwaukee department of public works, through the central board of purchases, Willits Pollock, secretary, is taking bids until Saturday, Feb. 16, for a miscellaneous assortment of cast iron pipe and specials, as follows:

Notice No. C. P. 7.—500 tons of 6-inch; 150 tons of 8-inch, and 150 tons of 12-inch class C water pipe. About 100 tons of special lengths of standard B. & S. pipe, 20 to 24-inch diameters, 50 tons of special 3-way and 4-way curves, etc., from 4 to 16-inch diameters. Thirty 2-inch; thirty 3-inch; thirty 4-inch and twenty 6-inch special or tapping valves.

MONROE, WIS.—The Industrial Cooperative Union will erect a $60,000 cold storage warehouse. It will be three stories high and 50 x 127 feet. The architect, C. F. Ringer & Son, Milwaukee, has awarded the general contract to Wagner & Bauman, Monroe; the contract for steel to A. F. Wagner Co., Milwaukee, and for the refrigerator system to Vilter Mfg. Co. L. E. Gettle Madison, Wis., is secretary.

NEW LONDON, WIS.—Knapstein Bros, brewers, will award contracts soon for the remodeling of a part of their plant into a cold storage warehouse and refrigerating plant at a cost of about $15,000.

RACINE, WIS.—The Webster Electric Co., manufacturing small electric motors and motor-driven appliances, has incorporated its business with a capital stock of $600,000. A large plant addition is under construction. The owners are John B. Simmons, Walter Brown and P. G. Crewe.

SPARTA, WIS.—Ed. Dargle has opened a garage and machine shop in the former Edwards building, which has been rebuilt and equipped for the purpose.

SUPERIOR, WIS.—The Globe Shipbuild-



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17 Ton Buckets,* capacity 1,250,000 tons per season; *15 Ton Buckets,* capacity 1,000,000 tons per season; *10 Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8 Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

ing Co. has acquired an old flour mill site adjacent to its yards and shops and will construct several shipbuilding ways. A 1-story addition, 45 x 100 feet, is being erected for the pipefitting, blacksmithing and tinsmithing departments.

WAUPECA, WIS.—The Jorgenson Mfg. Co., which recently accepted a contract for furnishing about 25,000 castings and parts for military trucks for the government, has booked orders from seven Wisconsin automobile and truck manufacturers for gas engine primers for their 1918 outputs. The contracts call for more than 100,000 devices and are from the Nash Motors Co., Kenosha, Wis.; Mitchell Motors Co., and J. I. Case Threshing Machine Co., Racine, Wis.; International Harvester Co., Stegeman Motor Car Co., Sterling Motor Truck Co., and Harley-Davidson Motor Co., Milwaukee.

WEST ALLIS, WIS.—Jacob Karth has purchased the plant and business of the F. A. Gardner Machine Works, 75th and National avenues and is now in possession. Fred A. Gardner, former owner, has joined the Crown Metal Co., 871 Robinson avenue, Bay View, as general manager.

WEST BEND, WIS.—A 22-inch lathe, drill presses, an oxyacetylene welding outfit and other new equipment is being installed in the machine shop of Kuester Bros., proprietors of the Triangle Garage, West Bend.

ALMA, MICH.—The R. & P. Tractor Co., capitalized at $500,000, is preparing to erect a large plant here next spring. Channing Parsons is vice president and general manager.

CRYSTAL FALLS, MICH.—Quinnesec Iron Mining Co., capitalized at $250,000, has changed its name to the McKinney Steel Co.

DETROIT.—The Flower & Stephen Co. will build a factory addition costing $180,000.

DETROIT.—The Christie-Kline Forge Co., 64 St. Aubin street, will build a forge shop costing $30,000.

IONIA, MICH.—The Hays Mfg. Co., manufacturer of automobile bodies, is building an addition to cost $10,000.

JACKSON, MICH.—The Jackson Munition Corp. has been organized with $500,000 capital. Clarence B. Hays is president.

JACKSON, MICH.—The Sparks-Withington Co., North street, manufacturer of automobile radiators and fans, is building a factory 25 x 344 feet.

JACKSON, MICH.—Jackson Munitions Corp. is fitting out the plant of the Jackson Automobile Co. for the manufacture of 155 millimeter shells. The plants of the Mott Wheel Works and Jackson Cushion Spring Co., also are being utilized. William Kessler is supervising construction work.

JONESVILLE, MICH.—The city of Jonesville will install a centrifugal pump, direct connected to a 20-horsepower motor. A. T. Mewton is superintendent.

LANSING, MICH.—Duplex Truck Co., according to President H. M. Lee, will increase its production to 300 trucks a month for the remainder of the year.

PETOSKEY, MICH.—Blackner Rotary Pump Co. has increased its equipment to permit production of $360,000 worth of pumps annually. The company manufactured $200,000 worth in 1917. A. B. Klise has been re-elected president.

RIVER ROUGE, MICH.—Whitehead & Kales are building a machine shop 32 x 80 feet in size.

SAGINAW, MICH.—Peninsula Shell Co. is remodeling the plant of the Marquette Motor Works for the manufacture of munitions. It will open March 1 with 1600 employes. It will assemble the products of the General Motors Co. plants in Michigan.

SAGINAW, MICH.—Saginaw Shipbuilding Co. has laid the keel of its second ship. The plant is practically completed and is employing 250 men, which number will be increased to 800. The company has a contract with the government for six vessels all of which will be completely equipped here.

AURORA, ILL.—The Aurora Tool Works Co. has bought a site and will build an addition.

CAMP GRANT, ROCKFORD, ILL.—Plans for 12 one-story convalescent barracks adjacent to the hospital have been drawn. Congress will be asked to appropriate $40,800 for this work. With this addition Camp Grant hospitals will be able to take care of 2000 men.

CHICAGO. — Henry E. Pridmore, 1901 South Rockwell street, manufacturer of molding machines, will build a machine shop 50 x 60 feet, equipped with a crane, for which equipment has not yet been purchased.

Make Business Changes

THE general offices and branch sales office of the American Refractories Co. are now located at suite 315, Union Arcade building, Pittsburgh. The general sales offices will be located at 208 South La Salle street, Chicago. A branch sales office will be opened in the Equitable building, 120 Broadway, New York.

Mayer Bros, Inc., Antigo, Wis., power hammers, will move its plant and offices to Kaukauna, Wis., where it has secured the factory and business of A. W. McLean & Co. The latter company has been doing business under the name of the Kaukauna Machine Works.

The Asbestos Protected Metal Co., of Pittsburgh, has announced the removal of its New England office to the State Mutual building in Boston. William H. Cummings is in charge.

CHICAGO.—The Roth Mfg. Co., 118 South Clinton street, has bought a site at Sixteenth street and Kilbourn avenue and will build a plant.

CHICAGO.—The Harrington & King Perforating Co., J. M. Fuller, president, 612 North Union avenue, will build a one and 2-story plant 126 x 312 feet in size, at Taylor and Campbell avenues, to cost $100,000.

CHICAGO.—The West Steel Car & Foundry Co., 122 South Mchigan avenue, has has plans prepared by Dillard & Bacon, architects, for a 1-story steel factory addition at Brandon avenue and 136th street, to cost $60,000.

LINCOLN, ILL.—Rural school houses will be built this spring in the Lawndale and Victory districts.

MURPHYSBORO, ILL.—The board of education plans an improvement to the Douglas school, which, with the site, will cost from $15,000 to $20,000.

PEORIA, ILL. — The Domestic Electric Appliance Co. has been incorporated with $25,000 capital by R. B. Cherry, V. E. Hopkins and E. G. Kuecks.

PEORIA, ILL.—The Peoria Foundry Co. has been incorporated with $5000 capital by James Fitzgerald and J. F. Hadank.

DUNDEE, ILL.—The contract for the Main street bridge has been let to the Ottendorf Construction Co., Palatine, Ill. The bridge will be of reinforced concrete with a straight away and a temporary bridge. Contract price is $42,794.

ST. CHARLES, ILL.—The plant of the Faultless Stove Co. has been damaged by fire. The loss was $40,000.

EVANSVILLE, IND.—The Schroeder Headlight & Generator Co. has been incorporated with $150,000 capital. J. H. Schroeder, John D. Craft and William A. Carson are interested.

FORT WAYNE, IND.—Bids will be taken shortly for a bridge over the St. Joseph river at State and Fourth streets. A. W. Grosvenor, Bass block, is engineer.

INDIANAPOLIS, IND.—The Kelloniemi Mfg. Co. has been incorporated with capital of $10,000 to manufacture machinery. The incorporators are W. Kelloniemi, V. Viliki and W. Anderson.

KENDALVILLE, IND.—The Noble Heater Co. has been incorporated with $300,000 capital to manufactue automobile heaters. Gilbert A. Bartholomew, Clarence E. Baker and William S. Baker are incorporators.

MISHAWAKA, IND.—The contract for a 2-story bank and office building has been let by the Mishawaka Trust Co. to Fridstein & Co., Chicago. The building will have a granite and Bedford stone exterior with marble and mahogany fixtures.

MONTEREY, IND.—The Monterey Electric Light & Power Co. will build a power house 50 x 125 feet in size to cost $50,000.

MUNCIE, IND.—The Muncie Gear Co. will build a 1-story addition 139 x 450 feet in size at Clark and Penn streets. The Austin Co., 14230 Euclid avenue, Cleveland, is taking bids.

PIERCETON, IND.—The Knull Motor Co. has been incorporated with $30,000 capital to manufacture automobiles. L. R. Deboer, Carl F. Knull and George A. Scifer are incorporators.

VINCENNES, IND.—Plans have been drawn by J. S. Spiker, city engineer, for a bridge over the Wabash river connecting Indiana and Illinois to cost $200,000.

AKRON, O.—The Bridgewater Machine Co. has increased its capitalization from $20,000 to $250,000.

CINCINNATI.—The David Welding & Mfg. Co. has been incorporated with a capital of $75,000. The incorporators are Augustine Davis Jr., Arthur L. Betts, Floyd C. Williams, Peter Scola and Frank H. Shaffer.

SANDUSKY, O.—The Sandusky Foundry & Machine Co. has taken out a city engineers permit to erect a $20,000 addition to its present building on West Market street. G. William Doerzbach is the contractor.

TOLEDO, O.—I. Gerson & Sons have recently incorporated under the name of the I. Gerson & Sons Co. The incorporators are E. H. Gerson, Samuel Gerson, Sol M. Gerson and S. H. Franklin. They will deal in iron and steel scrap, metals, etc.

MIDDLEBOURNE, W. VA.—Bids are desired by the Tyler Co. for the building of 100-foot, 2-span concrete arch bridge over Point Pleasant creek.

NAUGATUCK, W. VA.—Bids are desired by the Mingo Co., Williamson building, for the building of a steel bridge over Pigeon creek.

HANNA



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"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic.

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

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DETROIT TORONTO

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Say you saw it in THE IRON TRADE REVIEW

Western and Intermountain Territory

MINNEAPOLIS.—Thomas Blackwood, 1900 East Third street, will build a factory, 55 x 100 feet to cost $10,000.

CEDAR FALLS, IA.—The city will install a 150-horsepower boiler and make other improvements at the waterworks plant. C. H. Streetor is city engineer.

DAVENPORT, IA.—The Independent Motor Truck Co., 1801 North Third street, will build a factory.

DES MOINES, IA.—H. Cohen, Cohen Bros. Iron & Metal Works, 307 East Third street, is organizing a company with $1,000,000 capital which proposes to build a rolling mill.

RYAN, IA.—Fridstein & Co., Chicago, have secured the contract for a 1-story building containing a bank and two store rooms.

KANSAS CITY, MO.—The American Airship & Transportation Co. has obtained a Delaware charter with $2,000,000 capital to manufacture airplanes. J. W. Graves, W. H. H. Leach, C. A. Roff and J. W. Brown are interested.

KANSAS CITY, MO.—The stockholders of the Nevada Consolidated Mining Co. have authorized C. E. Swiane, engineer for the company to place an order for equipment for the construction of a mill on the property of the company in Nye county, Nevada. The mill will be in operation next fall.

ST. LOUIS.—The St. Louis Malleable Castings Co., Conduit avenue, plans to build a machine shop, forge shop, foundry and electric power plant.

EAGLE PASS, TEX.—The American Reinforced Concrete Tie Mfg. Co. will build a plant for the manufacture of reinforced railroad ties. W. F. Faunt is president.

CAMP FUNSTON, JUNCTION CITY, KANS.—The people of Missouri will be asked to give from $25,000 to $30,000 for a building for the 354th regiment of Missouri troops at this camp.

LEAVENWORTH, KANS. — The Victor Mfg. Co., manufacturer of electric washing machines and other devices, has increased its capital by $60,000 and will build a 2-story addition to double its output. F. J. Tallant is president.

WICHITA, KANS.—The Midland Valley Railroad Co. has purchased the old fair grounds and will build a new round house, shops and switching yards.

Up and Down the Pacific Coast

BELLINGHAM, WASH. — Bellingham & Northern railroad will rebuild its flood-damaged glacier line at a cost of about $20,000.

CHENEY, WASH.—The Fred A. Wilson Engineering Co., Central building, Seattle, will prepare plans for a new flour mill and grain elevator here, mill to have a capacity of 900 barrels of flour per day.

SEATTLE.—Bids will be received up to March 8 for construction of steel superstructure of the double-leaf bascule bridge over the Lake Washington canal on Eastlake avenue. This improvement consists of a steel superstructure, operating machinery and furnishing and erecting other parts of the superstructure described in the specifications. Contract will be for placing 243,000 pounds of machinery, 1,830,000 pounds of structural steel, 12,500 pounds of reinforcing bars, etc., this equipment having been purchased some time ago.

SPOKANE, WASH.—The Hallidie Co., 801 Railroad avenue, manufacturer of deck machinery and marine equipment, will build several plant additions and will install new equipment.

TACOMA, WASH.—Work is to start shortly on the proposed addition to the Sperry Flour Mill Co. plant, here cost about $175,000. John D. Armstrong is manager.

TACOMA, WASH.—City officials intimate that the municipal car line will be double-tracked from the east end of the viaduct to the Todd Shipbuilding plant to relieve traffic congestion.

PORTLAND, OREG.—The Universal Lock Nut Co., manufacturer of lock nuts, will build a plant to cost $50,000.

HUNTINGTON PARK, CAL.—The Warman Steel Castings Co., Douglas building, Los Angeles, will build an extension of 100 feet to its plant in Huntington Park.

OAKLAND, CAL.—The Premier Machinery Co., 16 California street, manufacturer of canning machinery, will build a 1-story factory on West Twenty-second avenue, to cost $10,000.

SAN DIEGO, CAL.—The Landis Electric Co. has been incorporated with $25,000 capital to manufacture electrical devices. The incorporators are Edward Jewell, Arthur J. Simpson and H. G. Landis.

SAN FRANCISCO. — W. R. Berry will build a 2-story concrete machine shop at Howard and First streets.

SAN FRANCISCO. — The Edwards Wire Works will rebuild its plant recently damaged by fire. M. L. Spangler is general manager.

New Business in Eastern Canada

AURORA, ONT.—The Aurora Foundries, Ltd., has been incorporated to carry on a general business as founder and machinist with $40,000 capital stock. Incorporators are Reginald A. Fraser, George W. Johnston and others.

AURORA, ONT.—The factory of the Office Bureau Co. was badly damaged by fire Feb. 4, with a loss of $70,000.

COCHRANE, ONT. — The St. Maurice Lumber Co. has been granted permission to carry on lumbering business in Ontario, to build and operate sawmills, planing mills, etc., with $60,000 capital; and has appointed Wilfrid Adams, Cochrane, Ont., to be its attorney.

COLLINGWOOD, ONT. — Ferguson & Wheatley, Ltd., have been incorporated to manufacture hardware, machinery, implements, tools, etc., with $40,000 capital stock. George H. Ferguson, Horace W. Wheatley and Thomas W. Phipps are the incorporators.

FORT WILLIAM, ONT.—The Canadian Car & Foundry Co. Ltd., 1209 Laughton street, will commence at once on the erection of a shipbuilding plant for turning out steel ships. Mr. Elster is in charge.

GANANOQUE, ONT.—The town council will make repairs and build additions to its waterworks and sewage plants and will install an electric pump to cost $15,000.

GUELPH, ONT.—The White Sewing Machine Co. of Canada, Suffolk street, will build an addition to its plant to cost $15,000 and has awarded the general contract to G. A. Scroggie, 400 Woolwich street.

HAMILTON, ONT.—Robert H. Hassler, Ltd., Indianapolis, Ind., is making preparations for the erection of a manufacturing plant at Hamilton, Ont., to cost $100,000. It is expected that building operations will be started in the spring.

HESPELER, ONT.—The washing machine and truck departments of the London Foundry Co., London, Ont., will be removed to Hespeler, where the company proposes to go into the manufacture of these products on an extensive scale.

LONDON, ONT.—The utilities commission is in the market for two electrically-driven waterworks pumps. Philip Pocock is chairman.

LONDON, ONT.—The London Soap Co., 197 Ottaway avenue, will build an addition to its factory to cost $5000. Proprietor is A. G. Phillips.

OJIBWAY, ONT. — The Canadian Steel

Corp. will start at once on the construction of a waterworks system for its plant to have a capacity of 7,000,000 gallons daily.

OTTAWA, ONT.—The Ketchum Mfg. Co., Ltd., has been incorporated to manufacture metal products with $40,000 capital stock, Zebulum C. Ketchum, Westboro, Ont., and Henry G. Ketchum, Ottawa, Ont., are incorporators.

OTTAWA, ONT. — The British America Nickel Co., it is reported, may possibly abandon its plan to establish a refinery at Sudbury, Ont. The report states that the company is now contemplating the erection of its plant in the Ottawa valley, where there is at present developed a surplus of hydro power over local consumption.

PEMBROKE, ONT.—The Colonial Lumber Co. will commence at once on the erection of a plant to cost $75,000.

SARNIA, ONT.—The Holmes Foundry Co. will commence at an early date on the erection of a plant to cost $100,000.

SAULT STE. MARIE, ONT.—Plans are under discussion for establishing a shipbuilding plant at the Soo. Before the war steps were taken to establish a shipbuilding plant in this city but work has been held up. Now it is proposed to launch into the construction of wooden ships in connection with the steel plant with a view to the building of steel ships at a later date.

STRATFORD, ONT. — The George McLagan Furniture Co. is in the market for a horizontal tubular steam boiler, size 16 feet long by 6 feet in diameter.

STRATHROY, ONT.—The Dominion Canners, whose plant was damaged by fire a few months ago, are having plans prepared and will commence the erection of a new plant in the spring to cost $100,000. The factory will be equipped with the most modern machinery obtainable.

TORONTO, ONT.—The planing mill owned by C. E. Williams, St. Albans street, has been damaged by fire with a loss of $3000. The plant will be rebuilt and new machinery to cost about $1000 will be required.

TORONTO, ONT.—The Metropolitan division of the Toronto & York Railway Co., car barns including repair shop, storehouse and a number of cars were damaged by fire Feb. 5, with a loss of $50,000. The plant will be rebuilt at once and some machinery for the repair plant will have to be replaced.

MONTREAL, QUE.—The Dominion Cement Co., 92 Notre Dame street east, will build a cement plant to cost $100,000.

SOREL, QUE.—The foundry owned by La Cie d'Entreprises Metallurgiques, was damaged by fire Feb. 6, with a loss to plant and equipment of $50,000. The plant will be rebuilt immediately.

THREE RIVERS, QUE.—The Page Wire Fence Co., Walkerville, Ont., proposes to build a manufacturing plant at Three Rivers next spring to cost $150,000, and will be in the market for motors and other equipment.

New Trade Publications

BLOW TORCH.—An interesting folder describing a gas-electric portable blow torch designed for melting metals, making pattern castings, straightening bars, bending tubing, heating rivets, soldering, fitting boiler patches, skin drying molds and drying cores, is being distributed by the Naab Mfg. Co., Cleveland.

MACHINE TOOL PUMP.—An attractive folder describing and illustrating machine tool pumps has recently been published by the Fulflo Pump Co., Cincinnati. The folder shows many views of the pump, enumerates a list of advantages which it is claimed to possess and reproduces several letters received from satisfied users of the product.

SELF OPENING DIES.—The Greenfield Tap & Die Corp., Greenfield, Mass., has recently issued an attractive 24-page booklet describing its line of self-opening threading dies which are applicable to manufacturing automatics, screw machines, lathes, drill presses, etc. The booklet contains 28 illustrations and the construction and operation of the dies is explained in a complete manner.

ELECTRIC HOISTS.—The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., recently published a 24-page folder describing and illustrating electric hoists and showing the diversified line of enterprise to which they may be adapted. Reproductions of photographs showing simple hoists, and hoists with gear trolleys at work in foundries, shipping rooms, machine shops, scaling departments, lumber yards, etc., are presented. Hoists with geared trolleys are furnished in capacities ranging from 1 to 20 tons and are furnished with plain, geared or motor-driven trolleys.

FORGING PRESSES.—A 48-page booklet has been issued by the United Engineering & Foundry Co., Pittsburgh, describing a line of high-speed, steam - hydraulic forging presses. The presses are built in a range of sizes from 150 to 12,000 tons capacity for all kinds of forging, pressing and shearing. The booklet is well illustrated and descriptions of each type of press are included. Some interesting illustrations of actual forgings are also presented. These are fully dimensioned and the actual forging time for each piece is given. Tables giving the standard dimensions of the company's presses and a table of steam pressures in pounds per square inch are also included.

SAFETY HANGERS.—The Thompson Electric Co., Cleveland, is distributing a 24-page booklet devoted to safety hangers. These hangers curve horseshoe style at the top and lamps are suspended from the curved portions. This arrangement permits the lamp to be lowered and rehoisted for cleaning whenever desired. The lamp is unlocked from its position on the hanger by pulling a rope. All danger of shock to the caretaker is said to be obviated because when the lamp is released from its position on the hanger it is automatically and electrically disconnected. The bulletin reproduces a number of photographs of lamps and also presents detailed views of the lock, enabling the reader to obtain a comprehensive idea of its arrangement.

DRAWING TABLES.—The Hein Furniture Co., Toledo, designers and manufacturers of special furniture, interior wood work and cabinet work, is distributing a comprehensive bulletin devoted to drawing tables and filing cases. Tops of all tables and drawing boards are made of soft white pine glued up from strips three to five inches in width. Ends of table tops are fitted with hardwood straight edges set in grooves. All other exposed parts of table are plain oak, save the legs, which are made of elm. The loose inclined drawing board is made ⅞ inch thick with two cross pieces to prevent warping. The board is inclined by turning raising blocks 2½ inches high. Each type of table and cabinet is individually illustrated and specified in the bulletin.

RIVETERS.—A new catalog describing the full line of riveters handled by the Vulcan Engineering Sales Co., 1765 Elston avenue, Chicago, for the Hanna Engineering Works, has been issued. Considerable space in the catalog is devoted to descriptions of special machines adapted to shipbuilding. Many designs of riveters suitable for use in automobile plants, boiler, tank and locomotive shops also are presented. A comprehensive description of the Hanna link motion is given. This motion is employed exclusively on Hanna type riveters. It is so adjusted that a predetermined and practically uniform pressure is developed on the die during approximately the last half of the piston stroke, or what amounts to about the last half inch of die travel. Therefore, it is said, only a single stroke of the die screw is necessary to take care of ordinary variations in the length of rivets, thickness of plates, size of holes, etc. The aim of the designer of the Hanna riveter was to develop a machine which would give results comparable with hydraulic riveting when using compressed air.

BOILERS.—"Finding and Stopping Waste in Modern Boiler Rooms" is the title of a complete boiler room manual recently published by the Harrison Safety Boiler Works, Philadelphia. The booklet is 274 pages in length. It includes information on almost every line of boiler room practice and methods of securing and maintaining plant economy that the owner or operator might need. The booklet is divided into sections, section I being devoted exclusively to data on fuels such as their analysis, size, appraisal, method of sampling, mixing, nitrogen determination, heating value, etc. Section II is devoted to combustion and presents information on such features as air theoretically required for combustion, air required for different fuels, grates, grate surfaces and firing, types of fuel employed, thickness of fire, automatic stokers, traveling grates, overfeed stokers, automatic furnaces, underfeed stokers, furnace temperatures, furnace gases, clinker draft, boiler draft, flue proportions, stack proportions, mechanical drafts, draft gages, dampers and flue gas temperatures. Section III is devoted to heat absorptions. This section likewise contains many ramifications, the most important of which are heat transmission by conduction, by convection and by radiation, heat transfer, economizers (air heaters and superheaters), methods of improving absorption, heating surface (including boiler capacity), boiler setting, refractories, soot, scale, methods of softening water, feed weight heating, exhaust steam heating. Section IV is devoted to boiler efficiency and boiler testing; Section V to boiler plant proportioning.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melt'g steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	25.00 to 27.50
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	28.00 to 28.50
Steel rails, short, Chicago	34.50 to 35.00
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.50 to 20.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	22.50
Stove plate, Birmingham	19.00 to 21.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$32.00 to 33.00
Boiler plate, cut, No. 1, St. L.	25.50 to 23.00
Bundled sheets, Cincinnati	20.00 to 20.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	37.50 to 38.00
Stove plate, Chicago	22.50 to 23.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis; St. Paul	4.54
Duluth, Minn., to:	
Minneapolis- St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	75.0 cents
Pacific coast (tin plate)	75.0 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	32.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	32.00
Cast borings, New York	17.00
Cast borings, eastern Pa.	20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	29.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	19.00 to 19.50
City wrought, long, N. Y.	32.00 to 32.50
Cut forge, Chicago	33.50 to 34.50
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	22.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chgo.	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	35.50
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east. Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	34.50 to 35.00
R. R. wrgt. No. 1, Birming.	27.00 to 30.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$37.50 to 38.00
Angle bars, steel, St. Louis	31.50 to 32.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	38.00 to 39.00
Busheling, No. 1, Chicago	25.50 to 26.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.00 to 26.50
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.50
Machine turnings, Cinci.	15.50 to 16.00
Machine turnings, St. L.	17.25 to 17.75
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	24.50 to 25.00
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	33.50 to 34.00
Steel car axles, St. Louis	43.00 to 43.50

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, eastern Pa.	34.00 to 35.00
Cast, No. 1, Birmingham	25.00 to 26.00
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00 to 31.00
Cast No. 1, Chicago	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable, Cincinnati	30.00 to 35.00
Malleable, Cleveland	30.00 to 35.00
Malleable, Buffalo	30.00 to 35.00
Malleable, Pittsburgh	30.00 to 35.00
Malleable, east. Pa.	30.00 to 35.00
Malleable, Chgo.	30.00 to 35.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	24.50 to 25.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	32.00 to 33.00
Locomotive tires, St. Louis	33.50 to 34.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, March 7, 1918 *No. 10*

Price Questions Concern Industry

Higher Maximum Levels Agitated by Producers in Certain Lines as Necessary to Cover Increased Costs—Plates Figure Prominently in This Movement—Government Appealed to by Basic Iron Consumers to Provide Tonnage

PRICE matters again are commanding the chief attention of the iron and steel industry as April 1, when the present schedules expire, draws near. Earnest consideration by government authorities of the higher producing costs in certain lines is being urged by the works. At a general conference of iron and steel makers at New York the past week, discussions centered strongly on this factor. Certain mills, which are buyers of pig iron or semifinished steel, have been leading the movement for advanced prices for their finished product which they declare are necessary to enable them to meet their rising costs. In plates especially there has been much dissatisfaction with the present price of 3.25c at which is claimed but few mills are able to show a profit. If any urgent pressure is to be made on the government for higher prices, it is expected to be in this product.

Appeal to Government

Shortage of the market supply of pig iron apparently is bringing closer increased government supervision of blast furnace operations. The question is being put squarely up to Washington authorities by the appeal of important steel works buyers in Pittsburgh and Ohio territory who are producing war essentials. These consumers, unable to cover future needs totaling more than 100,000 tons, have petitioned those charged with the distribution of raw materials that specified producers be directed to change to basic in their behalf, certain furnace capacity now on foundry iron. The complications of such a move are suggested by the fact that the furnace in view is sold up on foundry iron for the current year, much of which is for war purposes. The growing seriousness of the pig iron situation as aggravated by recent losses of production is being given fresh recognition weekly both within and without the trade. Curtailment of building operations has been advocated by the steel director as one means of conserving pig iron for more essential steel requirements. Heavy inquiry for iron is being maintained, but sales are being held back because the order books of various merchant furnaces are filled far ahead. In the south some inquiry for 1919 delivery has appeared.

Seller Must Pay Broker

If commissions are to be paid on pig iron transactions the director of steel supplies has ruled that they must come from the producer or seller and not from the consumer. The latter is not expected to pay more than the maximum price fixed by the government. The question of commissions also continues to agitate the scrap trade. Brokers are holding back on negotiations until a ruling on this point has been made by proper authority.

Recovery in the production of pig iron after the recent sweeping curtailment has been accelerated by more favorable weather conditions. This is illustrated by the 319 furnaces which were in blast the last day of February against 294 in January, a gain of 25. The average daily output of the furnaces in February was 82,734 tons compared with 77,523 tons in January. The totals were 2,316,545 tons against 2,403,227 tons, respectively, the discrepancy being due to the shorter month just past. The statistics show that steel works stacks have been able to regain lost output more rapidly than the merchant furnaces. Coke shortages still restrain pig iron production. Providing an adequate supply of cars for the Connellsville region remains a stubborn problem. This week service ranged from 38 to 55 per cent on different lines.

War Orders Are Heavy

New government orders of large tonnage are in sight. For the expected contracts for 150,000 cars and 2500 locomotives, probably 1,500,000 tons of steel will be needed. Large rail orders to be bought by the government also are expected. An inquiry for 183,000 tons of shell steel is current. A new ordnance bureau in France calls for a heavy tonnage of fabricated material of which one shop will furnish 15,000 tons. Powder plants being placed call for 20,000 tons further, some of which has been distributed.

The Iron Trade Review

EDITORIAL

Why Restrict Highway Improvement?

EACH passing hour finds a new committee organized at Washington for the purpose of regulating, supervising or restricting some activity that has a bearing on the conduct of the war. The efficient work of some of these committees has been a marked credit to the judgment of their membership, but in other instances the results have failed to measure up to constructive standards.

Recently an advisory committee to the capital committee of the federal reserve board was named. This latter body will pass upon all bond issues for highway improvement and it is reported it will refuse to sanction those roads which do not assist in the movement of troops or war supplies. The intention is to avoid the issuance of a large number of bonds which will compete with the government for capital, and which will offer higher rates of interest to the investor. The intention is good. Capital should be consecrated to war use. But there is a serious danger, if the interpretation of the powers of this committee is made so broad as to obstruct the construction of all save strictly military roads and streets.

Transportation is vital. The winter's bitter lesson is still pounding this fact upon public attention. We must have transportation or every element of production both agricultural and commercial is useless. During the crisis in railroad affairs when the vital elements of industry were tangled at the transportation centers or piled high at the shipping points awaiting cars, the council of national defense called upon the motor trucking facilities of the country to aid in handling all classes of materials over hauls not exceeding 200 miles. An appeal was made to state and national road commissions to lend their energies in providing roads for this freight relief work. The response was instant and every effort was made to speed up necessary road and street construction. Encouragement was given to motor truck freighting in many states. Among others Connecticut organized a bureau with branches in the principal cities to handle the details of return loads and to arrange routes for regular truck schedules.

The capital issues advisory committee has not progressed far enough in its activities to warrant an opinion as to its policies, but a source of danger exists which should be avoided at any cost. Care must be taken that really necessary and useful road work be not hampered. The average distance which each soldier sent abroad is transported has been stated to be 1200 miles. Munitions, food and supplies will probably average in the raw or finished state a distance equally as great. This enormous ton-mileage must be carried by the railroads under impending conditions of restricted and diminishing labor supply. The result is that other transportation agencies, motor truck freighting in particular, must be developed quickly and thoroughly to take care of the light and short haul burden. This development must be preceded by road construction and road maintenance, which it will require bond issues to finance. Careful discrimination must be exercised by those who have power to regulate these matters in order to avoid hampering the nation's best interests as well as genuine public advancement. Road construction, particularly trunk line improvement, for which the need is clearly shown, should be encouraged in every possible way.

Overdoing Specialization in Skill

DUE to the great scarcity of skilled machinists needed in the prosecution of the country's vast war program, attention is being called as never before to the American methods for training this highly important class of artisans. Twenty years ago an apprentice in order to obtain his machinist's papers, had to have a practical working knowledge of virtually every type of machine tool. Under the present quantity production methods of American manufacturers, the novice is developed into a specialist. He is taught to know one machine well, in most instances, to the exclusion of all others.

As a result, America's huge war machine now is working under considerable handicap. In the aviation service, where thousands of machinists are enrolled the government is having great difficulty in developing men to care for the repair and upkeep of airplane motors. In one aviation camp, 2500 machinists were recently found unsuited for this work due their lack of the broad, general knowledge of machinery which was required. Another instance, reflecting this great scarcity of skilled machinists, is to be found in the railroad industry. Large numbers of locomotives and other rolling stock are standing idle awaiting repairs, owing principally to difficulty in obtaining men for this work.

This problem not only has its national aspects in a wartime, but also has particular application to individual manufacturers. In the automobile industry, for example, where quantity production has been attained to a marked degree, sharp competition has

The Iron Trade Review

EDITORIAL

developed the fact that the more successful manufacturer is he who can satisfactorily repair as well as produce at the lowest possible cost. The necessity for conserving as well as producing thus reflected is developing more all-around machinists in the automobile field. Manufacturers in other industries, too, most likely would derive much benefit from the development of some all-around men in their shops as well as the specialists. It is not wisdom to allow our enthusiasm for lower costs and increased sales through quantity production to carry us too far into specialization with the resultant gradual extinction of the machinist's art in its broader and general application.

Production Costs Mount Rapidly

MANUFACTURER'S costs are rising, even in industries where material prices are fixed and wages, fairly stationary. This has been the experience of machine tool builders in recent months. Railroad congestion has been one cause of a considerable item of expense. For example, builders have had much trouble in getting shipments of steel castings through from foundries, even for government work of the highest importance. These manufacturers have been forced to send men to Washington for shipping permits and to employ others to follow up cars and keep them moving. In one case, about a month ago, two cars of steel castings were shipped from a foundry; the first in the regular manner, but the second with a man in charge. The second arrived in due time, enabling the builder to proceed with his government work, but the first is still on the road. The expense involved in following up the car in this case was $250. Then, delays experienced in receiving necessary parts for large machines already on the assembly floor is another source of expense. For example, a builder needed a large machine in his shop for building tools needed for war work. Four motors were ordered for this machine 13 months ago and to date only three have been received. The motor manufacturer now is turning over every motor made to the government under priority orders. In the meantime, the machine in the builder's plant is taking up valuable assembly-floor space, which figures in the "overhead". These instances illustrate only a few of the numerous ways in which incidental expenses are climbing, each comparatively small in itself, but contributing to a large aggregate. Prices of machine tools have been almost stationary since October, due largely to the high level which they have already reached. But there are indications that further advances in prices of some types may be forthcoming before long.

Wanted—Sensible Inspection Methods

FROM time immemorial government inspection of manufacturers' products has not only been strict and exacting, as it properly should be, but insistent upon the observance of the minutest letter of the specifications. Today, although the inspection forces of the various government departments have been augmented by veritable armies of new men, the old, rigorous demand for the observance of standards that are almost absurd, when viewed from a commercial standpoint, seems to prevail throughout the entire range of our wartime production activities. In fact, many of the new government inspectors are so ignorant of their work that they cannot do otherwise than blindly follow the literal wording of the specifications placed in their hands. Instances are on record where inspectors of steel castings were so uninformed on this branch of the foundry business that they were unaware that small defects in such castings could be readily and effectively made good by oxy-acetylene or electric welding. The Emergency Fleet corporation has placed orders for a great many marine engines and is pressing for deliveries. Yet there is at least one foundry in the state of Ohio where there are several large cylinder castings out in the yard waiting for the skull-cracker ball that would now be in the machine shop were it not for the petty exactions of certain subordinate inspectors. The cumulative effect of this maladministration of our inspection service is delayed production and shortage of important materials.

By this it should not be inferred that any brief is held for slipshod or unsatisfactory work. But there is no reason why, in the present emergency, when production is the primary desideratum, commercial standards that have proved entirely satisfactory for the most important work of our largest corporations should not prevail and be entirely suitable to the government. This applies particularly to work of an ordinary commercial character such as marine engines, cars, locomotives, etc.

The government needs businesslike inspection methods which will insure the maximum production of equipment of standard, acceptable, commercial quality. In inspection work, as elsewhere, red tape must be cashiered if we are to win the war.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 638

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	8.00
New River furnace	7.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, delivered.	$250.00
Spiegel, 20 per cent fur.	60.00
Spiegel, contracts, furnace.	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh.	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.80c to 4.90c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products March 6, average for February, 1918, average for December, 1917, and average for March, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices March 6, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$37.45
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	32.85
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	36.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	35.70
Lake Superior charcoal, Chicago	37.50	37.50	37.50	37.55
Malleable, Chicago	33.50	33.50	33.50	35.70
**Southern, No. 2, Birmingham	33.50	33.50	33.50	28.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	36.00
Basic, eastern Pa.....	33.00	33.00	33.00	34.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	34.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	37.25
Ferromanganese, delivered.....	250.00	250.00	247.50	275.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	67.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	67.00
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	67.00
Open-hearth billets, Pitts.....	47.50	47.50	47.50	67.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.20
Steel bars, Chicago.....	2.90	2.90	2.90	3.40
Iron bars, Philadelphia.....	3.50	3.50	3.685	3.509
Iron bars, Cleveland.....	3.64	3.64	3.64	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices March 6, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Iron bars, Chicago mill.....	$3.50	$3.50	$3.50	$3.00
Beams, Chicago	3.00	3.00	3.00	3.65
Beams, Pittsburgh	3.00	3.00	3.00	3.45
Beams, Philadelphia	3.185	3.185	3.185	3.759
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.20
Tank plates, Chicago.....	3.25	3.25	3.25	4.60
Tank plates. Philadelphia.....	3.435	3.435	3.435	5.659
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	5.05
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	4.70
Sheets, galv., No. 28, Pitts.....	6.25	6.25	6.25	6.70
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.15
Connellsville furnace coke.....	6.00	6.00	6.00	7.60
Connellsville foundry coke.....	7.00	7.00	7.00	6.90
Heavy melting steel, Pitts.....	30.00	30.00	30.00	23.40
Heavy melting steel, eastern Pa.	30.00	30.00	28.75	23.75
Heavy melting steel, Chicago..	30.00	30.00	28.90	23.00
No. 1 wrought, eastern Pa.....	35.00	35.00	35.00	30.50
No. 1 wrought, Chicago.....	35.00	35.00	34.75	28.85
Rerolling rails, Chicago.....	35.00	35.00	35.65	27.25
Car wheels, Chicago.....	30.00	30.00	30.75	20.30

(For Additional Prices See Page 638)

Appeal to Government for Basic

Steel Works Unable to Buy Iron Petition Washington to Direct Makers to Change Over Foundry Production in Their Behalf—Unsatisfied Inquiry in Steelmaking Grades Still Piling Up—Furnace Output Better

Pittsburgh, March 5.—Blast furnace interests in this district, which have been selling for that delivery appear to be entirely committed for the last half. Numerous inquiries involving large tonnages have been withdrawn from this market and put out in other producing sections. Evidence that there is going to be a tremendous shortage of iron continues to accumulate and consumers are making vigorous efforts to cover their requirements as fully as possible. Many of them realize they will fall far short of obtaining adequate supplies. One consumer in this district is sounding out the market in the east for a limited tonnage of basic iron for second quarter delivery, but so far has been unable to cover. Another Pittsburgh consumer seeking a round tonnage of basic has closed with a furnace in the west for 1000 tons and is about to complete negotiations for another lot. Some buyers who ordinarily purchase iron in this or nearby districts are sounding out southern markets and tonnages from that section are now being shipped to the Pittsburgh territory. The embargo declared last week by the Pennsylvania railroad on freight originating on lines west for shipment beyond the switching limits of Pittsburgh and destined to the east affects pig iron. This has prevented furnaces from making many deliveries, although where the iron is in pressing need for government purposes, permits are being issued. At the same time this embargo has caused shipments to be made more heavily to other points and no stocks have been piled. Furnace operations have improved during the past week, but some of them are on a day-to-day basis because of the shortage of coke. The Carnegie Steel Co. has in operation 41 of its 59 stacks, the National Tube Co. 9 of 11 and the Jones & Laughlin Steel Co. 7 of 11.

Ask Government to Act

Cleveland, March 5.—A new turn of the market which may be fraught with far-reaching developments is represented by the appeal being made by certain steelmakers to the government authorities that specified merchant furnaces be ordered to make basic iron in their behalf. At least two important steel plants in Pittsburgh and Ohio territory which have essential war business to fill but have been unable to buy their basic in the open market are taking this step. These interests need well over 100,000 tons for the last half. They are proposing that a certain stack now running on foundry be directed to switch to basic. The furnace in question is filled up for months ahead on foundry iron. The action resorted to by these steelworks consumers reflects the acuteness of the shortage of basic iron. New inquiries for this grade continue to appear. A New York state plant wants 12,000 to 15,000 tons for last half as well as 2000 tons of March-April malleable. A Philadelphia foundry interest wants 6000 tons of malleable, 1500 tons of basic and 500 tons of foundry for last half. A steel foundry has continued to sound the market for an indefinite tonnage of basic. Nothing has developed from the inquiry in the south for 72,000 tons of basic by a northern Ohio melter. Leading lake and valley sellers are offering practically

nothing in any grade as they are sold up through the year. Chicago producers will fill an allocation of 15,000 tons of malleable for a car-wheel maker in that territory. Only part of 2000 tons for the same consumer for Boston delivery has been allocated. Furnace operations are improving steadily and some stacks are back to about their November position before the severe weather appeared.

Big Tonnage is Needed

Boston, March 4.—About the only feature of the local pig iron situation is the fact that there is a somewhat freer movement of iron to this territory on government permits to plants engaged in war work. In spite of the improvement in the railroad freight situation and the fact that most furnaces are operating more freely, there is no improvement in the local supply situation. Almost all of the big melters in New England underestimated rather than overestimated their probable needs and if the orders could be placed, it is probably no exaggeration to say that 100,000 tons could be booked within 24 hours. And it would not matter much what kind or grade of iron it was if it could be secured between now and the middle of the year. With the furnace already booked ahead of their probable production for the next few months, however, there is little inclination to accept further orders and even regular customers are unable to budge makers from this position. The iron simply is not available. There are urgent calls for deliveries on existing contracts and in the effort to tide over, there are inquiries for ferrosilicon to take the place of 4 to 6 per cent silicon pig, supplies of which are very short and shipments of which are long overdue. Until the railroad situation clears further and there is a more normal movement of freight, it is probable that deliveries will be confined largely to the iron that is being shipped under a special or government permit and to plants working on war contracts. Recently, the shipping situation was worse in the south than in the north or west but with a special or government permit, which must be secured by the consignees, the only means of getting shipments through, it is as easy to move iron from the south as from any of the other producing regions.

Basic Tonnages Sought

New York, March 5.—Demand for pig iron has been more active again in this district. A New York state melter is in the market for 15,000 tons of basic for the second half and the National Enameling & Stamping Co. is seeking 10,000 tons of the same grade for the same position for Granite City delivery. Numerous inquiries for second half delivery are current and in the aggregate these constitute a large total. The furnaces generally continue to pursue the policy of not quoting for second half delivery and of accepting orders only when practically forced by regular customers to accommodate them. Such sales in this district during the past week did not exceed 10,000 tons and were made up mainly of foundry grades. Other current sales include only small tonnages of off or special analysis iron for prompt shipment.

Last Half Inquiry Heavier

Philadelphia, March 4.—Increased interest in second half iron has been manifested by consumers in this district during the past week through a greater volume of inquiry. One of the largest new inquiries is that from a Pottstown, Pa., consumer who wants 6000 tons of malleable, 2000 tons of basic and some foundry, all for second half. Other new inquiries call principally for foundry and involve a large tonnage in the aggregate. None of the makers, as far as known, are quoting on any more second half business at this time. Much pressure continues to be exerted for iron for shipment prior to July 1, but the only offerings are occasional carloads, mainly off iron. It is expected that a Virginia furnace, which has not yet taken any second quarter iron, will accept some tonnage shortly for this position. Inquiry for basic continues just as active as in preceding weeks, but none of this grade is to be had. Although furnace stocks as of March 1 have not yet been compiled, it is expected that a slight reduction will result from the better shipping conditions which have prevailed of late. It again is possible, for the first time in many weeks, for Virginia furnaces to make shipments to New England.

Much Inquiry is Passed

Buffalo, March 5.—Inquiry for pig iron in this district is considerable but the business being done is not large. The most extensive selling of the week was an aggregate of 7000 tons of foundry iron sold by one interest for third quarter delivery. Furnaces are being importuned for last half product so strong is the demand for this period that one furnace interest has had to refuse to increase orders for last half already given by old customers. One maker continues to be flooded with inquiry for thousands of tons of malleable, basic and foundry, though it has been out of the market, including last half delivery, for months. This furnace has been able to give old customers a very small tonnage. A Depew, N. Y., melter is inquiring for 12,000 to 15,000 tons of basic for last half and for 2000 tons of early malleable. There is prospect that some of the furnaces may be more interested in inquiry within a short time. The fuel situation has improved slightly, though production still is sadly hampered. Contemporaneously there is a freer movement of empty cars, though some of the principal lines are badly tied up. Improvement of iron production waits on the coke situation. A further lifting of embargoes is making shipments easier. The embargoes, in fact, are off to a large extent, except some points in Canada.

Embargoes Are Lifted

Cincinnati, March 4.—The combined efforts of the railroads and the furnace operators appear to have had some effect toward moving shipments to destination more promptly. Nearly all embargoes on southern iron have been lifted, and it is now possible to ship iron to points north of the Ohio river, with very few exceptions. Shipping restrictions as applied to the Ironton district have also been almost entirely removed, but the difficulty now is to obtain cars in which to load the iron. These are scarce and are likely to cause more trouble as iron commences to move in larger volume. The inquiry is falling off, and sales of southern foundry iron are also fewer. Another trouble that has existed for some time, and which is now increasing is the difficulty in obtaining iron with the correct analysis wanted. High sulphur iron in the south is in larger supply than at any previous period. Several melters of northern iron have been quietly taken care of covering a last half supply, but available metal for that shipment is now very limited. No change in the silvery iron situation is reported, although some high silicon iron has recently been disposed of by southern producers, nearly all of which was for last half shipment.

Fearful After July 1

St. Louis, March 2.—Large inquiries and light sales briefly sum up the pig iron situation here. Actual transactions during the present week were the smallest so far this year. Southern makers, it appears, have oversold themselves and will have to address themselves to intensive production in order to meet their bookings. This

week some small tonnages of No. 2 southern were disposed of for second half delivery, but otherwise furnaces in that region have entirely withdrawn from the market. Among the inquiries reported were several for small amounts of Ohio silvery grades but so far as could be learned none is to be had for any shipment. East side foundries and mills are inquiring for fair tonnages of steelmaking iron. Consumption in the St. Louis district continues heavy. The only factor holding operations being the continued scarcity of coke. While most of the important consumers are covered pretty well over the first half, apprehension is felt relative to pig iron supplies from July 1 on. There is a marked hesitancy about accepting business depending on pig supplies after that date.

Southern Inquiry More Active

Birmingham, Ala., March 5.—Inquiries for pig iron are numerous again. Southern furnaces after practically withdrawing from the market for any future period have resumed some selling. Consumers consequently have renewed inquiries for third or fourth quarters. In one or two instances quotations have been asked on next year's delivery. But little, if any iron at all is to be had for the second quarter and the probable make for the third quarter has already been well sold. Some inroads have been made on the fourth quarter tonnage. While production shows some improvement, the output is not what has been expected. The Republic Iron & Steel Co. has not had normal output, coal and coke shortage having caused the deflection. Weather conditions have been almost ideal for steady operations. Railroad service also is better and some of the delayed shipments are being caught up with. Blowing in of additional furnaces is scheduled for the next few days including stocks at Sheffield. The Trussville furnace is still delayed by lack of washed coal. The furnace has been in readiness for 60 days. Home consumption of iron still lags as pipe plants are not melting as extensively as a few months ago.

Want Closer Touch

Chicago, March 5.—The western division of the American Board of Scrap Iron Dealers has voted to send a representative to Philadelphia to make arrangements for keeping the western division closely informed of every development relative to proposed or agreed changes in scrap.

Cars Still Cripple Coke

Despite Urgent Measures Transportation Service in Connellsville Region Far Under Needs—Speed Up Shipments for Low Phos Iron

Pittsburgh, March 5.—Shortage of cars in the Connellsville coke region still hampers shipments and remains at about the same average that it has been for the past two or three weeks. The average for that period has been approximately 38 per cent on the Monongahela railroad, and between 55 and 60 per cent on the Pennsylvania railroad. On Monday of the current week there was a better supply on the Monongahela railroad, but today it dropped to only 30 per cent. The average promised for tomorrow is 40 per cent. The Pittsburgh & Lake Erie railroad is taking care of all requirements for the Monongahela and is said to have placed 125 per cent of its supply yesterday. Producers and consumers alike are unable to explain the unsatisfactory supply of cars and are greatly disappointed at the failure of the free movement of empties back to the coke region. Beginning last Saturday empties started to return from the east and some of them went to the Connellsville region. They, however, would take fuel only for points west, resulting in a more acute shortage for eastern furnaces. A. H. Smith, regional director of railroads of New York, issued an order Saturday directing that priority movement be made of empty coal and coke cars and this is expected to result in a large increase in the supply in the coke region but so far such a situation has not developed. While it is known there is a vast number of cars in the east their rapid return is not expected owing to traffic congestion, together with the lack of motive power. It is claimed there are 25,000 open cars alone in the east waiting to be returned to the west for carrying food products and war materials. Production in the Connellsville region for the week ended Feb. 23 shows some increase as the output was 264,849 tons, as compared with 240,772 tons for the preceding week, according to *The Connellsville Courier*.

Increased prices for coke allowed by the fuel administration last week do not affect Connellsville fuel but relate to ovens on the Baltimore & Ohio railroad between Tunnelton, Grafton, Preston county, Pennsylvania, Meridian, Barbour county, West Virginia, the Pocahontas district of that state and Indiana county, Pennsylvania. The amount of coke commandeered by the fuel administration for the Eastern Steel Co. for low phosphorus pig iron production is 10,000 tons monthly. In addition ovens with contracts with the Northern Iron Co. making low phosphorus iron have been instructed to make 100 per cent shipments.

New Jersey Fuel Sold

Boston, March 5.—New Jersey by-product foundry coke which was fixed by the fuel administration at $9.25, ovens, maximum, has been selling in this territory at $12, delivered. The maximum price of the New England maker is $13.94, ovens, but some sales have been made at $13.45, ovens.

Sell Last Half Fuel

Philadelphia, March 4. — Several thousand tons of western Pennsylvania beehive foundry coke again were sold in this district during the past week for second half shipment. The seller now has withdrawn and the market again is devoid of offerings for any position.

Contracts Are Renewed

Cleveland, March 5.—Connellsville makers of foundry coke have been renewing contracts for last half or for all year to July 1, 1919, with regular customers in this territory. These contracts are subject to subsequent official price revision. One local foundry is inquiring for 25 cars and another for 10 cars.

Supplies Are Better

Cincinnati, March 4.—Changes made in prices on some coke, especially in the New River field, have had no effect. No coke can be had for prompt shipment, and this applies equally to all fields and on all grades. Contract business also is at a standstill, as the producers are very slow in committing themselves to deliver any more fuel than already under contract. Cars are getting scarcer, and delays are to be expected on this account. Both the furnace and foundry supply has improved to such an extent that no plant is expected to shut down for the want of fuel. This does not mean that stocks of coke are approaching normal, but that there is sufficient on hand to run these plants several days ahead.

Permission was recently granted the Brier Hill Steel Co., Youngstown, O., by the federal government to fill the bank of the Mahoning river with a retaining wall as a protection against floods at the tandem plate mill being erected a few miles above the center of the city.

Commissions Check Sales

Scrap Dealers Reluctant to Trade Pending Settlement of Compensation Question—No Ruling Yet Announced—Producers Sell Direct

FOR COMPLETE SCRAP PRICES SEE PAGE 638

Pittsburgh, March 5.—While it has been dull for sometime the scrap market has become more stagnate since the reclassification and the establishment of differentials were announced recently. This situation is due to the fact that brokers and dealers are uncertain as to whether or not a commission is allowable on transactions. Consumers are declining to pay a commission in the absence of an official interpretation making it plain whether or not sellers are permitted to take a percentage over the levels fixed. Dealers in scrap say they are compelled to pay these fixed levels for supplies they obtain and that therefore they cannot do business unless a commission is allowed. In consequence sellers who were offering considerable tonnages of different grades, especially heavy melting steel and low phosphorus scrap, hav withdrawn from the market. At a meeting last night at the Fort Pitt hotel, this city, of the central division of the American Board of Scrap Iron Dealers, C. A. Barnes, secretary of the board and also a member of the subcommittee of the iron and steel scrap committee of the American Iron and Steel institute, said that the matter of compensation for brokers and dealers still is under consideration by the committee on steel and steel products of the institute. The central division at present takes in only Cleveland, Detroit, Cincinnati and Columbus districts. An invitation was extended to dealers and brokers in the Pittsburgh and Erie, Pa., and Buffalo, Rochester and Syracuse, N. Y., districts to join the central division and it is probable it will be accepted. The Pennsylvania took bids on March 5 for 6500 tons of miscellaneous railroad material.

Market More Active

Boston, March 4.—More favorable weather and an easier shipping situation have combined to make a more active market for scrap in this territory. Actually, the market has been active in demand right along, but it has not been until the past week that it has been possible to do much shipping and the local trade is largely dependent on distant consumers for business. Better selling prices evidently prevail for cotton ties, rerolling rails, wrought iron pipe, No. 1 railroad steel, machine shop turnings and drop forge trimmings, for dealers are paying higher prices for those offerings. Wholesale dealers' paying prices per gross ton, f.o.b. shipping points, follow: Wrought No. 1, yard, long, $30 to $31; horse shoes, $30 to $31; cotton ties, $22 to $23; stove plate, $20 to $20.50; No. 1 machinery, $32 to $33; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $31 to $32; bundled barrel hoops, $17.50 to $18; iron boiler plates, $34 to $35; wrought iron pipe, new specifications, $28 to $29; steel rails, $26 to $27; No. 1 railroad steel, $26.50 to $27; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $15 to $16; cast borings, $16 to $17; drop forge trimmings, $23 to $24; cast iron car wheels, mill price, $35 to $37.

Railroads Still Direct

New York, March 5.—With the railroad situation steadily improving, the scrap market in this district continues to reflect a better tone. Dealers report good trading in virtually all descriptions. One development of the past few weeks which now is having a more direct effect on the business of some brokers is the tendency of the railroads to sell direct. It is expected that as time goes on this practice will become more general, particularly in the outlying districts. Under the control of the government, it is believed the railroads will distribute much of their scrap to consumers along their main lines. This would supplant the present method of selling to dealers, delivering the material to their yards at terminal points and eventually carrying it back over the same line to the ultimate consumers. At present demand is of sufficient volume to keep the dealers well booked. Prices generally are firm, except on wrought pipe, which now is holding at $30.50 compared with the previous level of $31.

Buyers Avoid Commission

Philadelphia, March 4.—A growing proportion of the scrap business in this district is being transacted direct between producers and consumers. This development is due to an increasing disinclination on the part of consumers to pay a commission to dealers. Visible sales during the past week, therefore, were mostly by the smaller yards to the large dealers. How much business has been transacted direct is not known. The only price change during the past week was an advance of 50 cents on No. 1 forge and bundled sheet scrap. In general, the market seems somewhat weaker, due to the loosening of the supply of scrap by the more moderate weather. The Pennsylvania railroad has made changes in its methods of selling. It now requires not only a bid f.o.b. the point at which the scrap is held, but the name of the consumer and the equivalent delivered price at the point of consumption. It also desires information as to whether the scrap will be used in a blast furnace, or for chemical purposes, or in a basic or acid open-hearth plant, etc. One result of the regulation of the market is that the Cambria Steel Co., being located nearest the Altoona, Pa., shops of the Pennsylvania railroad, is able to bid a higher price than any other important consumer.

Classify Shell Turnings

Buffalo, March 5.—The market is becoming easier. Consumers appear to be getting scrap and the intensified demand caused by the fact that certain users feared they would not be able to cover all their requirements is diminishing. Little material is coming into yards, however, and in addition to a dearth of railroad and mixed scrap, there is still a shortage of heavy melting steel. It is understood in local scrap circles that a ruling has been made in regard to shell turnings, large tonnages of which now are coming in, by which the government price of $25 for heavy axle forge turnings and their equivalent will include first and second cuts only of shell turnings. The lighter shell turnings are to be classified as ordinary machine shop turnings and will come under the government price of $20. In the event plants do not separate first and second cuts, the output will be classified as merely "machine shop turnings". Large tonnages of shell turnings are beginning to come on the market in this territory. No. 1 busheling now is selling at $31. The government price is $32. Speculation has been entirely eliminated by the fixing of prices. Most contracts are being made with the proviso that any new government price at delivery will obtain.

Uncertainty Over Commissions

Cleveland, March 5.—Uncertainty over "commission or no commission" dominates the scrap iron and steel market in this district. Many dealers have come to the conclusion that the haziness on this point of the new schedule of prices recently announced is purposeful, the intention being to

eliminate the 3½ per cent commission if the complaints do not prove overwhelming. It cannot be ascertained that any scrap has been sold minus the commission, while several deals with the commission are reported. One of the largest dealers in this territory is not doing any business pending an expected announcement. If none is forthcoming, dealers say they will be forced to accept the new schedule at its face value. No sale of cast scrap of cupola size at $35 is yet reported. The trade feels that foundries being practically the only users of cast, would have obtained as plentiful a supply at $30 as at $35. The $37.50 grade of low phos has aroused some discussion, too, it being felt that it is an in-between grade that can too readily be thrown $2.50 either way. All dealers' offers to consumers are being snapped up.

New Prices Satisfactory

Chicago, March 5.—Both buyers and sellers of iron and steel scrap appear well satisfied with the new price schedule recently announced. The market has been showing more stability and buying has been stimulated. Demand for foundry grades is decidedly heavier and cast scrap, which was difficult to dispose of recently, is in strong demand, with prices considerably higher. Lack of a decision on the matter of commissions on scrap sales where the price is at the maximum is preventing some trading. Rumors are heard from time to time of some grades being traded in at prices above the announced maximum and shipments of scrap to eastern users are said to have been made on the basis of the Chicago quotation, the consumer paying the freight. Supply is fairly short in most lines and railroad offerings, which have been somewhat larger recently, have taken a slump at present. It is announced from headquarters of the scrap association that present prices are applicable only until April 1 and that contracts for delivery after that date must be subject to whatever price is announced for the period when delivery is made.

Market Remains Quiet

Cincinnati, March 4.—Mixed cast scrap is a little firmer, but the change was brought about by the new price regulations and not by any increased call for this kind of metal. Business is still very quiet. A prominent dealer states that no change of consequence may be expected until after all railroad embargoes are lifted. Even after such an order goes into effect, it will require considerable time to clean up shipments on contracts. Dealers are not adding to yard stocks.

Asks Shell Steel Tonnage

Government in Market for 183,000 Tons—Shortage in Semifinished Material, Especially Sheet Bars, Grows More Acute

Pittsburgh, March 5.—New shell steel inquiries aggregating 183,000 tons are understood to have been put before makers. Urgent inquiries in increasing number are being made for billets and sheet bars. There is an extreme shortage of this class of tonnage and makers are unable to satisfy the demand. Some of them not only are consuming all of their own output but are anxious to buy outside. A consumer in this district is seeking approximately 5000 tons of sheet bars. The government is taking large steel requirements and this factor is preventing domestic consumers from covering. Some makers who have heavy bookings for the government have speeded up their plants to the highest point in order to complete production on scheduled time. Demand for wire rods continues active. Some makers are not taking business, while others are accepting only limited lots. A middleman is seeking 300 tons. Two other inquiries involve 50 tons each. Platemakers in the east are searching this market for slabs, one inquiry involving 4000 tons. Jobbers also are after slabs, and together with independent sheet and tin plate mills are trying to obtain sheet bars. A large lot of ingots is being inquired for.

Limited Strip Sales Made

Pittsburgh, March 5.—Small tonnages of cold-rolled strip steel are being sold by makers in this district, largely for government work. Manufacturers of pleasure automobiles also are taking limited lots. Sales made call for first quarter delivery almost exclusively, producers being unwilling to commit themselves to any great extent after that period because prices are subject to revision April 1. The fixed price of 6.50c is being obtained on current sales.

Demand More Acute

Cleveland, March 5.—Demand in the open market for various forms of semifinished steel is intense as there is little material for sale. Sheet and tin plate mills continue to seek sheet bars actively, taking practically anything that the mills can offer them whether it be small tonnages or offheats. The mills have virtually nothing for sale. An inquiry for 1800 tons monthly of open-hearth blooms for an indefinite period has been put out by a large consumer in northern Ohio and this probably will be satisfied soon as it is related to war work. Another northern Ohio finishing mill has been asking for a tonnage of rerolling billets for miscellaneous purposes.

Many Nails

Wanted by the Government—Wire Price Irregularity is Reported

Pittsburgh, March 5.—Operations of wire mills in this district continue to increase and are now estimated at about 65 per cent of capacity. Shortage of steel still hampers the output and compels makers to decline to quote on numerous inquiries. The government is seeking 12,000 kegs of nails. Two inquiries, one for 300 tons and the other for 400 tons, have been put out by domestic consumers for barbed wire. Fair demand is also being made for plain wire. Some of the business being taken calls for delivery at the convenience of mills. Makers are hoping to increase production through the free use of discard steel, which would have to undergo a process of annealing before being suitable for the wire trade. Tests are said to have shown that large nails can be made with particularly good results from discard steel. It is reported that wire nails are being offered direct by one producer to small consumers at $3.80 per 100 pounds, Pittsburgh. The government price for jobbers is $3.50.

Mills Lack Stocks

New York, March 5.—Various government departments are allotting wire and nail orders constantly but these represent only a small total. There is, however, an active demand for wire products from miscellaneous sources based on direct and indirect government requirements. General domestic demand also is more urgent so that in conjunction with reduced manufacturing operations, producers are prevented from accumulating stocks.

Will Hear Officer

The March meeting and dinner of the New England Foundrymen's association will be held at the Exchange club, Boston, Wednesday, March 13, at 6 o'clock. The speaker will be Capt. Leslie Vickers, whose subject will be "Out of the Trenches".

Bar Buying Much Better

Consumers in All Districts Showing More Interest in Purchases—Implement Orders Liberal—Reinforcing Lots Are Sought

Chicago, March 5.—Increased inclination to buy steel and iron bars is noted in the west and inquiry is increasing steadily. In the case of soft steel bars it is practically impossible to place new business as demands by the government for all forms of finished steel are sufficient to absorb most production. Agricultural implement makers have been able to cover their requirements without definite promises of delivery but with assurances of being taken care of as well as possible. Bar iron demand is not heavy but current business is steady and most tonnages are wanted for quick delivery. Bar iron is being utilized in place of sofe steel for many purposes. A better demand for rerolling bars is current, implement makers using this form of steel instead of soft steel bars and reinforced concrete builders showing added interest. While most of this business is for prompt delivery, some inclination is noted toward making contracts for future delivery.

More Demand Appearing

Cleveland, March 5.—The approach of spring appears to be the cause for the bringing out of a considerably increased demand for merchant steel-bars from general consumers in this territory. Implement manufacturers especially have been sending in liberal specifications which with some makers are the best in several years. Jobbers also have been placing some attractive orders for shafting, one of which was in excess of 500 tons. Reinforcing bar demand is light due to the limited amount of building construction. Some makers in this district have accumulated unusually large stocks of this product. An inquiry for 1000 tons of reinforcing bars for construction work in Kansas City is current.

Expect Heavy Implement Buying

Pittsburgh, March 5.—Indications are developing that the implement trade is about to come into the market for tonnages of steel bars and it is believed that buying will be well under way during the fore part of April, and will involve the largest tonnages these consumers ever have taken. A large portion of it will be required for the construction of farm tractors. Operations of mills have increased considerably and while makers are deferred on shipments and well committed for the first half it is probable they will be able to take good sized tonnages after the output gets nearer to its normal status. Makers of bar iron are operating heavily on government contracts and are able to take only limited tonnages from domestic consumers.

Wanted for Chemical Uses

Philadelphia, March 4.—Sales of steel bars continue limited to occasional small tonnages. Included in business of the past week was one lot of large diameter rounds up to 6 inches. Although bars continue difficult to get, the outlook is that offerings shortly will be more plentiful. Demand of late has shown a falling off. Iron bars also are quiet. The quotation most frequently heard now is 3.50c, Pittsburgh, compared with the maximum of 3.50c, mill, or Pittsburgh. An unusual inquiry calls for several thousand tons of special analysis bar for chemical use. Demand for tool steel is quiet and a current inquiry for 30 tons of high-speed steel and 30 tons of high-carbon steel is exceptional.

Want Reinforcing Bars

Buffalo, March 5.—Inquiry for reinforcing bars has been fair. There has been a demand for several 1000-ton lots for export, and more or less government purchasing. There has been a slightly increased activity in commercial demands. An inquiry approximating several thousand tons is before the market from northwest Canada. A local sale of 1000 tons of soft steel bars in the past week is noted.

Need Tonnage For Buildings

New York, March 5.—An inquiry for 8100 tons of concrete bars for army and navy buildings at Washington and for naval stores depots in South Brooklyn has been put out by the Turner Construction Co. The bars probably will be allotted through government channels.

Seeks Shafting Tonnage

Pittsburgh, March 5.—An Ohio consumer is inquiring for 7000 tons of cold-rolled shafting to be worked up into war material. Most of the tonnage being sold is for government purposes. The implement trade is closing for limited amounts. While it is the general policy of makers not to sell beyond the first quarter, some business is being taken from implement interests for second quarter, the price being subject to revision by the government on April 1. Tonnages to be delivered previous to that period are being sold at the fixed level of 17 off to list, Pittsburgh, in carloads.

Hoop Demand Good

Pittsburgh, March 5.—Makers of hoop steel are booking tonnages for miscellaneous manufacturing lines rather freely at the fixed price of 3.50c, Pittsburgh. Better demand exists for flat steel, which is being sold at maximum levels. A small portion of the latter business is for second quarter shipment. Makers are hesitant about selling for this delivery because of the uncertainty as to prices after March 31. Only limited lots of bands are being sold. The price of 2.90c, Pittsburgh, is not sufficiently attractive to cause manufacturers to actively solicit business.

Pipe Market

Shows Activity in Wrought Goods But Dullness in Cast Product

Pittsburgh, March 5.—The market for iron and steel lap weld pipe is active. Mills are having no trouble in making sales, and some are so heavily committed that they are out of the market. A leading steel pipe-maker is filled up for one year on lap weld tonnages and for 18 to 20 weeks on butt weld sizes. A prominent maker of iron pipe is about two months behind on deliveries of lap weld orders but can make fairly prompt deliveries of butt weld tonnages from the relatively small stock on hand. The chief difficulty is the transportation situation, which has made it impossible to get a steady and sufficient supply of pig iron and skelp. Mills are operating as heavily as is possible, the only restriction being the supply of raw material.

Eastern Market Looking Up

New York, March 5.—The tone of the cast iron pipe market in the east continues to firm up, and prices are steadier than in weeks. This has been brought about by the further good demand from private sources in conjunction with expectations of increased government awards. Included in recent purchases are 300 tons by the J. G. White Engineering Corp. for government work at Sheffield, Ala. It is estimated that 3000 tons eventually will be needed for the Sheffield plant. Considerable export demand continues, but due to diffi-

culty in obtaining ships, little of this business has reached consummation Nothing new has developed in the way of public work.

Tonnage Small in West

Chicago, March 5.—Cities continue to buy lightly for their cast iron pipe requirements to meet 1918 extensions. Bids will be opened at Minneapolis March 7 on 450 tons of 42 and 48-inch pipe. The United States Cast Iron Pipe & Foundry Co. has been awarded 485 tons for Rockford, Ill., the American Cast Iron Pipe Co. 1392 tons for Minneapolis and the Hammond-Bird Iron Co. 438 tons for St. Paul.

Operate Under Difficulties

Birmingham, Ala., March 5.—Cast iron pipe plants in this territory are operating under difficulties. The effect of the quiet pipe market is being felt and on top of it a strike on the part of metal trades workmen who are seeking an 8-hour day with the same pay they have been getting for 10 and 11 hours. On of the larger cast iron pipe plants still is down and a foundry and machine shop at Bessemer also is out of commission. Some contracts being held up are for the government and this may bring federal intervention.

Spring Betterment Lacking

Boston, March 4.—Local jobbers continue to do a rather good business with those companies engaged on war orders, but still find the demand for structural material exceedingly slow. In fact, the latter division is quieter even than it has been and the trade as a whole is not looking for the improvement which usually develops about this time of the year when mild and open weather is conducive to building operations. Not only are building materials, outside of iron and steel, so high as to discourage new construction, but labor is short and high and the banks are not inclined to put out money for building purposes, unless the proposed structure is necessary for government work. Some improvement is reported in the deliveries of stock from the mills, but the jobbers are still a long ways from being well supplied with those lines needed by war plants.

A complete catalog, showing the resistance materials, nickel alloys and monel metal has been prepared by the Electrical Alloy Co., Morristown, N. J. It gives much data of interest to electrical engineers and electrical device manufacturers. Copies will be sent on application.

Great Car Tonnage Needed

Expected Government Awards of 150,000 Cars Estimated Will Require 1,500,000 Tons, Mostly Plates—Ship Steel Closed

Pittsburgh, March 5.—A huge tonnage of plates and in a lesser degree of shapes and bars is involved in the tremendous program of railroad equipment buying by the government, the necessary legislation for which now is reaching a final stage. Not less than 1,500,000 tons of steel will be called for if 150,000 box, hopper and gondola cars are purchased as now is indicated. The box cars will call for 7 tons of steel each and the hoppers and gondolas for 17 tons each. In addition if 2500 locomotives are bought, this means probably 75,000 tons more of plates. Makers of plates in this district are well sold up and except for comparatively small tonnages they are offering nothing in the open market.

Production Increases Slightly

Philadelphia, March 4.—Plate mill operations have shown a slight improvement during the past week. Present output in eastern Pennsylvania appears to be at the rate of about 55 per cent of capacity. The chief obstacle to a more pronounced betterment is continued scarcity of gas coal. In the face of the reduced operations and the continued huge requirements, eastern Pennsylvana mills are unable to take on any of the orders which consumers all over the country are clamorous in trying to place. Mills figure that they now have enough orders on their books to keep them occupied for 10 months ahead. Practically all of this is urgent government business.

Ship Steel Placed

Cleveland, March 5.—Government ship work on the lakes continues to direct some sizable tonnages to the mills. A new lot to be placed with Pittsburgh makers calls for 10,000 tons of shapes and plates for eight vessels for the Emergency Fleet corporation placed with the Toledo Shipbuilding Co. Another order distributed this week involves 2500 to 3000 tons of plates, shapes and bars for gun mounts on 70 government ships building on the lakes. Considerable tonnage also remains pending for the rebuilding and reinforcing of those vessels which are to be cut in two for passage of the Welland canal. It is understood that the American Shipbuilding Co. has the assurance of additional government contracts which will engage its capacity to the end of 1919. Local mills have been completing some shipments of light plates for airplane drop bombs.

Ship Demand Strong

Chicago, March 5.—Demand for steel plates continues the strongest feature of the finished steel market and shipbuilders, buying through the government, are taking by far the largest part of the tonnage. The government continues to place large tonnages, both for fabrication in bridge shops and for use at shipyards. These allotments range from small lots to 20,000 tons or more. Aside from government business mills are unable to take on much further tonnage of plates.

Now Selling Ore

Contracts for 1918 Lake Superior Ore Are Being Signed

Cleveland, March 5.—Lake Superior iron ore for 1918 delivery is now being sold. Operators have begun to send out contracts to consumers. The prices called for are those in the 1917 schedule. These quotations are: Old range bessemer, $5.95; Mesabi bessemer, $5.70; old range nonbessemer, $5.20; Mesabi nonbessemer, $5.05.

The contracts now being signed are largely by consumers who previously had reserved ore for their 1918 needs. The ore market has been disturbed for weeks by the request of the government that the prices approved on Jan. 1 be not used in contracting beyond March 31 of this year. The ore trade has operated on a 12-month basis so that the actual selling movement for this year has been delayed until means were devised of meeting this ruling. This is now being done by the insertion of a special clause in the new contracts providing for a readjustment of the prices to meet the future action of any authorized federal price-fixing agency.

Considerable ore remains to be sold in the open market, despite the heavy reservations which many consumers have made. Ore sellers expect that before March 31 some definite interpretation will be obtained from the government regarding the setting of a fixed price for the entire season.

The Groton Iron Works, Groton, Conn., will start work immediately on six steel cargo-carrying ocean liners.

Place French Depot Steel

Ordinance Buildings for Expeditionary Force Call for Large Structural Tonnage—Powder Store Houses Awarded

New York, March 5.—Tremendous tonnages of steel are involved in the construction of the ordnance base depot in France. Among other awards the Fort Pitt Bridge Works was alloted 15,000 tons, and will erect 20 buildings. The American Bridge Co. also is reported to have received a large tonnage. The depot will include 20 storehouses, 12 shop buildings and 100 smaller shops. Large tonnages for government powder storehouses also have been placed. The aggregate of those jobs of the character placed are still pending is placed at 25,000 tons. Demand in the New York structural market remains dull, although considerable business bearing principally on government work is in prospect. This not only involves the huge tonnage required for airplane shelters, but a number of miscellaneous tonnages for plant additions. As soon as the railroad situation becomes more improved and manufacturers have some definite assurance that they not only will be able to make shipments, but will have supplies of fuel sufficient for their needs, a much better demand for structural steel will arise. Export demand also is of small volume. At present, the majority of the fabricators have considerable work on hand. This, however, is not due so much to new demand, as to delays occasioned by the difficulty in getting material and in the making of shipments of steel already fabricated.

Place Navy Yard Tonnage

Philadelphia, March 4.—As far as ordinary structural lettings are concerned the market in this district continues devoid of developments. The only activities involve government work and there is nothing of importance in this direction. A fair sized tonnage for an airplane assembling plant at the League Island navy yard will be supplied by the American Bridge Co. The contract for a storage building at League Island of reinforced concrete has been let to Cramp & Co. Sales of plain structural shapes involve only a few small tonnages here and there.

Western Demand Light

Chicago, March 5.—Buying of structural shapes for building purposes is even lighter than it has been during the past few weeks. The spring building season holds no promise of increasing business and the trade looks forward to almost nothing outside of industrial and war business. The latter, however, promises to engage most fabricating shops and lack of general buying probably will not be so much of a factor. Recent tonnages placed in the west are for small lots and entirely for industrial purposes.

Car Shortage Holds Up Work

Pittsburgh, March 5.—Shortage of cars has made it impossible for some fabricating shops to obtain steel and as a result they have had to delay work on important government contracts. Operations are devoted almost exclusively to government requirements.

CONTRACTS AWARDED

Conveyor supports, etc., for primary and secondary crushing plant, 160 tons, for Utah Copper Co., Arthur, Utah.

Steffens plant for the Utah-Idaho Sugar Co., Toppenish, Wash., 150 tons, to Minneapolis Steel & Machinery Co.

Headframe for the Colby Iron Mining Co., Bessemer, Mich., 100 tons to Worden-Allen Co.

Tractor assembly plant for the Chandler Motor Car Co., Cleveland, 320 tons, to the Russell Wheel & Foundry Co., Detroit. Ernest McGeorge, Leader-News building, Cleveland, engineer.

Additions to the American Multigraph Co., Cleveland, 400 tons, to the King Bridge Co.

Twenty buildings for the ordnance base depot in France, 15,000 tons, to the Fort Pitt Bridge Works. American Bridge Co., also receives large tonnage.

Extension to the plant of the Standard Car Construction Co., Sharon, Pa., 235 tons, to McClintic-Marshall Construction Co.

CONTRACTS PENDING

Additions to the plant of the D. Connelly Boiler Co., Cleveland, 200 tons, bids taken by the company.

Ferro Prices

Unchanged Despite Low Supply of Spot Metal and Foreign Ore

New York, March 5.—Current transactions in ferroalloys are small. Sales of ferromanganese during the past week totaled only a few hundred tons. The market continues firm at $250, delivered. The fact that prices have not been advanced recently has caused surprise in some quarters. The supply of spot ferromanganese is very low and the foreign ore situation remains unchanged. The embargo in Brazil against shipments of manganese ore to the Brazilian seaboard still is in effect. There are practically no offerings of foreign ore. There is considerable apprehension whether production, after present foreign ore reserves are used up, can be maintained anywhere near capacity. Producers in some cases are complaining that present prices on ore threaten to reduce their profits to the vanishing point.

To Supply Manganese

New York, March 4.—The Phillipsburg, Mining Co. Phillipsburg, Mont., has closed a contract with a leading eastern maker of ferromanganese to supply to the latter all of its output of manganese concentrates and about half of its production of natural ore. It now is turning out concentrates at the rate of about 225 tons per day and shortly will increase this to 300 tons. These concentrates average 45 per cent manganese, 10 per cent silicon, 1½ per cent iron and some alumina.

Ferrosilicon Market Active

Pittsburgh, March 5.—Fairly active demand exists for small tonnages of 50 per cent ferrosilicon. Some makers are quoting both prompt and second half tonnages at $175, delivered, although a quotation as high as $190, delivered, is also being made for spot shipment. Small lots of ferromanganese have been sold during the past week for shipment in three, six and nine months, the price being $250, delivered, which is also named for prompt shipment. Spiegeleisen is quoted at $60 to $65, furnace.

Higher Rates

On Tin Plate to Pacific Coast Cause Speeded Up Shipments

Pittsburgh, March 5.—Freight rates on tin place to the Pacific coast of the United States will advance from 75c to $1 and to British Columbia from 75c to $1.25 a box on March 15. Efforts are being made to have large shipments made to consumers to those points before the higher rates become effective. Shipments during the past week have not shown any appreciable improvement, but the food administration is understood to be still taking steps to give further relief in the way of supplying more cars. Railroads were instructed recently to give priority shipment to tin plate for shipments to the west, but the shortage of available cars has made it impossible for them to furnish sufficient rolling stock. Operations of all mills are reported to remain at about 60 per cent of capacity.

The T. W. Price Engineering Co., New York City, has taken a contract from McCord & Co., Chicago, for handling the plant additions made necessary by the installation of a new 10-ton electric furnace.

Pig Iron Output Shows Small Gain

Production in February Increases Slightly Over January But is Well Below Previous Months—25 Furnaces Relighted as Operating Conditions Improve—March Production Should Show Increase

BLAST furnaces at the opening of March were operating at a higher rate than at any previous time in weeks. A large number of stacks were relighted during the closing weeks of February. This fact coupled with the removal of part of the restrictive factors which slowed down production seriously in January, forecasts somewhat heavier pig iron production this month.

MONTHLY PRODUCTION

	1918	1917	1916
January ...	2,403,227	3,159,839	3,171,878
February ...	2,316,545	2,649,935	3,078,548
Total 2 mos.	4,719,772	5,809,774	6,250,426
March	.....	3,255,813	3,327,630
April	.....	3,328,061	3,225,496
May	.....	3,413,677	3,364,584
June	.....	3,260,234	3,213,818
Total 1st half.	.....	19,067,559	19,381,954
July	.....	3,337,442	3,221,127
August	.....	3,238,970	3,197,838
September .	.....	3,140,742	3,208,041
October	.....	3,296,286	3,508,180
November ..	.....	3,198,597	3,317,805
December ..	.....	2,885,380	3,184,178
Total 2d half	.....	19,097,417	19,637,169
Grand total	4,719,772	38,164,976	39,019,123

This improvement is reflected in the output of coke and anthracite pig iron during February. The total production last month was 2,316,545 tons, against 2,403,227 tons in January, a loss of 86,682 tons. This loss, however, is only apparent, as the average daily output in February was 5211 tons greater than during January. The blast furnaces averaged last month a daily production of 82,734 tons, against 77,523 tons in January.

The serious drop in production during December and January, together with the slight improvement last month, are reflected clearly in the records made by Pennsylvania, Ohio, New York, Indiana and Illinois stacks. These furnaces in December had an average daily output of 75,600 tons, in January 61,200 tons, and in February 65,500 tons. Despite the short month, the production in Indiana and Illinois was greater in February than in January, although far below the December record.

Many of the furnaces which were forced to bank or blow out on account of fuel shortage have again been placed on the active list. On Feb. 28, 319 stacks were in blast, compared with only 294 on the last day of January, a net gain of 25. The February total is only two less than the Dec. 31 figure of 321. The gain in active furnaces in February was made almost entirely by steelmaking stacks. Twenty-five nonmerchant furnaces were blown in and only four blown out, a net gain of 21, while 12 merchant stacks were relighted and eight blown out, a net gain of four.

The production of steelmaking or nonmerchant stacks during February was 1,640,403 tons, a loss of 30,262 tons compared with the January figure of 1,670,665 tons. A much greater loss was shown by the merchant stacks. Merchant iron production amounted to 647,337 tons, compared with 701,727 tons in January, a loss of 54,390 tons. A comparison of the daily averages, however, shows a gain in both the merchant and nonmerchant production. The steelmaking stacks produced 58,586 tons daily in February, compared with 53,893 tons in January, a gain of 4693 tons, and the merchant furnaces gained 483 tons, the February daily average being 23,119 tons, and the Janury, 22,636 tons.

In February, 18,156 tons of ferro were produced, compared with 22,824 tons in January, a loss of 4668 tons. Spiegel production showed a gain of 2638 tons. The tonnage in February was 10,649, against 8011 tons in the previous month.

AVERAGE DAILY PRODUCTION

	1918	1917	1916	1915	1914
Jan.	77,523	101,930	102,319	51,323	60,624
Feb.	82,734	94,641	106,157	59,521	67,450
Mar.	.....	105,026	107,343	66,009	75,534
Apr.	.....	110,936	107,517	70,484	75,383
May	.....	110,119	108,535	72,747	67,646
June	.....	108,675	107,127	78,998	63,486
July	.....	107,659	103,907	82,687	63,075
Aug.	.....	104,483	103,156	89,510	64,403
Sept.	.....	104,691	106,935	94,478	62,757
Oct.	.....	106,332	113,167	100,656	57,007
Nov.	.....	106,620	110,593	101,174	50,042
Dec.	.....	93,077	102,715	103,278	48,236
Av'ge	79,996	104,562	106,610	81,022	62,934

FEBRUARY PIG IRON

States	No. of stacks.	No. in blast last day of month. Feb.	Jan.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— Feb.	Jan.
Pennsylvania	160	117	105	150,985	730,159	881,144	938,859
Ohio	79	64	53	123,346	382,095	505,441	542,648
Alabama	47	32	33	116,385	91,190	207,575	218,410
Virginia	21	14	14	40,914	.....	40,914	39,694
New York	27	19	19	65,400	87,784	153,184	169,357
New Jersey	6	4	5	15,033	.....	15,033	17,196
Illinois	24	20	17	38,656	119,188	157,844	130,217
Colorado	6	4	3				
Indiana	14	13	13	20,737	183,576	204,313	189,862
Maryland	4	3	3				
Wisconsin	6	3	4				
Kentucky	7	4	4				
West Virginia	4	3	3	45,111	22,976	68,087	69,531
Tennessee	17	11	10				
Washington	1	1	1				
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	3	3	3	30,770	23,435	54,205	56,618
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						10,649	8,011
Ferro—All states....						18,156	22,824
Total	435	319	294	647,337	1,640,403	2,316,545	2,403,227

Save Pig Iron

Says Replogle, by the Curtailment of Building Construction

Washington, March 5.—Laying stress on the acute shortage of pig iron which was analyzed and emphasized by THE IRON TRADE REVIEW in its last week's issue, J. Leonard Replogle, director of steel supply, is advocating curtailment of building construction as a means of conserving blast furnace metal for the more essential production of plates and other war steel. His position in the matter was made clear in a letter to Paul M. Warburg, chairman of the capital issues committee of the federal reserve board, indorsing the plan to discourage new construction as a means of conserving the country's financial resources.

Mr. Replogle's letter to Mr. Warburg in part said:

"As regards the steel situation, I would state that the supply of structural steel is ample for all purposes, but owing to the curtailment of operations of blast furnaces and steel mills, due to shortage of fuel and inadequate transportation, the pig iron situation is becoming acute,"

Huge Car Orders Are Near

Government Preparing to Buy Probably 125,000 to 150,000 Cars and 2500 Locomotives—Large Rail Purchases Also in Sight

Pittsburgh, March 5.—Heavy buying of railroad cars and locomotives is about to begin now that the administration bill appropriating $500,000,000 to buy equipment is in conference and is soon to be reported back to congress. Indications are that the cars and locomotives will be bought direct by the government, and that while the bill provides for the purchase of a maximum of 250,000 cars and 4000 locomotives, the first lot to be closed is expected to be between 125,000 and 150,000 box, gondola and hopper cars and 2500 locomotives. The cars will be standardized and designs, it is reported, will be ready by the middle of next week and the order will be placed within a few days.

It is the impression that the box cars will be of 80,000 pounds capacity, and that the gondolas and hoppers of 100,000 pounds. It is not known how the cars will be distributed as to types. In view of the situation regarding material and labor, it has been roughly estimated that it will require until the end of 1919 to turn out this equipment. Car shops are prepared to begin building at once. Some of them are cleaning up all their orders and will have them out of the way early in April.

Jobbers are showing increased interest in small spikes and limited quantities are being sold for first quarter. Some producers are out of the market, not finding attractive the price of $3.90 per 100 pounds base, Pittsburgh, in 200-keg lots. For shipments under this quantity the price is $4.90. Inquiries involve sizes from 4½ x ½ inches down to 2½ x ⅜ inches chiefly. The market for standard railroad spikes is quiet. The Baltimore & Ohio railroad has taken approximately 5600 kegs from a Pittsburgh manufacturer for prompt delivery. Dullness also prevails in the market for standard rails. Light sections are fairly active.

Seek Rail Requirements

New York, March 5.—In order to ascertain the steel rail requirements of the railroads in 1918, Director General McAdoo has issued questionnaires to all railroads under government control. It is understood the total tonnage involved in these requirements will be purchased by the government and then allotted to the various roads.

The railroads are advised to forward their questionnaires, when filled out, to George B. McGinty, secretary of the interstate commerce commission. In the questionnaire the railroads are asked to state the number of gross tons in track during 1917; also to estimate separately, for maintenance and construction, the number of gross tons required in 1918, and to state the minimum number of gross tons absolutely required to maintain tracks in a safe condition during the year. They further are asked to give the tonnage contracted for delivery during 1918, including the amount due on previous contracts or carried over from previous years and the tonnage on hand Jan. 1, 1918.

Due to developments at Washington, the purchase of rails during the past month has been comparatively light. It is estimated in some quarters that not more than 20,000 tons were booked during February. In the car and locomotive market, buying also has been light. Aside from 3500 cars of miscellaneous types purchased by the government for the expeditionary forces in France, few large single orders were awarded. Total car contracts awarded during February for domestic use are estimated at about 1800.

Inquiries for tank cars are more numerous. These principally are from oil companies and total approximately 650 cars of 8000 to 10,000 gallons capacity. During the past week about 30 tank cars were placed chiefly with the Pennsylvania Tank Car Co.

Await Government Car Order

Chicago, March 5.—Greatest interest in the railroad car market at present is centered in the expected buying by the government of 150,000 standard freight cars. It is understood that car builders have been asked to consider such an order, and that its distribution waits definite choice of the standard type. This probably will present some difficulties and the cars may not be placed with builders for some time. Aside from this, nothing is being considered as all railroads are holding off to allow the government to take the initiative. Only odd lots of standard steel rails are being booked and these do not amount to an important tonnage. No inquiry is being received for delivery during 1919, and it is apparent that the railroads expect the government to place orders for that year. In fact, one inquiry recently put out has been withdrawn with the statement that the government probably will do the buying.

Sheet Shortage

Feared Because of Reduced Output—60 Per Cent Operations

Youngstown, O., March 6.—All sheet mills in this territory are booked to capacity for some weeks and current inquiry for all grades is heavy. This has led some makers to believe that there will be a sheet shortage in the near future. Blast furnaces and open hearths in the valley have not operated at capacity for some time and as a result the sheet bar and sheet mills are beginning to feel the pinch. Nearly all the sheet mills here are in arrears with their deliveries. Consumers who are inquiring for second quarter are asking the mills if they will make an adjustment on prices providing the government alters the present ones. One maker is replying to these inquiries as follows: If the prices are lowered and the sheets have been previously rolled the buyer will pay the present prices; but if the sheets are not rolled until after the next price announcement then an adjustment will be made. Makers are not promising any open-hearth sheets for the next quarter on account of the present shortage of open-hearth bars which threatens to grow more acute. Buyers are being informed of this condition and of the advisability of obtaining this grade of sheets wherever possible. Most of the valley sheetmakers state, however, they will be in a position to supply their customers with bessemer material.

Specify Heavily for Sheets

Pittsburgh, March 5.—Heavy specification for all grades of sheets are coming to mills and some new business has been taken. Tonnages of galvanized sheets for second quarter shipment have been allotted by the leading interest to sales agents, jobbers having inquired freely for this delivery. The government continues to take heavy requirements, and will need an unusually big tonnage of No. 22 corrugated sheets for hangars in France. Operations of all mills are roughly estimated at between 50 and 60 per cent of capacity. Mills are suffering from a shortage of sheet bars but are hampered mostly by the transportation situation, which improves slowly under the bettered conditions.

Costs May Force Higher Price Plea

Steel Makers at New York Conference Review Conditions of Industry Preliminary to Conferring with War Board on Price Settlement April 1—Some Makers in Difficulty Because of Costly Raw Materials

OFFICIALS of iron and steel companies comprising nearly 100 per cent of the country's production, held a meeting at the Waldorf-Astoria hotel, New York, March 1, to formulate, for presentation to the war industries board, important recommendations for changes in present prices on iron and steel products. This meeting succeeded two previously held, which differed from it only in that the first two were confined to members of the general committee on steel and steel products of the American Iron and Steel institute.

The meeting of March 1 occupied the entire day and was devoted to a discussion of the costs of manufacture at iron and steel plants in order that this data may be submitted to the war industries board at Washington during the next week or two, to serve as a basis for warrantable price action by the government. Although no such information was given out following the conclusion of the meeting, it is understood the greatly increased cost of manufacturing iron and steel during the past few months, was shown indicating the necessity for higher prices, particularly in the case of the Class 3 mills, which buy their pig iron or semifinished steel in the market. Some of these mills have been sustaining losses as a result of the government prices now prevailing.

After the meeting, Chairman E. H. Gary of the general committee on iron and steel of the institute, gave out the following statement:

The general committee on steel and steel products of the American Iron and Steel institute expects to be invited in the near future to appear before the war industries board at Washington to discuss prices for the various iron and steel products, commencing March 31, when the term for the present prices, as approved by the President, expires.

The meeting today of representatives of the various lines was held for the purpose of examining the cost sheets of manufacturers and for the discussion of the relative or differential prices heretofore in force in order intelligently to present to the war industries board the facts necessary to a determination of future prices.

After the presentation of facts and figure, it was finally decided to place the claims of the manufacturers in the hands of the general committee for submission to the war industries board in such a manner as the committee may determine.

Those present by invitation in addition to the members of the committee included Frank H. Gordon, W. Vernon Phillips, Wm. B. Dickson, A. A. Fowler, Leonard Peckitt, J. G. Butler Jr., Jay I. Andrews, Frank Baackes, Wm. H. Donner, James B. Bonner, Waddill Catchings, and others.

Official Action Uncertain

WASHINGTON, March 5.—With the time for steel price adjustments less than a month away, the industry is pausing in its efforts hampered by fuel shortages and transportation difficulties to bring production up to normal, to turn an anxious eye toward Washington. But has yet no enlightenment is to be had. No one here really appears to know just what form the price adjustment steps will take. Representatives of the industry undoubtedly soon will be called into conference with the war industries board, as was the case in September and December.

It is evident some readjustment of prices will be made. Whether this will be upward or downward or some of both is too early yet for speculation, but the emergencies of the winter just past undoubtedly will be reflected in cost reports. The impression given in New York that lower prices after April 1 will be opposed is felt here also. It is even suggested that the present prices will be urged to be revised upward.

No intimation has yet been given what attitude the government will take on the clause forced on steelmakers in the last price ratification. That clause prevents manufacturers contracting for their output at present prices unless the contracts provide for acceptance of the price no higher than the maximum quotations to be promulgated effective April 1. If the prices are revised upward, it is believed the clause will be continued. If they are downward, there is a possibility of the restriction being removed.

It is believed here it is likely that the prices to be fixed April 1 will be continued for a period longer than the three months' limit considered. Another interesting point arising in connection with the price adjustment program is, what will be the war industries board's attitude toward the long list of extras and differentials promulgated by the trade in accord with the President's announcements?

Baruch Seeks Efficiency

WASHINGTON, March 6, 1917.—In official circles it is believed that the naming of Bernard M. Baruch, of New York, as chairman of the war industries board to succeed Daniel Willard, resigned, will mean greater efficiency in that body and the clarifying of the muddled situation arising from the lack of authority. Mr. Baruch, who has been head of the raw materials division, often has declared himself in favor of further centralization and in reorganizing the board. His main effort, it is expected, will be expended along that line. President Wilson in appointing him to the chairmanship, admonished him to let alone what is being successfully done and assist all present normal processes.

Suggestions made to him by the President as to his duties may be summarized as follows: Creation of new facilities and disclosing additional sources of supply; conversion of existing facilities to new uses; studious conservation of resources and facilities; advising various purchasing agencies as to prices to be paid; determination of priority of production and delivery and of the proportions of any given article to be made immediately accessible to purchasing agencies when the supply of that article is insufficient and the making of purchases for the allies.

Quantity Production

With Radical Price Regulation Limit Republic Earnings

The Republic Iron & Steel Co.'s report for the year 1917 shows net earnings of $28,329,718, compared with $16,544,635 in 1916. Provision for excess profits taxes and other contingencies amounted to $9,878,657 in 1917. After this provision and all other charges and deductions, the balance available for dividends was $15,857,196, as compared with $14,789,162 in 1916. The summary of profits applicable to dividends by quarters shows graphically how steel company earnings are dwindling as the result of war conditions. This summary for the past two years follows:

1917:	Profits
Fourth quarter	$2,811,858
Third quarter	1,568,004
Second quarter	7,130,406
First quarter	4,346,927
1916:	
Fourth quarter	5,139,441
Third quarter	3,628,634
Second quarter	3,903,676
First quarter	2,139,441

The income accounts for the years 1917 and 1916 compare as follows:

*Net earnings	$28,329,718	$16,544,635
Other income	439,302	348,576
	$28,769,021	$16,893,212
Less:		
Deprec. and renew...	$1,999,760	$600,090
Exhaust. of min.....	274,072	245,221
Extraord. deprec. ...	.....	400,000
Excess profits tax.....	9,878,657	.....
Total deduct	$12,152,489	$1,245,312
Net profits	16,616,531	15,647,899
Deduct:		
Bond int.	759,334	858,736
Pref. divs.	1,750,000	4,500,000
Com. divs.	1,631,460	407,865
Total deduct	$4,401,794	$5,766,601
Surplus for year.....	12,475,736	9,881.297
Surp. Dec. 31, 1916..	18,236,251	8,354,953
Surp. Dec. 31, 1917	$30,711,988	$18,236,251

*From operations, after deducting charges for maintenance and repairs amounting to $3,559,157 in 1917 and $2,138,373 in 1916, and after deducting special compensation under merit system plan.

The gross volume of business for 1917 was $78,325,461, comparing with $52,844,017 in 1916 and $29,916,228 in 1915. The value of inventories Dec. 31, 1917, was $13,475,652 at the close of 1917, compared with $8,814,358 at the close of 1916 and $7,634,728 at the close of 1915. The company added $7,277,464 to new property account in 1917, the total new construction to Dec. 31, 1917, being $33,780,931. Following is a comparison of the company's production of various materials during the years 1917 and 1916:

	1917	1916
Pig iron	1,062,657	1,117,597
Bessemer steel	675,182	718,377
Open hearth steel.....	486,601	541,594
Mill products	1,109,829	1,216,716
Beehive coke	676,390	669,239
By-product coke	653,419	616,401

The average number of men employed in 1917 at all works was 14,510, compared with 13,056 in 1916 and 11,105 in 1915.

The balance of unfilled orders Dec. 31, 1917, in steel was 318,324 tons, against 617,950 tons in 1916 and 591,270 tons in 1915, and in pig iron 100,619 tons against 183,026 tons in 1916 and 138,406 tons in 1915.

Handling All Alloys

The American Iron and Steel institute which recently was asked by the government to act as consignee for all importations of tin, chrome, cobalt, manganese, molybdenum, scheelite, spiegeleisen, titanium, tungsten, vanadium and wolframite, whether in the form of ore or of ferroalloy or chemical extracted therefrom, has undertaken this work for the government. It has enlarged its staff and its working space at its headquarters at 61 Broadway, New York. The institute has appointed the following to act as attorneys for it in customs matters connected with these importations: At New York, James T. McCleary, Howard H. Cook, William G. Gray; at Philadelphia, H. W. Summers, E. K. Bauer, J. F. Harder; at Baltimore, S. H. Bland, G. F. Medinger, J. D. Boan; at New Orleans, S. W. Wheelock, James L. Hyde, J. P. Pannill; at Eagle Pass, Tex., F. L. Jordan; at El Paso, Tex., John A. Wright; at Laredo, Tex., Ellis C. Williams; at Nogales, Ariz., William T. Haley; at San Francisco, A. T. DeForest, W. A. Ross, L. M. Korndorff, H. F. Wilson; at Seattle, Albert E. Knoff, Edward Bray, Karl S. Harbaugh.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, March 5.—Consumers of tin are paying higher and higher prices for such small lots of spot metal as they can pick up. In the past week several sales of such small lots have been reported at 98c to 98.50c. Tin plate manufacturers are reported to be evincing more interest in their tin requirements, while makers of bearing, solder and babbitt metal continue in the market. No more Straits tin is available for March shipment from Singapore. The price for April shipment from Singapore is about 74.50c, c. i. f. New York; for May 73.25c; for June 72.75c. Various consumers are showing increased interest in Banca, due to difficulty in getting Straits. However, the output of Banca tin is normally not much more than 1000 to 1200 tons a month, or about one-fourth the normal output of Straits. Banca tin now afloat is quoted 76c; March shipment sold today at 72.50c; April shipment yesterday was quoted 72½c. Chinese 99 per cent tin, shipped in February from Honkong, is quoted 73.50c; March 69.50c; April 69c. It takes about three months for shipments of Straits from Singapore, Banca from Batavia and Chinese from Honkong, to get to New York.

The average price of lead for February as quoted in the *Engineering and Mining Journal*, was 6.889c, St. Louis. This is the price which the government paid for its requirements for the month. The average daily price of the American Smelting & Refining Co. for the month was 6.877c, St. Louis. The price of the leading interest now is 7.17½c, St. Louis, and sales have been made in the outside market at this price. Outside sellers are quoting 7.20c to 7.30c, New York. The market is weak today, with little commercial demand.

The spelter market continues to drag, with production gradually being further curtailed. Business is being done by makers of grade A spelter, sheet zinc and zinc plates at the new prices fixed by the government, but in the past week there has been some further shading in the price of prime western, whose price has not been fixed. The market for prime western now may be quoted 7.65c to 7.75c, St. Louis, for prompt, March and April shipment.

The aluminum situation has been growing tighter, largely because of the traffic situation. Outside sellers had just raised their prices before the price was set, asking 40c to 41c, for No. 1 virgin ingot; 39c to 40c for No. 1 remelted, 98 to 99 per cent; and 32c to 34c for No. 12 alloy. The government has fixed a price of 32c f. o. b. plant on ingot metal 98 to 99 per cent.

Several sales of antimony have been made the past week at 13.37½c, duty paid, New York, by dealers to makers of antimonial lead for shrapnel purposes. Little inquiry is in the market and stocks remain large. Sellers who have been disposing of metal at this price, say they have lost money on the transaction, in addition to the carrying charges.

Reports of the various copper producing companies for February indicate that production was maintained about at the January rate, despite the traffic troubles. While only a small proportion of the output is available for the requirements of ordinary commercial consumers, such requirements have become very small and no complaints are heard on the score of inability to get copper. The market continues 23.50c for carloads and 24.67½c for less than carloads.

NEW PLANT OF CANTON SHEET STEEL CO.

By JOHN D. KNOX



Fig. 1—Canton Sheet Steel Co.'s New Plant, Showing the Open-hearth, Soaking Pit and Bar-Mill Buildings

MAXIMUM production is the goal toward which every iron and steel concern in America is striving. This goal has been commanding the attention of mill managers for many years but the sledding has never been so hard as during the past two or three years. Executives have met obstacles on every side, first the shortage of raw materials, next the inability to obtain semi-finished material, then the difficulties of transportation, and finally a host of minor problems always pressing for immediate solution. But in spite of many handicaps the mills have cogged away as fast as their raw material was delivered to them. This raw material was sometimes scanty even before the United States went to war. There were periods when the tonnage of ingots sent through the sheet bar mills was exceedingly small and this, of course, put a damper on the production of finishing mills which were not self-contained. This condition was analyzed by some of America's keen-eyed business men who predicted that before long the intermittent operation of the mills would be more noticeable.

The iron and steel industry at large was not inclined to consider their statements seriously. A few concerns, however, were impressed and inaugurated building programs which would make their plants self-contained. Open-hearth furnaces began to spring up, bar mills followed, and in a short time the hum of the motors under test was drowned by the roar of the bar mill rolls. As a result a generous stock of raw material in the form of sheet bars accumulated in the storage yards. The sheet mills became independent of the tardy outside mills and no longer had to contend with irregular operating and traffic conditions.

Among the first concerns to realize that centralized control is exceedingly advantageous in the operation of sheet mills was the Canton Sheet Steel Co., Canton, O., a $2,000,000 corporation. The directors of the company in 1917 authorized the construction of open-hearth furnaces, soaking pits and a sheet-bar mill to supplement the previously existing sheet mills. The company was organized in the early part of 1910. By Jan. 2, 1911, a plant had been completed with a capacity of approximately 40,000 tons annually. The works consisted of three 28 x 34, three 28 x 38 and one 28 x 42-inch black sheet mills; seven pair and seven heating furnaces; four 24-inch cold mills; one combination heating furnace; seven box annealing furnaces; four pickling machines; and, eight galvanizing pots. April 10, 1916, the company added a 30 x 46 and a 30 x 56-inch jobbing mill, two 28 x 42 sheet mills, two 28 x 38-inch sheet mills, one stand of 24-inch cold rolls and four roughing stands.

Plant Changes Hands

In the latter part of 1917 the Canton Sheet Steel Co. was sold to the Hydraulic Pressed Steel Co., Cleveland, the amount involved in the transaction being $4,000,000. By acquisition of the Canton plant the Hydraulic company secured for itself and its subsidiary, the Cleveland Welding & Mfg. Co., control of its own raw material. At the time of the sale, the Canton company had $1,000,000 of 7 per cent cumulative preferred stock outstanding; $563,000 common, all closely held. The company paid for a substantial part of the new work out of its surplus and the remainder out of funds derived from the sale of preferred stock.

Ground was broken for the steel plant in February, 1917. The first ingot was rolled Dec. 26, 1917. The new plant includes three 35-ton open-hearth furnaces, 11 gas producers, 16 soaking pits and a 30-inch bar mill. The open hearths have an annual capacity of 100,000 tons and along with the gas producers and part of the charging floor, were purchased from the Chambersburg Engineering Co., Chambersburg, Pa. The bar mill has an annual capacity of 90,000 tons. Operating in conjunction with the steel plant are 12 sheet mills, five mills for cold rolling and four mills for roughing.

After the steel from the furnaces is poured into ingots, it is transported to the soaking pits where it is reheated and thence to the bar mill. The sheet bars are sheared, loaded into railroad cars and shipped to the bar yard where they are unloaded and piled. They are heated in coal-fired furnaces and rolled into sheets. The products of the plant are black, blue annealed and galvanized sheets; eave troughs; conductor pipe; corrugated roofing and siding; stamped and beaded ceiling metal; spouting; metal shingles; and other formed roofing material.

The axis of the plant runs from east to west, the open-hearth furnaces being at the southwest end. The scrap yard shown in Fig. 5 lies east of the open-hearth building and is connected to it by a wooden trestle supporting a narrow-gage railroad track. Scrap is loaded into standard size charging boxes by



FIG. 2—THREE 35-TON OPEN-HEARTH FURNACES WERE MOVED FROM CHAMBERSBURG, PA., AND RE-ERECTED

means of locomotive cranes fitted with magnets. Four boxes are mounted on a truck. The material is then weighed on a platform scale and hauled to the open-hearth department by a narrow-gage locomotive.

The open-hearth building is 120 x 260 feet and is so arranged that when more furnaces are necessary, it can be extended westward. The sides and roof are sheathed with corrugated galvanized sheets manufactured by this company. The building has a monitor type roof and was erected by the Canton Bridge Co., Canton, O. Provision has been made for installing an overhead traveling crane for the charging side of the open hearths. A general view of the charging floor and the three furnaces is shown in Fig. 2. While the furnaces are rated at 35 tons they are at present producing 40-ton heats. Each furnace is equipped with three brick-lined charging doors which are operated electrically. The charging boxes are handled by a high-type charging machine built by the Pawling & Harnischfeger Co., Milwaukee.

Producer gas is used for melting the charge, each furnace being served by three hand-fired Rider producers. These are equipped with Porter type reversing valves and are housed in a building south of the open hearth structure. Coal is unloaded from a trestle along one side of the charging floor and charged by hand. Two Heine boilers rated at 300 horsepower each, operate in conjunction with the producers. Water from these boilers and for general use is obtained from wells 200 feet deep which the company was obliged to drill. Nearly all manufacturing concerns in Canton depend upon drilled wells for their water supply, only one small stream flowing through the city. The six wells sunk by this company have 6 and 12-inch outlets, the water being withdrawn by means of electrically driven turbines of the deep-well type.

The ladles into which the steel from the furnaces is tapped has a capacity of 40 tons. Producer gas is used for drying the newly lined



FIG. 3—INTERIOR OF SOAKING PIT BUILDING.



FIG. 4—GAS-PRODUCER DEPARTMENT AND GAS MAINS

ladles. For this purpose two double-type driers equipped with mushroom brick-lined hoods are installed. The ladles are handled by a 75-ton crane fitted with a 15-ton auxiliary. For lighter work around the pouring bay a 10-ton crane is used. Both cranes were built by the Cleveland Crane & Engineering Co., Wickliffe, O.

Ingots Are Bottom-Poured

Since sheet bars is the only semi-finished material rolled by the 30-inch mill, the practice is to cast the steel into ingots which weigh about 2000 pounds and measure 12 x 12 x 72 inches. In doing this the bottom-pour process is used. The molds are arranged in two groups of from 18 to 20 each. This number of molds is sufficient to hold one heat. Each group is made up around a master mold which is connected to the individual molds by suitable leads or runners near the base. The 40-ton ladle is suspended over the master mold by means of trunnion hooks attached to the big hook of the 75-ton crane. A clay-capped bott which is inserted in the tapping hole of the ladle governs the flow of metal. When the bott is raised, the molten steel flows into the master mold and the entire group of molds are filled simultaneously. The operation is controlled by a workman stationed on the pouring platform near the group of molds.

The ingots are given a reasonable amount of time to cool before they are stripped from their molds. On account of their being molded in such a small size it was not deemed necessary to install a crane-type stripper. The ingots are stripped by the 10-ton crane fitted with draw hooks shaped similar to ice tongs. Each mold is grasped by the tongs and elevated to a suitable height. Any bullheads or stickers are removed from their molds by means of an electrically-driven horizontal stripper.

After the ingots are cold, they are loaded into narrow gage flat cars and taken direct to the soaking pits. The pits are shown in Fig. 3. Two holes each containing four pits are provided. The covers are electrically operated. The furnaces are housed in a building 125 x 81 feet. The ingots are charged into the pits by means of a 10-ton Cleveland crane and a set of tongs equipped with an extension lever. The gas for these furnaces is generated in two Bradley producers equipped with three hoppers and recently patented reversing valves. The latter were built by the Blair Engineering Co., New York. The valves and controlling mechanism are housed in a leanto building, 100 x 33 feet, the former being installed at ground level and the latter on a balcony above.

When the ingots are brought up to a cherry-red heat, they are withdrawn from the pits and placed on a motor-driven ingot chariot which transports them to the bar mill. Most plants are laid out so that the haul from the soaking pits to the bar mill is as short as possible. However, this company has planned to install a blooming mill when operating conditions warrant and has left ample space between the soaking pits and bar mill for this purpose. The ingots are delivered in a heated state to the bar mill by the ingot car previously mentioned. This operates on a standard gage railroad track covered with a roof. The car is provided with a cab which protects the operator from the heat given off from the ingot while in transit between the two departments. As the car enters the bar mill building the ingot carriage is automatically tripped in such a way that the ingot is deposited on the approach table which serves the sheet bar mill.



FIG. 5—STOCK FOR THE OPEN-HEARTHS—THE TRESTLE LEADING TO THE FURNACES IS SHOWN AT THE LEFT

Roll Mill Equipment

This mill was built by the National Roll & Foundry Co., Avonmore, Pa., and consists of one stand of 30-inch, 3-high pinions and one stand of 30-inch, 3-high sheet bar rolls. The roll stand is of modern construction and is equipped with steel housings which weigh 41,480 pounds each. The bar rolls are 93 inches long and weigh 23,780 pounds. The pinions are of the inclosed type. They are mounted on massive shoe plates and connected to the roll stand by balanced spindles. The latter arrangement prevents undue wear on the roll wabblers and eliminates noise. The mill which has a capacity of 800 tons per 24 hours, will reduce a 2000-pound ingot to an 8-inch sheet bar in 11 to 13 passes according to the thickness desired. As shown in Fig. 6 it is enclosed in a steel building, 63 x 440 feet. The 30-inch unit is not fitted with manipulators although plans are already formulated to provide them in the near future. The top and middle rolls are chilled iron; the bottom roll is steel. The ingot is given its preliminary roughing between the bottom and middle rolls and is finished into a sheet bar by the bottom and middle rolls. The front runout table is 144 feet long.

The front and rear tilting tables, which are geared to individual 80-horsepower motors, are pivoted in the center. By the latter arrangement they are swung into action quickly so that little time is lost between successive passes. A 1500-horsepower Westinghouse motor drives the mill. It is supplied with current at 2200 volts. Attached to the shaft between the motor and flywheel is a liquid slip regulator. This provides an automatic retardation and acceleration of the flywheel and improves the peak loads of the mill while rolling. The motor operates at 234 revolutions per minute and is connected to the jack shafts through reduction gears. The latter were built by the Stoddard Machine Co., Wooster, O., and have a ratio of 3.71:1. The speed of the mill is therefore 63 revolutions per

minute, under normal operating conditions.

The mill motor is housed in the power house adjoining the bar mill structure. Current is supplied by the local electric power company at high tension. The voltage is stepped down by a transformer from 22,000 to 2400. This transformer has an oil capacity of 1940 gallons and is rated at 2000 kilovolt amperes. Two other transformers are provided. One lowers the voltage from 2400 to 230 and 115 for lighting purposes, operation of motors, etc., and the other lowers the voltage from 2400 to 59 volts for starting and 189 volts for running the convertor. The latter operates at 1200 revolutions per minute. A suitable switchboard is used to effect the speed changes of the mill motor and for the general control of the other equipment. In addition to the usual volt and ampere meters, the board is equipped with a self-recording kilowatt meter. All the equipment installed in the power house was furnished by the Westinghouse Electric & Mfg. Co., Pittsburgh.

After passing through the rolls, the sheet bars are run out onto a cooling bed 210 feet long and transferred at right angles across a rail-type transfer table to the shear approach table. The latter is 228 feet long. The bars are passed direct to the shear where they are cut into multiples, each multiple making a sheet or plate, whichever is required in the finishing mills. The shear is equipped with a flywheel and a continuous running motor, the operator engaging a clutch when a cut is to be made. The multiples are discharged into a bar pit on the edge of which the shears are mounted. The present practice is to load the bars onto cradles and weigh them, after which they are shipped to the storage yard to await retransfer.

In the immediate future, however, the company plans to install an electrically driven underground conveyor which will connect the bar mill and sheet mill departments. This will permit the bars to be sheared while hot and delivered to the sheet mills. The storage yard is located between the bar and sheet mill buildings and is served by a railroad siding. This track is laid along the south side of the yard. The sheet bars are delivered by the railroad to the storage yard, unloaded by a bridge crane and piled a few feet away from the heating furnaces. This arrangement expedites the handling of the raw material for the sheet mills and reduces the number of labors required. Reheating furnaces receive the bars from the piles and heat them to a temperature suitable for rolling.

The sheet mill building is situated at the north side of the plant. Heavy gage sheets are rolled on 46-inch and 56-inch jobbing mills located at the east end of the building. Both are two-high mills and are fitted with electrically driven screwdowns. After the bars are heated in stoker-fired furnaces, they are placed on an L-shaped hook suspended on an overhead monorail and transported to the roughing stands about 20 feet from the furnaces. They are roughed down and transferred to the adjacent finishing stand where they are rolled to the exact gage. Sheets from the 46-inch mill are passed direct from the finishing rolls through a roll leveler and sheared. Four 126 and 156-inch electrically driven shears are conveniently located throughout the mill. The sheet trimmings are collected from around each shear and taken to a hydraulically-operated bundling machine. This machine compresses the scrap into bales and ejects them onto an inclined, electrically driven conveyor which discharges into cars outside the building. The bundled scrap is then shipped to the open-hearth department to be remelted.



FIG. 6—RUNOUT TABLES WITH 30-INCH BAR MILL IN THE BACKGROUND

Disposing of the Finished Material

Sheets from the 56-inch mill are conveyed slowly through a Costello continuous annealing furnace. After passing through a roll leveler which is placed at right angles to the furnace and driven by a 15-horsepower motor, the sheets are deposited on a three-strand chain conveyor. The speed of the conveyor is such that the sheets have ample time to cool before being trimmed by the jobbing mill shears. These shears are placed a short distance from the discharge of the conveyor. If a light gage is going through the mill, the heated sheet bars are rolled on the roughing mills and placed one on top of the other in pair furnaces for further heating. The packs are then passed through the finishing mill rolls until the desired gage is obtained after which they are sheared, separated and piled on a rack. The racks are then delivered to the annealing department in the west end of the sheet mill building. The mills and annealing departments are served by a 10-ton and a 30-ton crane.

The sheet mill heating equipment consists of 13 stoker-fired pair and sheet furnaces. The stokers are hand-fed and were installed by the American Stoker Co., New York. The seven sheet mills which were originally built in 1910 are rope-driven by a 34 x 60-inch corliss steam engine rated at 1200 horsepower. The engine is connected to four vertical boilers rated at 1300 horsepower. The gear and engine sheaves are 24 and 10 feet in diameter respectively and are grooved for thirty-two 2-inch wire ropes. An exact duplicate of the bar mill motor drives the two jobbing mills, four hot sheet mills, two cold mills and four roughing stands. It operates at 240 revolutions per minute. The motor is coupled to the various mills through reduction gears, the final one of which drives the mill rolls at 30 revolutions per minute.

To counteract the hardness imparted during the rolling process, the sheets are annealed before they are shipped. For this purpose nine double annealing furnaces are provided. Four of the furnaces are heated with producer gas and five are stoker fired, the coal being charged by hand. As previously mentioned, the sheets are delivered to the annealing department on racks which were designed by the officials of the Canton

Sheet Steel Co. The racks are placed in boxes fitted with cast iron covers. The boxes are then placed inside the furnaces, the temperatures of which are increased slowly to the desired degree, and left there for about 24 hours. The furnaces will accommodate 22 boxes.

When the sheets are properly annealed they are withdrawn, piled on trucks, and hauled by electrically-driven tractors to the assorting department. This department is located in the west end of a building which parallels and lies between the soaking pit and sheet mill structures. A brick wall extends lengthwise through the building and separates the galvanizing and forming departments from the warehouse and shipping departments.

After the black sheets are assorted they are either taken to the warehouse and shipping departments direct or they are put through a galvanizing process which protects them from oxidation. In this process the sheets are arranged in batches and submerged in dilute sulphuric acid to remove any scale. Four plunger type pickling machines are provided for this purpose. After about five minutes the batches are transferred to the wash tanks to remove the acid. They are then placed in feed tanks where they are given a further cleansing prior to being galvanized.

Galvanizing the Sheets

Eight cast iron galvanizing pots of the usual gas-fired type are provided. The sheets are passed through rolls which are immersed in a bath of liquid spelter, the last set squeezing off the surplus zinc. These rolls discharge the sheets onto a chain conveyor which transfers them to the shipping department where they are inspected. They are either loaded into cars, transferred to the bundling tables or sent to the forming department. The warehouse and shipping departments are shown in Fig. 7. The company's active interest in the welfare of its workmen is demonstrated by the conveniences found in these departments. They are provided with wood block floors and an abundance of light. In order to heat the room comfortably in winter, two large fans are kept in operation and distribute hot air through overhead pipes.

Products manufactured from galvanized sheets by this company are fabricated in the forming department which is located in the east end of the galvanizing, shipping and warehouse building but is separated from them. The forming business carried on by this company last year increased to such an extent that larger quarters were imperative. The foundations for a new building were prepared last fall and as soon as the weather permits construction of the building proper will commence.

An up-to-date thoroughly equipped chemical laboratory is operated in connection with the plant. Raw material for and the steel from the open hearths as well as the finished product from the sheet mills are analyzed with care. Great stress is laid upon this work. To maintain a stable labor supply, the company has erected at its own expense four large buildings which are equipped with steam heat, shower baths, electric lights, etc. They provide homes for 300 men.

The officers of the Canton Sheet Steel Co. are: J. H. Foster, president; C. A. Irwin, vice president and general manager; H. A. Roemer, assistant general manager; H. S. Renkert, second vice president; H. P. McIntosh, treasurer; S. H. Tolles, secretary; George T. Thomas, general sales manager.



FIG. 7—GALVANIZED SHEET WAREHOUSE AND SHIPPING DEPARTMENT

Railroad Reclaims Scrap

Charles E. Parks in an article in *Railway Magazine* describes the economy obtained by the Atchison, Topeka & Santa Fe railway in saving scrap. The early practice looked only to a large showing in scrap sales, and consequently a great amount of really valuable material was junked. The discovery of this leak led to a reclamation plant for collecting, sorting, classifying and remaking when possible all scrap from the entire system. About 650 men and a number of women are employed in the department at present, and a large saving has been effected in addition to the profit made on scrap sales.

Since 1911, approximately 140,000 tons of scrap have been handled annually at the scrap yards. During that year 143,142 tons of scrap material were sold for about $1,000,000, or at the rate of $7 a ton. In 1916, 139,789 tons were sold for $2,003,820, or at the rate of $14.33 a ton. During the first nine months of 1917, 120,115 tons were sold for $3,160,613, or for $26.31 a ton, or nearly double the price of a year ago. The cost of handling 140,000 tons of scrap in 1911 was approximately $50,000; in 1916 it cost $103,368 to handle the same amount, while during the first nine months of 1917, it cost $162,784 to handle only 120,115 tons. Although the price of scrap has advanced nearly 400 per cent in seven years, the cost of handling also has advanced in about the same proportion. The material which is reclaimed is turned back to the company's storerooms. The saving from this source probably approaches in value, if not in cost, the total of scrap sold.

Indian Ore Uniform

The uniformity of oriental Indian manganese ore is brought forth in a table of analyses covering 27 cargoes imported by the Matthew Addy Co., Philadelphia, which has been compiled by William W. Hearne, managing director of the company in Philadelphia. These various lots show a range of from 50.080 to 53.071 in manganese; from 4.980 to 7.975 in silica; from 0.054 to 0.114 in phosphorus, and from 0.335 to 1.143 in moisture. Of the steamer lots analyzed, 23 were imported during the season of 1917.

Tool Steel Gears for Mill Service

Long Life and a Supplementary Saving in the Cost of Installation Are Important Factors Recommending the Use of Gears With Hardened Surfaces for Severe Service

BY E. S. SAWTELLE

THE material covered in this discussion is treated by a special process which for purposes of comparison must be likened to case-hardening, though in the results obtained it differs radically from case-hardened gearing. The likeness consists in the fact that both materials are made from a low carbon steel, preferably about 0.20 per cent, that they are subjected after manufacture to a carbonizing process which changes the chemical content and after this they are heat-treated and quenched for hardening. The dissimilarity lies in the fact that entirely different ingredients are used in the carbonizing process, giving a much deeper and more uniform penetration, a material which is free from virtually all of the defects and hindrances common to the ordinary case-hardened gear. Whereas in case-hardening, it is usually impractical to penetrate to any considerable depth, with this particular method a depth of as much as 3/16 inch to ¼ inch can be readily obtained. Throughout this depth the hardness is virtually uniform instead of tapering off from a very hard skin on the surface to the soft center as in case-hardening. This is particularly noticeable owing to the fact that the wearing qualities are maintained until the complete depth of hardness has been worn off, instead of having an acceleration in wear after a surface skin has been penetrated. The hardened wearing surfaces are particularly free from some of the most embarrassing case-hardening difficulties, such as peeling, scaling, etc.

It is quite evident that most of the differences described are more or less intangible when it comes to an inspection of samples, but they have been very readily demonstrated in careful service tests covering a period of approximately 10 years. This feature is best illustrated by the fact that this particular grade of material is being successfully used in such service as crane track wheels, where to the best of my knowledge no one has had the temerity to even offer a case-hardened part.

Obviously for gear service a composition with a glass-hard wearing face and a soft and tough center is ideal, and gives much better wear and strength than anything obtainable by the use of a homogeneous steel, heat-treated or quenched for toughness and hardness, but where neither of these can be obtained at their maximum since the hardening tends to brittleness, and the toughening tends to softness.

Methods of Manufacture

The general method of manufacture is, first to machine the part throughout, then raise the carbon content for the desired depth to approximately 1 per cent, protecting the bores so that they retain their original chemical properties. A series of heat-treatments refines the grain and hardens the piece, at the same time very decidedly toughening the center. While it is possible to protect the bore, or virtually any surface where a junction of steel on steel perfectly tight can be obtained, it is practically impossible to do selective hardening by protecting certain parts with special paints, copper plating, or similar methods. The penetrating qualities of the carbonizing agent are such that these methods, common to case-hardening, are absolutely noneffective. A certain amount of selective hardening can be done at decidedly increased expense by leaving the parts large, raising the carbon content to an equivalent of tool steel, annealing, and then turning off the piece in the parts to be left soft until the high carbon material has been completly removed. After this operation has been completed, the piece is hardened by quenching and heat-treatment; the surfaces that have been machined after the impregnation process will remain soft.

Chemical and Physical Properties

As has already been stated, the center of the gear remains of the same analysis as the initial material which is approximately 0.20 per cent carbon steel. This steel responds somewhat to the proper kind of heat-treatment and when backed up on either side by a hard and more or less rigid substance, gives unusual strength. The wearing surface will run from 0.90 per cent to 1.20 per cent in combined carbon, and as such, is entirely similar to high-grade carbon tool steel, such as was used for lathe tools prior to the advent of high-speed steel and is now being used extensively on drills, etc. This method of hardening is being used to some extent for tool work, especially for taper reamers, and as such is giving life fully as good as from carbon tool steel.

Exact physical properties are unobtainable owing to the two-fold nature of the material, which does not lend itself to reliable physical tests. Obviously a test of the center would not be characteristic of a test of the piece. In actual gear service tests, it has been demonstrated that the combination of the two hard surfaces with considerable rigidity backing up the very tough center gives a tooth that has greater strength and greater resistance to shock and strain than does the high carbon untreated gear or the gear of homogeneous steel that has been quenched for toughness. The hardness of the outside wearing surface will run from 90 to 100 on the scleroscope and is too great for accurate test on the Brinnel instrument. A sharp corner can be used to scratch glass without difficulty. In connection with the subject of physical properties, it must be borne in mind that the only true criterion is to test out the actual piece itself rather than a small test bar which may be prepared in a way somewhat or exactly similar. I believe that the latter method is very deceptive since the internal heat in the test bar is very small, whereas in the gear it is much greater and tends to retard the cooling and to give properties that are quite different from properties that can be obtained from the small piece responding immediately to the action of the heat or quenching agent. Very frequently astonishingly good physical properties can be obtained by a heat-treatment of the small test piece, but they are not comparable with the properties obtained when a large piece of steel is handled in the same manner. For these reasons, we consider that the only fair durability test is on gears in actual service.

Inasmuch as the gears are machined before they are subjected to the hard-

A paper presented at the recent Philadelphia meeting of the Association of Iron and Steel Electrical Engineers.

ening process, it is essential that precautions be taken to have them correctly designed so as to avoid distortion. It takes years of experience to know the proper way to handle gears, keeping them true to their original shape. Despite all the theoretical calculations on the subject of distortion, it resolves itself down very largely to a matter of past experience applied to the individual cases at hand.

Distortion is nearly always encountered in the nature of shrinkage, running usually about 1/64 inch shrinkage for each foot in the diameter. This, however, depends considerably upon the pattern and design, since if these are not properly balanced and established, there may be a great deal more shrinkage and a decided distortion in addition. Very frequently pieces must be tempered in specially designed jigs to keep them straight. In a gear running from 24 to 50 inches in diameter, properly handled there should be very little distortion out of plane, not running more than about 1/32 to 1/16 inch at the most. When the decrease in diameter through shrinkage is balanced up and figured on the basis of radius instead of diameter, it is too small for any practical concern in the average run of mill or electric railway motor car gearing. Pinions are frequently made as a unit with some shaft, such as is the case in the typical mill pinions, or in some cases armature pinions, too small to be detached from the shaft. In a case of this sort there is apt to be a certain amount of kinking or distortion in the shaft, especially if it is long; this can be corrected by making it oversize and grinding after the hardening operation. Inasmuch as the shaft has a soft, tough, pliable center, it is possible to straighten it cold within reasonable limits before the grinding operation.

The natural tendency is for distortion to cause noisiness and excessive vibration, but we have found by experience that this can be kept down so that is causes no annoyance in installations where the speed is excessive. In one case, a continuous rod mill is operated through gears of 18-inch pitch diameters at 1123 revolutions per minute, giving a peripheral speed of approximately 5292 feet per minute. Another rod mill with gears of 20-inch pitch diameters operating at 955 revolutions per minute, gives a peripheral speed of 5000 feet. We have numerous cases of 28 and 29-inch diameter electric railway motor gears which will operate at a peripheral speed of as high as 4000 feet per minute, and yet these gears are quiet in their operation. The test in electric railway service is unusually severe as the least indication of excessive noise causes severe criticism. In careful tests on both machine molded cast-tooth and on cut-tooth spur gears up to 6 feet in diameter, the distortion is found to run so slight as to be detected only with delicate calipering instruments. In hardening mill pinions up to 10 feet in over-all length we have found that the distortion is almost negligible excepting that a slightly greater allowance must be left for grinding the bearing surfaces.

Intermating Hard and Soft Gearing

The question as to the desirability of running hardened pinions with soft gears, or vice versa, is one of considerable importance and one that has been carefully checked in numerous tests. These tests have indicated that it is wholly unwise to run the hardened steel pinions with cast iron mates, that it is not advisable to intermate the hardened steel pinion with a very low carbon gear, especially under 0.30 per cent. It is, however, good practice and entirely proper to intermate the hardened pinion with a gear where the carbon content runs higher than 0.30 per cent, the higher the carbon the better the combination. In case the hardened pinion is run with the untreated steel gear, experience has shown that the combination is always detrimental to the fullest service of the pinion. Whereas a hardened pinion mated under the same conditions with a hardened gear will last from seven to ten times as long as the ordinary untreated 0.30-per cent carbon steel pinion, if it is mated with a soft gear, it will only last from four to six times as long as the 0.35-per cent carbon pinion. The effect upon the gear is generally conceded to be good, owing to the fact that the hardened pinion retains its full tooth shape and contour for a very long period of time and takes on a high polish, which tends to curtail friction and reduce the gear wear.

It is, however, considered by far the best practice wherever possible to mate hardened pinions with hardened gears.

General Advantages

The primary advantage in using the hardened gear is the long life. Service tests have demonstrated its ability to wear from seven to ten times as long as the ordinary untreated gear and at least twice as long as any other grade such as case-hardened, heat-treated, manganese steel, mold-hardened, etc. Coupled with the long life is a decided saving in installation cost where a hardened gear once installed will avoid numerous replacements, with incidental saving in freight and storeroom charges. Loss of output is no small consideration in this connection. As an illustration, we know of several steel mills where their cost for the installation of a $10 pinion runs into hundreds of dollars unless the change can be made on one or two national holidays when the plant is shut down. This loss is not in the nature of direct labor, but because of reduced output.

It is frequently the case that one or two gears are the limiting factor in a machine; the only solution is to increase the size of the gears or to improve the quality: The former is usually a very expensive remedy since size increase in gears must be accompanied by corresponding increases in housing, bearings, etc. In such cases, the hardened gear proves of tremendous usefulness. In designing new machines, the size of the gears can be greatly reduced and thereby their cost cut down by the substituting of a long-lived, high-quality, high-strength hardened gear in place of the ordinary untreated material.

It is a decided advantage to have the hardened gears so protected on the bores and keyseats that they can be machined to an exact fit before application, and even if necessary, have this machining operation done in the customer's shop to fit nonstandard shafts.

In cast-tooth gears, it is possible to make accurate and uniform teeth in low carbon castings, so the gears run quietly after hardening. It is further of decided advantage that before the hardening process the teeth are soft and any irregularities or bumps can be readily filed or machined after the casting is made. This condition applies either to pattern cast gear with cast teeth or to gears with cast teeth, formed by machine molding. In either case it is always desirable to slightly clean up the teeth after the casting operation.

It is exceedingly difficult to keep accurate records in mill operation and get close comparisons to show quality in gearing. As a rule, the severest service in any particular place is selected for a test. We are citing a number of cases of this sort showing the results obtained, doing this with the thought that these instances may offer suggestions of specific places where the hardened gear will prove of advantage in other mills or services.

In electric railway motor car service both wear and strength are absolutely essential factors, owing to the continual increase in the horse power of the motors which has not been accompanied by a corresponding increase in the size, pitch or face of the gears. In this service, accurate tests are obtainable, as there are four motors under the car, and it is possi-

ble to equip part with special gears and part with ordinary grades and check the relative life. This has, therefore, been a field where virtually every quality of gear has been tried out; untreated, oil and water-quenched, and case-hardened. In this service gears with tool steel wearing surface have invariably proved their superiority on a basis which entirely eliminated the untreated gear from the calculations and which has outstripped the various special gears in ratios of from two or four to one. Kindred to the electric railway field are the motor gears for coal-mining locomotives and machines and the mill motor gears and pinions. These types of gearing are almost invariably cut-tooth and of comparatively fine pitch. Gears in the cement mills, steel mills and foundries operate in unusually dirty and dusty atmosphere which greatly accelerates wear. A test was followed in cement mill service where the ordinary untreated pinion lasted eight months; the hardened pinion in this service has now been in use slightly less than three years and shows about one-third as much wear as is normally allowed. In a steel mill ladle crane test, in a particularly troublesome location, ordinary pinions had been lasting 4½ months; a heat-treated, oil-quenched pinion was installed which lasted 11¾ months. After this a hardened pinion was applied, and it was in service 32 months, and when removed was not entirely worn out.

Rod mill pinions, operating at exceedingly high speeds, are normally subject to considerable breakage, especially after the pinions become worn. We have several cases where the application of the hardened gear to this service has eliminated wear, kept the machinery in smooth operation and absolutely without breakage, though the tests have run from two to three times as long as the life usually obtained from ordinary pinions.

Roll Mill Gears

A test was followed in blooming mill screw down service, where the untreated motor pinions average only two months of life, due to excessive wear. The hardened pinion is still in service, after over one year's use, and is now about half worn out.

Cast-tooth table miters are usually worn out rapidly and the ones next to the rolls are subject to breakage strains. Tests in this service have been run in numerous mills comparing with untreated, mold-hardened, and manganese steel. In comparison with untreated gears, the hardened ones have now lasted twice as long, and show barely a polish on the teeth. As compared with mold-hardened, experience has shown about a 3 to 1 ratio of life, and about 2½ to 1 in comparison with manganese. Compared especially with teeth unmachineable after casting, gears with tool steel wearing surfaces are much more satisfactory, by reason of tooth smoothness with reduction in vibration and noise. Hardened gears have demonstrated themselves to be proof against breakage due to the toughness of center of teeth. A number of steel mills are now standardizing on hardened material for their staggered tooth spur mill pinions, basing these decisions upon long life and strength in the pieces, and upon the fact that the wobblers can be accurately machined and then hardened to reduce excessive wear and play. In one case tests are now being run on hardening the coupling box as well as the wobblers.

Because of the grittiness of coke dust, there is a considerable field for hardened gears in coke machinery. A hardened cast tooth, shrouded spur rack pinion on a beehive oven coke drawing machine, drew 9000 ovens of coke after which it was worn about one-third as much as allowable. The untreated steel pinions in this service average 2870 ovens when completely worn out. Grit and dust are decided factors in gear wear on crane service, especially in foundries.

Tool steel wearing face is found desirable for certain other classes of work, such as on track wheels and sintering chains. In the track wheels, the hardened wearing surface is a protection against rapid tread wear and is especially valuable for prolonging flange life if rails are not in perfect alignment. Poorly lined rails will frequently cut out the softer steel wheel, or cause the flange to peen out of shape or to break. Breakage in the tool steel wheel is obviated by the toughened center of the flange. While track tests have not been followed on as extensive a scale as gears and pinions, a number of the large mills have now reached the point where they are continually sending repeat orders, and in one case the hardened wheels have been in service 5½ years as compared with eight months, the average life obtained from cast steel wheels. Wherever it is possible to obtain forged material, the track wheels are made from forged or rolled steel blanks, or from solid forgings.

Very exhaustive tests have been made in one of the large sintering plants leading to their standardizing on hardening chain. In this particular service 1-inch chain is used in endless sections 240 feet long, and is continually circulated through sintering kilns carrying scrapers to keep the sides of the kiln clean and stir and break up the iron to be reclaimed. The temperature of the kiln is very high and would ordinarily draw the temper of the hardened chain, but this is obviated as the chain moves through in less than a minute and is for a corresponding time submerged in a bath of cold water on the outside. In this service, numerous grades of chain were tried, the best of which lasted from six to 10 days. Removal was due to excessive wear and frequent breakage on the part of the worn links. Hardened chain has lasted from 92 to 100 days, and thus far has given no breakage trouble excepting in one or two cases, where defective welds in the links have opened up. In this service the hardened chain has been successfully used for over a year.

Sintering chains are not subjected to excessive strains and while hardened chain can be satisfactorily used in this field, it cannot be recommended for service where there is not a large factor of safety against breakage. This is due to the fact that in chain the strain is entirely a tensile pull and the hardening reduces the strength. On the other hand, gearing is subjected to a compression rather than a tensile stress.

The mill industries, especially in the gearing fields, continually offer problems that are baffling. There is an increasing tendency to solve these permanently by the use of the highest quality. There is probably no other field where economies are greater and the elimination of annoyances more noticeable than where quality gears are used to solve gearing troubles.

War Aid the Keynote

The spring meeting of the American Society of Mechanical Engineers will be held at Worcester, Mass., June 4-7. The primary purpose of this meeting will be to bring out suggestions for making the society an even greater factor in war service. At the sessions devoted to the conduct of the war, papers covering the utilization of nonessential industries, shipbuilding, the manufacture of all classes of arms, aircraft procurement, supplies and labor will be presented and discussed. This will be in addition to the general sessions for papers on research, design, construction and other technical subjects.

The S. R. Avis Arms Co., West Haven, Conn., which recently closed its plant because of the cancellation of the Russian gun contract, has received orders from the government and will resume operations again in the near future.

Crane Demand Parallels Ship Need

Shipbuilding Program Causes Intense Production Activities Among Crane Builders —Few Newcomers Among Makers—Augmented Manufacturing Capacity Due Mainly to the Installation of Modern Equipment

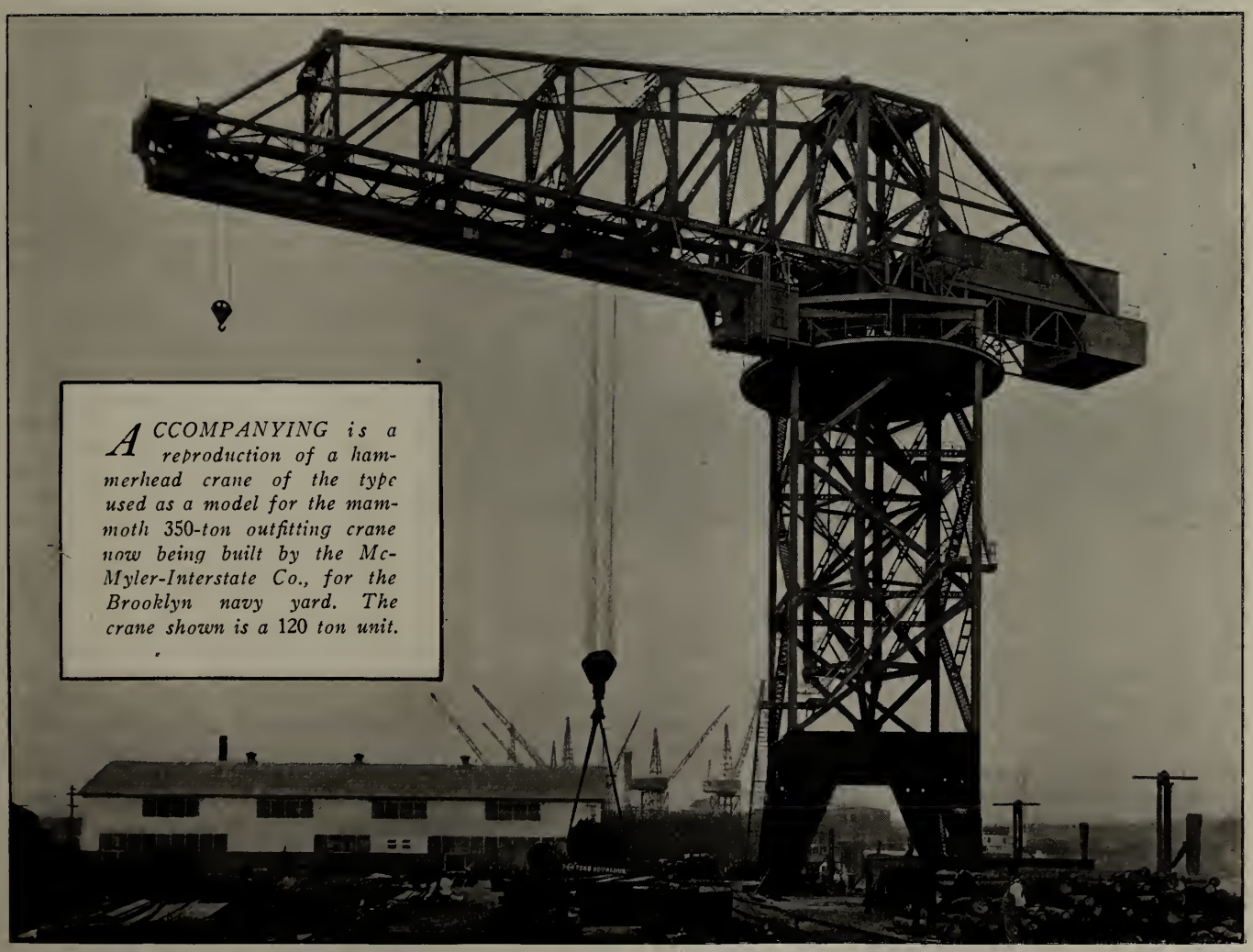
BY B. K. PRICE

WHEN an ancient Egyptian king became particularly hard pressed by ambition, he not infrequently would turn his attention to some unusual feat in construction. He would call before him all of his male subjects from throughout the land. He would outline his project, and, in the language of the day, tell them to stir around and get busy. And so, equipped with crude instruments and ropes and indomitable perseverance and courage, his subjects would set out to do his bidding. They would tug and pull and push and heave and finally after an elapse of five or 10 or possibly 20 years, they having completed their task, would sit down for a well earned rest. This, in simple terms, is the story of ancient engineering achievement, as handed down through the centuries of tradition. Precisely how these curious ancient builders moved and lifted the huge masses of stone embodied in some of their larger structures, nobody knows. One ancient writer ventures, what is regarded as a rather sound guess, that they were aided by crude sheer-legs with a primitive windlass and pulley block tackle. Their heavy lifting, according to this particular writer, was done with sort of a guyed derrick, but without the boom, and, with the lack of evidence that anything better was employed, the majority of the present day scientists appear willing to give this ancient scribe the benefit of the doubt.

Crane Dates Far Back

Since man first began to build, the problem of lifting and transporting great weights has taxed his ingenuity to the utmost, and it may may be regarded that with the construction of buildings—even of the most primitive kind—the development of the present day crane was begun. Although little is known of its early stages, it is believed that the under branced swing crane, the derrick with swinging boom, sheer legs and lifting jacks, embody the principles most widely used by the ancients.

According to all records, it was not until 1850 that the first real semblance of the modern crane made its appearance. During the 50 or 60 years intervening, however, the development of the crane has been so rapid that now in the face of a national crisis but few refinements in design have been necessary. Today it is playing a part in the conduct of war second to no other piece of machinery. From one



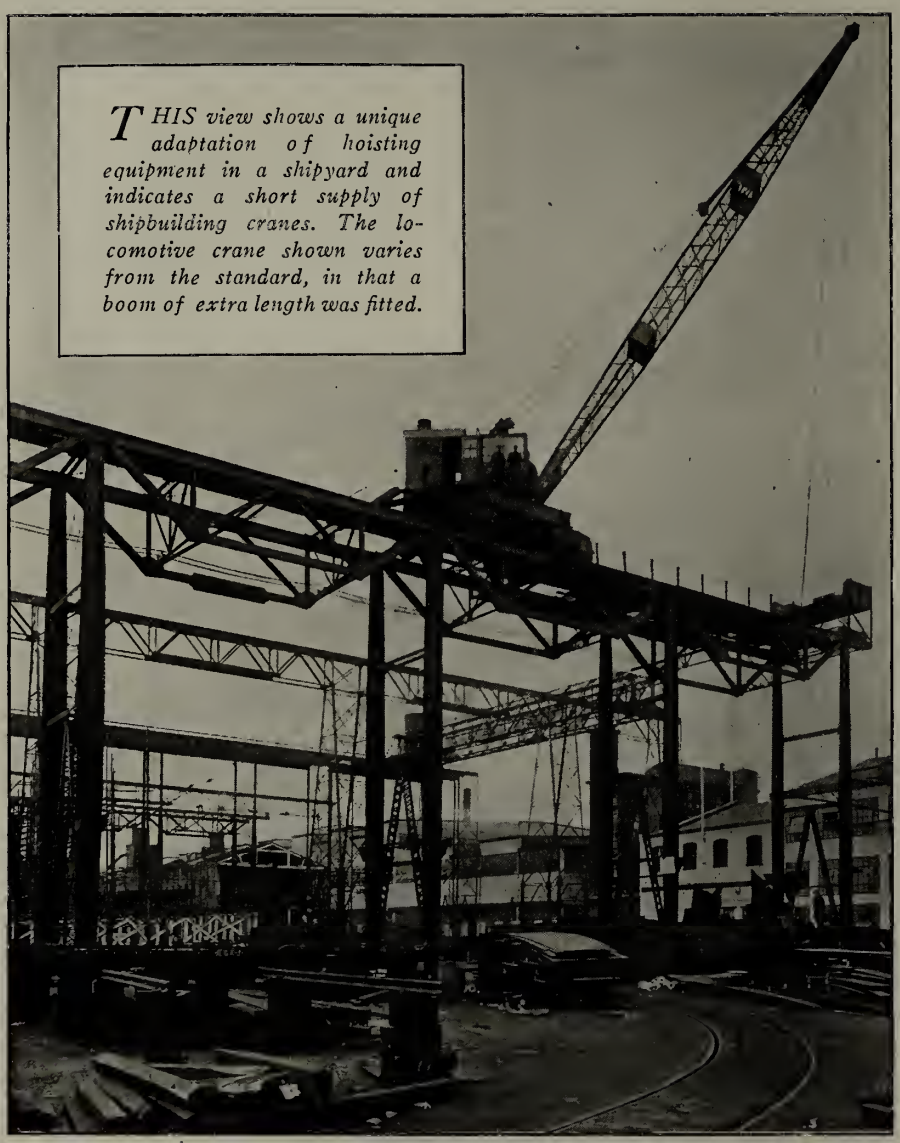
ACCOMPANYING is a reproduction of a hammerhead crane of the type used as a model for the mammoth 350-ton outfitting crane now being built by the McMyler-Interstate Co., for the Brooklyn navy yard. The crane shown is a 120 ton unit.

end of the country to the other, in every iron and steel plant and in every munition plant, on the iron ranges, and along all channels of traffic may be seen the crane, lifting and pulling—carrying in the most actual sense its share of the war's burden. To its lot falls the responsibility of relieving millions of men for other work, urgently needed in the successful prosecution of the war. It not only is executing this task, but is doing it with expediency and dispatch.

Due to the particularly prominent part, the crane industry is playing in the war, its growth during the past three or four years has become of national importance. When the European war broke out in August, 1914, it found the crane industry in the throes of a general depression. Plant operations had been considerably curtailed for months, and as a result of heavy cancellations cranes were plentiful. In one instance, as high as 50 cranes were reported in the yard of one large builder. In the savage competition which naturally accompanied this depression, prices in many instances were sharply cut by manufacturers in an effort to meet their payrolls and keep their plants in operation.

Allies Start Big Buying

It was not until after the first half of 1915, when the vast buying movement of the entente had gotten well under way, that the first real demand for cranes developed. Munition plants required conveying equipment for new construction and the handling of increased production. The railroads needed cranes to handle the rapidly swelling flood of traffic, and the shipyards were becoming more active throughout the country. Considerable export demand developed, particularly for locomotive cranes needed in expediting the erection of railroads and the movement of supplies in the war zone. In October of that year demand, as it appeared shortly after, had reached unparalleled proportions. Prices, however, had not begun to show any material increase, capacity was practically unchanged, the shops being capable of turning out about 80 locomotive cranes a month and perhaps two or three times that number of electric cranes. Few new companies had entered the field up to that time. During the 12 or 15 months which followed, production was steadily increased, until the output of locomotive cranes had reached approximately 120 a month. This was not brought about so much by plant expansion as by the installation of new and more modern equipment. In electric cranes, the increase in production was considerably greater, due not only to the larger number of plants in the first place, but to greater plant expansion, and to the entrance of several new companies into this particular field. However, in a broad sense comparatively few new companies have taken up the construction of cranes during the past three years. When this country entered the war last April and a heavy demand for cranes was practically assured for many months to follow, official Washington was in receipt of many proposals from people who build cranes. By far the majority of these propositions, however, were squashed.



THIS view shows a unique adaptation of hoisting equipment in a shipyard and indicates a short supply of shipbuilding cranes. The locomotive crane shown varies from the standard, in that a boom of extra length was fitted.

Shipbuilding Booms the Market

It was shortly after this country's declaration of war with Germany that the shipbuilding boom set in. Although the operations at yards along the Atlantic and Pacific seaboards and Great Lakes had long since gotten under full swing, it was not until this country entered the war and the necessity became acute for building ships in undreamed of numbers, that any large expansion along shipbuilding lines was undertaken. Realizing the urgent need of ships to transport men and to keep them as well as their allies in supplies, the government instigated huge shipbuilding projects and fostered others where trustworthy backing was shown. It was from this expansion that the crane industry has received its greatest stimulation. At the government's Hog Island plant, the largest to be erected, approximately sixty-five 25-ton locomotives are in operation. The requirements of other new merchant shipyards have been of tapering proportions. Although the shipbuilding industry has greatly increased the demand for all sizes of cranes, it also has been a potent factor in the development of larger cranes. Machines of large capacity have been made necessary particularly for fitting out ships. A type of this crane is shown on the preceding page. It is a stationary hammerhead

crane, with a capacity of 120 tons at a 60-foot radius or 50 tons at a 100-foot radius. It has a clearance under the hook of about 90 feet. A similar type, but of 350 tons capacity, is now being built by the McMyler-Interstate Co., Cleveland, for the Brooklyn navy yard. This will be the largest crane in the world. Two other cranes of similar size have been considered by the government, but have not been placed. A crane which may be considered in many respects as having been developed for use particularly in the erection of ships, is a stiff leg derrick, which is mechanically operated, and mounted on stationary towers. These cranes are so located and are of sufficient number as to control the shipbuilding operations on two adjacent ways. This type of crane is extensively used at the yards of the Submarine Boat Corp. and the American International Shipbuilding Co.

Aside from the increased capacity of cranes in many instances and the changes in supplemental construction, which has been necessary particularly for the erection of ships, conveying equipment has undergone but few innovations. A case in point in the later instance is shown on the preceding page. It sets out strikingly the steel construction around the shipways of the William Cramp & Sons Ship & Engine Building Co., Philadelphia. Although the boom is of unusual length, it may be noted that the crane is of the standard locomotive type. Several overhead traveling cranes are also in operation at this yard for handling material at the shipways. Some of these cranes have spans of 150 feet, which in this respect equal anything known in crane construction. These cranes have a capacity of 10 tons, and are mounted on runways 95 feet high. Overhead travelers also span the shipbuilding berths at the yards of the Bath Iron Works, the New York Shipbuilding Co. and several other companies.

At the Fore River Shipbuilding Corp. an unusually interesting bit of construction was undertaken at one of its ways with a view toward expediting the movement of material required in the construction of battleships. Steel towers more than 150 feet high were erected on either side of the shipway. These towers support two sets of runways, one approximately 150 feet in height and the other about 125 feet. On the lower track a 50-ton overhead traveling crane has been installed, while on the other track a 7½-ton traveler, with a slightly longer span, has been placed in operation. According to this arrangement, either crane can work over the entire shipyard without interfering with the operation of the other. Although several other interesting systems have been installed at various yards whereby the heavy and light capacity travelers can be brought into operation at the ways, this construction at the Fore River yard, due particularly to its immense size, is most unique.

At present the crane capacity of the country appears capable of coping with any demand that may arise, at least in the near future. Deliveries on both locomotive and electric cranes are improving, shipments now being obtainable in from three to four months and in some cases sooner, whereas up until recently cranes could be had under five or six months. Nevertheless, in spite of the fact that conditions in the crane market are now somewhat easier, it is believed that the further expansion of industry, as outlined in the government's huge war program, will insure a continued good demand for cranes from the shipbuilding interests for many months to come until present needs are filled.

Forced Lubrication for Turbines

AN EDITORIAL in *Engineering*, London, discusses forced lubrication for marine turbines, and points out that with the more or less general adoption of geared turbines on all classes of ocean-going vessels, in most of which, unlike the English navy, there are only two engineers on watch, it has become necessary to give the subject of lubrication considerable thought with a view to obtaining a degree of simplicity and dependability which will reduce attention to a minimum.

The article describes a combined gravity and forced system consisting simply of a pump taking oil from a drain tank and discharging it through a cooler to a gravity tank, from which it falls to the turbine bearings, etc., and back to the drain tank; or it can be by-passed, in which case it does not enter the gravity tank but is forced direct to the machinery. The following main fittings would be required for such a system, and are stated in the order in which the oil would pass through them when traveling from the drain tank to the turbines; one drain tank; two oil strainers, one for each pump; two pumps, one working and one stand-by; one oil cooler; two gravity tanks; one combined oil distributor and water-and-sludge collector.

The drain tank should be of sufficient capacity when full to supply oil for 15 minutes, assuming that none is returning to the drain tank. It should be a self-contained unit placed in a cofferdam in the double bottom rather than built into it, and should be easy of removal for examination. The top should be not less than six inches below the bottom of the gear case to insure a ready drain, and not less than three inches above the double-bottom tank to clear bilge water. In addition to the drain and suction-pipe connections a float-level indicator can be fitted so as to be easily observed from the starting platform.

The body of the oil strainer may be of cast iron, having a cover easy of removal. The straining grid may be a gun-metal casting or a steel tube perforated with holes, say, 1 inch in diameter, but in either case the area through the grid should be about 10 times that of the suction pipe. A suitable straining medium is a 24-mesh wire gauze, which should be properly secured to the grid. The gauze will, however, reduce the effective area through the grid by about one-half.

The oil cooler may take the same form as a steam condenser, with similar tubes and packing, but with the water circulating around the outside of the tubes with preferably a four or six flow to insure good circulation. As, however, it is economically impossible to render the flow of oil turbulent, which makes the rate of heat transfer low, certain firms construct their coolers in a different way. The water is passed through the tubes, and the oil outside. Numerous baffles are fitted to cause the oil to flow up and down in zigzag fashion across the cooling tubes, and at each abrupt change in direction a certain disturbance is produced in the laminar flow of the oil, which facilitates the interchange of heat. At present, knowledge of oil coolers is in its infancy and there is much room for research.

The combined oil lubricator and water-and-sludge collector need be nothing more than a cylindrical casting of sufficient depth to admit of water and sludge gathering at the bottom while oil flows out at the top to the bearings and gear sprayers.



Panoramic View of the Plant of the Clark Equipment Co., Buchanan

Manufacturing High Speed Twisted

BECAUSE a flat high-speed drill, suitable for shallow work, would not lift its chips from a depth greater than one and one-half times its diameter, a manufacturer heated a flat drill and twisted it so the inclined plane would elevate the chips and give deeper penetration. In that act the "twist" drill, so-called because it looks as though it has been twisted, became in reality a "twisted" drill, and a new idea was born.

The twist drill is a spiral cut by a milling machine from a round bar of steel, with two, three or four flutes. When drilling the point cuts the material away from the bottom of the hole and the spiral elevates it and keeps the chips from packing and heating the drill unduly.

In making ordinary twist drills considerable steel in the form of chips is removed by the milling machine. These chips are generally sold for scrap and have comparatively little value. In making such drills of high-speed steel this loss is increased. In the process of making the twisted drill, the high-speed steel is rolled or forged to the proper section. The drill is either made flat or with two, three or four flutes, and when the twist is given, the fiber of the steel following the angle of the flute is retained without being interrupted. When removing surface irregularities and giving a finish to the drill, the loss of steel is negligible because only a small portion must be removed by grinding.

This process of making twisted drills was developed by the Clark Equipment Co., Buchanan, Mich., successor to the Celfor Tool Co. The latter company started in 1904 to make a flat, beaded drill for drilling bolt holes in steel rails and for use in shallow plate work. A chuck was also devised to give quick adjustment and to regulate the penetration of the drill into the material.

When the drills are operated in gangs of three or more, one of the drills often becomes shorter than the others. This requires more time to complete the triple penetration. However, by adjusting the chuck which holds the short drill in place, the tip of the latter is brought to the same level as the other drills.



THE GRINDING AND BUFFING DEPARTMENT IS LOCATED IN THE EAST WING OF THE MACHINE SHOPS

Development of the Drill

The flat drill, when used for deep boring, became a source of trouble due to jamming. This led to the introduction of the twist drill which has been used ever since for that class of work, the tailings being extracted by means of the flutes. The next development was the making of a concave drill. Here the flutes are formed by forging instead of milling, giving great strength, conserving material and making the steel denser. The piece is forged straight, reheated and the twist finally given through the medium of a me-



ich., Showing the Beautiful Grounds and Park by Which it is Surrounded

Drills by the Hammered Method

chanism devised for that purpose. Later, drills with three and four flutes, made from high-speed steel rolled to the proper section, cut to length, heated and twisted, were added.

The processes through which the twisted drill passes are many and present several points of interest. The steel is heated no less than four times and annealed three times.

The flat or fluted section first is heated and cut to the proper length. For the concave drill the bit then is heated to forging temperature and forged in a helve hammer. Then the bits are set in the shank, which is slotted to receive the flutes, and heated in a brazing furnace. In the case of small drills the bit is electrically welded to a similar section of nickel steel and then forged.

Finishing and Testing

The small drill blanks are heated and twisted, the machine being operated by a hand gear; for larger sizes by a power gear. The mechanism for giving the flutes their spiral is composed of a series of superposed disks, each carrying in its center a die to correspond to the section of the drill. The blank is placed in these dies and gears are turned. The bottom disk is stationary and holds the tip of the blank while each successive disk above the bottom is rotated in turn by the gears through a certain number of degrees to a stop, the next disk then engaging and doing its prescribed rotation. By this means the exact contour of the spiral may be formed. The face of each die is relieved sufficiently to allow for the curvature of the spiral. After being twisted the drill is drawn from the dies and the gears reversed to set the disks for the next operation. Finishing operations include grinding the drill to exact diameter, buffing the spiral to give a finish, relieving the edge of the flute on a grinder and pointing. The tang is formed by milling the drills in gangs after which it is hardened by heating and cooling in oil.

One of the most interesting features of the tests to which the drills are subjected is the shock test. Although this test is almost primitive in its nature, it is said to be reliable in detecting even the smallest flaw. The drills are thrown with force against a cast steel block embedded in the floor from which they rebound, sometimes as high as a man's head. The ring resulting from the impact gives proof of the soundness of the steel and the presence of a check or flaw even of microscopic proportions is said to cause the steel to break like glass.

Chemical and microscopical tests are made of the material as received, and occasionally, while it is in the process of melting.

The Clark Equipment Co. has three principal departments. One is devoted



WEST WING OF MACHINE SHOPS SHOWING THE DRILLING AND SLOTTING MACHINES



VIEW IN THE FORGING DEPARTMENT SHOWING THE HEATING FURNACES AND HELVE HAMMERS

to the manufacture of twisted drills as described previously, another to the manufacture of cast-steel truck wheels and the third to the manufacture of rear axles for automobiles and trucks. A panoramic view of the plant and adjoining grounds is shown at the top of the preceding pages.

Form Highway Association

Each national association, representing an industry embracing the use or construction of highways has named a representative on the board of directors of the Highway Industries association recently organized. At a recent meeting in Washington, the following were nominated: A. N. Johnson, Portland Cement association; W. P. Blair, National Paving Brick association; A. P. Sandles, National Crushed Stone association; W. O. Rutherford, Motor and Accessory Manufacturing association; W. T. White, motor truck division of the National Automobile chamber of commerce; W. E. Metzger, motor car division of the last named body; E. G. Sutton, National Association of Sand and Gravel Producers; H. J. Long, National Slag association; E. J. Morrison, National Association Asphalt Block Manufacturers, and S. G. Beaty, National Association Road Machinery Manufacturers. The first five likewise serve as directors of the executive committee, with the association's officers as follows: S. M. Williams, president; A. R. Hirst, first vice president and E. J. Mehren and S. T. Henry, second vice presidents.

Effects of Arc Welding

The effect of electric welding upon iron or steel was tested recently. Five standard test pieces, ½-inch in diameter, were prepared. An arc was struck on four of these pieces. In some cases the arc was merely struck and in other cases the arc was struck and carried along the test piece for a distance of 1 inch. During this operation, no material was deposited from the electrode. The piece on which the arc was not struck was tested with the others. The welding current was approximately 60 volts and 150 amperes. The tests were conducted in the Westinghouse works at East Pittsburgh, Pa.

The accompanying illustration shows the specimens after they had been subjected to a pulling test. Figs. 1, 2, 3 and 4 show the pieces on which the arc was struck while Fig. 5 shows the one which was not disturbed in any way. The bar shown in Fig. 1 had a tensile strength of 49,200 pounds with 43 per cent elongation; Fig. 2, 49,100 pounds with 41.7 per cent elongation; Fig. 3, 48,600 pounds with 44 per cent elongation, and Fig. 5, 49,350 pounds with 40 per cent elongation.



THE PIECES AFTER TESTING

The investigation showed that the ultimate tensile strength of all five pieces checked closely. The piece which was not disturbed by the arc had a lower percentage of elongation than the other pieces. The test showed that the material on which the arc was struck underwent no structural change which would injure its original physical properties.

Co-ordinating Engineers

A meeting of representatives from every society and local section of national engineering societies in the state of Ohio was held in Columbus recently. This meeting resulted in forming the Association of Ohio Technical societies, with Clyde T. Morris, Ohio State university, as president and C. E. Drayer, Cleveland, secretary. Resolutions were adopted suggesting to the national engineering societies that membership in a local engineering organization should be a prerequisite to membership in the national societies, and urging local bodies to have at least one engineer named on any board having to do with expenditure of public funds where engineering experience would be of service. All delegates expressed the feeling that the practice of the profession must be regulated by engineers.

Norway Extends Electric Steel Manufacture

Commercial Attache Erwin W. W. Thompson, Copenhagen, Denmark, reports that transportation difficulties have greatly curtailed Norway's imports of iron and steel of various kinds. In normal times these imports aggregate 350,000 tons annually. In 1914, 1915 and 1916 the total tonnages imported were 243,733, 333,535 and 264,967, respectively, subdivided as follows:

	1914	1915	1916
Pig iron	32,254	33,208	34,761
Steel	2,638	1,697	2,230
Bars, rods, etc.	44,951	62,999	60,269
Heavy plates	41,124	70,829	55,375
Thin plates	34,021	41,710	29,267
Bolts, etc.	21,834	32,337	16,710
Beams and shapes	30,496	48,296	29,462
Tubes	18,896	22,030	22,187
Wire	17,519	20,429	14,706
Total	243,733	333,535	264,967

Since Norway's iron ore mines are so extensive, considerable attention is being paid to their exploitation as well as to the use of electric smelting because of the large amounts of available water power. No less than five new companies, according to Mr. Thompson, contemplate the working

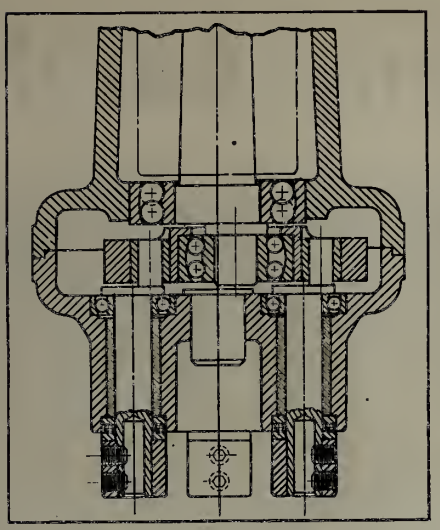
of iron and steel in various ways. While the Christiania Staalverk was originally capitalized 30 years ago at $8000, it is now the largest concern of its kind in Norway. It is planned to increase its present capital stock of $268,000 to $6,000,000 when its anual capacity for making steel and rolling plates and shapes will be 50,000 tons. This extension will receive encouragement from the government which offers to guarantee a loan of $2,742,000 to be repaid in 40 years. The government will also grant a subsidy of $1.61 per metric ton of rolled products turned out in the first five years' operations, as well as certain waterpower concessions. This will mean the development of power of the waterfalls, located about 18 miles from Christiania.

Plan to Build Coke Plant in Northern Mexico

It is probable that the southwestern portion of the United States at least may obtain a big part of its fuel supply in the near future from the extensive bituminous coal deposit situated near Ortiz, State of Sonora, Mexico. This coal is a semi-anthracite grade and is said to be the best quality yet found in Mexico. The development of the mines was begun several years ago, and for some time prior to the beginning of the revolutionary period, the output of the property was distributed over a wide area of Western Mexico. It is announced that E. P. Spalding of New York and associates have just purchased these semi-anthracite coal mines from the Carlos F. Johnson Coal Mining & Development Co. for a consideration of $3,000,000 to be paid in five years. The new owners plan to make extensive improvements which will include the installation of machinery, the opening up of new shafts and the construction of a spur railroad track to a connection with the Nogales-Guaymas branch of the Southern Pacific, a distance of four miles. It is stated that this coal is not only of a grade specially adapted for all kinds of fuel purposes, but that it produces a high quality of coke which will be used for smelting.

New Type of Drill Head

A crank method of driving multiple spindle drill heads has been adopted by the Heinkel Machine Tool Co., Sandusky, O. Two views of its adjustable 4-spindle drill head are shown. This drill head may be adjusted while the machine is in operation, thus facilitating the location of drills in jig bushings. Another



CROSS SECTION OF DRILL HEAD

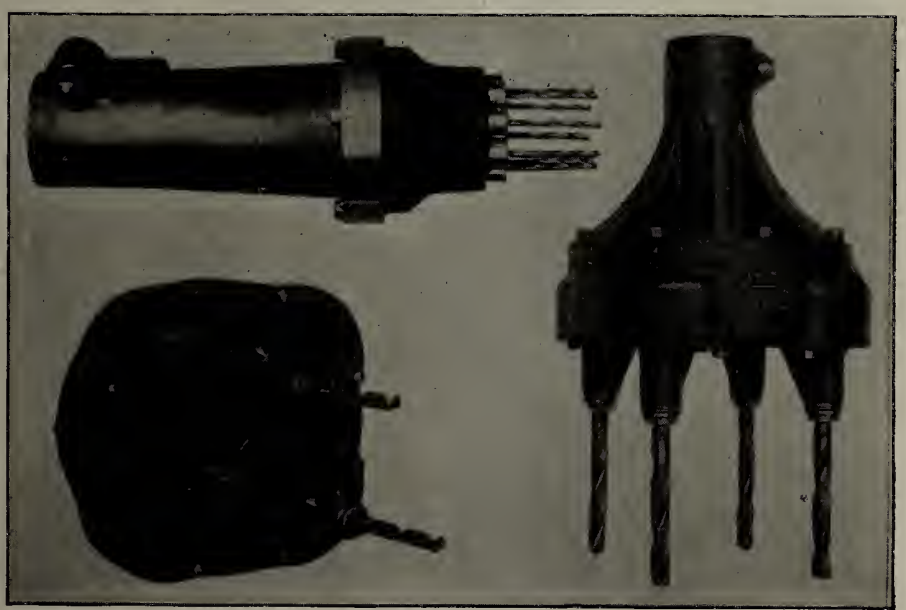
feature of the head is the elimination of overhang on one side of the drill press spindle as the method of adjustment allows the movement of the head in a circle. Adjustment in this manner keeps the drills equally balanced across the center line of the drill press spindle.

An 8-spindle drill head of the fixed type is also illustrated. This head is used for quantity production on certain pieces of work. A cross section which is reproduced on this page illustrates the design and construction of the fixed center type. The head is fastened to the sleeve of the drill press by a clamp screw and is held from slipping upward when under drilling strain by a stop which abuts against the bottom of the drill press rack. An annular ball bearing is mounted on the taper shank and thus gives extra support to the head and the drill press spindle. Power is transmitted by means of a crank on the lower end of the taper shank. This crank also has an annular ball bearing mounted on it, which is set into the driving plate. The driving plate oscillates when the taper shank revolves. The crank spindles fit into steel bushings in the driving plate and are rotated by the oscillating motion of the driving plate. A ball thrust bearing is mounted on each spindle and held in position by a nut. A floating steel plug is fitted which may be used to drive the taper shank into the drill press spindle.

Consider Roll Economy

British steelmakers, face to face with the necessity of reducing costs and increasing efficiency if they are to compete successfully for the world's steel trade after the war, are considering eliminating the multiplicity of rolls evil. A committee of the Iron and Steel institute has proposed, among other things, that there be a central committee to which all orders be sent. This central body, in turn, would allocate the orders among the various mills. It is pointed out that many mills now have rolls for practically all of the standard British sections, entailing the investment of thousands of dollars. But with a central board mills could be kept at the same kind of work for long periods, thus reducing the amount of roll changing and, hence, the cost of production.

The W. W. Sly Mfg. Co., Cleveland, manufacturer of foundry equipment of all kinds, is revising its catalog files and desires new catalogs, covering principally engineering subjects and equipment of various kinds.



MULTIPLE SPINDLE GEARLESS DRILL HEADS

Detroit Motor Car Manufacturer



Women Master Machinery Operations Almost as Quickly as the Finer Inspection Processes



Has Training School For Women





WOMEN, in increasingly greater numbers, are training to take the places of the skilled male mechanics who are entering the service of the nation. The interior views of a leading Detroit motor car plant which are reproduced on these pages show a few of the many production details in which women are acquiring marked proficiency. This company conducts a training school where women are instructed in the principles of shop practice. Views of the class in upholstery are shown at the upper left and at the bottom of the page. Instruction is also given for the purpose of minimizing accidents. The "safety first" photograph at the upper right is used by the company to emphasize the necessity for care in machine operation and to encourage the use of adequate protective devices on machines.



Combating Low Phos Iron Shortage

Government Employs Vigorous Methods to Deal with Scarcity of Raw Material for War Essentials—Provides Ore for Immediate Smelting and Commandeers Coke for Certain Furnaces—Various Expedients Proposed

WASHINGTON, March 2.—Energetic efforts being made by the government to increase the supplies of raw material for the tremendous requirements of and steel castings for war purposes, continue to accentuate the serious character of this problem. The latest developments that have been brought forth by this situation relate to the vigorous attempts being made to increase the supply of low phosphorus pig iron. This grade of iron is indispensable to the meeting of the severe specifications which various war departments, especially that of the ordnance division, insist shall be observed to the hair-line limit. The ordnance department's standards provide that the phosphorus of the casting shall not exceed 0.05 per cent. Recently the government ordered to be made up at the plant of the Eastern Steel Co., Pottstown, Pa., a quantity of low phosphorus ore which was in stock in the east. About 20,000 tons of iron are expected to be realized from this operation. Subsequently 15,000 tons of additional low phosphorus ore were obtained in Cuba by those in charge of pig iron distribution at Washington. This is to be brought in and converted in a similar way. To supplement this action the fuel administration, at the request of the war industries board, has commandeered coke from the Pottstown, Pa., furnaces which will smelt the low phosphorus ore. It also has ordered that 100 per cent shipments be forwarded against contracts by coke producers to other furnaces which are regular makers of this grade of iron, even though the fuel must be taken away from steel works and blast furnaces and the operations of the latter be curtailed accordingly. It is expected that these aggressive measures of the government to increase the supply of low phosphorus iron will be continued. Further furnaces are to be put on its production. One Ohio plant now is preparing to change its mixture from bessemer to low phosphorus.

Problem One of Ore

The low phosphorus problem, it is pointed out by those who are best informed on this subject, is one of ore. The developed domestic supplies are limited and considerable tonnage always has been imported, particularly from Spain and Cuba. Ordinarily these supplies would be sufficient to fill the normal requirements of the country but the war demands have expanded these needs tremendously and the situation has been reduced simply to one where the requisite supply of ore or iron is not available. There has been some agitation in favor of the intensive development of some ore deposits in the Superior regions, which while low in phosphorus, also are lean in iron content thereby adding considerably to the cost of their mining.

The furnaces which have been producing low phosphorus iron include those of the Northern Ore Co., at Standish and Port Henry, N. Y.; the Delaware River Steel Co., at Chester, Pa.; the Robesonia Iron Co., Robesonia, Pa.; the Bethlehem Steel Co., at Lebanon, Pa.; the Stewart Iron Co., Sharon, Pa.; the Cranberry Furnace Co., Cranberry, Tenn.; and the Thomas Furnace Co., Milwaukee. These producers combined have been turning out about 500,000 tons of iron per year. This includes both the copper-free and the copper-bearing iron. Beaurocratic redtape and the apparently temperamental inability especially of the war department to make any readjustments of its prewar standards in order to cope with an entirely new set of conditions, are charged with greatly aggravating the present situation. It is appreciated these are probably various classes of service which require the most exact limitation of the phosphorus content in castings. Furthermore, it is pointed out there are unquestionably other indispensable uses of low phosphorus iron by the government which have been rendered vitally important and of increased magnitude by the war. These relate to certain gun parts, special cables, etc. These absolute essentials, it is contended, make all the more imperative the conservation of the limited output of low phosphorus pig iron, especially of the finer quality most needed for the more exacting uses. This view is being impressed more and more strongly upon government officials by iron producers, steel foundrymen and other manufacturers who are directly concerned with the problem. So far it has accomplished little results. That the practical aspects of the situation operating upon those in the government war machine responsible for production, gradually will force remedial measures, however, is confidently believed by those who are in close touch with the situation. In the end, it is thought the government experts who are clinging to theoretical and minutely-drawn standards applicable without great advantage to pre-war demands but incongrously and seriously out of gear with the critical requirements of warfare on a big scale, will be brought to modify their views.

Substitutes Are Proposed

Substitution of acid steel castings by castings made by other processes, especially of the lighter character, by rolled and forged steel products and by other material wherever the physical requirements can be met, are being urged with increasing force in order that the intense pressure upon the low phosphorus iron supply may be eased.

American Gear Manufacturers to Convene

The second annual convention of the American Gear Manufacturers' association will be held at Green Brier hotel, White Springs, W. Va., on April 18, 19 and 20. The session will open with an address by F. W. Sinram, president. Following this address, C. R. Poole, representing the United States Chamber of Commerce, will read a paper on "Hardening and Heat Treating of Gears". Other papers which will be presented are as follows: "Uniform Cost Accounting", by J. W. Dunn; "Hobs and Hobbing Machines", by a representative of the Barber-Coleman Co. A report of the standardization committee will also be presented.

Iron Ore Booklet

Oglebay, Norton & Co., Cleveland, are distributing a 48-page booklet giving analyses of the various grades of iron ore which they handle. These ores are produced in a number of mines on the Gogebic, Menominee Mesabi and Cuyuna ranges, and from the Sudbury district of Canada. Sieve tests are given for a number of coarse Mesabi ores.

Obituaries

WILLIAM Parmelee Murray, member of the firm of Pickands, Mather & Co., Cleveland, died at his home in that city, Feb. 27, after an illness extending over a period of almost two years. He was born at Mentor, O., July 12, 1854, where his father, Robert Murray II, was a cattle dealer from 1830 until 1863. William Parmelee Muray, at the time of his death owned a stock farm of 600 acres there for breeding trotting horses. He received



WILLIAM PARMELEE MURRAY

his early education at the Mentor high school and his early occupation was as bank clerk with E. B. Hale & Co., Cleveland, commencing as office boy in 1870 and remaining until 1873 when he became assistant teller of the Merchants National bank. He left this position April 1, 1881, to learn the iron, ore and coal business and commenced making pig iron at Steubenville, O., for the Cleveland Furnace Co. In 1883 he became affiliated with the Tod-Stambaugh Co., and went on the road selling pig iron, remaining with them five years, when he established the coal department of Pickands, Mather & Co, later being admitted to the partnership.

Thomas F. Noon, president of the Illinois Zinc Co., Peru, Ill., died March 2, at Phoenix, Ariz.

John G. Sheidel, manufacturer of hoisting machinery, died recently at his home in Reading, Pa., aged 62 years.

Thomas Kendrick, one of the founders and part owner of the Kendrick Valve & Washer Co., Syracuse, N. Y., died suddenly in St. Luke's hospital, Jacksonville, Fla., Feb. 25. He was born in Cambridge, Mass., 66 years ago, but had lived in Syracuse practically all his life. He left for a short vacation about two weeks ago in good health.

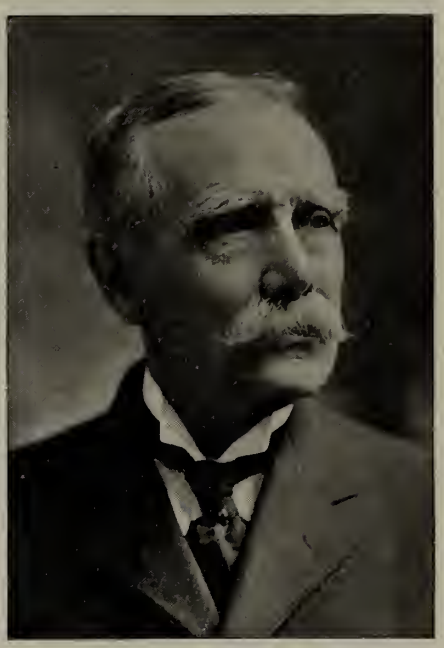
William Robert Sterling, a partner in the firm of Peabody, Houghteling & Co., died March 3 at his home in Chicago, aged 66 years. He was born in Scotland and before becoming affiliated with Peabody, Houghteling & Co. he was vice president of the Illinois Steel Co., previous to that being connected with the Joliet Steel Co.

Harry Smith Morrow, well known hydraulic engineer, died at his home in New York City, March 4. Some of the engineering feats with which he has been identified are the Whitney, N. C., dam and waterworks, the New York state barge canal and the pipe line which brings the water supply to New York City 900 feet under the Hudson river from Storm mountain.

Charles A. Borst, mine owner, Clinton, N. Y., and head of the Clinton Hematite Co., died suddenly at his office a short time ago. He was born in Schoharie county in 1851 and was graduated from Hamilton college in 1881. About 15 years ago he became interested in the low grade hematite ore in the vicinity of Clinton. Later developments in the process of making iron with ores of higher grades especially for use in the bessemer process, enabled him to extend his operations considerably.

Irving McC. Bean, who was assistant manager of the Northwestern Iron Co. plants, at Mayville, Wis., and Milwaukee, and president of the Milwaukee Boiler Works, died recently after an attack of pneumonia, at the age of 43. He was a graduate of the universities of Wisconsin and Michigan and a son of the late Captain Irving McC. Bean, one time owner of the Northwestern Iron Co. and president of the Spring Lake Iron Co., which had a furnace at Fruitport, Mich.

William D. Dunning, 81 years old, a well known manufacturer and foundryman of New York state, died recently at his home in Syracuse, after several weeks' illness. He was born in Whitesboro, N. Y., Feb. 11, 1837, and as a young man was employed in 1862 in the state engineer's office at Albany. He then took up a position in the state engineer's office at Syracuse, where he remained until 1870, when he entered the firm of Alexander, Bradley & Dunning. The latter operated an iron foundry and



WILLIAM D. DUNNING

machine shop on the site occupied now by the Alexander Iron Works, which Mr. Dunning carried on after the death of his partners. He was also secretary and treasurer and large stockholder of the Boomer & Boschert Press Co., and was a director of the Onondaga County Savings bank.

William Burnham, who was chairman of the board of directors of the Standard Steel Works Co., Burnham, Pa., and a director of the Baldwin Locomotive Works, Philadelphia, died recently in that city, following an operation. He was 72 years old and entered the Baldwin works on leaving Lawrence Scientific school, Cambridge, Mass. In 1871 he became assignee for William Butcher, maker of the first steel locomotive tires in the United States, and was made secretary and treasurer, when the Standard Steel Works Co. was formed.

Great Ford Plant is Taking Form

Shipyard for Submarine Chasers Will Be Completed Speedily as First Unit of Group—Two Blast Furnaces to be Ready Next Year—Special Metallurgical Process to be Followed in Steelmaking

DETROIT, MICH., March 4.—Steel work, following a year's operations in the laying of foundations, is beginning to appear on the 4000-acre site of the Ford Motor Co.'s blast furnace, steelworks, by-product coke, shipbuilding tractor and rubber plants on the River Rouge, just outside the westerly city limits of Detroit. A vast amount of temporary construction work has been done on the property. The first permanent construction now is nearing completion in the form of an ore unloader, being installed by the Wellman-Seaver Morgan Co. Materials for another unloader are on the grounds awaiting assembly. The project eventually will represent an investment of $14,000,000.

Up to this spring, work on the site of the four blast furnaces has been devoted to the sinking of thousands of piles as foundations for the ore and coal storage yards and dykes forming the walls of what will be a 2600-foot canal, 20 feet deep and 110 feet wide. The canal will run through the center of the entire property, dividing the blast furnace and shipyard sites from the tractor plant. The canal now is taking form and the waters of Roulo creek will be diverted into it, emptying into the River Rouge a mile from that stream's junction with the Detroit river. It is on the east bank of the canal that the ore unloaders are being erected and the foundation for the ore storage yards is being laid. There are 6000 men now at work on the construction of the blast furnace facilities and the shipyard. In the latter will be turned out submarine chasers for the navy department.

Provide for Water Navigation

An indication of the engineering problems that are being solved in preparing the site is given in the fact that River Rouge and Roulo creek will be diverted into new channels. The creek, now a winding, shallow stream, will be converted into a straight canal with concrete embankments. The River Rouge is being deepened and straightened in its course to permit its navigation by lake freighters drawing 20 feet of water.

The turning basin for lake freighters will be constructed under government supervision at the junction of River Rouge and Roulo creek canal. This area, forming a semicircular bay will be dredged and widened until it has a depth of 25 feet and an area of 989,100 square feet. The turning basin and canal will be dredged within the next 30 days and entirely completed this year. Incoming steamers will turn in the basin and back up the canal for unloading by two 12-ton scoops. The turning basis is being dredged by the Duluth-Superior Dredging Co. at the rate of 500 yards per hour. The mud taken from the basin is being distributed for filling purposes over the property by air pressure through steel pipes.

The steel plant will cover 350 acres and will have seven buildings, four blast furnaces and four storage yards. It is planned to have two of these furnaces in operation in 1919. All four will be in operation by 1920. The administration building, on the east side of the property, will be 175 x 175 feet; the laboratory also 175 x 175; the by-product plant 1000 x 1000; the powerhouse 300 x 440; the machine shop 1000 x 200; the foundry 275 x 1000, and the cleaning shop 1000 x 100. The storage yards, two for ore and two for coal, will be 500 feet wide and 1530 deep. These will extend along practically the entire length of the canal.

Special metallurgical processes which will give the Ford company greater flexibility in the grades of steel produced are to be carried out in the blast furnaces and steel works. The ore, it is said, will receive some new character of treatment in the smelting operation and the final reactions will take place in the open-hearth furnaces. It is declared that the process to be pursued in steelmaking is of a secret character and only general statements regarding it now are being made public.

The layout of the plant provides that the ore will be handled by cars from the docks into the storage yard or to the furnaces. The direct furnace ore will be delivered to a bin system which will serve the skip hoists. The iron will be tapped in molten form to the ladles and transferred to the open-hearth furnaces nearby. From the open-hearth plant the metal will be conveyed to the foundry. After molding, the castings will be taken by conveyor to the cleaning department and then passed on to the machine shop.

The by-product coke plant will be operated and owned by the Semet-Solvay Co. The Ford company has entered into an agreement with the Solvay interests whereby they are to occupy a part of the blast furnace property, and in turn produce for the Ford industries. All the by-products will be taken out by the Solvay company during the reduction process, and the plant will furnish the Ford property with gas.

Concrete Work Very Extensive

Millions of barrels of cement will be used in the construction of the ore and coal storage docks and yards. Already much reinforced concrete foundation work has been completed. Boats are bringing in 700 cubic yards of gravel daily for this cement work. The first ore yard soon will be completed adjoining the ore unloader. To carry the millions of tons of ore, piles were driven four feet apart over the entire area. On top of these will be placed two feet of reinforced concrete flooring. The yards are divided into two sections which distribute the ore load equally. The retaining walls are of reinforced concrete, the first one, on the canal side, being 17 feet high and supporting the ore unloader. The middle wall is 20 feet high and the third 40 feet.

Concrete mixing for this work is being done through a new process which forces the concrete in liquid form through 6-inch pipes under 80 pounds of air pressure to the section on which the concrete is being poured. It is also carried 50 feet up to the top of the forms for the retaining walls.

Officials in charge of the project, which is the largest industrial improvement of its kind ever attempted in the state of Michigan, include W. B. Mayo, chief engineer of the Ford Motor Co.; G. R. Thompson, construction superintendent; J. W. Gray, resident engineer for Julian Kennedy, noted Pittsburgh blast furnace builder; H. J. Lamet, building inspector for the Ford Motor Co. and expert dyke builder, J. W. McClain,

head of the receiving department and George A. Brown, auditor.

Coking Coal

Developments Advancing in Eastern Kentucky—Steel Corporation Active

(Special Correspondence.)

Whitesburg, Ky., March 1.—The most important coal deal consummated in Kentucky in several years was closed a few days ago for 125,000 acres lying in Perry, Leslie and Clay counties below Whitesburg. The Peabody-Hoteling Co., Boston, Mass.; Williams & Peters; The Semet-Solvay Co. and others of Charleston, W. Va., for the development of 400 acres of Caudill's Branch coal lands several miles below here involving large expenditures. A six-mile branch of the Louisville & Nashville is being extended into the Caudill's Branch section. The Middle West Coal Co., the Rockhouse Coal Co. and the Turkey Foot Coal Co. are new corporations developing in that section. The Middle West Coal Co. is composed of Toledo and Cincinnati interests and will be the largest in that section. The Kentucky Block Coal Co. is a new company just organized by West Virginia and Ohio capitalists at Virgie, east of here, on the Baltimore & Ohio railroad, where 2000 acres have been leased from the Solvay Co., Boston, for immediate development. A new town will be established. The United States Coal & Coke Co., a subsidiary of the United States Steel Corporation, developing 20,000 acres in the Looney Creek section, in Harlan county south of this city, is making shipments of 20 cars daily, and has its plant only partially developed. It is planned to be mining 10,000 tons daily within three months. Within a few months the new city of Lynch, modeled after Gary, Ind., will house about 8000 to 10,000 people. The coal is being shipped to Gary, South Chicago and Joliet, for coking.

The Virginia Iron, Coal & Coke Co. has leased several thousand acres of coal lands lying along Carr's Fork, below here, where development has commenced by the Carr's Fork Coal Co. At least six coal operations are going on in that section. The Louisville & Nashville railroad is building an extension up Carr's Fork to reach the new developments. The whole of eastern Kentucky soon will be under way of development by large corporations.

The Caudill's Branch Coal Co. has been organized by P. M. Clanahan and ers of New York, were the purchasers. The Middle Fork railroad, 50 miles long, will be built in order to develop the properties. Several new industrial towns will be constructed along the route of the railroad extension. The coal to be developed in the territory is of gas and by-product quality.

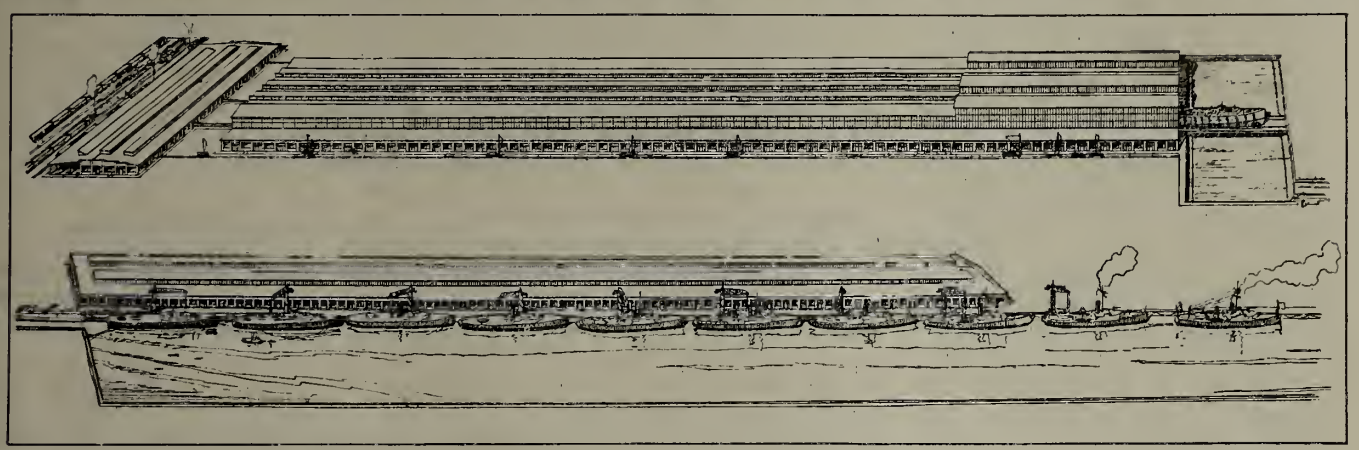
Philadelphia and Detroit men, including C. C. Winters, A. L. Mancourt, A. F. Weist, D. C. Anderson and J. B. Altemus who recently organized The Elkhorn Collieries Co. to develop 6000 acres of coal lands on Thornton Creek in Letcher county have started initial development work. A five-foot vein of cannel coal and a seven-foot vein of steam, gas and by-product coal will be developed. Tests have shown that the coal is especially adapted for coking.

Crucible Files Protest

Three supplementary affidavits have been filed in the United States district court at Pittsburgh by the Crucible Steel Co. of America, against the making of payments to the railroads for hauling slag. Recently Judge W. H. S. Thomson of the federal court decided that iron and steel manufacturers are liable for freight charges for the transportation of slag regardless of the manner of its disposal by the carriers. Since the railroads use a great quantity of slag the manufacturers claim no charge should be made for the hauling of slag when it is devoted to this purpose.

After considerable delay because of dearth of material, a second blast furnace has been added to the Penchihu Collier & Mining Co.'s equipment in Manchuria, which will increase the company's annual output to 100,000 tons of pig iron. Mining arrangements at Nanfen are being enlarged to meet the increased demands of these furnaces.

Ford Submarine Killer Plant Expected to Produce in 75 Days



THE drawing shows how the Ford Shipbuilding plant, now under construction at River Rouge, will look when completed. The drawing is in two sections, the lower one connecting at the right of the upper. Materials for the building of submarine killers will go into the fabricating shop, shown at the left of the upper section, and as put together will be carried on rails into the bays adjoining. Here as a hull gradually is assembled it will move through the bay until ready for launching, it reaches the transfer table, shown at the right of the upper section, and is dropped into the water. It then will pass through a slip to the position of the first boat shown at the dock in the lower view. Here equipment will be installed and the ship moves to the position in which the second boat appears. It will be moved up in turn to the positions indicated by the succeeding boats, and will be fitted out in consecutive operations. At the last place, wireless will be installed and the boat will be ready for its trip to the submarine zone. Crews of the boats will be trained on the scene and follow the construction of their craft through every stage, manning them when they are complete. The plant, which will cover five acres of land, north of the blast furnaces, will be completed and producing before May 10—75 days.

Discuss Remaking of War Board

Expansion of Present Body to Include Representatives of Army, Navy, Shipping Board and Other Leading Consuming War Branches is Proposed—Steel May Lose Individual Representation—More Authority is Promised

WASHINGTON, March 5.—Reorganzation of the war industries board is regarded as altogether likely whether either the Overman or the director of munitions bills passes congress. It is under discussion now and plans have been proposed to expand the board through the addition of some and the dropping of other divisions. The vacancy in the chairmanship of the board and the popular demand for a board of some authority, whether given by the President through one bill or another, are regarded as almost certain to bring about some readjustment.

Men on the board or in its divisions and men outside but still in the government realize that reorganization is necessary. What the President may have in mind largely is what his advisers suggest. One plan, broached to government officials and approved, in a measure, by war industries board officials, looks to more equitable representation of the various war branches. While it may not be accepted officially and finally, it is expected to have weight.

It has been suggested that the shipping board, the fuel and the railroad administrations, the war trade board, the allies and the steel and priorities divisions of the war industries board be given representation on the reorganized board and that raw materials, finished products and labor representations be regarded as divisions and not commissionerships. This would leave the army and navy sections of the present board intact except, possibly, for change in the representative personnel.

Suggest Dropping Steel Section

Such a plan, while regarded as meritorious and looking to full co-ordination, would make a board of nine, exclusive of the chairman, which would be unwieldy, according to some opinions. From this source it is suggested that steel and priorities be dropped along with labor and the raw materials and finished products sections. That would still leave a board of seven, eight with the chairman, which is large yet fully representative of consuming ends of the government.

Because of the demands for steel by the army, the navy, the allies, the railroads, the shipping board and neutral countries, and because of the demands of transportation of fuel, raw materials and finished products, it is felt all should have some representation in the board. What is true as to steel is true also of other war essentials, and for that reason it has been suggested steel be given no more preference than lumber or cotton or wool, etc., which leaves open only the course of making steel and the other raw and finished materials sections as divisions under the board.

At present the army and navy are the only consuming ends represented on the war board, Admiral Fletcher and General Pierce being the incumbents. Yet neither has had authority to decide which of the branches of their respective military departments would have preference over the other when there is a conflicting demand for some essential in which there is a shortage. Officers from the war and navy departments, even in the same section or division, have made similar demands on the directors under the board and as a result have caused much confusion which has led to halting and indecision. Each wants his needs supplied and no one had authority to give preference.

To Fix Priority of Essentials

For this reason it is felt that every army requirement or every navy or every shipping board demand should be made to the war industries board through one source, that source being a responsible officer with authority to determine which is the more essential of several demands. With the railroad administration to be a big buying factor, its representative necessarily would have two functions, that of presenting the railroads' needs and of assisting the other departments in their transportation difficulties. By this plan neutral requirements would be presented through the war trade board. The allies, instead of speaking through the present commission, which is composed of three of the six members of the board, would present their requirements through one representative. The fuel administration's representative also would be an authority, which representation would, if for no other reason, require submission of any such plan as the fuel conservation order of Jan. 17 before its promulgation.

Labor is taken from the board, in the proposed plan, because labor already has representation in the advisory board of the council of national defense, has ample play for its demands through the various labor channels already set up and in action here. Because it is a raw material entering into production of war essentials, could have representation under a division in the war industries board's various sections and directories. For this reason the raw materials and finished products sections also would be left off the board in its reorganization.

Chairman to be Supreme

Above these representatives would be the chairman with authority of the President, for the new chairman, whoever he may be, likely will be one with powers delegated by one law or another. He would decide questions arising between any two or more of the members of the board as to which department should have preference as to this tonnage of steel or that quantity of copper, etc. The subdivisions of the board would in reality be the administrative functionaries of the chairman which would include practically all of the present divisions. Each member of the board necessarily would have to have his own staff which largely would be the entire department from which he would come. The allies' representative, for example, would have a staff composed of a member from each of the war missions.

This plan is that on which the war trade board, the war council of the war department and the council of national defense, each in its own way, have been built up. At present the council of national defense with the shipping board, the food and fuel administrations and one or two other government branches have a get-together meeting once a week, but more for guidance of the leaders rather than decisions affecting specific questions.

The Norfolk & Western railroad seeks cancellation of pig iron rates out of Bristol, Va.

Exports Slump to Nations Nearby Germany

Washington, March 2.—American imports so far have not been affected by the proclamations of the President but exports are beginning to show curtailment. Available figures present an increase of $7,000,000 in import trade for January over December and a decline of over $80,000,000 in exports in the same period.

The value of all imports to the United States in the seven months ending with January, the total for the month being $235,000,000, was $1,634,000,000, an increase of nearly $300,000,000 over the same months in 1917. Exports, which in the first month this year fell to $504,000,000, had a total value of $3,448,000,000 in the seven months' period compared with $3,616,000,000 last year. Gold imports in January, $3,746,000, were less than the exports by nearly $700,000. The seven months imports and exports of gold were, respectively, $78,694,000 and $41,186,000. Silver imports were $5,997,455 in January and $41,186,000 in the seven months while exports were $6,628,000 and $52,032,000, respectively.

South America, Japan and Mexico in January show an increase in commodities received from the United States, while Russia, since the revolution, and neutral countries, since the promulgation of the licensing system, show sharp declines. Exports of all kinds to Sweden fell from $5,564,171 in January, 1917, to $4,392 in January, 1918; similarly exports to Holland declined from $14,776,742 to $479,476; to Denmark from $5,475,516 to $405,376; to Russia from $51,547,000 to $2,996,000.

The foreign trade carried on by the United States and Russia last year amounted to $438,000,000, a decline of $39,000,000 which is considered remarkable in the face of the unsettled conditions. The decrease in the total volume is believed due to the congestion and port restrictions at Vladivostok, as loss occurred only in the trade with Siberian Russia. The increase in trade with European Russia was $14,000,000 over the total of $313,000,000 in the year before. This gives a decline of $53,000,000 in Siberian commerce. Deductions indicate the business sent to and taken from Siberia reached $111,000,000 last year as against $164,000,000 in 1916. Trade with Russia practically ceased early in December.

Capital Odds and Ends

BUSINESS firms which have found the regulations too general to fit specific cases are expected to welcome a board of excess profits reviewers soon to be created by Internal Revenue Commissioner Roper, to make rulings on specific questions in returns. Upon the board's decisions will depend many millions of dollars in taxes.

* * *

Increase from 15 to 16 cents per 100 pounds in the carload commodity rate on tinplate and terneplate from Cincinnati to Nashville, Tenn., has been asked.

* * *

Cancellation of rates on iron pyrites is asked by the Chicago, St. Paul, Minneapolis & Omaha railroad on shipments from Washburn, Wis., and Ashland, Wis., to Barkdale, Wis.

* * *

Cancelling a tariff providing for a rate of $1.50 per ton on pig iron in carload from Chicago to Alton, East St. Louis, Granite City and Madison, Ill., asked by the Pennsylvania lines will leave a rate of $1.50 in effect.

* * *

Increases in minimum carload weights on sulphuric acid and ores and concentrates and cancellation of rates on pig iron and copper bars and plates are asked by the Atchison, Topeka & Santa Fe railroad.

* * *

Railroads have asked an increase of 1.8 cents per 100 pounds on the rates on machinery, including steam pumps and air compressors, from Quincy, Ill., to gulf ports when consigned to Porto Rico.

* * *

The Atchison, Topeka & Santa Fe railroad wants to cancel the carload rate of 64 cents per 100 pounds on iron and steel bars from Minnequa, Colo., to various New Mexico points; to substitute an increase rate of 4 cents on bars in carloads, and to increase the minimum carload weight on bars from 36,000 to 40,000 pounds.

* * *

Seattle station of the bureau of mines is conducting experimental work on Alaskan nickel and tin ores and expects soon to undertake work on chrome ores. Concentration will probably be so divided that the ore concentrates will be brought to the United States for treatment. The urgency efficiency bill now in congress grants a $75,000 appropriation which will enable the bureau to send to Alaska metallurgists and engineers to further investigate the mineral resources.

Foundry Meeting

Will be Held in Milwaukee in October—A. F. A. Takes Action

Milwaukee, one of the leading foundry centers of the United States, has been selected as the 1918 meeting place for the annual conventions of the American Foundrymen's association and the American Institute of Metals. Concurrent with these gatherings will be held the exhibition of foundry equipment and supplies, machine tools and accessories. On Monday, Oct. 7, the deliberations of the two foundrymen's technical societies will be opened with a joint session, and at the same time the visitors will be given their first opportunity to inspect the displays. The convention and the exhibition will continue throughout the week.

The meetings of the American Foundrymen's association and the exhibition will be held in the auditorium where ample display space will be afforded and a sufficient number of large meeting rooms are available for the joint sessions which will be scheduled for three days of the week.

The auditorium is one of the largest and most complete structures of its kind in the world. Machinery hall, where the operating exhibits will be assembled has a floor area of 54,000 square feet, and the arena, where the still exhibits will be located, has a floor area of 22,500 square feet. If necessary, the stage, 50 x 68 feet, also may be used for exhibition purposes. Two large meeting halls are located on the first and second floors,

Milwaukee is one of the largest foundry centers of the United States, and provisions will be made for plant visitation throughout convention week. Within the confines of the municipal limits of the city are located about 80 gray iron, steel, malleable iron and brass foundries, and including North and South Milwaukee and West Allis the total is in excess of 90. Racine, Wis., only a short distance from Milwaukee, is the center of approximately 20 foundries.

The committee of the American Foundrymen's association empowered to decide upon the time and place of the 1918 convention and exhibition, which met in Milwaukee several days last week consisted of the following: Benj. D. Fuller, president, Westinghouse Electric & Mfg. Co., Cleveland; C. E. Hoyt, exhibition manager, Chicago; H. R. Atwater, Cleveland Osborn Mfg. Co., Cleveland; S. T. Johnston, S. Obermayer Co., Chicago; V. E. Minich, Sand Mixing Machine Co., New York, and A. O. Backert, secretary-treasurer, Cleveland.

Scour Britain For Scrap

Shortage of Pig Iron Causes Demand For Old Castings—Works Combination Effected—Ferromanganese Advanced

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 26, 1918.

THE pig iron situation has not materially altered. At the meeting in Birmingham yesterday there was great pressure for supplies, nearly all the makers were declining new business while doling out in small parcels such iron as they had to offer. Almost every hour brings warning from some customer that a foundry or a mill is on the eve of stoppage. Usually, after this distress, the metal gets there in time to prevent a stoppage. Now that it is impossible to get adequate pig iron the country is being scoured for old castings, special agents being started on the road with this object, so that the pig iron deficiency may be made up by broken cast iron. There is practically no forward pig iron buying, the makers putting on their books orders for short periods, which they consider they can safely supply. The scarcity of metal in the Midlands has diverted a good deal of business to the Cleveland district, where some little surplus iron is to be had, mainly because the export trade is practically suspended through lack of tonnage, and the necessity, on account of the shipping difficulties, to restrict exports to the minimum. Demand for hematites is as keen as ever.

One of the best known sources of pig iron supply, the Frodingham Steel & Iron Co., Lincolnshire, figures prominently today in an amalgamation now announced. Messrs. Steel, Peech & Tozer, of Sheffield and Rotherham, in conjunction with Messrs. Samuel Fox & Co., of Stocksbridge, Sheffield, recently acquired the works of the Frodingham company and shortly afterwards amalgamated with the Workington Steel & Iron Co. It is now reported that they have purchased from the Steel Co. of Scotland their interest in the Appleby Iron Co., another Lincolnshire undertaking. The effect of these purchases will be to constitute another big iron and steel combination, which will be almost self-contained, since it includes companies who possess coal mines, iron ore fields and complete iron and steel making plant. The capital of the Appleby Iron Co. is £400,000 and the Steel Co. of Scotland provided one-half. The Appleby Iron Co. produces pig iron only. When the Steel Co. of Scotland acquired an interest in it some years ago, the intention was to add the manufacture of steel, but this has not yet been done. It is thoroughly recognized in the iron and steel trade that a new policy of enterprise is greatly needed for the increase of pig iron production. Even the man in the street now recognizes, after the fierce light thrown upon the subject by the war, the enormous importance of iron and steel production as a factor for promoting national safety.

Ferromanganese is Advanced

Ferromanganese has been advanced from £25 ($120) to £26 10s ($127.20) per ton and there is an enormous demand for this material. With regard to hematite, efforts to increase all supplies have met with a measure of success, so that there is on the whole a fairly hopeful outlook with regard to increased iron supplies in the future. Stacks are in course of erection in different parts of the country; but, with the scarcity of labor and the enormous difficulty in obtaining essential items of plant, progress is much slower than all parties desire. Undoubtedly, the comparative scarcity of coal places an obstacle in the way of production. All smelting is carried on under difficulties, through railway congestion and truck scarcity.

The iron masters of South Staffordshire have disposed of one formidable difficulty, in the settlement of the wages question. The ministry of munitions has placed no obstacle in the way of the program initiated by the Midland wages board, and the new scheme was set forth yesterday in connection with the bimonthly return issued by the board showing selling prices for November and December. This is issued a week later than usual, but its publication was delayed with the object of including the statement as to the 12½ per cent advance authorized by the ministry of munitions.

Workmen Receive Advance

As recently explained, the Midland wages board decided to pay to the day workers the 12½ per cent, when the men receive their wages tomorrow, and no doubt the settlement of this question will be plain sailing. The men will have a very substantial sum to play with, as the advance dates back to last October. The addition of the 12½ per cent to the tonnage men was a somewhat less simple matter, but after much negotiation the simple policy was adopted of adding this to the sliding scale payment. As there is an advance in selling prices sufficient to authorize 2½ per cent from Monday last, the puddlers and mill men will now get a solid advance of 15 per cent. This brings puddlers' wages up to 19s 6d ($4.68) by far the highest wage ever earned in the iron works.

Engineers to Give Study to Problems of War

The program for the spring meeting of the American Society of Mechanical Engineers, to be held at Worcester, Mass., June 4 to 7, has now been tentatively arranged by the committee on meetings and the Worcester local section's committee. As in the past two meetings, the program will be devoted almost exclusively to military matters or to subjects having a direct bearing on the war such as the textile industry, the shipbuilding industry, the manufacture of small arms and gun carriages. One of the most interesting features of the convention will be an all-day automobile excursion to the New England cantonment at Camp Devens and to the historical places at Concord and Lexington, which hold peculiar interest right now.

Members will register on Tuesday afternoon, June 4, at the Hotel Bancroft. The business sessions will be formally opened on Wednesday, June 5, with an address by Charles Washburn on the industries of Worcester. General sessions with technical papers will be held, these including one devoted to industrial safety and workmen's compensation. A general war session will be held in the evening on the general theme, "How Engineering Societies Can Assist in the Procurement Program of the Government." Some of the major topics to be discussed at the session are ordnance and ships for the navy department, munitions for the army, aircraft material, merchant ships, training of labor, etc.

On Thursday, June 6, general sessions with technical papers, including a fuel and public relations session, will be held. In the afternoon, members will adjourn to the plant of the Norton Co. for a general plant inspection. A dinner followed by an illustrated lecture will feature the evening's entertainment. Friday, June 7, the last day of the meeting, will be given over to the automobile excursion.

Exports Decline As Ban Tightens

Foreign Iron and Steel Shipments in January Slump All Along the Line—Net Loss 113,224 Tons Over January, 1917—Pig Iron Leads in Shrinkage —Downward Movement Expected to Continue

EXPORT figures in iron and steel compiled by the bureau of foreign and domestic commerce for January indicate in a striking manner a tightening of the nation's economic blockade of Germany. The precipitate decline of shipments of all kinds to neutral countries adjacent to Germany which took place in the initial month in a considerable measure was made up of iron and steel and their products. A small part of this decrease is attributed to the shortage of cargo space, as the allied tonnage is being devoted mainly to supplying the needs of France, England, Italy and of the American army overseas. Late figures evidence a decrease in total exports to England in January, 1917, but likewise indicate a great increase in shipments to France and Italy.

IRON AND STEEL EXPORTS, GROSS TONS

	January,		Seven months ending January,	
	1918	1917	1918	1917
Scrap	412	23,012	26,145	136,881
Pig iron	20,581	69,146	298,752	526,982
Steel billets, ingots and blooms	195,385	183,656	1,180,304	1,089,961
Wire rods	14,800	7,467	126,217	84,171
Steel rails	35,824	76,493	252,073	376,190
Steel bars	73,772	57,358	357,952	465,050
Iron bars	5,399	5,171	31,012	39,135
Struc. iron and steel	25,368	28,590	155,075	200,815
Hoops, bands and scroll	4,283	4,753	36,319	25,973
Sh'ts & plates	50,199	62,512	461,713	338,742
Tin and terne plate	19,958	23,408	124,835	127,957
Barbed wire	8,492	17,304	111,336	230,984
All oth. wire	13,591	17,735	110,985	155,819
Cut nails	162	288	2,950	3,153
Wire nails	8,071	7,224	76,248	85,193
All oth. nails incl. tacks	990	1,637	9,101	9,942
Pipes & fit'gs.	14,463	17,013	117,730	159,385
R. R. spikes, bolts, nuts, rivets and washers	2,549	5,205	30,320	28,165
Horseshoes	512	103	7,538	2,917
Cast radiators	246	206	2,080	1,624
Total	495,057	608,281	3,518,685	4,089,039

Iron and steel and their products led in the marked decline of shipments which is apparent in all commodities. Scarcely a single item appears in the list of iron and steel products that did not register a sharp decrease in January. Exports have been dwindling ever since restrictions have been placed on the shipment of certain products and this is expected to continue indefinitely. The month of January probably is only an indication of what may be expected in exports for February under the new licensing system restricting all exports. Total iron and steel exports in January were 495,057 tons compared with 608,281 tons in January, 1917, a loss of 113,224 tons.

Pig Iron Leads Decline

Pig iron lead the decline with the largest increment of decrease of any of the products on the iron and steel list. Foreign shipments of pig iron in January, 1918, were only 20,581 tons, as compared with 66,573 tons in December, 1917. These figures show a difference of 45,992 tons. This sets a record of shrinkage for all the products. The total tonnage of pig iron exports for the seven months' period ending January, 1918, was 298,752 tons against 526,982 tons in 1917. This low aggregate for the seven months' period is believed to have been occasioned more by the country's own war requirements, however, than by any governmental curtailment of shipments. Steel billets and blooms followed the general trend of all iron and steel exports, although to a less marked degree than in most of the other items. The aggregate tonnage exported in January, 1918, was 195,385, while that shipped abroad in the preceding month was 204,555 tons. Structural shapes also fell off in January, notwithstanding the great amount of construction work that is being done by the government in France. Further government work for France either definitely announced or planned, may materially raise the tonnage of this product exported in succeeding months. Foreign shipments of structural shapes amounted to only 25,368 tons in the first month of 1918 as contrasted with 34,567 tons in December, 1917. These figures show a decline of 9199 tons in one month. Steel rails were no exception to the prevailing tendency. Exports of rails were only 35,824 tons in January, 1918, as compared with shipments of 50,935 tons in the preceding month of 1917.

The unfavorable turn of events in Russia evidently has had considerable effect on the exportation of rails and other track material. Vast quantities of these products were sold for delivery in Russia, but with the coming of the new regime in that country, together with its reign of anarchy, these products were held in America, or reworked so as to be used for the allies. Exports of scrap were only 412 tons in January, 1918, as compared with shipments of 857 tons in the preceding month of 1917. Tin and terne plate dropped from 24,025 tons to 19,958 tons in the month of January; sheets and plates, from 84,882 to 50,199; steel bars, from 78,569 to 73,772, and wire nails, from 16,829 to 8071 tons during the same period.

EXPORTS, GROSS TONS.

	Pig iron	Semi-finished material
1916		
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555
1918		
Jan.	20,581	195,385

Produces Much Ore

Seven grades of iron ore are being produced from the Hull-Rust open pit mine at Hibbing, Minn., and continuous shipments have been made from it since 1897. Up to Jan. 1, 1918 this mine produced 41,232,421 tons. During the first year of its operation 31,982 tons were shipped and the output steadily increased. The largest annual production was for 1916 when the shipments comprised 7,665,611 tons.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

HERMANN A. BRASSERT, who has been connected with the United States Steel corporation since its organization, has resigned his position as assistant general superintendent of the Illinois Steel Co., South Chicago, in order to devote himself to his personal interests. As vice president of the Miami Metals Co. and subsidiary companies, he will have charge of their operations in the production of ferromanganese. Mr. Brassert also will act as consulting engineer for Freyn & Co., engineers and contractors. He will associate himself with Francis H. Hardy and Chester D. Tripp in the firm of Brassert, Hardy & Tripp, to act in a consulting and advisory capacity on commercial and operating problems in the iron and steel and affiliated industries. Mr. Brassert will remain in Chicago, with offices in the Peoples Gas building.

Clayton Mark, W. L. Brown and C. T. Boynton, Chicago, were elected directors of the By-Products Coke Corp., Chicago, recently.

Charles D. Rawstorne was recently elected vice president of Freyn & Co., engineers and contractors, 643 Peoples Gas building, Chicago, and Frederick H. Willcox was made secretary.

Fred T. Llewellyn, who for 11 years has been an engineer in the New York office of the Carnegie Steel Co., temporarily is located in Pittsburgh, to look after the interests of the Federal Shipbuilding Co.

C. H. Newcomb, resident manager of Crocker Bros., Philadelphia, pig iron brokers, won high honors at the recent Pinehurst, N. C., shooting tournament and was awarded the Pinehurst gold medal for 1918.

L. A. Larsen, formerly assistant to the president of the Lima Locomotive Works, Inc., Lima, O., has also been appointed secretary and treasurer to succeed W. D. Cloos, who recently resigned.

P. K. Aldrich with the title of president and general manager, has formed the Superior Side Bearing Co., 922 Webster building, Chicago. He was formerly with Edwin S. Woods & Co., Chicago.

W. M. Faber, plant engineer of the American Steel & Wire Co., Cleveland, was made chairman of the fuel service committee of the Cleveland Engineering society, which was formed recently to conserve fuel.

William J. Laffrey has been made Michigan district sales manager for the West Penn Steel Co., Brackenridge, Pa., with an office in the Dime Bank building, Detroit, to succeed George R. Fink, who has entered the United States military service.

E. L. Marshall, who recently resigned from the railway sales department of the National Carbon Co., Cleveland, has been succeeded by A. E. Pratt, who for several years has been signal superviser of the Erie railroad at Marion, O.

J. D. Gallery was elected a member of the board of the Westinghouse Air Brake Co., Pittsburgh, to succeed Cyrus S. Gray, deceased. Benjamin G. Becker of Chicago was added to the directorate, making the board number 10 instead of nine as heretofore.

Henry M. Hower, who has been manager of the Knight division of the Willys-Overland Co., Toledo, will represent the government for the duration of the war, in the management of a plant at New London, Conn., for the manufacture of naval supplies.

William W. Cotter has been made works manager for the Turner & Seymour Mfg. Co., Torrington, Conn., manufacturers of hardware, to succeed H. H. Leonard, who recently resigned. Mr. Cotter was formerly assistant superintendent of the Ansonia, Conn., branch of the American Brass Co.

Morris Metcalf, vice president of the American International Steel Corp., subsidiary of the American International Corp., has temporarily assumed the duties of the president's office, pending the election of a president to succeed the late Edward McKim Hagar.

J. Fred Smith, formerly vice president and secretary, was made chairman of the board of directors of the Stover Mfg. & Engine Co., Freeport, Ill., a newly created position, at a recent meeting of the board. W. A. Hance was made president and re-elected treasurer.

Frank W. Hutchings, H. H. Bingham and George J. Webster, treasurer, secretary and general manager, respectively, of the Charcoal Iron Co, of America, Detroit, each were honored with the additional rank of vice president at a recent meeting of the board of directors in New York.

Benjamin F. Groat, hydraulic engineer, Pittsburgh, was awarded the Norman gold medal of the American Society of Civil Engineers, for the presentation of his contribution to engineering science, "Chemihydrometry and Its Application to the Precise Testing of Hydroelectric Generators".

A. C. Baker, sales manager and assistant secretary of the Cleveland Steel Co., Cleveland, has been made a commissioner of the American Junior Naval and Marine Scout organization, whose executive offices are in New York. He will have charge of the campaign for recruits in the Cleveland district.

George B. Kerr, Chicago manager of the Scovill Mfg. Co., Waterbury, Conn., recently celebrated the golden anniversary of his connection with the company, having entered its employ as an office boy in 1868. A banquet was tendered him by the Chicago staff and he was presented a silver loving cup.

Walter E. Brown, who for many years was office manager of the Youngstown Iron & Steel Co., Youngstown, O., and recently auditor of the Sharon Steel Hoop Co.'s office in that city, resigned recently, effective March 7, to take charge of the stock farms of Jonathan Warner, president of the Trumbull Steel Co., north of Youngstown.

Richard F. Grant, who became a member of the firm of M. A. Hanna & Co., Cleveland, early in 1917, having been the firm's counsel since 1909, has been appointed Lake division director of the next Red Cross war fund campaign from May 6 to 13, by James R. Garfield division manager. Mr. Grant was at one time a member of the Minnesota legislature and served in the house of representatives in 1908 and 1909. In November of the latter year he located in Cleveland as counsel for M. A. Hanna & Co.

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

E. ALLEN MOORE, vice president of the Stanley Works, New Britain, Conn., was elected president at the annual meeting, Clarence F. Bennett, second vice president, being promoted to the first vice presidency. No successor was named to Mr. Bennett. William H. Hart, chairman of the board of directors, who is 83 years old and who has held elective office in the corporation continuously for 63 years, tendered his resignation. He is succeeded by his son, George P. Hart, the company's former president. Other members of the board were re-elected as were officers, as follows: L. Hoyt Pease, treasurer; L. W. Young, assistant treasurer; H. B. Humason, secretary, and Walter H. Hart, assistant secretary.

W. B. Stratton, of Toledo, and Allen Smith, of Niagara Falls, have been made directors of the Curtiss Aeroplane & Motor Corp., Buffalo.

George T. Kimball, secretary of the American Hardware Corp., New Britain, Conn., has been elected a director of the corporation.

Edwin A. Carter, vice president of the Chapman Valve Mfg. Co., Indian Orchard, Mass., has been made chairman of the Springfield, Mass., fuel committee.

Herbert Howard Bassett, Worcester, Mass., who served as contracting engineer for the Berlin Construction Co., Berlin, Conn., has received a major's commission in the engineer reserve corps of the national army.

Randolph S. Jones, an executive officer of the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., was a guest of honor at a banquet at the Lorraine hotel in Bridgeport recently to celebrate his 30-year affiliation with the company.

Kurt R. Sternberg, formerly treasurer and general manager of the Dickinson Mfg. Co., Springfield, Mass., and president of the Employers' association of Hampden county, has assumed his new duties as consulting chemist for the Johns-Pratt Co., Hartford, Conn.

Henry Keohler, formerly with the Crucible Steel Co. of America, is now superintendent of the L. S. Brach Supply Co., Newark, N. J. Louis Rise, formerly with the Crocker-Wheeler Co., Ampere, N. J., and Herman Rose have been appointed production engineers of the Brach company.

W. H. Thompson, who for many years has been prominent in the heavy electric traction work of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has resigned to accept the position of works manager of the Fairmont Mining Machinery Co., Fairmont, W. Va., maker of coal mining equipment.

William Waring, formerly Philadelphia district representative of the Galion Dynamic Motor Truck Co., Galion, O., has joined the organization of the Lakewood Engineering Co., Cleveland, which recently purchased the Galion company, and will serve the trade in the Pennsylvania territory in connection with factory and warehouse trucking and tractor problems.

Clinton B. Amorous, who because of his knowledge of gasoline engines and his powers of organization, was granted a major's commission in the signal corps of the aviation section was for many years affiliated with the sales force of the Locomobile Co., of America, Bridgeport, Conn. He is one of the youngest majors in the United States army. He is stationed at Washington at present.

Joseph W. Powell, promoted from the presidency of the Fore River Shipbuilding Corp. to the position of vice president of the Bethlehem Shipbuilding Corp, Ltd., in charge of all shipbuilding activities, recently was tendered a dinner at the Fore River club house, Quincy Point, Mass., by officials of the Fore River and Squantum, Mass., plants. He was presented with a pigskin traveling and brief case with silver and cut glass fittings.

C. E. McArthur, who recently resigned as superintendent of the J. I. Case Threshing Machine Co., Racine, Wis., to accept the position of works manager of the Barnes Foundry & Machine Co., has resigned. He has been made foundry superintendent of the Greenlee Foundry Co., Chicago. Plans to make automobile castings have been temporarily abandoned by the Barnes company, owing to unsettled business conditions and this made the change necessary.

W. J. Haggerty, who for several years has been assistant engineer in the furnace and gas producer department of the Wellman-Seaver-Morgan Co., Cleveland, resigned recently to become cost accountant of the Lakewood Engineering Co., Cleveland, manufacturer of industrial equipment such as trucks, tractors, mine and quarry cars, buckets, etc.

Charles Rodelius has been appointed superintendent of the Deere & Mansur plant at East Moline, Ill., of the John Deere Plow Co., Moline, Ill., to succeed C. E. White, who recently resigned. Mr. Rodelius has been assistant superintendent for many years. H. B. McKahin has been made works manager of the Deere & Mansur plant, having been promoted from the position of general manager of the Marseilles works of the company.

H. W. Knowles has been transferred from the New York office of the Cutler-Hammer Mfg. Co. to Washington, where he will remain as a representative of the Cutler-Hammer company during the period of the war. Mr. Knowles entered the service of this company shortly after graduating from Cornell university in 1912. He spent nearly five years in the shops, engineering department and sales department of the company at the main office and works in Milwaukee. Mr. Knowles' headquarters are at the Bradford, Eighteenth and K streets, Washington.

M. W. Crawford, who for many years has represented the Greenfield Tap & Die Co., Greenfield, Mass., in the Detroit territory which was recently extended to include Indiana, and H. S. Huncke, formerly sales promotion manager of the company's Greenfield plant, have formed the firm of H. S. Huncke & Co., 74 congress street, Detroit. It will represent the Lincoln Twist Drill Co., Taunton, Mass., high speed twist drills, and the Bicknell-Thomas Mfg. Co., Greenfield, Mass., friction chucks and taps, in addition to the Greenfield Tap & Die Co.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Steel Stocks Are Valued Conservatively

EXCEPT in times of severe industrial depression, the rate of works' operation in the iron and steel industry rarely falls as low as in the first two months of 1918, when paralysis of the railroads and fuel shortage interposed difficulties that could not be overcome the situation in these respects looks somewhat brighter, but the average earnings of steel companies, as will be shown by their reports for current quarter, will present a decided reduction from a year ago. Just now steel shares are holding their own, for recent annual statements have shown results for 1917 after taxes which compare favorably in many cases with those of the banner year 1916. However, the prices of the steel stocks are far from compatible with the earning power displayed within the past two years of the companies they represent. The following tables indicate how steel stocks have moved in the face of unprecedentedly large earnings. The first table shows the earnings per share of several of the leading companies in the years 1917 and 1916 and the total earnings per share in the two years:

	Earned per share in 1917	Earned per share in 1916	Total earned in two years
U. S. Steel	$39.20	$48.46	$87.66
Midvale	17.12	16.11	33.23
Lackawanna	45.89	34.81	80.70
Republic	52.78	37.58	90.36
Bethlehem	44.20	71.57	115.77
Crucible	18.87	44.39	63.26

The next table shows the total earnings for the two years 1917 and 1916, with the amount of dividends per share paid and the surplus earnings after dividend payments:

	Earned in two years	Divs. paid	Surplus after divs.
U. S. Steel	$87.66	$26.75	$60.91
Midvale	33.23	6.00	27.33
Lackawanna	80.70	.....	.....
Republic	90.36	7.50	82.86
Bethlehem	115.77	18.00	97.77
Crucible	63.26	none	63.26

The next table shows the market prices of the stocks of the various companies on March 1, 1918, and on March 1, 1916, together with the net change over the intervening two years:

	Mkt. pr. Mar. 1, 1918	Mkt. pr. Mar. 1, 1916	Chg. in two years
U. S. Steel	96	116	—20
Midvale	45	63	—18
Lackawanna	77	75	+ 2
Republic	77	51	+16
Bethlehem	80	*117	—37
Crucible	64	73	— 9

*Actual quotation March 1, 1916, was 468, the common stock then being $14,862,000, since being increased to $59,448,000.

Think War Effects Discounted

Certainly the stock market has discounted all probable exigencies arising out of war-time conditions. These figures supply food for thought. United States Steel, which two years ago was quoted 115, has earned a surplus of $60.91, after all charges, taxes and dividends, yet its price has declined $20 per share. Republic Iron & Steel two years ago was quoted only 51. It has added $88.26 surplus earnings after all charges, including 11 per cent in back dividends on preferred, yet its market price has advanced only $15 a share. No effort is made in the foregoing tables to compare the values of the respective shares, for in such a comparison the earning power and the value of the shares in previous years would have to be taken into account. But the figures do show the conservative valuation which the stock market puts on the steel industry in war times.

Lackawanna Steel Has Its Best Year in 1917

Net profits for the year ended Dec. 31, 1917, reported by the Lackawanna Steel Co. were by far the largest in history and totaled $16,106,976, as compared with $12,218,234 in 1916, an increase of $3,888,742. In terms of stock, the company's earnings on the $35,096,500 outstanding common stock were at the rate of 45.89 per cent a share, as against 34.81 per cent in 1916. The company's report of unfiled tonnage as of last December shows a decrease from one year ago. The latest figure is 731,526 gross tons as compared to 811,126 in 1916.

Total deductions of interest on bonds, including premiums on gold notes and royalties and rentals shows a drop from last year of $364,768 while appropriations for extinguishment and depreciation amounting to $2,201,662 show an increase of $178,085. The profits for the year of $16,106,976 reveal a gain over the previous year of $3,888,741. The comparative income account of the company follows:

	1917	1916
Total net earnings after ordinary expenses, repairs and maintenance but not renew.	$19,793,916	$16,090,858
Bonded interest, rents and royalties	1,485,278	1,850,047
Balance	18,308,638	14,240,811
Extinguishm't of mines and mining investment and deprec.	2,201,662	2,022,576
Profit	16,106,976	12,218,234
Unfilled orders	731,526	811,126

Penn Seaboard Assets Grow Rapidly

The Penn-Seaboard Steel Corp., organized in December, 1915, did a gross business of $10,544,000 in 1917, on which it earned a net profit of $1,045,000 after all deductions, including taxes. Two note issues of $500,000 each were paid off during the year, and dividends of $240,000 paid, but surplus to profit and loss increased $479,000 and current and fixed assets increased $2,220,000. President Rodney Thayer states that arrangements have been completed for installation at the Newcastle plant of the necessary machinery for manufacture of plates for ships, locomotives and cars, involving an expenditure of about $2,000,000.

New York Air Brake's Net Declines During 1917

While the New York Air Brake Co. shows net earnings of $1,893,825 for 1917, or one-fifth of what they were in 1916, prospects for the present year are unusually bright, according to President C. A. Starbuck, who says to fill government munition or-

ders in excess of $30,000,000, four large steel and concrete buildings had been constructed. Orders for air brakes on hand aggregate $6,000,000, while munition orders in several cases run into 1920. From January to November, 1917, no munition orders were received and in 1916 munitions brought most of the gain. A comparative income account follows:

	1917	1916
Sales	$10,157,038	$24,051,103
Mfg. cost	7,792,145	14,083,281
Mfg. prof.	$2,364,892	$9,967,822
Other inc.	112,292	93,894
Total inc.	$2,477,184	$10,061,715
Adm. ex., etc.	403,359	466,753
Interest	180,000	180,000
Depreciation	.....	1,200,000
Net profit	$1,893,825	$8,214,962
Dividends	*1,986,980	1,149,126
Deficit	$93,155	‡$7,065,836
Previous surp.	8,082,591	1,016,754
Total surplus	$7.989,436	$8,082,590
Taxes for 1916	1,090,351	.....
1916 adjust.	418,256	.....
Surplus	$6,480,829	$8,082,590

*Dividends declared out of 1916 surplus.
‡Surplus.

The earnings in 1917 were equal to $18.94 per share, compared with $82.15 in 1916. The net earnings reported do not include, it appears, excess profits taxes, on which account a reserve of $100,000 is set aside in the balance sheet. Deducting this sum from the reported earnings would make the net for stock $17.94 a share.

Empire Steel and Iron Has Most Prosperous Year

For the year ended Dec. 31, 1917, the Empire Steel & Iron Co., Catasauqua, Pa., earned 50.2 per cent on the $1,254,774 common stock outstanding in 1917, as against 28 per cent in 1916. Last year was the most prosperous in the company's history since net income, including $62,237 earned by the Crane Iron Works, was raised to $630,674, as compared with $360,386 the year before.

The company's current assets jumped from $1,059,921 in 1916 to $1,598,626.96 in 1917. The cash position rose from $190,007.91 in the previous statement to $351,508.72 in the latest one. The comparative income account and balance sheet of the company follows:

	1917	1916
Gross income	$1,800,250.91	$666,627.25
Deprec. and depl.	$147,631.33	94,490.74
Int. coll. notes	8,625.00	11,750.00
Int. Crane Iron, bonds	25,820.00	.....
Res. for bad debts	25,000.00	.....
Total net income	$1,593,174.58	$560,386.51
Fed. tax res. cont.	500,000.00	.....
Less res. for cont.	75,000.00	.....
Net profit	$1,018,174.58	$560,386.51
Prfd. dividend	387,500.00	200,000.00
Surplus	*630,684.58	360,386.51

In his statement to the stockholders, President Leonard Peckitt says:

"We can draw no parallel with the year 1917 because, from a purely business standpoint it marked (1) the culmination of the inevitable pyramiding of prices resulting from a constantly increasing demand for raw and manufactured products of all kinds by the European nations at war; and (2) the entry into the war by the United States, immediately converting it into the world's largest purchaser whose demands were to be given preference above all others." Mr. Peckitt says that the average monthly earnings of employes during one of the latter months of 1917 shows an increase in comparison with the corresponding months five years before of 117½ per cent, and with the same month two years ago of 96½ per cent.

The pig iron production of 254,586 tons was the largest for any single year in the history of the company. The ore mined during the year was 276,334 tons.

During the year the company retired $75,000 of collateral notes, $20,000 tons of Crane Iron Works bonds and $245,000 of notes payable.

Financial Crop Ends

The annual meeting of the stockholders of the Republic Iron & Steel Co. will be held in Jersey City, 11 o'clock, Wednesday, April 17.

* * *

The Seaboard Steel & Manganese Corp. will hold its annual meeting of stockholders, March 16, at 74 Broadway, New York City.

* * *

On April 9, stockholders of the Sharon Steel Co., Sharon, Pa., will meet to vote on increasing the capital stock from $10,000,000 to $15,000,000.

* * *

The Milwaukee Steel Post Co., 415 Iron block, Milwaukee, Wis., has changed its name to the Newark Steel Post Co.

* * *

The American Metal Concern, Inc., 1147 South Washtenaw avenue, Chicago, has changed its name to the American Metal Co. and has increased its capital from $5000 to $15,000.

* * *

The Perkins Machine Co., 216 North Jefferson St., Chicago, has changed its name to the Wittenmeier Machinery Co. and has increased its capital from $4000 to $10,000.

* * *

Reports are current that a merger between the Dominion Steel Corp., Sydney, N. S., and the Nova Scotia Steel & Coal Co., New Glasgow, N. S., is being given consideration.

* * *

That the Detroit Architectural Iron Works has merged with the Page Steel & Wire Co., Adrian, Mich., is a statement made by A. L. Stewart of the Detroit plant.

Sulphate Orders

Again to be Distributed by Government—Toluol Brings Premiums

New York, March 2.—Producers of coal tar products learned this week that the government is about to make a second allotment of orders for sulphate of ammonia. Nothing yet has developed as to the size of the quantities to be required. With the exception of this feature, the market in sulphate of ammonia is quiet and sales comprise only an occasional spot carload. This business is being done at $5.25 to $5.35 per 100 pounds at seaboard. Output of sulphate of ammonia now is at the rate of about 80 per cent of capacity, and this figure is representative of the present output of all coal tar products at this time.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant
Pure benzol ..... $0.35 to .40
Toluol ..... (nominal)
Solvent naphtha ..... .18 to .22

Per Pound at Producers Plant
Phenol ..... $0.52 to .55

Per 100 Pounds at Seaboard
Sulhate of ammonia (nominal) ..... $5.25 to 5.35

Contract

Per Gallon at Producers Plant
Pure benzol ..... $0.35 to .40
Toluol ..... nominal
Solvent naphtha ..... .18 to .22

Per Pound at Producers Plant
Phenol nominal.

Per 100 Pounds at Seaboard
Sulphate of ammonia ..... nominal

In benzol, interest continues to be centered in the question as to whether or not the government will decide to requisition this product for the manufacture of picric acid. It now is felt that several months will elapse before a decision will be made. Business this week has been of fairly large proportions. Owing to the large production, however, the tone continues weak. Pure benzol is quoted at 35 to 40 cents per gallon, but it is certain that unusually large orders could be placed at less.

Toluol is unchanged. The government energetically is commandeering supplies as fast as they accumulate so that consumers who are not making trinitrotoluol have great difficulty in obtaining deliveries on old contracts. Second hands occasionally have small lots to offer, and it is understood that on these as high as $5 and $6 per gallon is being asked. As far as producers are concerned the market is entirely nominal.

Housing Plan Taking Form

Prospect of $100,000,000 Appropriation Soon Becoming Available Speeds Up Preparations—How Fund Will be Handled

WITH the signing in immediate prospect of the bill approved by senate and congress which will appropriate $50,000,000 to meet the housing problem in shipyard districts and a like amount in other war industries, interest in the proposition of supplying workmen with suitable living quarters has broadened greatly. Much activity along this line engages the thought and attention of industrial heads.

J. Rogers Flannery, director of housing for the Emergency Fleet corporation states that the $50,000,000 appropriated by congress for use in shipbuilding territories will be expended exclusively in the congested area along the northern Atlantic seaboard and explains the method of obtaining such funds as follows:

"The shipbuilding company will apply to the Fleet corporation for the loan of a specific sum of money with which to construct housing accommodations for its present employes or those it expects to employ in the immediate future.

Should the Fleet corporation, after investigation, determine such housing necessary, it will loan to the shipbuilding company the money required to defray the actual cost of constructing the necessary housing facilities. The Fleet corporation loan will be amortized over a period of 10 years, bearing interest at the rate of 5 per cent payable semiannually, and be secured by a first mortgage upon the real estate upon which the development is had. The men will be protected from high rentals.

"The loan being assured, the shipbuilding company will organize a subsidiary company which will acquire at its own cost and expense and hold in its own name, real estate upon which the houses would be erected.

"This subsidiary company will have charge of the maintenance, the renting and sale of these houses; it will be restricted in its right to pay dividends, salaries and various other expenses, until such time as the loan to the Fleet corporation had been entirely paid, and even then these restrictions will be continued beyond that time, for the benefit of the owners of the houses and of those persons living in that vicinity, and above all for the protection of the men."

In Youngstown, where 5000 houses are needed now and where 3500 men will be added during 1918 in new iron and steel employment, a $1,200,000 corporation has been formed to build 750 structures a year. Assets of two construction companies which merged to form this new concern will absorb the common stock and a like amount of preferred stock will be purchased by manufacturers and business interests. The Merchants' Shipbuilding Corp., Bristol, Pa., which is constructing part of the war fleet of merchant ships, is building a city to house 3000 of its workmen and their families. It is estimated the population of this new city will be 10,000. E. A. Morse, president of the Groton Iron Works, Groton, Conn., states that the company will furnish 10 per cent of the $1,500,000 to be expended in the near future to house its employes and the balance will come from the government. The latter will take first mortgage on the property.

For every $200,000 Wilmington, Del., citizens subscribe, the government will put forward $800,000 and the city $600,000 to raise $3,000,000 to meet the housing of labor problem there in the shipbuilding industry, if plans of the recently incorporated Wilmington Housing Co. are worked out.

Advance Funds to Men

Because in many steel plants, particularly in the east, fuel shortage, railroad congestion, embargoes, etc., have brought about curtailed operations, and wages, several companies have arranged to advance money to the men, who have maintained good records. It is the thought of the heads of organizations confronted by this necessity, that to make an investment of this sort under present labor market conditions, is better than to run the risk of losing the workmen when normal operations will obtain.

Puddling Rate Goes to New High Point

At the recent bi-monthly wage settlement in Youngstown between the Western Bar Iron association and the Amalgamated association of Iron, Steel and Tin Workers, an average sales price of $3.10 per 100 pounds for bar iron was disclosed for the January-February period. This compares with $2.95 which applied during November and December. This increase of 15 cents increased the boiling rate from $14.30 to $15.05 a ton, the largest single advance since the last bi-monthly period of 1916 when the average price went from $2 to $2.15. Secretary J. H. Nutt, of the Bar Iron association announced that this settlement brought finishers an advance of 7½ per cent. In the January-February period, 1916, the average sales price of bar iron was $1.40, meaning a boiling rate of $6.90 a ton and the present rate exceeds any level attained in recent years. The bimonthly bar iron average price per pound and the resulting puddling rate per ton are as follows:

	1917		1918	
Jan.-Feb.	2.35c	$11.30	3.10c	$15.05
Mar.-Apr.	2.45c	11.80	.....	.....
May-June	2.65c	12.80	.....	.....
July-Aug.	2.75c	13.30	.....	.....
Sept.-Oct.	2.85c	13.80	.....	.....
Nov.-Dec.	2.95c	14.30	.....	.....

Creates Trust Fund

A trust fund of $100,000, devoted to the support and relief of employes of the Matthiessen & Hegeler Zinc Co., the Western Clock Co., the La Salle Machine & Tool Co., and the La Salle & Bureau County Railroad Co., La Salle, Ill., has been established by a provision of the will of the late F. W. Matthiessen, who was head of these companies. The fund will be known as "the F. W. Matthiessen Fund for Employes".

Labor Notes

Twelve strikes were called in Canada in December which involved 25 firms employing 3209 people. This caused a loss of 33,192 working days.

Approximately 4000 metal workers in shipyards at New Orleans have called off their strike and have returned to work.

To limit the workday for all classes of labor to eight hours, three bills have been introduced in the Kentucky legislature at Louisville.

To stimulate interest in their work, the Ingersoll-Rand Co., Easton, Pa., has offered to its employes a bonus of 10 per cent to all who lose no time for an entire month.

As a further complication in the loading of ocean bottoms, freight handlers on the docks of the Eastern District Terminal Co., Brooklyn, N. Y., recently struck because their demand for an increase of $4 a week over their present wage of from $22 to $26 a week, was refused.

Posters are being distributed by the United States civil service commission, advertising for 14,850 men and women to fill positions in the ordnance department of the army to serve in the United States. The list includes clerical, testing, inspection, mechanical trades and drafting positions, at salaries ranging from $800 to $2400 a year. Communications should be addressed to John A. McIlhenny, president of the commission, at Washington, D. C.

Tool Demand Less as Output Falls

Inquiries Grow Fewer in Number—February Records Show Effect of Fuelless Monday—Second Ordnance Base Depot Will Be Built in France—Crane Requirements of Navy Yards Are Important

ASSIMILATION, by machine tool builders, of their many orders for equipment was interrupted during February by shortages of fuel and difficulties in making deliveries, not to mention the deterrent effect of the government's slowness in making payment for equipment purchased. New England builders, in particular, were seriously affected by the lack of sufficient coal for manufacturing purposes. Many machine tool builders throughout the country who had difficulty in ascertaining whether they were permitted to operated on workless Mondays were placed on the list of exempted manufacturers when assurance was given that production would be concentrated on essential government work. In cases where only part of the plant was engaged on government work, that part was permitted to operate, while the remainder was closed. This contributed to a much-improved situation among manufacturers and finally, with the removal of the Monday closing order, builders resumed maximum operations; their limitations varying principally with their ability to secure fuel and to make shipments.

Shipping Permits are Source of Confusion

The time required for shipments was long in comparison with the normal, and dealers were annoyed, mainly, by the procedure to be followed in obtaining priority numbers, by shipping permits, and by government commandeering of tools. Due to railroad embargoes, dealers have been obliged to obtain shipping permits for tools in addition to the usual priority certificates. Several cases are known where manufacturers had machines ready for delivery under a certain priority number, but delivery was deferred owing to the inability of the buyer to obtain a shipping permit. In some instances other buyers in the meantime presented an advanced priority certificate to the builder and a shipping permit. Delivery was then made to the latter, and the original buyer was forced to wait several months for the machine to which he had previously been entitled. The effects of embargoes, at least so far as machine tools are concerned, are now rapidly being neutralized in the scheme which several shippers are using. This consists in wiring for the name of the government's inspector at the plant of the consignee and shipping the machines in his name. Government commandeering has been troubling dealers. In some cases shipments from builders' plants failed to arrive for more than 60 days.

Respite from Large Inquiries Prevails

A temporary respite from large inquiries has been observed in market centers. Authorization for new army construction work which will aggregate several million dollars recently was given to Gen. I. W. Littell, in charge of construction. The expenditure of this sum, it is thought, will be reflected in the machine tool market. The authorizations include two new ordnance base depots, which are to be built on the Atlantic coast; one to cost $6,000,000; the other, $4,000,000. Other authorizations aggregating $100,000,000 were made, but these are for projects which it is not likely will have any material effect on the market. Negotiations are still being carried on by the government, preliminary to the letting of contracts for making shell forgings, which, it is estimated, will involve an outlay of about $200,000,000.

Tool Business is Well Distributed

Several companies took a prominent part in the market activities of the month. The Worthington Pump & Machinery Corp. inquired for several hundred machine tools said to have been needed for its Deane Pump Works at Holyoke, Mass., in order to carry out a government contract for submarine destroyer pumps. Lately, however, it is reported that the Worthington corporation will allot most of this contract to its Harrison, N. J., works. A long list of tools was issued by the Aeronautical Engine Co., which was formerly the General Vehicle Co., Long Island City, N. Y. This list covers about 100 machine tools. The navy department inquired for approximately 40 machines of various types for its Brooklyn, Boston and Charleston navy yards. Additional tools are required by the Studebaker Corp., South Bend, Ind., in order to expedite its work on recoil cylinders. Other inquiries include those from the Watertown arsenal; the Submarine Boat Corp., New York, for several 72-inch planers, and the Savage Arms Co., Utica, N. Y. The Wagner Axle Co. received a contract for artillery wheel hubs and closed for $100,000 worth of equipment shortly afterward. The W. F. McCord Co., Chicago, bought equipment totaling several hundred thousand dollars, following the receipt of a government order for artillery wheels. Lathes, boring mills and drills, aggregating about $100,000, were purchased for the Watervliet arsenal. Some used equipment was purchased by the Federal Shipbuilding Co., from a Long Island plant and transferred to Federal company's shipyard at Newark Bay. The value of this equipment is placed at $100,000.

Navy Yards' Crade Needs are Large

By far the greatest interest in the crane market has centered around the government's crane requirements for the Washington and Philadelphia navy yards. One lot for the Washington navy yard involves approximately $600,000. Equipment purchased by the government for its explosive plant at Charleston, W. Va., included 49 2-ton hand-power traveling cranes and 21 2-ton chain hoists. J. N. McKinney, Chicago, was awarded the contract for this equipment. Shipbuilding companies were the source of numerous inquiries for cranes. The Atlantic Corp., Portsmouth, N. H., was awarded a contract for 10 steel ships by the government and immediately made plans for enlarging its plant. Its locomotive crane requirements are to be filled by the Brown Hoisting Machinery Co., Cleveland. The inquiry made by the Groton Iron Works for four 5-ton electric traveling cranes to have a span of 80 feet, which are to be used in its shipyard at Alexandria, Va., has been partially filled.

Trade's Efforts Center in War Work

Contract for Machine Guns Produces Large Tool Sale—Chicago Interests Plan Great Shellmaking Plants—Emergency Fleet Corporation Awards $5,000,000 Equipment Order—To Build New $25,000,000 Ordnance Base in France

CONCENTRATION of the nation's production facilities on war material is reflected in the machinery market. Manufacturers throughout the country are responding to the call for munitions and ships and zealously turning their efforts to the making of these essentials. The government has ordered a New York arms company to proceed with an order for Lewis machine guns. As a consequence, this company has purchased about 200 additional machine tools for its plant. Contracts for Browning machine guns are being held up temporarily for the reason that manufacturers already have their manufacturing capacities well taken with war work of other kinds. Chicago interests are promoting two great projects for making 155-millimeter shells; one of these is backed by the Chicago Association of Commerce. Several of the country's best known automobile companies are engaged in the manufacture of airplane motors and a high production rate has been attained. Interest attaches to the recent awarding of a contract by the Emergency Fleet corporation to a Texas shipbuilding company for equipping 22 wooden ships which are now being built at various gulf shipyards. Announcement has been made by the war department confirming the rumor that a second ordnance base depot will be built in France which will require machine tool equipment aggregating $5,000,000. This depot will cost $25,000,000 and includes 20 large storehouses, 12 shop buildings and 100 smaller shops.

Tools intended for export, in some cases, have been commandeered by the government and held in reserve; further, the government maintains control of several plants and is supplying these tools to government contractors when they are unable to secure them elsewhere. Import and export licenses are required for shipments to France and while machinery may be sent to Italy, few tools go to that country because of the difficulties encountered in securing cargo space. Exports of tools to South America and the Far East are under no government restrictions.

Tool Shipments Manifest Marked Improvement

LEADING sellers of machine tools some months ago viewed with anxiety the situation then developing, due to the machinery requirements arising from our extensive war preparations. Machine tool builders were already sold up many months ahead, with the peak of the business coming. Deliveries were becoming more and more delayed, until it appeared as though vital preparations could not be undertaken for a year or more, due to the lack of essential equipment. Today there is a perceptible lull in the market, following many months of the greatest agitation ever experienced. One of the largest sellers states that his shipments last month were less than his orders for the first time in over two year. This was due partly to the fact that bookings are so large that sellers can afford to discriminate in favor of the choicest offerings, but partly because there was less actual business offered. Railroad restrictions are not entering into the shipments of machine tools particularly, as nearly all machines now completed are needed for government work, with a permit forthcoming. In many cases, to save time, shippers are wiring for the name of the government inspector at the consignee's plant and shipping the machines in his name. This procedure is authorized under the rules, but it renders the embargoes almost a dead letter so far as machine tools are concerned.

Sale of Used Equipment Eases Tool Market

The principal reason for the slowing-up is the extensive utilization of used equipment. The high premium paid for second hand machines has served to mobilize such tools effectually. Also, the government has taken control of numerous plants over the country and has held their equipment in reserve, to be supplied to war contractors at their cost price. Still other plants are being taken over now and their machines appraised. The government also has commandeered many tools being held in warehouses at seaboard for export not only to Russia, but to other countries. For instance, 40 grinders consigned to a leading English dealer have been requisitioned by the government and are being held.

Market Shows Keen Interest in Pump Contract

Sellers in the east are watching with interest the activities of the Worthington Pump & Machinery Corp., which has decided to manufacture its order of Ford submarine destroyer pumps at Harrison, N. J., instead of at its Holyoke, Mass., plant, as originally planned. Most of the machines for this work have been purchased. The Foundation Co., 233 Broadway, New York, which has a contract to build 36 mine sweepers and is constructing a yard at Savannah, Ga., states it has obtained equipment necessary, but is in the market for pumps. The Submarine Boat Corp. remains in the market for a 46-inch and several 72-inch planers. The Morse Dry Dock & Repair Co. has been buying equipment for its extension in Brooklyn and still is in the market. The Savage Arms Co., Utica, N. Y., is reported to have bought more than 200 machines to cover additional orders for Lewis guns. However, more interest now is being shown in the requirements of the companies which will manufacture Browning guns, since this gun passed a successful test and now is regarded with much enthusiasm in official circles at Washington. The problem now is to increase production of Browning guns at the various plants. Tools may be supplied from the reserve stocks

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Cleveland Office—Hickox Bldg., The Hamill-Hickox Co., District Representatives.
Chicago Office — 1370 People's Gas Bldg., 122 So. Michigan Blvd., C. H. Beach, District Sales Manager.
Syracuse Office—621 University Block, T. B. Davies, District Sales Manager.
Philadelphia Office—603 Widener Bldg., Frank Wallace, District Sales Manager.
J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.



"AGATHON" Nickel Steels

"AGATHON" Chrome Nickel

"AGATHON" Chrome Steels

"AGATHON" Chrome Vanadium

"AGATHON" Vanadium

"AGATHON" High Carbon

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of the government. The Colt's Patent Fire Arms & Mfg. Co. and the Remington Arms Co. are among those said to be making the Browning gun.

Production of Airplane Motors is Large

It is reported in the trade that the machinery of the Fiat Co., Poughkeepsie, N. Y., will not more than one-third fill the requirements of the Duesenberg Motor Co. for its Elizabeth, N. J., plant. It is also said, on good authority, that this plant will manufacture "Liberty motors" on a large scale. Manufacturers of airplane motors include the Chalmers Motor Co., Detroit; the Packard Motor Car Co., Detroit; the Stearns Motor Car Co., Cleveland; the Lincoln Motor Co., Detroit; the Westinghouse Air Brake Co. Pittsburgh; and others.

Shipments to Europe Almost Impossible

The Minneapolis Steel & Machinery Co., Minneapolis, which has gun mount and shell contracts, is said not only to have filled its requirements but may have some machines for sale. The Standard Steel Car Co., Hammond, Ind., is still buying against its ordnance contract. In the export field, sellers are finding it next to impossible to ship to Europe. Licenses are obtainable easily to Italy, but lack of shipping space makes such shipments difficult. Exports to France require both import and export licenses, which renders business difficult. Sales still are being made to South America and the Far East. Shipments of machine tools to the west coast are much easier than to the east.

Crane Demand Made Up of Small Inquiries

Crane demand at this time is made up of a few small miscellaneous inquiries, although the allotment of considerable business by the government is expected to be made public shortly. Included in this are cranes worth $600,000 for the Washington navy yard. Bids were closed on these cranes March 4, the date being extended from Feb. 25. Another large contract for government account is that involving 336 1-ton jib cranes for the use of the American expeditionary forces in France. Further requirements of the government, which now are pending, include one 20-ton, one 25-ton and two 10-ton electric cranes, under specification 2734, also for the Washington navy yard, and 30-ton electric crane, under specification 2809, for the Philadelphia navy yard. The Thompson-Starrett Co. has issued an inquiry for a 50-ton electric crane for the government explosive plant at Charleston, W. Va. This inquiry is regarded as an alternative to that recently issued by the Thompson-Starrett Co., calling for a 75-ton crane. The Hay Foundry & Iron Works, Newark, N. J., which is building an addition to its fabricating plant, is expected to be in the market shortly for several cranes. The Consolidated Rolling Mills & Foundries Co., New York, is expected to close this week on one 15-ton electric crane, with 60-foot span, and one 5-ton electric crane, with 30-foot span.

Two Shellmaking Plants are Proposed for Chicago

COMPARATIVELY quiet continues to mark the machine tool industry in Chicago; the lack of large inquiries, which has been the rule for several months, makes the present comfortable volume of business seem small. There is constant inquiry and booking of orders for various machines in single tools or small lots. This is especially true of 16-inch and 18-inch lathes, which are available from warehouses or for immediate delivery from makers. At least two extensive shellmaking plants are being tentatively planned for establishment in Chicago, and the market is being sounded as to the possibility of obtaining equipment. One company is planning to make 155-millimeter shells. The Arnold Co., of Chicago, engineer, is conducting negotiations for one large project and the other is under the auspices of the Chicago Association of Commerce. Price advances are being made from time to time on various lines, frequent announcement of 10 per cent additional being received. However, buyers do not complain of prices and the only point at issue usually is possible delivery. The Leader Iron Works, Decatur, Ill., is building an addition to its machine shop and making other improvements. The Coal Products Mfg. Co., Chicago, will build a benzol plant at Lockport, Ill. The Crane Co., Chicago, is adding another two-story building to its Corwith plant and making other improvements including a steel bridge and a reinforced concrete tunnel. The Ilg Electric Ventilating Co. will build a plant in Chicago to cost $750,000.

Shipments in Pittsburgh District Are Better

MAKERS and sellers of machinery and machine tools in the Pittsburgh district report that improvement has developed in the transportation situation and shipments can be made more easily. It is hoped that it will continue to become less difficult to make deliveries because this is one obstacle that is restraining buying on the part of domestic consumers, although high prices are another important factor. The government does not appear to be making any inquiries in this district for shell machinery. Preliminary to the placing of contracts an inquiry said to have come from the government is being made for 500 trailers for army trucks. A few small inquiries for machine tools in miscellaneous lines are out from buyers in surrounding towns. Key seaters and drill presses are included in the equipment wanted. Sales of rolling mill equipment are extremely limited. Mills requiring this equipment to produce government work make purchases direct but it is claimed that the policy of the government deprives manufacturers of any incentive in taking equipment. Some of the work placed by the government is taken on a percentage basis. This is held to be unsatisfactory. Other work placed on a direct contract basis apparently does not afford adequate profits. The Hudson Sheet & Tin Plate Co., Marietta, O., of which Howard R. Kirock is president, has bought some rolling mill equipment from the Mesta Machine Co., Pittsburgh. The Hudson company will begin soon to roll steel at its plant. The plant has six roll stands.

Cleveland Dealers Receive Many Inquiries

UNABLE to secure a sufficient number of new planers, for its plant the Studebaker Corp., Detroit, Mich., which is a division of the Detroit Shell Corp., has sent an inquiry broadcast among dealers in used tools for all planers available between and including the sizes of 30 x 30 inches x 10 feet and 36 x 36 inches x 10 feet. The Standard Parts Co., Cleveland, has issued an inquiry for the following equipment for installation at its Hess plant at Carthage, near Cincinnati: One multiple spindle drill press with tapping attachment; one straightening press; one centering machine; one 24-inch x 8-foot bed tool room lathe; one No. 2 universal cutter grinder; one No. 3 universal-type horizontal milling machine; one 24-inch heavy duty shaper, and one 20-inch light drill press. Equipment requirements of the E. F. Hauserman Co., Cleveland, include a shaper, a 24 x 24-inch x 10-foot planer and one large inclinable press. The Cleveland Tractor Co., Cleveland, requires a 3-foot radial drill. Following are the tools contained in an inquiry from the Lowe Bros., Columbus, O.: One 40-inch vertical boring mill and one 12-inch stroke slotter.

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Delaware River Steel Co.

"DELAWARE"

Say you saw it in THE IRON TRADE REVIEW

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The Myles Standish Mfg. Co. has been incorporated with $250,000 capital by E. M. Leavitt, Ernest L. McLean, Clyde R. Chapman and others to manufacture metal specialties.

PORTLAND, ME.—The Enterprise Oil & Gas Co. has been incorporated here with a capital of $25,000 to engage in a general oil and gas business. Perley C. Dresser, Henry N. Taylor and Dennis A. Maher are interested.

BOSTON.—The 4-story factory at 76 Freeport street, Dorchester district, occupied by the Stuart-Howland Co., manufacturer of electrical equipment, was damaged by fire Feb. 17 with a loss of $35,000.

BOSTON.—The William S. Simpson Co., contractors' and masons' supplies, has been incorporated with a capital of $75,000 by William S. Simpson, Newton, Mass., M. K. Morse, Quincy, Mass., and E. L. Bunker, South Manchester, Conn.

BOSTON.—The Mobec Metals Co. metals and drosses, has been incorporated with a capital of $50,000 by William B. Nash, Brookline, Mass., John A. Sturtevant, Boston, and Forrest L. Mitchell, Melrose, Mass.

BOSTON.—The New England Power Co. plans to issue bonds to the amount of $560,000 to provide for additions and extensions to its plant.

BOSTON.—The factory occupied by the Joseph Pollak Tool & Stamping Co., doing government work, at 76 Freeport street, was damaged by fire to the extent of $25,000 Feb. 17.

BOSTON.—The Westerly Textile Co., tire cloth manufacturer, is in the market for new machinery, to provide which the capital of the company was recently increased to $300,000.

CAMBRIDGE, MASS.—The Stewart Bros. Co. has been incorporated to manufacture machinery with $5000 capital by J. M. Mannix, George M. Doring, Allston, Mass., and J. Drummey.

EVERETT, MASS.—The J. Duncan Co. is in the market for machinery to equip a small structural iron shop, including machine lathes, power punches, cutters, bolt drivers, etc. The company maintains offices at 7 Fulton place.

EVERETT, MASS.—Maxim Bros., 53 Bartlett street, plan to build a 1-story, 40 x 60-foot factory and machine shop to be of reinforced brick construction, to cost about $5000.

FALL RIVER, MASS.—The Watuppa Mfg. Co. has been incorporated with $40,000 capital by James H. French, Stephen L. French and William A. Hart.

HUDSON, MASS.—The Universal Boring Machine Co. has completed plans for the erection of a 1-story, 40 x 100-foot factory addition. The work will be under the supervision of Densmore & LeClair, engineers, Boston.

QUINCY, MASS.—The U. S. Turbine Mfg. Co. has been incorporated with $50,000 capital by George A. Weaver, Henry Hood and William H. Pletsch.

SPRINGFIELD, MASS.—Bids close March 5 for reinforced concrete, fireproof, 1-story, 100 x 160 and 25 x 35-foot additions to the factory of the United Mfg. Co., Birnie avenue.

SPRINGFIELD, MASS.—Plans are being prepared for a brick, 1-story, 32 x 92-foot building for a laboratory at the United States arsenal.

WALTHAM, MASS.—The Stark Tool Co. has been incorporated with a capital of $40,000 to manufacture tools. John Stark, Henri Haldy and Robert M. Stark are the incorporators.

WESTFIELD, MASS. — The Hamilton Abrasive Co., which has been incorporated with $50,000 capital by Frank D. Hamilton, Buffalo, and others, will build a manufacturing plant on the Mosley estate for the making of emery wheels and other abrasive products.

WORCESTER, MASS.—The plant of the William H. Sawyer Lumber Co., 66 Lincoln street, was damaged by fire Feb. 21 with a loss of more than $200,000.

PROVIDENCE, R. I.—The Nicholson File Co. is building three brick additions to its plant on Kinsley avenue.

BRIDGEPORT, CONN. — A 3-story plant will be erected by the American Graphophone Co. Russell R. Meade is superintendent.

BRIDGEPORT, CONN.—Bids will be received shortly by the Bridgeport Compressed Paper Box Co. for a $25,000 factory addition, 2 stories high and 40 x 130 feet in size.

BRIDGEPORT, CONN.—Bids have closed for two brick and steel, 1-story, 50 x 150-foot buildings for pattern and casting storage for the Bullard Machine Tool Co.

MERIDEN, CONN. — The International Casket Hardware Co. has been organized, with a capital of $100,000. Arthur Manning, Manchester, Conn., is president of the new company.

NEW HAVEN, CONN.—The International Leather & Belting Co., New York, which recently acquired property on Clinton street, has awarded to the Sperry Engineering Co. the contract for three factory buildings, one of which will be 50 x 150 feet.

Along the Middle Atlantic Seaboard

ALBANY, N. Y. — Contracts have been awarded for the erection of a 50 x 125-foot machine shop at the plant of George H. Thatcher & Co., manufacturers of cast iron products and gray iron castings. Awards also have been made for alterations to the company's forge shop.

ARVERNE, L. I., N. Y. — Walter H. Goehagen, 147 Remsen street, Brooklyn, will erect a shipbuilding plant here, to include a 200 x 600-foot machine shop and a 200 x 300-foot woodworking shop, to cost jointly about $75,000.

BROOKLYN, N. Y.—The Metal Hose & Tubing Co., 257 Pillary street, is having plans drawn for a $5000 addition to its plant. John Clansitzer, 215 Montague street, is architect.

BROOKLYN, N. Y.—A $10,000 addition will be erected at the plant of N. J. Street, South Eighth street and Kent avenue.

BROOKLYN, N. Y.—A charter of incorporation has been granted to the Rubes Electric Lamp Co., organized with $10,000 to manufacture electric fixtures. The incorporators are A. Wegmann, N. and L. Rubes, 1585 Bedford avenue.

BROOKLYN, N. Y.—The William Harvey Corp., 111 Broadway, New York, is having plans drawn for a $17,000 manufacturing building to be erected here. The William Kennedy Construction Co., 215 Montague street, will be in charge of the construction.

ELMIRA, N. Y.—The Delaware, Lackawanna & Western railroad is having plans drawn for alterations to its roundhouse to cost $5000.

GLENDALE, L. I., N. Y.—James A. McCaffity & Sons Mfg. Co. will erect a 1-story, 30 x 58-foot metal working plant.

NEW YORK.—The Metals Fabricating Co., Inc., has been incorporated with $105,000 capital to manufacture metal products. The incorporators are W. F. Roohan, 99 John street, F. Lightfoot and others.

NEW YORK.—The Hudson Foundry Co. has been organized with a capital of $20,000. The incorporators are J. Mittelman, 27 William street, J. C. Garrett and others.

NEW YORK.—The American Life Savers Mfg. Co. has been incorporated to manufacture scientific instruments with a capital of



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$50,000 by M. Watson, P. McCartin and M. Parisi, 42 King street.

OGDENSBURG, N. Y.—All bids on the proposed $50,000 coal pocket for the George Hall Coal & Transportation Co. have been rejected. The structure will be 1 story high and 41 x 135 feet in size. A. M. Suck, Hyde Park, Mass., is architect.

OTISCO, N. Y.—A charter of incorporation has been granted to the Otisco Light & Power Co., capitalized at $10,000, to supply power to Onondaga county. The incorporators of the company are M. A. Phelps, E. T. Harter and B. L. Harter.

EDDYSTONE, PA.—Plans are being drawn for the superstructure for ammunition works No. 2 at the plant being erected by the Baldwin Locomotive Works. Foundation work is already in progress. The plant will cost about $2,000,000.

LANCASTER, PA.—The Rowe Motor Mfg. Co. will build a $35,000 plant addition, two stories high and 120 x 200 feet in size.

PHILADELPHIA. — Estimates are being taken on the construction of a new boat shop and an addition to the existing boat shop at the Philadelphia navy yard.

PHILADELPHIA.—William R. Dougherty has been awarded the contract for the erection of a $21,000 building at the Frankford arsenal. The structure will be 34 x 100 feet.

TACONY, PA. — The Tacony Ordnance Corp. is receiving bids for the construction of a 35 x 85-foot and a 24 x 42-foot building, one story high, at its plant.

TAMAQUA, PA.—The contract for an acid plant, to cost $100,000, to be erected at the local plant of the Atlas Powder Co., was recently awarded to the Austin Co., Philadelphia. The Atlas company has charge of an $8,000,000 powder plant to be erected in Maryland for the government.

TYRONE, PA.—The West Virginia Pulp & Paper Co., 200 Fifth avenue, New York, contemplates the erection of a 1-story addition to its alcohol plant.

CAMDEN, N. J.—A charter of incorporation has been granted to the Titan Automatic Tool Co., capitalized at $1,500,000. Joseph P. Murray, Frank S. Muzzey and F. Stanley Saurman, Philadelphia, are the incorporators.

CAMDEN, N. J.—The American International Shipbuilding Co. plans to build a 2-story, 105 x 135-foot addition to its plant at Sixth and Morgan streets.

CAMDEN, N. J.—The Lutz Co., Inc., of New Jersey, recently organized with a capital of $100,000, has taken over the plant of the Joseph Pedrick Foundry Co. at Twenty-fourth and Hayes avenue, which it will enlarge and equip for the manufacture of castings to be used in making compression tools and machinery. R. A. Rutherford is in charge of the Lutz company's plans for expansion.

EAST ORANGE, N. J.—A charter of incorporation has been granted to the New Jersey Metal Products Co., capitalized at $100,000, to manufacture metal novelties. The incorporators are Harry H. Picking, Charles O. Geyer and L. Mathews.

ELIZABETH, N. J.—A charter has been granted to the American Steel Hardening Products Corp., incorporated with $50,000 capital by C. Addison Swift, Charles Otto Jr., and Samuel Reibel.

HARRISON, N. J.—The Driver-Harris Co. plans to rebuild the portion of its plant recently damaged by fire. Reconstruction plans include the erection of a 3-story, 40 x 200-foot building and a 1-story, 25 x 110-foot building, for the housing of the shipping and insulated spooling departments. The F. H. Ogden Co., Newark, N. J., is the engineer in charge of the work.

JERSEY CITY, N. J.—The Mutual Iron Works, 907 Communipaw avenue, has been incorporated to engage in a general machine shop business with $125,000 capital.

NEWARK, N. J.—Frank Grad is drawing plans for a 1-story, 30 x 95-foot foundry, to be erected by Max Mandle.

WILMINGTON, DEL. — The Wilmington Sugar Refining Co. has purchased as a location for its new refinery 15 acres along the Christiania river.

BALTIMORE.—The C. H. Crook Co., 28 Light street, is having plans prepared for a shipbuilding plant at Locust Point, to replace that damaged by fire recently with a loss of $75,000.

SPARROWS POINT, MD.—The Bethlehem Shipbuilding Corp. has awarded the contract for the erection of a 1-story, 30 x 65-foot and a 30 x 34-foot addition to its plant. The joint cost of the improvements is estimated at $10,000.

NORFOLK, VA. — Benjamin F. Mitchell, architect, is drawing plans for a $50,000 shipbuilding plant. The owner's name is being withheld.

WASHINGTON.—The bureau of yards and docks has plans drawn for a $200,000 substation and frequency changer house.

Activities in the Central States

APPLETON, WIS.—The Northern Boiler & Structural Works, H. H. Timm, manager, will build a 1-story addition to be 100 x 150 feet in size, and to cost $30,000.

BEAVER DAM, WIS.—The Western Malleables Co. has completed a new pattern shop costing about $25,000 to replace the building damaged by fire several months ago.

CLINTONVILLE, WIS.—The Topp-Stewart Tractor Co., which recently purchased two water power sites on the Embarrass river, has awarded contracts for the first dam and hydroelectric plant, designed by Thomas W. Orbison, consulting hydraulic engineer, Appleton, Wis. The steel work will be done by the Northern Boiler & Structural Works, Appleton, and the concrete and mason work by C. R. Meyer & Sons Co., Oshkosh, Wis. The work will cost about $50,000.

HARTFORD, WIS.—The common council is considering the purchase of a 500-horsepower water tube boiler for the municipal light and power plant.

GREEN BAY, WS.—The Green Bay Barker Co., manufacturer of paper and sawmill machinery, will build an addition to its machine shop to be 60 x 120 feet in size.

GREEN BAY, WIS.—The American Hardware Co. has been incorporated with a capital stock of $30,000 by Lawrence Gottfredson, H. J. Bultmann and A. J. Kuitck.

JANESVILLE, WIS.—The Blodgett-Holmes Milling Co. is considering the installation of a larger hydroelectric power plant and new steam-generating facilities for auxiliary and emergency purposes.

MILWAUKEE. — Articles of incorporation have been filed by the Why Electric Manufacturing Co. The capital stock is $15,000 and the incorporators are Albert H. Walker, William F. Horn and Lafayette Yakes.

NEW LONDON, WIS.—C. J. Thompson, city clerk, is receiving sealed bids until March 1 for furnishing and installing one 200 kilowatt direct-connected generator for the municipal light and power plant.

NEW LONDON, WIS.—The plant of the former Kenkel Mfg. Co., wood products, has been purchased by A. M. Mayo & Co., Henry Fuerst and August Krueger, who will make numerous improvements, including the installation of a 100 or 150-horsepower motor generator unit.

OSHKOSH, WIS.—The Universal Foundry Co. has increased its capital from $10,000 to $25,000, to provide for expansion. Robert Ziebell is president.

RACINE, WIS.—The Webster Electric Co., manufacturer of small electric motors, has incorporated its business with a capitalization of $600,000. The incorporators are Walter Brown, P. G. Crewe and John B. Simmons.

SHAWANO, WIS.—Jay C. Bossard, P. J. Nolan and L. B. Woodruff contemplate the establishment of a factory for the manufacture of ensilage cutters and gasoline engines.

SHEBOYGAN, WIS.—The Jenkins Machine Co., 315 North Eighth street, will build a 2-story addition to its machine shop, to be 45 x 60 feet in size.

SHEBOYGAN, WIS.—The J. J. Vollrath Co., manufacturer of enameled sanitary ware, has awarded a contract to William Guenther & Son for the construction of a 1-story brick and steel enameling shop addition, 125 x 210 feet, from plans drawn by W. C. Weeks, architect, Sheboygan. The building will cost about $50,000 and with machinery, equipment, etc., will represent an investment of about $75,000.

SUPERIOR, WIS. — The E. Kane Co., Banks avenue and North Fourth street, is in the market for scrap yard equipment, including a crane, magnet and shears.

THORP, WIS.—The Thorp Electric Light & Power Co. has been incorporated by P. D. Kline, E. C. Dearth and Donald Boyd, Eau Claire, Wis., to take over and operate the electric light and power plant at Thorp. The capital stock is $10,000.

WASHBURN, WIS.—A new finishing plant will be built and other improvements estimated to cost about $100,000 will be made at once at the Barkdale plant of the Du Pont Powder Co.

DETROIT.—The Larned Tool & Die Co. has been chartered with $15,000 capital to design and manufacture tools. The incorporators include William C. Weicke, Charles V. Ketts and H. J. La Bean.

DETROIT.—The Detroit Copper & Brass Rolling Mills. 1350 West Jefferson street, will build a factory.

FLINT, MICH.—Bids will be received until March 5 by the water commissioners for a 15,000,000-gallon, 150-foot total head, geared turbine driven centrifugal pumping unit with



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condenser and auxiliaries. E. C. Shoecraft is city engineer.

GRAND RAPIDS, MICH.—A charter has been granted to the Michigan Boiler & Iron Works, capitalized at $10,000.

KALAMAZOO, MICH.—The plant of the Keystone Type Foundry, West Larned street, has been damaged by fire with a loss estimated at $100,000. The building was a 5-story structure.

MARQUETTE, MICH.—The city will build an addition to its hydroelectric plant at Dead river, to cost $75,000. C. Rettalic, city hall, Marquette, is superintendent.

MIDLAND, MICH. — The Dow Chemical Co. will build a 1-story factory, 100 x 150 feet in size, to cost $20,000. The Austin Co., 1430 Penobscot building, Detroit, is architect.

MUSKEGON, MICH.—The plant of the Sargeant Mfg. Co. has been damaged by fire with a loss of $10,000.

SAGINAW, MICH.—The city plans an auxiliary pumping station with two electrically driven centrifugal pumps of 6,000,000 gallons daily capacity, to cost $30,000. H. F. Paddock is city engineer.

WYANDOTTE, MICH.—The Detroit Shipbuilding Co. has let contracts for the erection and equipment of a power house.

CHICAGO.—The Denicke Steel Furniture Co., capitalized at $2500, has been chartered by F. E. Denicke, M. D. Denicke and C. W. Denicke, 53 West Jackson boulevard.

CHICAGO. — The Midwest Steel Products Co., capitalized at $2500, has been chartered by William W. Klein, Samuel Kraus and George Gottrell.

CHICAGO.—William P. Whitney, architect, 122 South Michigan avenue, is planning a manufacturing plant one-story, 65 x 135 feet in size, to cost $8000.

CHICAGO, ILL.—The Harrington & King Perforating Co., J. M. Fuller, president, 512 North Union avenue, will build a 2-story plant, 126 x 312 feet in size, to cost $100,000.

CHICAGO.—The Crane Co. will build a 2-story building, 80 x 100 feet and make alterations to other structures at the Corwith plant, including a steel bridge and a reinforced concrete tunnel. R. T. Crane Jr., is president, Kedzie avenue and Forty-first street.

CHICAGO.—The Ilg Electric Ventilating Co. has bought a site at Elston avenue and Snow street and will build a plant costing $750,000 in units 60 x 300 feet in size, with 80-foot light courts.

DECATUR, ILL.—The Leader Iron Works is planning improvements and an addition to its machine shop to be 50 x 200 feet in size. Aschauer & Waggoner, 225 Citizens Title & Trust building, are architects.

LOCKPORT, ILL. — The Coal Products Mfg. Co. will build a benzol plant. The Wilputte Coke Oven Corp., care G. B. Binington Coke Products Works, Lockport, and 6 Church street, New York city, is architect and engineer.

PEORIA, ILL.—The Peoria Foundry Co., 1306 South Washington street, recently incorporated, will establish a foundry. J. Fitzgerald and J. F. Hadank are incorporators.

EVANSVILLE, IND.—The Hercules Buggy Mfg. Co. will build an addition to its gas engine factory to be 180 x 1000 feet in size. J. D. Craft, Martin avenue and Indiana street, is manager.

INDIANAPOLIS, IND.—The Automotive Parts Co., capitalized at $100,000, has been chartered to manufacture automotive parts and appliances by George W. Cummings, Lawrence G. Cummings and William C. Jones.

AKRON, O.—Contracts will be awarded shortly by Franz Warner, architect, Hippodrome building, Cleveland, for a laboratory, boiler house and other buildings to be erected by the Northern Ohio Tractor & Light Co., at an aggregate cost of $200,000.

BEDFORD, O.—The Owen Tire & Rubber Co. will start work shortly on the excavation for its new plant to cost $125,000. The company, which maintains offices at 1900 Euclid avenue, Cleveland, plans to purchase material and do its own construction work.

CANTON, O.—The Van Kirk-Carroll Coal Co. has been organized by E. B. Van Kirk, M. E. Jobe and William I. Zink to develop 1000 acres of coal land in Carroll and Tuscarawas counties.

Trade Announcements

THE Westinghouse Electric & Mfg. Co. has announced the removal of its Phoenix branch to the Immigration building, Tucson, Ariz. The southwestern representatives are J. H. Knost and W. G. Willson.

The A. R. Williams Machinery & Supply Corp., Toronto, Ont., has opened a branch sales office at 402 Fidelity building, New York.

A transfer of its general purchasing office from St. Louis to the main office, 165 Broadway, New York, has been made by the American Car & Foundry Co. W. H. Hedgcock is general purchasing agent.

The name of the Midland Machine Co., Detroit, has been changed to that of the Grimes Molding Machine Co.

A branch office has been opened in Chicago by the Latshaw Steel & Metal Products Corp., New York. The Chicago branch is located in the Railway Exchange building. Marvin W. Singer is in charge.

The Pittsburgh office of the Reliance Iron & Coke Co., of which Ray S. Fox is manager, has been moved to 1226 Park building, in that city.

CINCINNATI. — The Cincinnati Traction Co. has applied to the city for a franchise to permit the extension of its lines through Pleasant Ridge and Kennedy Heights, and to build a power house for operating these extensions. Cost of the improvements is estimated at $75,000.

CLEVELAND.—The Glenn L. Martin Co. has purchased a tract of land on Wayside avenue, on which it will build a plant for the manufacture of airplanes. The contract has been awarded to the Crowell-Lundoff-Little Co., 1951 East Fifty-seventh street. Cost of the structure is estimated at $200,000.

CLEVELAND.—A charter of incorporation has been granted to the Breyley Automatic & Portable Car Stop Co., capitalized at $25,000. Frank S. Nay, James U. Duffy and others are interested.

CLEVELAND.—Plans are being prepared by Ernest McGeorge, engineer, Leader-News building, for a 1-story, 80 x 400-foot addition to the plant of the Chandler Motor Car Co., East 131st street and St. Clair avenue. The cost of the building is estimated at $80,000.

CLEVELAND.—Plans are being prepared by the Austin Co., 14230 Euclid avenue, for a factory to be built by the Warner Gear Co., Muncie, Ind. The building will be 1-story high and 135 x 450 feet in size. R. P. Jackson, at the company's Muncie plant, is in charge.

CLEVELAND.—The L. N. N. Foundry Co. has been chartered with a capital of $20,000 by H. H. Neuman and C. E. Lyall.

CLEVELAND.—A charter of incorporation has been granted to the Unit Power Wheel Co., capitalized nominally at $1000, in which Don B. Alexander and Anson Henry are interested.

COLUMBUS, O.—Plans are being drawn by Stribling & Lum, 85 North High street, for a 1-story brick machine shop to be built by the Okey Machine Co., Maughton street. The building will be 80 x 100 feet in size, of fireproof construction. Bids will be closed shortly.

DAYTON, O.—The Dayton Screw Co. has received a permit to erect an addition to its factory at Second and Webb streets, to cost $2000.

FREMONT, O.—Construction work has begun on the addition to the Hotz foundry on Wolf avenue, to be 60 x 60 feet in size. Contract has been awarded to Radde, Rink & Ehlers.

HAMILTON, O.—The Hamilton Furnace Co., Coke Otto, has awarded to the Hunkin-Conkey-Construction Co., Cuyahoga building, Cleveland, the contract for the erection of an addition to its plant to cost between $500,000 and $750,000. Construction will include an ore bridge and a car dumper.

LORAIN, O.—The Lorain Electric Co. plans to erect an additional power house as soon as the one under process of construction at the foot of Oberlin street is completed. The second plant will be built on a site adjoining the other and will be equipped to produce 12,500 horsepower. J. B. Johnson, Elyria, O., is general manager of the company.

MASSILLON, O.—The Melvin-Sailor Co., Clay street, will shortly begin work on the erection of a new plant to be 1-story high, and 40 x 150 feet in size. John Melvin is manager of the company.

NEWARK, O.—The Blair Motor Truck Co. plans to make extensive additions to its plant. The concern will be taken over shortly by a new company being organized with $1,500,000 capital, of which J. D. Potter, formerly vice president of the Kilburn & Jacobs Mfg. Co., is president.

TOLEDO, O.—The Toledo Electric Steel Organization, Buckeye street and Seek avenue, is in the market for a 12-inch bar rolling mill with drive, three water tube boilers, a second-hand electric furnace and three power hammers. S. Stuart Green, superintendent, is in charge.

YOUNGSTOWN, O. — The Independent Motor Co., Port Huron, Mich., plans to remove its plant to this city. A new company has been formed with $300,000 capital to take over the company's business. A. F. Frantz, Detroit, is in charge.

LEXINGTON, KY.—The Garey Coal Co. will receive bids in April for machinery to be installed at the company's new mines at Chavis, Ky.

LOUISVILLE, KY.—Damage of approximately $30,000 was done to the plant of the



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Voss Table Co. in a fire which gutted the boiler room.

NORTONVILLE, KY.—The Norton Coal Mining Co. has asked for bids on an addition to its power plant and other buildings, and will shortly ask bids on machinery requirements.

OWENSBORO, KY.—For the purpose of increasing its business and enlarging its manufacturing capacity the Anglo-American Mill Co., manufacturer of milling machinery, has increased its capital stock from $650,000 to $1,000,000. The company manufactures portable milling machinery, and requires some new equipment.

PADUCAH, KY.—The city plans the installation of two 300 horsepower boilers in the municipal lighting plant.

WINCHESTER, KY.—The city is planning to construct a waterworks system. E. B. McKay, city engineer, is in charge.

PARKERSBURG, W. VA.—A charter of incorporation has been granted to the Marietta & Parkersburg Bridge Co., capitalized at $250,000, to build a bridge between Marietta, O., and Parkersburg. S. E. Miller, Fairmont, W. Va., is in charge.

Up and Down the Pacific Coast

DAVENPORT, WASH.—The Intermountain Power Co. has made application to the county commissioners for a franchise to construct a 2-pole transmission line in Lincoln county to be 70 miles long.

SEATTLE, WASH. — The Western Drop Forge Co. is building a 1-story factory, 45 x 56 feet, at 301 Horton street, to cost $3500.

SPOKANE, WASH.—The Clarkson Mfg. Co., manufacturer of iron and steel products, will build a plant to cost $100,000.

TACOMA, WASH. — Commissioner H. F. Gronen is having an ordinance prepared for submission to the voters April 2, on the purchase of a site and construction of a power plant to cost about $5,000,000.

VANCOUVER, WASH. — The Vancouver Galvanizing Works, has been incorporated with a nominal capital of $1000 by F. E. Kennedy, M. W. Odell and Dan E. Hardin.

WALLA WALLA, WASH.—The Rickard Wheel Co. has been organized with a capital of $100,000 by L. J. Rickard and others. An automobile wheel recently invented by Mr. Rickard will be manufactured.

YAKIMA, WASH. — The county commissioners have awarded a contract to the Illinois Steel Bridge Co. for the construction of a bridge over the Yakima river, at the contract price of $30,699.

BURNS, OREG. — Promoters of Boise, Idaho, will construct a 33-mile line of railroad between this place and Crane, Oreg.

PORTLAND, OREG.—The commission of public docks has authorized the purchase of two additional locomotive cranes, one 10 to 15 tons capacity, the other 30 to 35 tons capacity.

MARTINEZ, CAL.—Plans are being prepared for a waterworks system for which $178,000 in bonds has been authorized. A pumping plant, reservoir and distributing system will be included.

OAKLAND, CAL.—The Aluminum Products Co. is building an addition to its plant on East Eleventh street.

PITTSBURG, CAL. — The Great Western Electro-Chemical Co. will build an addition to its plant.

SAN FRANCISCO.—W. H. Berry is building a 2-story concrete machine shop at Howard and First streets, to cost $25,000.

SAN FRANCISCO.—The Main Street Iron Works, 163 Main street, is building a plant at Seventh and South streets.

New Business in Eastern Canada

NANAIMO, B. C.—The Nanaimo City Gas Co., 59 Commercial street, is having plans prepared for the erection of an addition to its plant and will install new machinery to cost $35,000. W. W. Lewis is manager.

NELSON, B. C.—The Consolidated Mining & Smelting Co., Trail, B. C., contemplates establishing a smelter here.

PRINCE RUPERT, B. C.—W. R. Hinton, general manager in the northwest for the Grand Trunk Pacific railroad, announces that the road will build a brick railway station, machine shops and roundhouse near Cameron Cove, to cost $250,000.

VANCOUVER, B. C.—The Wallace Shipyards, Ltd., Esplande east, has awarded to Hodgeson & King, 1573 Main street, the general contract for remodelling and building extensions to its plant to cost $100,000.

VANCOUVER, B. C.—The British-American Shipbuilding & Engineering Co., Hitsilano Reserve, is having plans prepared for the erection of a shipbuilding plant. J. A. Sears is president of the company.

VICTORIA, B. C.—The Victoria Shipbuilding Co. will build an addition to its plant to cost about $100,000. J. H. Price, care of the Cameron-Genoa Mills, Ltd., Old Indian Reserve, Victoria, B. C., is president.

VICTORIA, B. C.—The Western Union Telegraph Co. is making preparations for the erection of a 1-story concrete terminal cable house, to be erected on Dalas road, at a cost of $40,000. F. H. Blashfield is local manager.

HAMILTON, ONT.—The Canadian Cotton Co., James street north, is building an addition to its foundry to cost $60,000.

HAMILTON, ONT.—The United Gas & Fuel Co. has submitted a proposition for the installation of municipal coke ovens to the city council. Owing to the fuel shortage, the council favors the project. The proposed plant will cost $3,535,000.

OMEMEE, ONT.—Charles Parsons & Son, leather manufacturers, 79 Front street east, Toronto, Ont., will make alterations and additions to their plant here, to cost $100,000.

OTTAWA, ONT.—Dr. J. A. Armstrong, Toronto, Ont., who is interested in the Oakoal Co. recently incorporated, proposes to erect a plant here to cost $60,000, for the manufacture of fuel from refuse.

ST. THOMAS, ONT.—The gas committee proposes to make improvements to the municipal gas plant and to install additional equipment, to cost in all about $40,000. Alderman Handford is chairman of the committee.

TORONTO, ONT.—The Electric Insulation & Varnish Co., Ltd., has been incorporated to manufacture paints, varnish, etc., with $60,000 capital. John Whitfield, James G. Shaw, Joseph Montgomery and others are interested.

TORONTO, ONT.—The Toronto Laundry Machinery Co., 1951 Dundas street west, engaged in the manufacture of munitions, whose plant was recently damaged by fire with a loss of $100,000, has awarded the contract to Brown & Cooper, Ltd., 297 Carlton street, for the erection of a manufacturing plant to cost $15,000.

TORONTO, ONT.—Permits for the plant to be built by the Dominion Shipbuilding Co. at the foot of Bathurst street, have been granted by the city architect. The plant when completed will cost $2,500,000. The foundation of the plant, which runs along the bay front from Bathurst street to Spadina avenue, is under way.

ARMAGH, QUE.—The town council will call for bids about March 15 for the erection of a waterworks plant to cost $40,000. Gouvin & Beauchemin, 147 de la Montagne street, Quebec, Que., are the engineers in charge.

POINT AUX TREMBLES, QUE. — The Dominion Cement Co., 92 Notre Dame street east, has secured a site and will build a cement plant to cost $100,000. J. A. Vinet is secretary and treasurer of the company.

BRIDGETOWN, N. S.—A. L. Beeler has leased a site along the North shore of the Annapolis river on which he will erect a shipbuilding plant.

DARTMOUTH, N. S.—The Canadian Carbonate Co., 132 Hollis street, Halifax, N. S., is building a manufacturing plant at Dartmouth, to cost $100,000. The Rhodes-Curry Co., Ltd., Windsor street, Halifax, is the general contractor.

HALIFAX, N. S.—The Halifax Graving Dock, Granville street, has awarded to S. M. Brookfield, Ltd., the contract for additions and repairs to the company's graving dock, to cost about $100,000.



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17-Ton Buckets,* capacity 1,250,000 tons per season; *15-Ton Buckets,* capacity 1,000,000 tons per season; *10-Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8-Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company
Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	29.50 to 30.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melt'g steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	25.00 to 27.50
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	29.50 to 30.00
Steel rails, short, Chicago	34.50 to 35.00
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	34.00 to 35.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.50 to 20.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	22.50
Stove plate, Birmingham	19.00 to 21.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$22.00 to 23.00
Boiler plate, cut, No. 1, St. L.	24.50 to 25.00
Bundled sheets, Cincinnati	20.00 to 20.50
Knuckles, coup., Chicago	35.00
Knuckles, coup., St. Louis	31.00 to 31.25
Springs, Chicago	35.00
Stove plate, Chicago	23.00 to 24.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis- St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	75.0 cents
Pacific coast (tin plate)	75.0 cents

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	31.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	32.00
Cast borings, New York	17.00
Cast borings, eastern Pa.	20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	18.50 to 19.00
City wrought, long, N. Y.	32.00 to 32.50
Cut forge, Chicago	33.50 to 34.50
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	22.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chicago	18.50 to 19.00
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	35.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	33.50 to 34.50
R. R. wrgt. No. 1, Birming.	27.00 to 30.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	30.50

(Net Tons)

Angle bars, iron, Chicago	$37.50 to 38.00
Angle bars, steel, St. Louis	34.50 to 35.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	38.00 to 39.00
Busheling, No. 1, Chicago	25.50 to 26.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.50 to 27.00
Busheling, No. 2, Chicago	18.00 to 19.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, St. Louis	17.00 to 17.50
Iron axles, St. Louis	42.00 to 42.50
Iron axles, Chicago	47.50
Machine turnings, Cinci.	15.50 to 16.00
Machine turnings, St. L.	17.50 to 17.85
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	26.25 to 26.75
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	30.00 to 30.40

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	42.00 to 42.50
Steel car axles, St. Louis	42.00 to 42.50

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, eastern Pa.	34.00 to 35.00
Cast, No. 1, Birmingham	25.00 to 26.00
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00 to 31.00
Cast No. 1, Chicago	32.00 to 33.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable, Cincinnati	30.00 to 35.00
Malleable, Cleveland	30.00 to 35.00
Malleable, Buffalo	30.00 to 35.00
Malleable, Pittsburgh	30.00 to 35.00
Malleable, east. Pa.	30.00 to 35.00
Malleable, Chgo.	30.00 to 31.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	26.50 to 27.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	26.50 to 26.75

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	32.50 to 33.50
Locomotive tires, St. Louis	39.50 to 40.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, March 14, 1918 *No. 11*

Costs Will Determine Price Action

Iron and Steel Producers to Display Increased Operating Outlay at Washington Conference—Lake Ore Interests Show Vanishing Profits—Operations Working Back to Normal—Urging Iron Division on War Lines

PRODUCTION costs are to be brought strongly into the determination of the question whether present iron and steel prices will be reaffirmed or revised by the government April 1. A conference at Washington, arranged for next Wednesday, March 20, between representatives of the industry and the war industries board will deal largely with this phase of the subject. It is apparent that producers will lay much stress upon the sharp upward rise in their operating outlay in recent months. An illustration of this line of procedure is given by the detailed data to be presented by independent producers of Lake Superior ore. Cost sheets covering the output in October and November of 5,000,000 tons of bessemer and nonbessemer ore from Mesabi underground mines show an exceedingly slender profit. It is set forth that this will be more than wiped out in 1918 if the 1917 price is reaffirmed. Similar estimated losses in 1918 are disclosed for Menominee and Gogebic underground mines. The Marquette properties would be the only ones to return a net profit this year and that a small one.

Contend For Pig Iron

Conflicting claims of consumers upon merchant pig iron capacity, sharpened by the present shortage of supply, promise to force an airing at Washington. An organized canvass of the foundry industry now is being made to determine to what extent its capacity is being devoted to war production. This survey is to furnish data to offset the movement by steelworks buyers to have foundry furnaces changed over to basic iron. The conviction grows steadily that the government must exercise a more positive control over iron production and distribution in accordance with war needs.

Joined with the question of the division of iron output are the heavy needs for government castings now taking form. The impossibility of procuring acid steel castings for all purposes because of the limited supply of low phosphorus iron has brought about comprehensive experiments with the use of malleable iron. Satisfactory physical tests have been obtained for malleable motor truck wheels. This is the first time this grade of iron has been used in this service. For the wheel sets for 25,000 trucks, about 12,500 tons of castings will be required. With the adoption of standardized freight car types now in sight, another tremendous requirement of castings will be brought forward. If 100,000 cars are ordered, this means a minimum of 400,000 tons of castings.

The demand for basic continues to pile up in all directions. The week's new inquiries include 40,000 tons for St. Louis, 20,000 tons for an Ohio river buyer, 10,000 tons for central Ohio and other lots.

Output Now Coming Back

While generally a freer traffic movement is reported, operations still are harrassed by car shortage. Mill stocks of tin plate, despite the active intervention of the food administration to maintain shipments are piling up rapidly. Sheet mills are running around 50 per cent and wire plants at about 80 per cent. Plate production has been maintained on a high plane. Operations in the Pittsburgh and Youngstown districts last week show 91 per cent activity for coke ovens and open hearth plants 92 per cent for blast furnaces and 81 per cent for bessemer works. The Steel corporation is producing iron at the rate of about 83 per cent and steel at about 87 per cent.

Fixed Prices Cut Wages

Sheet and tin plate workers have suffered the first cut in wages, amounting to about 2 per cent, under the reduced government price schedule. The bi-monthly examination disclosed an average selling price of 5.35c for Nos. 26, 27 and 28 black sheets, or $3 per ton under the previous settlement. The present government price is 5c for No. 28 gage. The average tin plate price was $8.40 per base box, against $8.60 two months before. The fixed price is $7.75. Curiosity is aroused as to how this and future sliding scale reductions are to be reconciled with the President's original stipulation of Sept. 24, that manufacturers were to maintain the existing levels of wages.

The Iron Trade Review

EDITORIAL

Let National Needs Dictate

APPRECIATION of impending famine in pig iron with which the country must deal this year, according to present statistics, is stirring precautionary action. The foundry interests especially are being aroused to the growing danger of a contraction of their future supplies. This threatened development has been brought more clearly before the gray iron and malleable shop by the efforts of steelmaking interests to have foundry furnace capacity changed over to basic mixtures, to satisfy their unfilled needs at the expense of foundry production.

The American Foundrymen's association has undertaken a survey of its membership to determine the exact proportion of their capacity that is being devoted to essential war production. This data is to be laid before the government with the claim that adequate producion of foundry and malleable pig iron be preserved for these requirements.

The recent tendency of merchant pig iron production of the country has been away from the foundry and toward the steelmaking grades. The war which has been marked by an insatiable demand for steel has quickened this movement. Furthermore there has been a removal from the market of various selling stacks through their having been booked up with steel works capacity. Total iron production in the first half of 1917 was practically 360,000 tons less than in the first half of 1916. This loss was more than included in the 484,000 tons decrease in foundry iron production practically all of which is of merchant character. Basic in the same period lost 210,000 tons, but bessemer and low phosphorus, probably due to heavy export demand, increased in the amount of 202,000 tons and forge 29,000 tons.

That recent events will necessitate a weighing by Washington of the relative claims for recognition of both steelmaking and foundry iron buyers under war conditions is a wholesome outcome. The available supply of iron for all legitimate war needs should be ample. The danger has existed in buyers of one class getting more than their just share because their case had been put more vigorously and their need has been more conspicuous from a military viewpoint. Those charged with the war management of industry iron are to have the opportunity to survey all branches of demand upon merchant iron capacity, and render a decision.

This should enable them to effect the most equitable division of tonnage as dictated by immediate necessities. In no other way can the present situation be harmonized. In doing so, they will be fulfilling their true function. There must be no conflict where the nation's best interests are involved.

Discards Fill Growing Function

HEAVY tonnages of discard steel are being used in various lines of manufacture, including light rails, shovels, agricultural shapes, large-sized nails and reinforcing bars for concrete. Tests being made have given encouraging indications that it can be used as a source of supply for other finished lines the output of which has been greatly restricted owing to a shortage of rerolling material. The practice of using discard tonnages as scrap still is common but not so much so as it has been. It is noticeable that offerings in the market are smaller, showing that this material is being consumed by its producers.

A large portion of the discard steel is high in carbon and represents the croppings from open-hearth steel to be finished into munitions. Severe specifications provide for the cropping of from 25 to 30 per cent of the ingot. To this is also added approximately 5 per cent cropping necessary in ordinary practice. It is not possible to say what the discard tonnage amounts to in the absence of figures showing the requirements for ammunition steel but it is very large. The open-hearth ingot production annually being approximately 30,000,000 tons, it is apparent that the discards run into large figures. Its tensile strength has made it particularly adaptable to different lines of manufacture, as pointed out, with the prospect that it will be converted into additional forms of production.

This is a partial solution to the problem of steel shortage, which the trade has been and is facing. It offers another interesting phase of diverted tonnage that has resulted from war conditions.

High Records Bring Reactions

MAINTENANCE of a maximum level price or production never can be achieved. All curves based on data of this kind show recessions after high altitudes have been reached.

From the beginning of 1915 practically all curves, both of production and price, tended upward, making new high levels. The peaks culminated about the third quarter of 1917. The government then stepped in and set maximum prices which effected a drop in all the price lines. Production curves continued high until interference with fuel and transportation at the beginning of this year changed them precipitately

downward. As a result of these two factors of price and tonnage, the curves of financial affairs will be brought down in reports for the first quarter of 1918 and the cycle will be complete. The inter-relation of these various factors of the market is absolute and when one or more is affected there is a corresponding change of the others.

The peaks of 1917 seem likely to remain as records for years to come. How near they may be approached in the next year or two remains to be seen and no man can predict with assurance. It is expected that record production levels will be attained again but if demand is slack, this will operate to depress prices. Removal of government regulations with a heavy demand maintained, will send price levels upward, but how far is difficult to predict.

Preserve Efficiency of Competition

A WARNING against the over-standardization of railroad equipment is carried in a letter recently sent to W. G. McAdoo, director general of railroads, by the Railway Business association, a national organization of manufacturers of railroad appliances. The letter pointed out that two antagonistic requirements must be compromised—improvement through change and stability through standardization. At present there is considerable apprehension expressed that, under the government's broad plan of standardization, a large number of manufacturers of established competing devices will be, temporarily at least, wiped out of existence, or, in more concrete terms, that the appliance of one manufacturer will be adopted as a standard to the exclusion of all others, thus eliminating competition which has long been the chief factor in the development of transportation science.

In recent years much has been done in the way of car standardization, although principally with regard to dimensions, and as a result, the inter-line use of cars has been made possible. This, in turn, has resulted in a tendency toward the interchangeability of parts, until today a device of any established patent can be placed on the modern freight car. Such also has been the development along the lines of interchangeability, that little delay is occasioned in the production of cars in the substitution of one patented device for another, according to the preferences of the particular buyer. It would seem that the work of the appliance makers, while continually furthering transportation science in various single instances as a result of keen competition, is sufficient in scope to meet all practicable demands that now may arise. It is important that Mr. McAdoo in the interests of standardization does not undermine an established industry which has proved its practical worth. The safest and fairest way is to let the respective roads use their judgment in specifying standard devices as in the past.

Stamp Out Labor Profiteering

COMPARABLE only to the unreasonable and unreasoning demands of the Bolsheviki, is William L. Hutcheson's demand as president of the carpenters' and joiners' brotherhood, that eastern shipyards be operated on the closed shop principle. Un-American as such operation would be, Mr. Hutcheson would use the crisis in which the country finds itself to foist this yoke upon a rapidly expanding industry. Serious curtailment of the shipping program only has been avoided by the timely intervention of President Wilson. The President's pleas resulted in sending back to work several thousand men who had already struck and keeping on the job others preparing to follow their lead. Wages and working conditions, including living quarters were some of the points advanced by strikers for their action. Submission of their differences to arbitration will follow and an amicable solution will be reached, but from latest advices, Mr. Hutcheson claims they will insist that closed shop principles must be upheld.

At this hour, after 10 months of preparation on our part, and 10 months of waiting on the part of our allies, we have reached a point where we are ready to contribute a share commensurate with our resources, toward the victory which must come. What is needed is ships. If ship construction is delayed, not only is victory delayed, but the aid which our men in the field need now and will need in increasing measure, will be withheld.

Possibly Hutcheson has no family connections in uniform, but doubtless many of the men he called and would call to strike, have relatives who have answered the country's appeal to its manhood. Are these going to fight against their own flesh and blood to uphold a principle which, based on coercion and interference, never has meant such deadly peril to the nation's security. The sacred duty is for every man to fill his job to the utmost of his ability. Labor profiteering is just as abhorrent as any which would exact large profits from the nation's extremity. The government should make no distinction in treating the profiteers of either labor or capital with a strong hand, and no temporizing should be permitted.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 638

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila., del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, delivered.	$250.00
Spiegel, 20 per cent fur.	65.00
Spiegel, contracts, furnace.	65.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh.	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.79c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products March 13, average for February, 1918, average for December, 1917, and average for March, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices March 13, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Bessemer pig iron, Pittsburgh	$37.25	$37.25	$37.25	$37.45
Basic pig iron, Pittsburgh	33.95	33.95	33.95	32.85
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	36.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	35.70
Lake Superior charcoal, Chicago	37.50	37.50	37.50	37.55
Malleable, Chicago	33.50	33.50	33.50	35.70
**Southern, No. 2, Birmingham	33.50	33.50	33.50	28.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	36.00
Basic, eastern Pa.	33.00	33.00	33.00	34.50
**No. 2X Virginia, furnace	33.50	33.50	33.50	34.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	37.25
Ferromanganese, delivered	250.00	250.00	247.50	275.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	67.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	67.00
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	67.00
Open-hearth billets, Pitts	47.50	47.50	47.50	67.00
Steel bars, Pittsburgh	2.90	2.90	2.90	3.20
Steel bars, Chicago	2.90	2.90	2.90	3.40
Iron bars, Philadelphia	3.50	3.50	3.685	3.509
Iron bars, Cleveland	3.64	3.64	3.64	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices March 13, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Iron bars, Chicago mill	$3.50	$3.50	$3.50	$3.00
Beams, Chicago	3.00	3.00	3.00	3.65
Beams, Pittsburgh	3.00	3.00	3.00	3.45
Beams, Philadelphia	3.185	3.185	3.185	3.759
Tank plates, Pittsburgh	3.25	3.25	3.25	4.20
Tank plates, Chicago	3.25	3.25	3.25	4.60
Tank plates, Philadelphia	3.435	3.435	3.435	5.659
Sheets, blk., No. 28, Pitts	5.00	5.00	5.00	5.05
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	4.70
Sheets, galv., No. 28, Pitts	6.25	6.25	6.25	6.70
Wire nails, Pittsburgh	3.50	3.50	3.50	3.15
Connellsville furnace coke	6.00	6.00	6.00	7.60
Connellsville foundry coke	7.00	7.00	7.00	6.90
Heavy melting steel, Pitts	30.00	30.00	30.00	23.40
Heavy melting steel, eastern Pa.	30.00	30.00	28.75	23.75
Heavy melting steel, Chicago	30.00	30.00	28.90	23.00
No. 1 wrought, eastern Pa	35.00	35.00	35.00	30.50
No. 1 wrought, Chicago	35.00	35.00	34.75	28.85
Rerolling rails, Chicago	35.00	35.00	35.65	27.25
Car wheels, Chicago	30.00	30.00	30.75	20.30

(For Additional Prices See Page 696)

Iron Distribution Becomes Problem

Washington Being Urged to Divide Tonnage in Accordance With War Importance —New Demands for Basic Total Many Thousand Tons—American Bridge Co. Buys 30,000 Tons of Resale Bessemer

Pittsburgh, March 12.—Extreme shortage of both steelmaking and foundry iron has led some prominent men in the trade to feel that the best solution to the problem of supply rests with distribution to consumers according to the importance of the war work in which they are engaged. It is understood that this plan has been taken up with authorities at Washington. Action along this line, it is pointed out, would dispose of the suggestion that has been made to the government that a certain capacity now making foundry iron be diverted to the production of basic iron. There is strong opposition to this in the trade, not only on the part of those who would be directly affected if this proposal were put into operation, but also by some who feel that the plan is not practical. They contend that foundries have government contracts whose importance is not transcended by those of steel plants. For instance, the argument is made that some foundries are casting parts for engines for the Emergency Fleet corporation. There is but a small production of foundry iron in this district at present. Blast furnace interests are disappointed in the slow improvement being made in the railroad situation. Curtailed production greatly has increased costs of operation and it is evident that interesting figures will be shown in this connection to the war industries board preliminary to the forthcoming price-fixing program. Confidence is felt that present levels will not be reduced. The general feeling is that present prices will be continued. Cost figures now are being compiled for submission to the board. Operations have increased somewhat. The Carnegie Steel Co. has 46 of its 59 furnaces producing compared with 41 one week ago. The National Tube Co. has active nine of its 11 furnaces and the Jones & Laughlin Steel Co. seven of its 11 furnaces. Consumers anxiously are seeking requirements, basic especially being in heavy demand, but sellers in this district are fully committed and have no available tonnages. One steel interest, it is said, would take 100,000 tons of basic if it could be secured but has been able to obtain only 2000 tons. Another steel producer, whose loss of furnace output has been heavy, would like to cover for almost any quantity of either bessemer or basic. Another melter is in the market for about 10,000 tons of basic for second quarter delivery.

Deliveries Much Improved

Boston, March 11.—The bright feature of the past week in the local pig iron situation, has been a marked improvement in deliveries. Shipments on government permits from all producing sections have increased so materially, plants working even as low as 30 to 40 per cent on government work no longer are hampered for want of iron. Deliveries to the so-called nonessential plants also are better. There has been no lifting of the embargoes on the railroads connecting with New England roads but in spite of this fact, there has been much improvement in transportation conditions, to which the 10 per cent excess loading of cars has been no small factor. New England melters undoubtedly are much better off than they were recently in the matter of supplies, but a number of in-

quiries for several thousand tons, for immediate and second quater delivery are current without a furnace to entertain them. A case is cited where an inquiry covering neutral iron was submitted to more than 20 furnaces, and brought but a single bid. The navy department is in the market for 700 tons for ballast but even so low a grade could not be had. It is hard to tell how much iron could be sold for prompt delivery but there is no doubt that it would foot up big, for there probably is not a melter in this section who did not underestimate his needs. Some furnaces are attempting to find out the future requirements of their regular trade, for it is realized that prorating will be necessary. Deliveries of Connellsville coke are poor; one shipment sent out in January was commandeered by the government at the New England gateway. On the ground that it was a cross shipment and the need should have been cared for by the New England Coal & Coke Co.

Sell Large Tonnages

Philadelphia, March 11.—The Penn Seaboard Steel Corp. finally has managed to place its second half requirements of basic pig iron. An eastern maker is understood to have closed a contract to supply this interest with approximately 25,000 tons, mainly for New Castle, Del. Another important transaction was the purchase of 30,000 tons of bessemer by the American Bridge Co. This iron, it is understood originally was sold for export but could not be shipped because of the embargo. Outside of these sales the market has been quiet during the past week. Other sales included limited tonnages of gray forge, off bessemer and off foundry, practically all for prompt shipment. None of the eastern furnaces are offering for second half. Second half inquiry has died down somewhat, due mainly to buyers' inability to get the iron, it is thought. The Sheffield Iron Corp. has about completed the rebuilding of its furnace at Sheffield, Ala., and expects to have it in operation about the middle of April. Its output, which is expected to be in excess of 200 tons of foundry per day, now is being offered over the remainder of the year. Considerable Sheffield iron already has been sold for delivery in the west. It is estimated that the Eastern Steel Co., which recently blew in one of its Warwick furnaces on standard low phosphorus, will make between 15,000 and 20,000 tons. Of this 9000 tons have been requisitioned for the Tacony Ordnance Corp., Philadelphia, as previously reported, and 4000 tons for the Edgewater Steel Co., Pittsburgh. Several other consumers making government castings each want the remainder. The question of distribution has been submitted to the government. It is believed the supply of pyrites residue suitable for furnaces making copper-bearing low phosphorus iron will be sufficient to carry them through 1918. The growing difficulty of importing pyrites from Spain, however, indicates that unless the government provides for a continuance of shipments, production of this grade will be materially restricted in the first half of 1919.

No Tonnage to be Had

Buffalo, March 12. — Conditions practically have reached the stage in this district where there is no iron to be had. Only one producer sold any iron during the week just closed and this was a small amount. Furthermore, this interest is soon to retire from the market on account of its sold-up condition. Inquiry continues to flow in upon local makers, the aggregate being thousands of tons. Furnace interests are compelled to turn down their oldest customers, and it is said that practically every regular patron is pleading for some iron. The majority of the requests are for 2000, 2500 and 3000-ton lots. An inquiry of the Gould Coupler Co., for 15,000 tons of basic and 2000 tons of malleable which has been before the market for some time and still is unsatisfied, may have to be withdrawn. The most persistent inquiry is for third and fourth quarter delivery. The filling up of the commitment of the furnace first mentioned will practically close this district to further business for some time, because of three sellers remaining, one has not been taking on any tonnage for weeks; another has long been sending its pig iron to its own mills, and the third for the past few weeks has been out of the market. Furnacemen are straining every nerve to get out government shipments, loading by crane, hand and every method at their disposal. The car situation continues bad.

Inquiry Active, Few Sales

Cleveland, March 12.—Only a small part of the current inquiry for pig iron continues to be converted into sales. The reason is that the producers supplying this territory have not the metal for sale. A local maker who for several weeks has been selling to regular customers for last half has accumulated a round tonnage of orders and now is picking business with great care. These sales mainly have been foundry and malleable, but this week an extra lot of 3000 to 4000 tons of basic which had been accumulated above this company's own needs were sold to an Ohio consumer. The last half situation on foundry and malleable is becoming increasingly serious as many of these buyers now inquiring find it almost impossible to get the furnaces to accept their orders. In this connection, makers who regularly book a certain tonnage of these grades report their order book is made up of a greater amount of basic and accordingly of a lesser proportion of foundry and malleable than usual. Notwithstanding the increased accommodation of basic requirements, unsatisfied inquiries of this kind still are piling up. New requests made this week call for 20,000 tons for an Ohio river works and 10,000 tons for a central Ohio consumer, both for last half. A Marion, O., buyer who asked 4000 tons for second quarter and last half has closed. Various other tonnages for Ohio and western Pennsylvania steelmakers remain before the furnaces. Government allocations this week have been small; only one or two light orders were placed. Interest in the market centers on the approaching government price action. In some quarters the possibility of a reduction in pig iron in order to work out an increase of the spread between semifinished and finished steel products has come in for serious consideration.

Sharp Scarcity at Chicago

Chicago, March 12.—Although last half production has been sold fully by local producers, large inquiry for all grades of pig iron continues to come out in this market. Malleable users apparently have need of considerable more iron than they have been able to contract and basic requirements are heavy. One inquiry by a St. Louis melter is for 40,000 tons of basic for last half delivery. Local producers have been unable to entertain this business. Other basic users are also in need. All merchant stacks in the Chicago territory, with the exception of one at Milwaukee are now active, but fuel conditions have cut down production and probably not more than 25 per cent of normal tonnage is being turned out. This has the effect of delaying deliveries somewhat, but every effort is being made to keep consumers supplied as well as possible. Southern producers are not selling freely, fuel conditions and uncertainty of delivered prices during the second quarter and last half apparently being a bar. Silveries and

bessemer ferrosilicon which could be bought up to within the last fortnight are now more difficult to obtain and some buyers have been unable to cover requirements.

Basic Is Allocated

New York, March 12.—Larger tonnages of pig iron are being distributed in the east by government direction. Buffalo furnaces during the past few weeks are understood to have been allocated through the Emergency Fleet corporation many thousands of tons of basic which are to go to works filling orders for the latter. The ordnance department is expected to place some large basic lots soon. It is reported that the Gould Coupler Co. has closed for 15,000 tons of second half basic, but this is not confirmed. Inability of consumers to bring out quotations has caused some falling off of foundry inquiry. Offerings continue mainly of off grades. Much interest has been aroused by the report that a large consumer with numerous plants recently made representations at Washington for a reduction in the price of pig iron allowable to southern furnaces.

Southern Offerings Larger

Cincinnati, March 11.—As the inquiry for southern foundry iron decreases, offerings of iron for second half shipment increase. Practically little No. 2 foundry for that delivery was to be had two weeks ago, but some now is quietly offered. The tonnage necessarily is limited and no sales of consequence have been made.

Basic Tonnage Closed

St. Louis, March 9.—In point of actual business transacted, the past week has been about the quietest which the pig iron market has experienced in 18 months. A fair scattered demand was reported, but sellers have virtually quit, having nothing to offer for any delivery. A recent basic transaction closed in the east involves 20,000 tons for last half to the National Enameling & Stamping Co., East St. Louis. This consumer still wants 10,000 tons for Granite City. Large tonnages have been sold in this market for first half delivery and quite a bit for the third quarter. For that period, therefore, needs are well provided, but decided apprehension is felt relative to later supplies.

Famine is Predicted

Birmingham, Ala., March 12.—Selling of pig iron in the south still goes on in small lots and mainly to regular customers. No trouble whatever is being experienced to dispose of iron and there is no inclination to sell indiscriminately.

Coke Traffic is Improving

Car Supply This Week Raised to 70 Per Cent—Furnace Receipts Still Inadequate—Pool Plan Not Yet Abandoned

Pittsburgh, March 12.—Improvement is reflected in the supply of cars in the Connellsville coke region. The average on the Monongahela for last week was only 43 per cent and yesterday and today was approximately 70 per cent. Whether or not this showing can be maintained is a question. It has been common of late for the railroads to supply good averages one day only to fall back the next day to a low point. This has been especially true of the Pennsylvania railroad, which furnished a 78 per cent supply yesterday to the Monongahela line. The Pennsylvania's average for last week was only 20 per cent as compared with an average of 80 per cent supplied by the Pittsburgh & Lake Erie railroad. Blast furnace interests report that while heavier shipments of coke are being received, they fall considerably under requirements and because of the irregularity of their arrival has placed some operations upon an almost day-to-day basis. It is understood that some equipment from the east has been diverted to the coke region in accordance with an order recently issued by the railroad administration. This is said to have proven helpful. For all practical purposes it is also said that the railroads have placed in operation the proposed change in car rating so that the supply is based on the number of ovens available for service instead of the number of ovens actually in blast. Tariffs calling for this change so far as known have not been approved by the interstate commerce commission, but it is not thought there will be any difficulty in having this done. There is practically no talk being heard at present regarding the pooling of coke shipments, but it is claimed that one railroad line and a representative of the fuel administration has not yet abandoned the plan as being impractical despite the claim of coke producers and consumers as well as the other railroad lines that it is not either feasible or desirable. Production in the Connellsville region for the week ending March 2, totaled 285,828 tons as compared with 264,849 tons during the preceding week according to the *Connellsville Courier.*

More Second Half Sales

Philadelphia, March 11.—Further sales of second half foundry coke, aggregating a large tonnage, have been made in this district during the past week. They were made entirely by a western Pennsylvania beehive maker. No blast furnace coke has been sold for some time. Despite the fact that shipments of coke are reported as improved, deliveries continue as slow as before and most eastern blast furnaces are hungry for fuel.

Pocahontas Fuel at $8

Cincinnati, March 11.—The fixing of a price of $8 per ton on Pocahontas coke was not generally known, as there was very little fuel in that district to be disposed of. The few carloads of foundry coke sold within the past week were on a basis of $8, ovens, but no transactions involving furnace coke have been made. Whether the same price is allowed on furnace coke is a matter yet to be determined. Slow shipments from all districts cause considerable complaint.

Shortage is Pinching

St. Louis, March 9.—The coke situation in this and the surrounding region continues lamentable. Best posted authorities say it has not eased up an iota and further there is nothing in sight which indicates that things are going to get any better in the near future. While plants in the district proper are not suffering to any great extent, they have to struggle for all the fuel they get and outside the zone cries for help come in daily. The car supply is extremely irregular, and receipts of foundry coke from eastern ovens are very disappointing. Owing to scarcity of the proper sort of equipment, the main producer here has had on several occasions to sell and load out foundry grade as domestic coke. Box car scarcity is growing.

Coke Production Unsteady

Birmingham, Ala., March 12.—While some improvement is to be noted in coke production in the south over last month, the output still is unsteady and pig iron production is being affected. In Alabama there is a better output at coke ovens than for some time. However, there is not as much coke throughout the south as there is need for it and two or more furnaces either are shut down or cannot be started because of this short supply. The coal mining situation is somewhat improved.

Scrap Shows Easier Trend

Uncertainty Over Commissions and Over Prices Beyond April 1 Continues Restraining Factor—Traffic Conditions Better

FOR COMPLETE SCRAP PRICES SEE PAGE 696

Pittsburgh, March 12.—Dullness in the market for iron and steel scrap continues and largely is due to the fact that nothing has been announced regarding the allowance of sales commissions. Consumers, it is understood, in most cases would be glad to pay a commission to dealers and brokers. In the absence of official interpretation by the scrap committee of the American Iron and Steel institute, however, they feel they have no right to pay any higher prices for scrap than those which have been fixed. Brokers and dealers also feel they have no right to accept a commission and say that unless they are able to do so, they can make no profit and therefore have no incentive to sell. Transactions involving limited lots are said to be under way between consumers and producers. No. 1 heavy melting steel, low phosphorus and No. 1 cast scrap are the grades which are in chief demand. With conditions in the traffic situation improving somewhat it is believed that once the market becomes active again there will be less difficulty than that experienced recently about making shipments.

Pennsy Distributes Tonnage

Philadelphia, March 11.—The Pennsylvania railroad has distributed about 10,000 tons of iron and steel scrap on the list it recently issued. Indications are that maximum prices were received, and that all of the scrap went to consumers direct. Sales reported here during the past week were made up of only moderate tonnages of cast scrap for foundry use. No heavy steel or wrought scrap figured. Although prices still are unchanged, the market generally reflects a weaker tone. Scrap is easier to get than at any time in months and shipments are being got through with less difficulty.

Rail Movement Better

Boston, March 11.—There has been no special change in scrap prices during the past week. The eastern Pennsylvania market for steel scrap is weak, with mills in that region taking less than they have recently in this territory, but the Pittsburgh market is strong both as regards demand and prices. The improvement in the railroad situation has resulted in a better movement of stock to buyers but it would still be exaggeration to say that the shipping situation is any better than fair. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought, No. 1 yard, long, $30 to $31; horseshoes, $30 to $31; cotton ties, $22 to $23; stove plate $20 to $20.50; No. 1 machinery, $32 to $33; No. 2 machinery, $28 to $29; car axles, iron, $42 to $44; steel, $43 to $44; rerolling rails, $31 to $32; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $28 to $29; steel rails, $26 to $27; No. 1 railroad steel, $26.50 to $27; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $15 to $16; cast borings, $16 to $17; drop forge trimmings, $23 to $24; cast iron car wheels, mill price, $35 to $37.

Demand is Strong

Buffalo, March 12.—The market now is marked by a good, strong demand for nearly every class of scrap with a pronounced scarcity of many of the big selling grades. There is a marked shortage of cast scrap, railroad malleable and car wheels and hardly a less noticeable shrinkage of heavy low phos and heavy melting steel. Conditions in yards still justify the assertion that there is no such thing as yard stocks. But shipping conditions are easing a little more and on the whole the situation is improving. There is a good demand for turnings and large quantities of these are beginning to come onto the market, but it is as yet too soon to say whether the amount produced is going to be in excess of the demand or not.

Commission Still Puzzles

Cleveland, March 12.—Scrap iron and steel prices are subject to revision March 31 along with iron and steel products, though the latest schedule has been in effect only since Feb. 21. Some dealers regard it as certain that the present arrangement of f.o.b. works will be revamped because of the discrimination that accrues to some scrap consumers by reason of location and consequent freight rates. As to commissions, dealers more and more have come to the feeling that to charge them is illegal so long as the present announcement stands unamplified. Some dealers are said to be receiving a 3½ per cent commission; in other cases consumers, while willing to pay one, hold to the belief they dare not. The trade still feels that the subcommittee which announced the new prices and classifications should make some explanation on commissions. Open-hearth plants are buying all the steel they can; otherwise little trading is under way. No sales of cupola size cast at $35 are reported in this district, though foundries have offered to pay pig iron prices for it. Dealers could sell most grades of scrap below government maximums, but are holding back, feeling they will be able to get the full price. The Lake Erie & Western railroad is offering a small list of 14 cars.

Business Still in Rut

Cincinnati, March 11.—Business does not seem to be able to get out of the rut. The inaction of the past few weeks appears hard to overcome. Occasional spurts develop that indicate melters of scrap are still interested in the market, but they are very slow in making contracts for a future supply. The traffic situation has improved considerably but permits still are necessary to make shipments to some Pittsburgh territory consumers. Dealers and consumers are slow in getting together on prices and transactions are so few that no definite figures on some grades of scrap have been established.

Acute Shortage Expected

Chicago, March 12.—Indications are that a severe shortage of scrap is likely to come about in this district and signs are multiplying to bear out this expectation. At present rerolling rails are almost impossible to obtain and some mills have had operation much restricted from lack of raw material. Various factors conspire to keep the market in a state of uncertainty and to restrain trading. Lack of provision for commission on sales is hurting dealers and the possibility of quotations being changed on material delivered after April is limiting trading. Railroad offerings are somewhat freer at present, but still are far below usual volume. The Northern Pacific is offering 2600 tons, the Union Pacific 1635 tons, the Wabash 1100 tons, the Chicago, Milwaukee & St. Paul 820 tons, the Chicago Great Western 600 tons and the Chicago & Eastern Illinois 300 tons. Although at this season movement of scrap to consumers usually is at a high tide, dealers now are not able to obtain sufficient tonnage to fill their

requirements. Only a few cars are being shipped in some instances where consumers have contracts for thousands of tons.

Waiting Attitude in South

Birmingham, Ala., March 12.—The southern scrap market is in a waiting attitude, the consumers apparently being anxious to see what the government will do in the matter of revision of the pig iron schedule April 1. Stocks of old material in the south are in good shape and have been accumulating a little but the dealers do not manifest any concern. While quotations nominally are unchanged, consumers are not willing to pay this price by as much as $1 in some grades. Inquiries are being received from the north, but there have been no sales. Railroad car service is greatly improved.

Shortages Threaten Plants

St. Louis, March 11.—The inability to move scrap to the mills is causing considerable inconvenience and an acute shortage threatens several of the more important plants. Sellers have been under fire to expedite shipments, and in turn have waged war with the carriers, all, however, to little purpose. So far as can be gathered, dealers have taken kindly to the new prices and regulations, and little complaint is heard. Most of the big melters in the district are willing to purchase at the maximum government price for prompt delivery, but owing to the demoralized transportation, dealers cannot promise any shipment whatever. The labor flurry here has caused some uncertainty but it is believed this element will be adjusted shortly. Sentiment with the melters is bearish despite the temporary paucity of supplies. Railroad offerings are somewhat heavier, including Pennsylvania Lines-West, 1650 tons; Wabash, 1200 tons; Missouri, Kansas & Texas, 900 tons; Mobile & Ohio, 700 tons; Kansas City Southern, 650 tons; New York Central, 600 tons, and Pere Marquette, 200 tons.

Rush Work on Dayton Blast Furnaces

Every effort is being made by the Dayton Co., Dayton, Tenn., to push work at its mines, coke ovens and blast furnaces in order that its Dayton properties may again be placed in operation. The company states that some delay has been experienced on account of embargoes placed on raw material and at present it is impossible to say when the blast furnaces will be ready for the torch.

Sheet Bar Needs Unfilled

Consumers Find Great Difficulty in Getting Supplies and Mill Activities Suffer—Steelmakers Are Also Short

Pittsburgh, March 12.—Demand for sheet bars continues to be heavy and there are no offerings in the open market. Inquiries come from various sources, including sheet and tin plate makers and producers of sheet bars themselves would be buyers if it were possible to obtain tonnages. Producers are not able to make shipments in sufficient quantities to take care of specifications. Most of the tonnage moving now is understood to be going at the government price of $51, a gross ton, Pittsburgh, old contracts apparently having been filled. Inquiries for 4 x 4 billets are not numerous. There is a shortage of this material and no offerings are being made. Plate makers are seeking slabs, a number of inquiries having come from the east. The round tonnage of ingots which was recently offered has not been sold so far as known and this probably is due to the fact that it is high in carbon.

Strip Requirements Heavier

Pittsburgh, March 12.—Heavier requirements are being placed by the government for cold rolled strip steel. Domestic consumers are showing increased interest in the market but as yet are not taking sizable amounts. Their stocks appear to be almost exhausted.

Eastern Scarcity Continues

Philadelphia, March 11.—Users of semifinished steel in the east continue to have great difficulty in getting supplies. Eastern producers, as a result of their curtailed operations this winter, are unable to do any better than deliver part of the tonnage due on contracts. The only sales reported are occasional small tonnages from the Pittsburgh and middle western districts. These comprise almost exclusively rerolling billets. It is practically impossible to get slabs and forging billets.

Production is Taxed

Cleveland, March 12.—Consumers of semifinished steel, especially sheet bars, who are uncovered on considerable of their requirements continue to meet with little success in filling these needs. Makers are obliged to persistently decline to take orders because their production is taxed either through their own needs or through government business. Steelmakers in this district continue to be occupied largely with direct and indirect war tonnage and some of them are short of steel themselves. The scarcity in sheet bars is reflected by the fact that some plants which ordinarily produce their own supplies have been endeavoring to make trades with other steel producers whereby the latter would furnish sheet bars in return for other materials. An inquiry for 1800 tons of rerolling billets monthly for a northern Ohio maker of automobile parts still is pending.

Mills Forced Down

Youngstown, O., March 13.—Scarcity of sheet bars continues to pinch the mills in this district. One producer has been obliged to shut down several mills because he can't obtain bars of the required specifications. One sheetmaker recently had 400 tons of bars available for sheets which originally were intended for export. The buyer countermanded this order because he was unable to obtain an export license. Except for such cases few makers have any sheet bars in stock that are not covered by specifications.

Sheets Raised

From Cleveland Store to Include Full Freight—Shipments Better

Cleveland, March 12.—Prices of sheets have been increased by one jobber 0.035c per pound. The new price for No. 28 black is 6.385c; No. 28 galvanized, 7.635c and No. 10 blue annealed, 5.385c. These changes were made merely to conform with the government's recommendation made some time ago that jobbers add to their prices the carload freight rate from Pittsburgh. This jobber had made an initial change of only 10c.

Shipments Coming Through

Boston, March 11.—Conditions in the steel and iron jobbing trade are unchanged aside from the fact that dealers are not having quite so much trouble as recently in getting through their shipments from the mills. This is explained by the fact that the mills are running fuller and the traffic situation has been helped by the more favorable weather. The character of the local demand has not changed; structural materials move slowly.

Bar Orders More Liberal

Specifications Against Contracts Are Active—More Selling Being Done—Pleasure Auto Building Cut to 30 Per Cent

Chicago, March 12.—Specifications on existing contracts are being received in heavier volume than ever, all consumers with contracts apparently seeking to obtain everything possible from mills. Sales continue in good volume, practically everything being for government purposes with only occasional small lots for private users. Production and shipment are assuming more nearly normal conditions and the leading interest now has 24 out of its 29 blast furnace stacks active, which approaches close to full operation. Further conditions depend on fuel receipts and additional coke ovens being made active. Agricultural implement manufacturers have been covered as far as mills are able and probably will not suffer for supplies. Bar iron manufacturers are coming back into better operating condition now that coal is moving more freely. Inquiry and orders are coming in steadily, although in small tonnages and for prompt delivery. Some inquiry is being received from the south and the east, consumers apparently being unable to cover their requirements nearer home. Inasmuch as mills have lost much time recently, consumers are seeking delivery on tonnage bought some time ago. Considerable iron is required by wagon manufacturers for tires and orders of 300 tons and upward have been taken for this purpose. Hard steel bars are not in strong demand although manufacturers are placing some business. Reinforced concrete builders are also becoming more lively as the building season nears. On account of short supply of rerolling rails, mills are not anxious to sell beyond such material on hand. Shortage of rails is such that plant operation is spasmodic.

Car Shortage Checks Output

Pittsburgh, March 12.—Makers of steel bars report that shortage of cars again has curtailed production. Mills had been operating rather heavily and making good headway in catching up on deliveries. Demand is fair but it is believed it will become heavy in the near future when the implement trade begins to place requirements for next year. Heavy tonnages also will be required for farm tractors. The development of this machine is an extremely interesting subject and will have a far reaching effect on steel bar requirements. It is estimated that there are now approximately 50,000 farm tractors in the United States and that the number will be increased by 70,000 before the end of the year. Makers are expected to be in a position to take care of requirements before long and every effort will be made to supply the implement trade.

No Effects of Auto Cut

Cleveland, March 12.—Announcement that production of pleasure automobiles will be cut to 30 per cent of capacity during the coming fiscal year has produced no reflection as yet in the market for steel bars and other products in this district. Some weeks ago it was stated that the curtailment of this class of production would amount to about 50 per cent and steel makers have been prepared to furnish material on that basis. Some of the automobile builders have been specifying freely for steel but some of this is for airplane motor work. The demand for bars apart from government requirements continues more active. The George A. Fuller Co. is the low bidder on viaduct work in Kansas City requiring 1000 tons of reinforcing bars. Flood reclamation work at Columbus, O., requiring about 500 tons. The inquiry for 55,000,000 bolts for the engineers' depot is being revised.

Fair Demand for Hoops

Pittsburgh, March 12.—The market for hoops and bands remains unchanged. Fairly active demand exists for hoop and flat steel while the market for bands is dull.

Car Supply Better

Pittsburgh, March 12.—A larger supply of cars is at the disposal of nut, bolt and rivet makers and in consequence they have been able to increase their operations, which are devoted largely to government orders. No large requirements have been placed by it during the past week. Deliveries to domestic buyers depend upon the grade and quantity of material and range all of the way from two weeks to 90 days, the average being six to eight weeks. Prices for shipment after April 1 are made subject to government revision. Producers are succeeding in getting sufficient supplies of steel bars. They claim that the existing government prices afford such a narrow margin of profit that it is not believed they will be reduced.

Places Reinforcing Bars

New York, March 12.—The Turner Construction Co. has placed the 8500 tons of concrete bars for government buildings on which it recently asked prices. Of this amount 4500 tons for army and navy buildings at Washinton went to Bourne-Fuller Co. and the Concrete Steel Co., and 3700 tons for naval stores buildings in South Brooklyn to the Cambria Steel Co.

Shafting Buying Increases

Pittsburgh, March 12.—Increased purchases of cold rolled shafting by miscellaneous domestic consumers have developed. The bulk of buying still is being done either directly or indirectly for the government. Greater output has made it possible for producers to give better shipment to private consumers but most of the tonnage for them is for second quarter. Prompt sales are made at the fixed level of 17 off to list, Pittsburgh.

Buffalo Maker Sells

Philadelphia, March 11.—Demand for steel bars still continues active, and is considerably larger than the mills can accept. Makers are taking on tonnage only when practically forced to do so by regular customers. Only one mill, a Buffalo interest, has really made definite offers and it now has about all the orders it wants. Some hard bars, rerolled from shell discards, are being sold at 2.90c, Pittsburgh.

Export Inquiry

For Rails More Active—Few Cars Being Placed

New York, March 12.—Inquiry for rails for export has become quite active during the past couple of weeks and current inquiries involve many thousands of tons. In most cases, these inquiries call for 500 to 2500 tons, but some of them involve as much as 5000 tons. Among new inquiries is one from Java for 1500 tons of 20-pound rails, and most of the other inquiries come from various countries in South America, and involve 60 to 70-pound rails. This business cannot be quoted on by any of the mills, not only because of the export embargo, but because of the fact that they already are behind in deliveries on many hundreds of thousands of tons of rails for domestic roads. It is reported that 50,000 to 60,000 tons of rails of the old Hudson Bay railroad have been purchased by England and are to be torn up and sent

abroad for relaying on newly built lines.

Some miscellaneous inquiry is before the market at this time, principally for tank cars. The largest of these call for 250 for the United Securities Co., and 300 for Cio Anfaldo & Co. Other inquiries for tank cars include 100 for the Oil Gas & Lease Co., 30 for the Pure Oil Co., and a number for Fels & Co. The Paragon Refining Co. recently awarded 20 tank cars to the Pressed Steel Car Co.

Await Government Program

Chicago, March 12.—Buying of steel rails and rolling stock by railroads is practically at a standstill since the impression has gained ground that the government will buy or supervise the buying of these supplies. Some small lots of standard rails have been placed recently, supplementary to previous contracts. Considerable inquiry exists for track fastenings but most railroads have sufficient supply already covered on former contracts.

Small Spikes Are Bought

Pittsburgh, March 12.—Fair sized lots of small spikes are being booked but the demand which comes chiefly from jobbers, exceeds the supply. Some makers are out of the market. Demand for standard railroad spikes is also increasing and a number of small orders have been taken during the past week for prompt shipment. The market for light rails is rather brisk and makers are in a position to give good deliveries at the fixed price of 3c per pound, mill. The market for standard rails continues dull.

Stocks Growing

In Tin Plate Because Car Supply is Far Below Needs

Pittsburgh, March 12.—Despite the recent order of the railroad administration allotting a full supply of cars to tin plate mills, the amount of rolling stock available is far short of the requirements. Last week only 65 per cent of the promised allotment was furnished. Operations of all the mills are from 80 to 85 per cent of capacity. It is therefore obvious that stocks in warehouses are accumulating and unless relief is forthcoming soon in the way of more cars, the storage capacity will become exhausted and compel producers to curtail output. This would be particularly distressing in view of the urgent necessity of operating at capacity to meet government demands. There has been a large loss in production of tin plate and the situation is serious.

More Ship Tonnage Placed

Eastern Plate Mills Receive 50,000 Tons For Merchant Fleet—More Open Market Selling—Keenly Await Price Action

Philadelphia, March 11.—Orders totaling at least 5000 tons were allotted to eastern Pennsylvania mills by the government during the past week. The greater portion of this business was placed by the Emergency Fleet corporation. In addition, more tonnage is being accepted by the mills from ordinary domestic users. One eastern Pennsylvania maker sold some 5000 tons of tank plates for delivery in six to eight months, and a Buffalo mill has taken considerable tonnage of tank plates for delivery in the next few months. Eastern makers are waiting with great interest the action which will be taken by the government with respect to prices that are to prevail after April 1. All the eastern mills who buy their raw material in the form of pig iron or semi-finished steel have requested an advance from the prevailing price of 3.25c, Pittsburgh.

Want Higher Prices

Pittsburgh, March 12.—Considerable interest is being manifested as to what the government may do with regard to fixing prices on April 1 for plates. The small consumers are insisting that the present level of 3.25c, Pittsburgh, is not profitable and that a higher figure should be allowed by the government. There is much sympathy with this position and these producers and the trade generally appear to feel that the request for an increased price will be granted, although action of this kind is by no means certain. Production of plate mills is proceeding at a high rate. Some authorities have expressed the belief that because of the large capacity, plates can be produced faster than the shipyards and other consumers can use them, and that therefore it would be a good plan to divert a portion of the ingot tonnage temporarily to other lines of output whose necessity is immediately pressing. Car makers have about cleaned up all their orders and would be in a position to begin work on this large volume of rolling stock at once. No offerings of plates are being made in the open market. The vast bulk of the output is for the government.

Government Tonnage Heavy

Chicago, March 12.—Large tonnages of plates, principally for ship construction, continue to be distributed by the government and furnish a heavy aggregate now on mill books. Considerable tank work will be required for power manufacturing plants about to be erected, which will add to necessity for supplying plates for that purpose. It is believed that better operating conditions of mills will shortly bring deliveries to a point where consumers will have excess supply and where steel can be diverted to other purposes temporarily, thus balancing operations better than at present.

Pipe Delivery

Hampered By Embargoes—Costs Rise—Cast Product Listless

Pittsburgh, March 12.—Embargoes in the east are hampering shipments of iron and steel pipe, but tonnages are moving in other directions and operations are proceeding on a good basis. One plant in the Pittsburgh district is operating fully on its lap weld capacity. Demand for this class, both iron and steel, is heavy and mills report there is no difficulty in making sales. Some producers are out of the market. It is claimed that the cost of some mills to make pipe has increased 25 per cent since the government established prices, and because of this makers feel confident the government will not lower schedules but that it would be justified in increasing them. Effective March 7 the Youngstown Sheet & Tube Co. issued a new card on electrical conduit pipe reducing the price $8 a ton by increasing the discounts on the base sizes, ¾ to 3-inch, from 17 to 21 off on galvanized pipe and from 23 to 27 off on black pipe, Pittsburgh. This replaces the card of May 2, 1917.

Miscellaneous Orders Fair

New York, March 12.—Although there is a lack of large inquiries, a good volume of miscellaneous business continues to come out in the eastern cast iron pipe market. This demand principally is from private consumers, as has been the case for the past several weeks. Government buying at this time is relatively small. Included in business recently placed are several hundred tons of bell and spigot pipe for the government explosive plant at Charleston, W. Va. This work went to the United States Cast Iron Pipe & Foundry Co. Flange

pipe for the Charleston plant is to be purchased shortly. The market practically is void of inquiry from municipalities. Export buying also is dull.

Cast Pipe Demand Slack

Chicago, March 11.—Cities continue to keep out of the market for cast iron pipe and the present situation is duller than has been experienced for a long time. Bids were to be opened at Beresford, S. Dak., March 11, on 185 tons and at Niagara, Wis, March 14, on 142 tons. The United States Cast Iron Pipe & Foundry Co. is low bidder on 1500 tons at Akron, O, and 350 tons at Minneapolis.

Wants Many Hangar Sheets

Government's Requirements of Corrugated Material for France Placed at 50,000 Tons—Production Low—Government Places 2000 Tons

New York, March 12.—A tremendous tonnage of corrugated sheets will be required by the government in connection with the construction of 25 hangars in France, which have been recently up for action. It is estimated that 50,000 tons of No. 22 gage sheets will be needed for these purposes. The contract for a number of these hangars already has been closed and further awards are to be made in the near future.

Operate at Low Rate

Pittsburgh, March 12.—Sheet mills are being operated at a low rate of capacity again on account of the shortage of sheet bars, together with the unsatisfactory transportation situation. One large maker was able to produce at only 13 per cent of full output yesterday and the output today was not increased much. This is not indicative of general operations, the specific average of which has not been made known, but is significant as showing the conditions which mills are facing. Rough estimates have been made that operations of all mills represent approximately 50 per cent of capacity. The government continues to place large orders for sheets. Sales being made to domestic consumers cover comparatively small lots. Producers have allotted their sales for the first half as a general thing and free tonnages available are small. This gives further evidence that there will be an extreme shortage for domestic consumption.

Government Orders Placed

Youngstown, O., March 13.—Buyers of sheets in this district evidently are not expecting any change in prices in the near future for they are inquiring for all grades. The government continues to be an active buyer and this past week has come out for further tonnages. One valley mill has closed for about 2000 tons of governmental galvanized tonnage which will be used for buildings now under construction at various shipyards. Another producer has taken about 800 tons of galvanized sheets to be used for roofing and siding of ammunition buildings which the government is constructing in this country. The government has been a heavy buyer in this district for several months and 65 per cent of the production of one mill the past week was of this character. Export business has fallen off considerably. Producers attribute this to the failure of the buyer to obtain permits. Shipments for western export are being dispatched frequently, however, and six permits were issued this week which authorized one mill to ship fair-size tonnages of black and galvanized to consumers in Australia. One valley maker has several mills idle on account of his being unable to obtain sheet bars to meet specifications.

Export Demand Heavy

Chicago, March 12.—Inquiry for steel sheets of all gages and grades is the outstanding feature of the market in the west. This demand comes from South America, Central America, the Orient and to some extent from European countries. It includes both black and blue annealed and galvanized. Domestic consumers for the most part have tonnages still coming on previous contracts and are not inquiring heavily at present, as they realize the situation is such that present buying would not bring deliveries for a long period. It is believed that could deliveries be made promptly, domestic users would come into the market for heavy tonnages. It is estimated that independent sheet makers are now running their mills at 80 per cent of capacity with the leading interest at a somewhat lower rate. Practically all sheets which can be made and delivered during first half are under contract.

To house shipwrights, the government will commandeer all vacant living quarters in the neighborhood of Hog Island, near Philadelphia.

Ferro Tonnage

Is Closed by Pittsburgh Consumer—Spiegel Prices are Stronger

New York, March 12.—A Pittsburgh district consumer has closed for 5000 to 6000 tons of ferromanganese for the second and third quarters with several producers at approximately $250, delivered. This is the largest purchase of this metal in several months. Approximately 1500 tons were placed by other consumers and about 200 tons of English metal were sold for forward delivery to a New Yorks state consumer.

Spiegeleisen is scarce for delivery prior to July 1 and it is doubtful whether any more first half tonnage is available at less than $65, furnace. It is likely that $70 would have to be paid. Sellers recently doing $3 per unit are now obtaining $3.50. Several hundred tons of 30 to 40 per cent have been sold at the latter price. New inquiries call for several thousand tons. The Algoma Steel Corp. has decided to postpone the placing of 3000 tons for second and third quarters.

The contract market on 50 per cent ferrosilicon now stands at $155, delivered. Two important makers quoted this price during the week. Spot material is scarce and is moving up. Prices range from $180 to $185, delivered.

Ferrochrome Strong

Considerable diversity in prices characterizes the ferrochrome market. Prices quoted on contracts by the leading producer for some time have ranged from 31 to 34 cents, furnace, for 60 to 70 per cent ferrochrome containing 4 to 6 per cent carbon. This interest has been restricting spot sales to urgent additional requirements of customers under contract. Prices in the outside market, however, are much higher and nothing less than 40 cents per pound, furnace, can be done. On attractive lots for the next 30 to 60 days, 40 to 42 cents is being named in some cases. Ordinary spot lots are bringing from 45 to 48 cents. Production of ferrochrome may be increased slightly in the next few months as efforts now are being made to increase the importation of chrome ore. Ferrotungsten is quoted at $2.20 to $2.25 per pound at the furnace for 70 per cent metal. Demand has quieted down somewhat.

Wait For Price Action

Pittsburgh, March 12.—Consumers of 50 per cent ferrosilicon are putting out inquiries for second quarter and last half in increasing number.

Only small tonnages are being taken. It is apparent that buying is checked because of the price-fixing program on April 1; and consumers seem to think this may affect and soften the ferroalloy market. Makers say they do not see any likelihood of such products as 50 per cent ferrosilicon and ferromanganese being brought under price control although it is reliably reported there is a movement under way to have this done. A price of $150, delivered, is quoted by one seller for last half 50 per cent ferrosilicon, while the prompt market continues at $175 to $180. A price of $190 has been asked. A few small inquiries for ferromanganese are out. The market is quotable at $250, delivered, for prompt shipment. It is reported that a price of $245, delivered, has been quoted by an electric furnace interest in the Far West on an inquiry from a Pittsburgh consumer for a round tonnage. Approximately 1000 tons of prompt 20 per cent spiegeleisen were sold by a Pittsburgh middleman to an Ohio consumer at $62, furnace. The war industries board has issued a form which requires buyers of ferromanganese to pledge themselves, that they will consume and not divert tonnages to other sources.

Ferro Price Shaded

Cleveland, March 12.—A local steelmaker has bought 600 tons of ferromanganese for delivery over the remainder of the year. A price of $250 delivered is understood to have been considerably shaded.

Chicago Ferro Steady

Chicago, March 12.—Considerable inquiry is being entertained by the western maker of ferromanganese but selling is restricted in view of uncertain ore conditions. The quotation remains strong at $250 per ton at the furnace.

Spring Trade

Opening Briskly in Wire Products—50,000 Kegs of Nails Asked

Cleveland, March 12.—Open weather conditions have considerably stimulated the demand from jobbers for fencing, wire nails, barbed wire and similar products. This is a result of the heavy demands which the dealers have been putting upon the jobbers during the past week or two. Some of the jobbers had been fairly swamped because the dealers have had no stocks and the opening of spring purchases by consumers had sent them scurrying for supplies. There is an active market for small spikes, especially boat spikes, and deliveries have dropped back for some makers to 14 and 16 weeks.

Seek Large Nail Lots

Pittsburgh, March 12.—Bids are being asked by the bureau of supplies and accounts, navy department, to furnish approximately 50,000 kegs of nails of various sizes for last half delivery to navy yards. Makers are asked to fix delivered prices but they would prefer to name mill prices because of the uncertainty as to what change may be made in freight rates before deliveries are begun.

Shape Demand More Active

Eastern Mills Enter Better Tonnage From Miscellaneous Sources—More Tonnage For Powder Plants is Placed

Philadelphia, March 11.—Demand for structural steel, while not really active, has improved markedly. Orders for at least 5000 tons of plain shapes have been placed during the past week. The largest order involved 1500 tons for a car builder. At least two 1000-ton lots were closed and a great many small tonnages. Most of this business was placed by jobbers and considerable came from fabricators. A large part of the material ordered is wanted in connection with government work. The Belmont Iron Works has received a contract for 20 of the 2500 airplane shelters on which bids recently were taken for erection in France. It is understood the letting of the remainder is held up temporarily.

Government is Large Buyer

Pittsburgh, March 12.—Large tonnages are involved in orders being placed by the government with fabricators in this district. The bulk of shop operations is devoted to its requirements. No difficulty is being experienced in getting steel tonnages where they are to apply on government orders but in the case of domestic orders, material cannot be had readily.

Ship Material Leads

Chicago, March 12.—Tonnages of structural material to be furnished fabricators preparing parts for ships continue to be placed by the government and furnish the largest proportion of new business. This work is keeping most shops busy and piling up somewhat on their ability to deliver. Powder manufacturing plants to be erected by the government are bringing some tonnage into the market and contracts have been let for two of these units, to be located at Nashville and Chattanooga, Tenn. The steel has been divided among fabricators but preference has not been given and the latter have been seeking to place the plain material. The total amount of steel required for all these plants has been placed at 20,000 tons. The Missouri Pacific has placed 497 tons for a bridge near Watson, Ark., with the American Bridge Co., contingent on obtaining government consent to build the bridge.

Powder Plant Steel Placed

New York, March 12.—Aside from a few contracts bearing on war work, little is appearing in this market in the way of new tonnages. Commercial demand continues at exceedingly low ebb and despite the near approach of spring, little is in prospect. It is believed that anything like a sizable tonnage at this time would bring forth the keenest competition among the majority of fabricators. A recent contract to be awarded this market is that involving about 1250 tons for the new government explosive plant to be erected by the Atlas Powder Co., near Perryville, Md. A similar tonnage for this work was also awarded to the McClintic-Marshall Co. Several sizable tonnages for the railroads still are pending.

CONTRACTS AWARDED

Atlas explosive plant, Perryville, Md., 2500 tons, to McClintic-Marshall and Levering & Garrigues.

Machine and erecting shops, blacksmith shop and car repair shops for Lake Superior & Ishpeming Railway Co. at Marquette, Mich., 268 tons to Lackawanna Steel Co.

Bridge for Missouri Pacific railroad near Watson, Ark., 497 tons, to American Bridge Co. Contract contingent on government consent for project to be carried out.

Powder plant for government 1100 tons a partial contract awarded to the Central States Steel Co. Much larger tonnage still to be placed.

Extensions to the plant of the Campbell Soup Co., Camden, N. J., 150 tons, to an independent shop.

Rebuilding of Monticello hotel, Norfolk, Va., 300 tons to Richmond Structural Steel Company.

CONTRACTS PENDING

Building for Edge Moor Iron Co., Edge Moor, N. J., 200 tons, bids being taken.

Marine Railway, Boston and Charleston, 500 tons, bids to be received by navy.

Secretary of Labor Wilson states that never before in his term of office have strikes been so few.

Foundrymen Fighting For Pig Iron

Organizing Protest Against Requisition by Government Action of Any Present Foundry Furnaces For Steelmaking Grades—Survey of Industry Being Made by American Foundrymen's Association to Demonstrate Its War Service

ORGANIZED cognizance of the threatened effects upon their business of the growing shortage of supplies of pig iron is being taken by foundry consumers. This movement has been brought to a head by the recent efforts of steel works in Pittsburgh and Ohio territory to induce the government to have changed over to the making of basic in their behalf, certain valley blast furnace capacity now on foundry iron. As recently stated in THE IRON TRADE REVIEW, these steelmaking interests have an uncovered requirement of at least 100,000 tons of basic for the last half of the year which they have been unable to cover in the open market because of the sold-up condition of the furnaces.

The effort to preserve a sufficient production of foundry and malleable grades of iron for the casting industry is being carried on by the official organization of the American Foundrymen's association. As a preliminary step, data are being collected to fix the exact part which gray iron and malleable plants now are performing in the production of essential war work. This information is being solicited in the form of a questionnaire which has been sent to all members of the association. Such replies as already have been received tend to show that approximately 50 per cent of the gray iron and malleable capacity of the country is engaged in some form of direct or indirect war business. The estimate of an engagement of 50 per cent capacity on war work is regarded as conservative. Recently a prominent middle western pig iron producer conducted an independent canvass of the list of consumers to which he was shipping foundry and malleable iron in order to determine to what extent this metal was going to government purposes. The replies elicited by this investigation indicated that 80 per cent of the iron being delivered by the several furnaces represented by the interest was being utilized for the manufacture of some direct or indirect war requirements.

Aim to Preserve Production

The survey of the foundry industry now being made by the American Foundrymen's association will be utilized in a vigorous attempt to preserve for this class of consumers a sufficient production of those grades of iron necessary to maintain their operations, especially along essential lines. The data thus compiled will be laid before the proper authorities at Washington in order that all aspects of the present situation may be understood and that no action shall be ordered which permanently may curtail the tonnage available for these shops. It is pointed out that already under the urgent pressure from steel works producing war tonnage and in some cases through the acts of those at Washington directing iron and steel distribution, there has been a switch to steelmaking grades of several regular makers of foundry and malleable iron. This has taken much tonnage out of the market for buyers of the latter class and has increased their difficulties in providing their requirements by forcing them to build up new sources of supply which they are scarcely able to do under present conditions.

These difficulties of providing supplies pertain mainly to forward requirements, especially after July 1. Then it is indicated the present shortened general production of pig iron and the increased demands promise to bring about a serious famine in this indispensable raw material. If such a development takes place the foundry industry because of the lessened number of blast furnaces operating in its behalf will be put in serious straits, it is set forth. The organized effort now being made to protect the interests of this industry is aimed to insure that this stringency which it is appreciated probably will have to be faced, shall not be aggravated by the subtraction of further foundry iron capacity from the present line-up of furnace operations.

The shifting of blast furnaces from foundry to basic iron would modify the demand for Lake Superior iron ore. Much of the ore for 1918 delivery has already been contracted for. These contracts were drawn in line with earlier market conditions and insure the delivery of tonnages of ore suitable for meeting the normal demand for both basic and foundry irons. Ore interests have not considered the situation brought out by the suggestion for reducing foundry iron production. Much of the ore now contracted for, running up to 0.35 per cent phosphorus, would normally not be used for producing basic iron, but in an emergency would be suitable for such purpose.

Wages Reduced

In Sheets and Tin Plate Because of Government Prices

As a result of the bi-monthly wage settlement of the Amalgamated Association of Iron, Steel and Tin Workers, effective for the two months following March 1, it is expected that all nonunion sheet and tin plate mill operatives in the country will have their wages reduced. Nonunion operators ordinarily follow the union wage scale closely. It develops at the meeting held at Youngstown this week, that the average sales price on 26, 27 and 28 gage sheet, shipments for the January-February period as $5.35 as against $5.50 two months earlier. On tin plate, the average price was $8.40 per base box as against $8.60 in November and December. This reflects the effect of the government price of $5 for 28 gage black sheets and $7.75 per base box tin plate and unless these are advanced effective from March 31, wages will still further recede.

At the last bar iron settlement, the price was $3.10, which means a boiling rate of $15.05. Should bar iron go to $3.50 the government level per 100 pounds, $17.05 would be paid puddlers or for the single operation of boiling, one-fourth the price of the finished product, $70 per ton.

Receives Advancement

George L. Danforth has been made assistant general superintendent of the Illinois Steel Co., South Chicago, succeeding Herman A. Brassert, resigned. Mr. Danforth long has been identified with the blast furnace department of the South Chicago works.

To Build Foundry

The Four Wheel Drive Auto Co., Clintonville, Wis., contemplates the erection of a steel foundry to be equipped with an electric furnace. G. H. Billings is purchasing agent.

New Steel Prices to be Fixed Soon

Steel Committee of American Iron and Steel Institute Will Meet War Industries Board March 20—Additional Prices Suggested—Operators Submit Ore Mining Costs

ON Wednesday, March 20, the general iron and steel products committee of the American Iron and Steel institute will take up with the war industries board at Washington the question of prices on iron and steel commodities after April 1.

The meeting is engaging the attention of the entire iron and steel industry. Government-fixed prices have now been in effect long enough to permit a thorough test of the whole price fabric under which the iron and steel industry is voluntarily operating. As a result, a number of claims have been brought before the institute committee by representatives of various lines of manufacture. These claims range from recommendations for changes in the prices of commodities on which the President set the quotations, to a request for fixed prices on commodities used in turning out iron and steel products. This latter class is understood to include such commodities as refractories, etc.

Want Price Fixing Extended

The institute committee has been petitioned to fix prices on all products entering into the manufacture of steel, as a means of stabilizing the price for steel products. The raw materials in steel manufacture have been placed under government price control, but a number of the accessories are obtainable only under open market conditions. This fact has been called to the attention of the institute committee by some steel manufacturers, who urge the inconsistency of setting prices for finished products without controlling quotations on all materials entering into their manufacture.

Many steel manufacturers attended the recent New York meeting held at the suggestion of the steel committee to secure information necessary in formulating price recommendations for the attention of the war industries board. One of the most interesting sets of cost figures which, it is understood, was brought to the attention of the steel committee related to iron ore prices. The 1917 prices on iron ore, which were set in November, 1916, have been continued in effect up until this time. The ore trade, accustomed to a 12-month basis of doing business, has been hampered in preparing for the 1918 season owing to the uncertainty regarding this year's prices.

The cost figures submitted by the independent ore interests show that for the underground mines in the Lake Superior district the margin between costs and sales price is sharply narrowed or disappears altogether if 1917 quotations are applied to 1918 costs of mining. Mesabi range underground mining costs follow:

Average Cost to Produce a Ton of Ore in October and November, 1917, of Mesabi Range Underground Mines, Showing the Profit or Loss of Operation.

Total tonnage shipped by independents in 1917 (Est.)	5,000,000
1917 tonnage of mines reporting costs:	
Bessemer	1,372,008
Non Bessemer	3,453,276
Total	4,825,284

	Bess.	Non-bess.	Total
(1) Labor	$1.184	$1.175	.....
(a) Powder	.094	.089	....
(b) Fuel	.129	.175	....
(c) Other supplies	.214	.219	....
(2) Total supplies	.437	.482	....
(3) Oth. mining costs..	.140	.133	....
(4) Depletion	.210	.276	....
(5) Depreciation	.111	.048	....
(6) Exp. of idle mines..	.009	.007	....
(7) Admin. exp.	.106	.085	....
(8) Royalties earned	.661	.492	....
(9) Total cost at mines.	2.812	2.678	....
(10) Rail and lake freight	1.819	1.760	....
(11) Insur. and analysis..	.021	.018	....
(12) Int. & carry'g chgs.	.106	.102	....
Total cost at Lake Erie..	4.761	4.558	....
Add 10c for hazards in mining and unsuccessful development	.100	.100	....
Total	4.861	4.658	....
Shrinkage in trans. (1 per cent B/L)	.049	.047	....
Grand total 1917 cost at Lake Erie	4.910	4.705	$4.763
Estd. increased cost in 1918—15 per cent of items 1, 2, 3 and 7....	.280	.281	.281
Total estimated cost at Lake Erie in 1918.....	5.190	4.986	5.044
Actual aver. price recvd. at Lake Erie in 1917...	5.630	4.650	4.933
Net profit in 1917 with 1917 ore price.....	.720	.05*	.170
Net estd. profit in 1918 with 1917 ore price....	.440	.33*	.11*

*Loss.

For the Menominee range underground mines whose operators submitted cost figures, the 1917 cost of iron ore is placed at $4.73 a ton, against an average price received of $4.76 a ton, a net profit of 3 cents. The estimated increase in cost this year is placed at 34 cents, so that if 1917 prices are reaffirmed the net loss this year would be 31 cents a ton.

On Marquette range underground mines, the net profit in 1917 is estimated at 41 cents per ton, but the net profit for 1918 on the basis of 1917 ore prices is placed at only 11 cents per ton. On Gogebic range underground mines, the net profit of mining ore in 1917 is placed at 4 cents per ton, while on the basis of 1917 ore prices operations in 1918 would result in a net loss of 39 cents per ton. Detailed figures for Menominee range underground mines follow:

Average Cost in October and November, 1917, of Menominee Range Underground Mines Showing the Profit or Loss of Operation.

Total tonnage shipped by independents in 1917 (Est.)	5,000,000
1917 tonnage of mines reporting costs.	3,332,749
(1) Labor	$1.244
(a) Powder	.239
(b) Fuel	.212
(c) Other supplies	.252
(2) Total supplies	.703
(3) Other mining costs	.178
(4) Depletion	.382
(5) Depreciation	.087
(6) Expense of idle mines	....
(7) Administrative expense	.127
(8) Royalties earned	.335
(9) Total cost at mines	3.054
(10) Rail and lake freight	1.418
(11) Insurance and analysis	.014
(12) Interest and carrying charges	.092
Total cost at Lake Erie (Average cost for year to Dec. 1, 1917, $4.36)	4.585
Add 10c for hazards in mining and unsuccessful development	.100
Total	4.685
Shrinkage in transit (1 per cent B/L)	.047
Grand total 1917 cost at Lake Erie	4.732
Estimated increased cost in 1918—15 per cent of items 1, 2, 3 and 7	.338
Total estimated cost at Lake Erie in 1918	5.070
Actual average price received at Lake Erie in 1917	4.760
Net profit in 1917 with 1917 ore price	.030
Net estimated loss in 1918 with 1917 ore price	.310

The big open pit properties, where mining costs are materially lower, show larger profits. The average cost of ore from open pits of the Mesabi range independent operators, laid down at Lake Erie ports in 1917, was set at $3.834 per ton, while the average price received was $4.79, a net profit of 96 cents per ton. In 1918, with last year's ore prices in effect, this profit would be reduced to 85 cents per ton.

Good Record

Made by Operations in Youngstown and Greater Pittsburgh Districts

Youngstown, O., March 13.—Operating conditions in this and the Greater Pittsburgh districts are better than they have been for many weeks. Coke ovens and open hearths are operating at 91 per cent capacity, blast furnaces at 92 per cent and bessemer plants at 81 per cent. All but five of the blast furnaces in this district are in operation.

In the Mahoning valley district alone there are 51,000 tons of steel piled in the yards of the various producers waiting shipment. Of this amount 30,000 tons were stocked on account of embargoes and 21,000 tons because of car shortage. A shortage of box cars has become prevalent in this district and is causing much inconvenience among the tin plate manufacturers. Recently the government requested that all western shipments be made in box cars so that an ample supply of these cars would be available later for grain shipments east. Material for eastern points is shipped when the buyer obtains a permit from the government.

Operations Increase

New York, March 12. (By wire.)—Chairman Gary has announced that the Steel corporation blast furnace output now is about 83 per cent, ingot production 87 per cent and structural mills 90 per cent. These percentages show increases of 5 to 10 per cent over a week ago. Ship plate production, Judge Gary said, is 100 per cent. The plate mills right along have been worked as near capacity as possible owing to government needs.

Steel Institute

Formed in Canada as Section of Mining Engineers Organization

Toronto, March 11.—Arrangements for the organization of an iron and steel section of the Canadian Mining institute were effected at the annual convention held at Montreal March 6 to 8. This matter had long been under discussion. Dr. Alfred Stansfield, metallurgical expert of McGill University, presided at a meeting attended by a number of members of the mining institute connected with the iron and steel industry when the new movement was launched. There was some expression for a separate organization. The resolution as finally adopted provided that the new society be formed as an iron and steel section under the auspices of the Canadian Mining institute but that it could be changed to an independent organization should this be deemed advisable at any time.

An organization committee, including leading iron and steel men of Canada is as follows: Robert Hobson, J. G. Morrow, F. A. Sherman and W. M. Curry, of Hamilton; Col. Thomas Cantley, Mark Workman, W. C. Franz, Dr. Alfred Stansfield, W. J. Jannsen, H. H. Jacquays, J. A. Irwin, C. F. Bristol, Esmond Peck, G. H. Duggan and P. L. Miller, of Montreal; F. H. Macdougal, Sydney, N. S.; F. Crockard, New Glasgow, N. S.; J. J. Hartley, Kingston; George W. Watts and William Ingalls, Toronto; Col. David Carnegie, Ottawa; Capt. D. Kyle, Sault Ste. Marie; M. Deakins, Winnipeg; W. F. Robertson, Vancouver, and George McKenzie.

New Officers For Valley Mould & Iron Co.

At the annual meeting of the stockholders and directors of the Valley Mold & Iron Corp., Sharpsville, Pa., held in New York on Tuesday, March 12, George H. Boyd resigned as president and was elected chairman of the board. John E. Perry was elected president. Mr. Perry previously was president of the Wharton Steel Co., Wharton, N. J., and previously was for a number of years assistant to the president of the Republic Iron & Steel Co. Floyd K. Smith resigned as vice president of the Valley Mold company.

Since the Fore River yards of the Bethlehem Shipbuilding Corp. increased the working force to 12,000, more men are employed than ever before.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, March 12.—Although the war industries board announced nearly a week ago that a price on aluminum had been fixed at 32c for lots of 50 tons and over of ingot of a grade 98 to 99 per cent, the trade still is awaiting details of the new policy which will enable it to proceed at the new level. The price is subject to revision June 1. Nothing was said in the statement with regard to sales of less than 50-ton lots, nor of the differential which should exist between virgin and remelted grades. It was merely said that the differentials now in force for the sundry grades, quantities and shapes, shall continue in force under the new contracts. At present some sellers of No. 1 remelted aluminum, 98 to 99 per cent are quoting 38c on less than carload lots. Sales of five and 10-ton lots of virgin have been made by outside sellers at 40c. Sheets in the outside market continue on the old base of 60c to 65c, although the new base, to be in line with 32c for ingots should be about 40c. Consumers are not buying except where necessity forces them into the market for immediate requirements. The aluminum scrap market sagged heavily when the announcement was first made, but now has recovered, somewhat, dealers being willing to buy old cast aluminum today at 21.50c; old sheet aluminum at 21.50c; and new aluminum sheet and clippings at 27.50c. Number 12 alloy has been offered by makers at 27c and it is believed this price might be shaded.

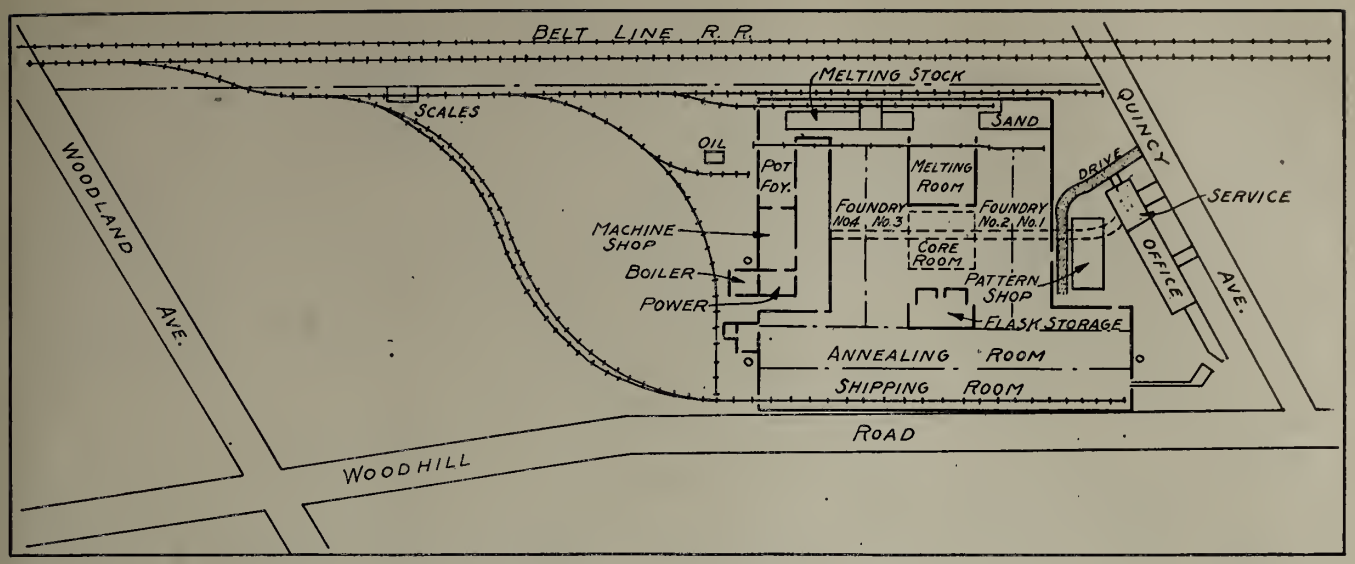
The tin market continues agitated. Practically no spot Straits or Banca is obtainable. The limited supply of 99 per cent tin, including Chinese No. 1, A. S. & R. and Lamb & Flagg, is quoted at around 85c to 86c for prompt shipment from New York. An active inquiry was in the market last week from miscellaneous sources, including makers of white metals, electrical manufacturers, etc. A good buying of Banca and Chinese tin for March shipment from the Far East, was done. Since many consumers of Straits tin are turning to Banca, and many former users of Banca are buying Chinese, the price spread between Chinese and Banca has been reduced considerably. Formerly the differential was about 6c to 7c, whereas now it is only about 1c to 2c. Chinese for March shipment from Hong Kong is quoted 74.50c to 75c; Banca for March shipment from Batavia is quoted 76.50c to 77c. It takes about three months for tin to arrive at New York after date of shipment. The government still is holding rather large supplies of Straits and Banca tin in this market, part of which is being released from time to time to manufacturers engaged in war work, the price being about 64c.

The copper market is devoid of interest. The supply of copper seems ample, with distribution going forward at 23.50c for carloads and 24.67½c for less than carloads.

The growing tendency toward higher prices in the lead market last week was checked by the entrance of one or two of the largest independent lead producers into the market. At present lead is available in the outside market at 7.25c, New York, for prompt, March and April shipment, the price which was quoted by the American Smelting & Refining Co. Inquiry is comprised largely of scattered carloads.

The spelter market remains lifeless, with an easier tendency still apparent in prime western. Offers of prime western at 7.65c, St. Louis, have failed to attract buyers and it is now said might be bought at 7.50c, St. Louis. The market may be quoted about 7.55c to 7.65c, St. Louis, for prompt, March and April shipment. In the east, spot spelter is available at about 8.25c, New York. Some business in sheet zinc now is being done on the base of 15c, f. o. b. mill. On high grade spelter, 12c, the new fixed price, prevails while on intermediate, sales at 10.50c to 11c, St. Louis, are reported.

The antimony market still is lagging. Chinese and Japanese brands have been offered at 13.25c, duty paid, without buyers.



General Layout of New Foundry of National Malleable Castings Co., Cleveland

Malleable Plant Nears Completion

Huge Foundry of National Malleable Castings Co., Cleveland, Rapidly Taking Shape—Will Be Exponent of Newest Features of Foundry Practice —Electric Furnaces to Be Employed

WHAT will probably be one of the largest foundries in the country is the huge new works of the National Malleable Castings Co., now rapidly nearing completion on a site adjoining the Belt Line railroad in the southeastern part of Cleveland. This plant, as a unit, is the result of years of planning and study, beginning virtually with the initial development of a new process for making castings. The preparation of the plans and the designing of the ingenious system which will characterize the operation of the new Cleveland plant have in fact been synchronous with the development of the triplex process, patented by W. G. Kranz, vice president, National Malleable Castings Co., Cleveland, on Dec. 5, 1916. The completed plant will stand out in the foundry industry as a radical departure from anything ever before attempted, for it represents the first attempt, other than experiment, to apply the electric furnace to the malleable iron foundry on a practical commercial basis.

Arrangement of Buildings

The buildings of the plant, upon which work has been progressing for almost an entire year, are located in a group slightly over 10 acres in area. They include the pattern shop, main foundry, service department, machine and carpenter shop and the boiler and power house buildings. The erection of the office buildings will be undertaken at a later date.

The main foundry building in which all of the apparatus for making castings by the Kranz process is contained, is an irregularly shaped structure approximately 575 x 725 feet. The building is of steel frame construction, the outer walls being of brick, while the roof is of the Aiken type, covered with cement slabs.

The structure is divided into bays or aisles in which the various departments are located. The accompanying plan reproduced from the February issue of the *Naco News* shows the general layout of the plant. On the side adjoining the Belt Line railroad is the storage department, 75 x 575 feet. It is provided with a series of reinforced concrete bins for storing sand, pig iron, melting stocks, coke, limestone and other necessary materials. Fifteen freight cars can be accommodated in this bay at one time.

The melting department adjoins the storage department at about the middle of the structure. It is easily the most interesting feature of the entire plant to the foundryman. All the equipment necessary to the proper working of the triplex process is located at this point. It includes two cupolas, two 20-ton specially constructed Heroult electric furnaces and two bessemer converters. Owing to the special nature of the product, however, only 15 tons of metal will be treated in the electric furnace each heat, despite the fact that they are 20-ton units. The melting capacity will be approximately 300 tons of metal per day, and the ladles of molten metal, holding from six to seven tons, will be transferred to the molding floors by means of electrically driven ladle cars.

Mr. Kranz's invention, described in his patent paper, is essentially as follows:

"My invention relates to the treatment of iron intended to be made into castings; and is designed to overcome the difficulties resulting from the presence of relatively high carbon and also in some cases of relatively high manganese and silicon, but particularly of carbon, in the iron.

Method of Melting

"In carrying out my invention, pig iron or scrap, or both, high in carbon, and which may contain appreciable percentages of manganese and silicon, are melted in any suitable furnace, such as a cupola, open-hearth, or air furnace. A portion of the melted charge depending on the amount of carbon and other impurities to be removed is then tapped out of the furnace and transferred to a bessemer converter, in which the carbon, manganese and silicon are wholly or partially blown out. The treated metal, and the remainder of the charge direct from the furnace, are then poured into a ladle or other container with the result that the percentage of carbon (as well as the percentage of the manganese and silicon) in the complete charge is reduced to within desired limits, and may then be cast. If a further refinement is desired, the charge may be transferred to an electric or other suitable refining furnace, in which

the refinement of the metal is completed.

"I have found that with a charge of iron containing 3.25 per cent of carbon very satisfactory results can be obtained by taking one-fifth of the charge, introducing it into a bessemer and reducing the carbon to 0.50 per cent or less by treatment therein, so that when the treated metal is mingled with the remainder of the charge the percentage of carbon in the whole is approximately 2.70 per cent. After further treatment in an electric furnace the metal thus refined is extremely well adapted for malleable castings, and can be produced at a very much lower cost and in much less time than is the case when the reduction of the carbon is effected in either the melting furnace or in the electric furnace. If it is desired to produce gray iron castings, suitable additions such as manganese or silicon may be made in the vessel to which it has been transferred, and the charge may then be cast.

"The advantages of my invention will be apparent to those skilled in the making of iron castings, since the troubles arising from high percentages of carbon and in some instances from high percentages of manganese and silicon, are practically eliminated, and iron containing excesses of such material is rendered commercially available for malleableizing and other purposes at a low cost and with a considerable saving in the time required for its conversion into castings. By the use of my invention it will be seen that the carbon and other substances may be reduced and equalized in any proportions depending on the character of the iron which it is desired to produce.

On either side of the melting room there are two aisles each 75 x 375 feet. These four bays or molding floors will be known as foundries, Nos. 1, 2, 3 and 4. The basement and coreroom will be located between foundries Nos. 2 and 3, in a floor space of 125 x 175 feet. East of the core department and almost in the center of the building is a 4-story structure to be used for storing molding machines, flasks, boards and various foundry supplies.

At the eastern end of the four molding floors and at right angles thereto is the annealing department, 100 x 725 feet. For the present 12 annealing furnaces of unusually large size will be utilized. They will be equipped to burn powdered coal.

The shipping and finishing aisle, directly east of the annealing department, has a floor space 75 x 725 feet. It lies parallel to Woodhill road. The railroad tracks inside this department will take care of from 18 to 20 cars at one time.

The boiler and power house 55 x 125 feet, is a steel and brick structure located at the southern end of the plant. The boiler room will contain three 350-horsepower water-tube boilers equipped with modern stokers. These boilers will be used for heating purposes only. In this department complete facilities have been provided for the handling and storage of coal and ashes. A heating system with a forced circulation of hot water is being installed in all buildings. The electric power for the entire plant will be obtained from an outside source, and in the installation of electrical circuits throughout the plant all have been placed in conduits. The runs from the power room to the various points of use are all underground, and for this purpose alone over six miles of fiber conduits have been used, while about 12 miles of metal conduits will be installed above ground.

The machine and carpenter shop building which is of steel, brick and reinforced concrete construction, 75 x 120 feet, two stories, lies between and adjoins the annealing pot foundry and the power house. The first floor of this building will be used for the machine shop and the second floor for the carpenter shop.

The service building, a 3-story brick structure 50 x 90 feet, faces Quincy avenue at the north end of the plant. The workmen enter the plant from this building through underground tunnels which lead from the time clock lobby on the first floor to all departments. This building is designed primarily to be of service to the employes and contains the dispensary, locker rooms and shower baths, beside several large club rooms. Attractive quarters will be placed at the disposal of the workmen.

Corrosion Tests of Steel Alloys

IN A GENERAL way it may be stated that the following are the types of corrosion usually met with: Corrosion from ordinary atmospheric effects; corrosion from special atmospheric conditions—for example, in manufacturing centers, where the air is less pure; corrosion in special media such as gases, acids, or other liquids; corrosion by heating effects. This is usually termed oxidation, but it is, of course, more or less corrosion. Losses by rust, oxidation, and even erosion may all be considered part of the same genus "corrosion," that is, the results obtained from each of the types named are governed by the same or, at any rate, similar laws.

Investigation Encouraged

Studies of the alloys of iron by which corrosion can be governed or corrected and conclusions arrived at as to the kind of alloys, whether of iron or other metals, which best resist this deterioration are to be encouraged, and should be of great service to mankind. Any of us who can, therefore, add to the life of iron and steel in its forms and uses will be a public benefactor, and although the present supplies of iron in the world are of enormous variety and extent, a time will eventually come when probably the iron of the world will have to be more carefully husbanded than now, when evidence of much waste of the metal is rife on every hand.

The old proverb that "He who owns the iron of the world will rule the world" is being exemplified in the terrible struggle now taking place. It is, indeed, a war of "iron," and the thunderbolts wielded by Jove were trifling compared with modern engagements on land and sea. All of us, must yearn for the happier times when the metal iron, to whose qualities we metallurgists bow down in the many fascinating studies it presents to us, will once more be used only in the arts of peace. Exaggerated claims were made a few years ago that nickel steel would resist corrosion. No doubt if the metal is present in high percentages the product is more highly resistant, but in the end it will also corrode, and quite badly. Moreover, as regards ordinary commercial nickel steels of lower percentages, while they show somewhat lower corrosion, it is found that, when deterioration once commences, corrosion continues at not much less rate than in ordinary steel.

Results of Former Tests

In this connection, reference may be made to some experiments carried out by the author in 1892. In his paper on "Alloys of Iron and Chromium," read before the British Iron and Steel institute in 1892, it was pointed out that an alloy containing about 9.18 per cent of chromium and 0.71 per cent of carbon showed a loss of 5.64 per cent after being immersed for 21 days in sulphuric acid of 50-per cent volume, compared with 44.7-per cent loss of wrought iron. The data taken during these tests are

An introductory address delivered by the president of the Faraday Society, England, before a recent meeting devoted to a discussion of the corrosion of metals. The extensive work of Sir Robert Hadfield is outlined in this address.

Table I

Tests of Iron and Chromium Alloys

Mark of the specimen in the Hadfield research		Percentage of C	Percentage of Cr	Strength of acid (H_2SO_4) per cent	Length of immersion days	Loss per cent	Color after treatment
Chromium steel (F)	Bar	0.27	1.18	50	21	3.32	Bright appearance in some parts.
Chromium steel (J)	Bar	0.77	5.19	50	21	4.78	Tarnished, no bright appearance.
Chromium steel (L)	Bar	0.71	9.18	50	21	5.64	Dull and tarnished.
			Si.				
Silicon steel (E)	Bar	0.20	2.67	50	21	3.32	Very bright appearance.
Ordinary mild steel	Bar	....	....	50	21	7.48	Dull bright.
Wrought iron	Bar	....	....	50	21	44.70	Most brilliant.

Table II.

Specimen No.	Analysis C	Si	S	P	Mn	Cr	Treatment	Tensile tests: Elastic limit, tons	Maximum load, tons	Elongation, per cent	Reduction of area per cent	Bending test
1176M.	1.27	0.38	0.10	0.03	0.25	11.13	Unannealed	30 to 35	62	10	11	24 degrees broken.
							Annealed for four days at a high red.	Bar began to track in thread at 5 tons up to breaking at 33 tons				14 degrees broken.
1177M.	1.06	0.63	0.12	0.06	0.08	10.83	Unannealed.	35 to 40	72	5	5	nil broken.
							Annealed for four days at a high red.	26	56	12	12	68 degrees broken.

Table III

Results of Corrosions Test Made by Sir Robert Hadfield

Specimen	Analysis per cent C	Si	Mn	Ni	Cr	W	Condition of material	After 32 days in water Loss per cent	After 33 days in sea water Loss per cent	After 17 days in 50 per cent H_2SO_4 Loss per cent	After 21 days in 50 per cent H_2SO_4 Loss in grams	Loss per cent	Remarks
A	0.47	....	0.95	.....	....	....	Forged	0.15	....	0.80	.....	....	Particulars of these are taken from the Author's joint paper on "Iron, Nickel, Manganese, Carbon Alloys," read before the Institution of Mechanical Engineers in 1905.
B	0.48	....	0.75	1.20	....	....	Forged	0.11	0.23	1.10	.....	....	
C	0.47	....	0.86	2.15	....	....	Forged	0.10	0.26	0.72	.....	....	
D	0.40	....	0.82	4.25	....	....	Forged	0.11	0.26	0.71	.....	....	
E	0.42	....	1.03	4.95	....	....	Forged	0.12	0.24	0.66	.....	....	
F	0.52	....	0.92	6.42	....	....	Forged	0.12	0.23	0.58	.....	....	
G	0.43	....	0.79	7.95	....	....	Forged	0.12	0.23	0.54	.....	....	
H	0.41	....	0.85	12.22	....	....	Forged	0.10	0.23	0.44	.....	....	
J	0.45	....	0.83	15.98	....	....	Forged	0.09	0.18	0.28	.....	....	
K	0.41	....	0.96	19.91	....	....	Forged	0.09	0.14	0.28	.....	....	
B	0.15	....	....	.....	....	0.20	Forged	....	....	....	3.055	5.01	Extracted from the author's paper on "Alloys of Iron and Tungsten," read before the Iron and Steel Institute in 1903.
G	0.21	....	....	.....	....	1.49	Forged	....	....	....	2.162	3.50	
H	0.28	....	....	.....	....	3.40	Forged	....	....	....	1.392	2.25	
I	0.38	....	....	.....	....	7.47	Forged	....	....	....	2.797	4.50	
L	0.76	....	....	.....	....	15.65	Forged	....	....	....	3.920	5.75	
M	0.78	....	....	.....	....	16.18	Forged	....	....	....	3.574	5.50	
Ordinary steel	0.40	....	0.80	.....	....	....	Forged	....	....	....	.....	3.97	
Mild steel	0.25	....	....	.....	....	....	Forged	....	....	....	.....	2.09	
Nickel-iron alloy	0.16	....	....	24.51	....	....	Cast	....	....	....	.....	1.37	
Platinoid	....	....	....	.....	....	.....	.....	....	....	....	.....	0.35	"The loss noticed did not differ greatly from those met with in the tests on iron, manganese, silicon, aluminum, chromium and nickel alloys. They are somewhat more than on nickel steel."
Metallic chromium	....	....	....	.....	98.0	....	.....	....	....	....	.....	0.03	
Metallic manganese	....	....	99.00	.....	....	....	.....	....	....	....	.....	10.60	
Nickel	....	....	....	98.50	....	....	.....	....	....	....	.....	very slight	
Iron	....	....	....	.....	....	Fe 99.80	.....	....	....	....	.....	4.52	
Chromium steel F	0.227	....	....	.....	1.18	....	Forged	....	....	....	.....	3.32	Extracted from the author's paper on "Alloys of Iron and Chromium," read before the Iron and Steel Institute in 1892.
Chromium steel J	0.77	....	....	.....	5.19	....	Forged	....	....	....	.....	4.78	
Chromium steel L	0.71	....	....	.....	9.18	....	Forged	....	....	....	.....	5.64	
Silicon steel E.	0.20	2.67	....	.....	....	....	Forged	....	....	....	.....	3.32	
Mild steel	....	....	....	.....	....	....	Forged	....	....	....	.....	7.48	
Wrought iron	....	....	....	.....	....	....	Forged	....	....	....	.....	44.70	
1287 C	0.13	0.23	0.72	0.95	....	....	Cast	....	....	....	2.003	3.23	Extracted from the author's paper on "Alloys of Iron and Nickel," read before the Institution of Civil Engineers in 1899. These samples were immersed for 21 days in 50 per cent H_2SO_4.
1287 E	0.19	0.20	0.65	3.82	....	....	Cast	....	....	....	1.611	2.95	
1287 G	0.17	0.28	0.68	7.65	....	....	Cast	....	....	....	1.581	2.77	
1287 I	0.18	0.22	0.93	11.39	....	....	Cast	....	....	....	1.390	2.60	
1287 M	0.14	0.38	0.86	29.07	....	....	Cast	....	....	....	0.759	1.34	

These results, representing corrosion tests carried out by Hadfield during the last 23 years, are plotted together in the diagram which accompanies this paper.

included in Tables I and II, page 657.

Table II shows the results of the mechanical tests. Each sample, ½ x 2½ x ¼ inches was immersed for 21 days H_2SO_4 of 50-per cent strength. The samples "F" (1.18-per cent Cr.), "J" (5.19-per cent Cr.), and "L" (9.18-per cent Cr.) showed a loss of 3.32 per cent, 4.78 per cent, and 5.64 per cent, respectively. Ordinary mild steel, tested under the same conditions, lost 7.48 per cent and wrought iron 44.7 per cent.

In order to determine the corrosion of metallic chromium, experiments were conducted with a number of specimens containing 99.35 per cent chromium.

In addition to the foregoing the author has made a large number of corrosion tests as shown in Table III, and referred to in his various papers during the last 25 years on alloys of iron, to which have been added the following special elements: Nickel, tungsten, chromium, silicon. The various results shown in Table III are shown in graphical form in the accompanying illustration.

Heat Metering and Control

In a paper noted in the proceedings of the Steel Treating Research society, Richard P. Brown describes a new instrument for the precise measuring of temperature through a high-resistance millivoltmeter.

In this instrument, in addition to the standard high-resistance millivoltmeter, is used an ordinary dry cell about 1¼ inches in diameter by 2½ inches long, and a suitable rheostat to reduce the voltage of the dry cell from approximately 1½ volts to a range from 0 to 60 millivolts, the voltage produced as a maximum by the thermocouples. In the operations adjustments are first made to insure that the voltage developed by the thermocouple is equal to the reduced voltage of the dry cell. Then the voltage of the thermocouple is cut out and the voltage of the dry-cell circuit read by direct deflection, which eliminates the line resistance entirely, just as a potentiometer gives a deflection indicating the actual temperature developed by the thermocouple at the moment of reading the instrument. It does not, however, indicate the fluctuation in temperature of the thermocouple, since it is the voltage from the dry cell that is being read.

From his experience the writer states that for industrial service an instrument actuated by the expansion of nitrogen gas is the most satisfactory for temperature measurement up to 800 degrees Fahr.

This instrument consists of a bulb of copper which is inserted in the heat and is connected by capillary tubing to an indicating or recording gage containing a helical expansive spring. The expansion of the gas in the bulb exerts a pressure in the capillary tubing which is conveyed to the spring in the instrument and the pointer attached directly to this spring moves across the scale or chart.

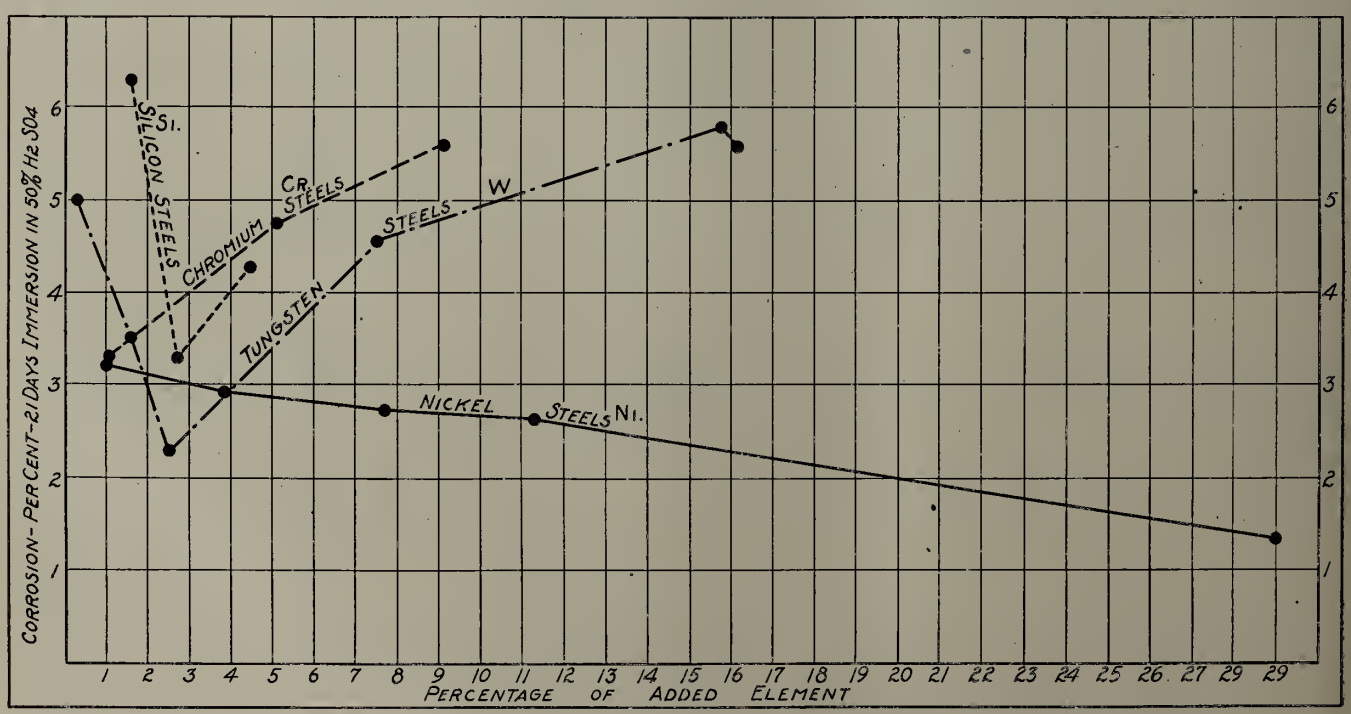
Makes Portable Pipe Vise

A portable pipe vise in which the gripping device consists of a pair of jaws and a steel chain lately has been marketed by the Gerolo Mfg. Co., Chicago. The vise may be attached to a column by a wrought iron chain which is riveted to the base of the vise. The tightening of an eyebolt nut draws up the supporting chain and secures the vise in position. Pipe is held in the vise by means of the jaws and steel chain previously mentioned; the clamping action is accomplished by the movement of the handle toward the vise. This handle fulcrums on a steel pin, which projects through two bosses.

Makes Small Toolholder

A new style of toolholder has been designed by the Ready Tool Co., Bridgeport, Conn., for the purpose of meeting the requirements of users of bench and watch lathes. This work requires a toolholder of unusually small size. The holder is a heat-treated drop forging and is broached for the cutter. Its dimensions are 5/16 x ½ x 3½ inches and a 3/16-inch square cutter is supplied.

Announcement was made recently of the invention of a commercial process for converting bituminous coal into a new fuel said to be the equivalent of anthracite coal. This fuel is said to be completely smokeless in character, hard and dense in structure, and occupies approximately the same space as run-of-mine coal. Coal by-products are recovered in the conversion. The coal, together with its by-products, will be marketed by the International Coal Products Corp., New York, recently formed for that purpose. C. H. Smith, inventor of the process, is president of the new company.



The By-Product Oven—A Paradox

Developed to Produce Coke, the By-Product Oven is Now Fostered for the Useful Residues So Valuable to Industry and to the War—These Will Also Be Valuable in Peace Time

BY WILLIAM HUTTON BLAUVELT

THE technical and engineering problems in the manufacture of coke are today the problems of the by-product oven. Except in a few special localities, practically no beehive ovens have been built in the United States for the last five or six years except as renewals of old plants, and during these years the total number of beehive ovens in existence has been steadily falling. On the other hand, the number of by-product ovens has increased from 4624 in 1911 to a total of about 7660 in operation at the end of 1917; with 2800 building this makes a total of about 10,460 which will be in operation in 1918, or shortly thereafter.

Preliminary government estimates place the total production of coke for 1917 at 56,600,000 tons, the largest tonnage in the history of the industry. Of this 34,000,000 tons or 60 per cent was beehive, and 22,600,000 tons, or 40 per cent, was by-product coke. Some time in 1918 the production of by-product coke should pass the beehive output, and when the by-product ovens now building are completed the total by-product capacity will be about 40,000,000 tons of coke per annum, which is over 70 per cent of the record-breaking total coke production of 1918.

Improvement in Oven Design

Since the by-product oven was brought to this country from Europe, in 1892, it has been radically improved, and from the point of view of American metallurgical practice it is safe to say that the American ovens are superior to those of Europe. The points of superiority are mainly those of larger units and larger output per unit, and the extent to which labor-saving machinery has been introduced. The increased output is due largely to the use of silica refractory material, which permits higher heats and shorter coking time than are employed in Europe. The modern American oven will carbonize commercially more than 20 tons of coal per day, and contrary to the European idea that slower operation is necessary to conserve the plant, this rate of operation with only current repairs, can be maintained for an indefinite time.

From a paper presented at a recent meeting of the American Institute of Mining Engineers. Mr. Blauvelt is a consulting engineer with offices in Syracuse, N. Y. He is coke expert for the council of national defense.

Services of the By-Product Coke Process

IT is difficult to suggest any industry which does more to conserve our resources than the by-product coke industry. Mr. Blauvelt designates some of these services, stating:

"The by-product oven gives this country something more than a cheaper method of producing coke. It gives the coke user a material which can be adapted accurately to his special needs. It renders available many coal deposits not heretofore considered suitable for making coke. It furnishes a new and large supply of gaseous and liquid fuel for metallurgical, industrial and domestic uses. It adds very greatly to the supply of available fertilizers which the overworked and underfed lands are coming to need so sadly. It furnishes an abundant supply of raw materials for a number of chemical industries, especially the great dye and color industry which war experience has shown is vital to a large number of manufacturing operations."

The by-product oven is not old enough in the United States to make it possible to state from experience how long an oven can be operated at maximum efficiency. There are a number of plants in different parts of the country which were built 16 or 18 years ago, which are more efficient today than in the first year of operation, and which show costs of operation which compete well with those of the most modern plants.

The accompanying illustrations, Figs. 1 and 2, show the earliest and the latest development of one of the prominent types of ovens in use in this country. The illustrations show the principal changes in the design. The first ovens had a capacity for carbonizing 4.4 tons of coal per day, as compared with the present capacity of over 20 tons mentioned previously.

The early ovens were economical in heat consumption because the heat in the waste gases was utilized efficiently in raising steam for the operation of the plant. On account of the growing demand for oven gas for metallurgical and other uses, the change to the regenerative type of oven has been general. While this type of oven is not so economical of the total heat produced by the combustion of the gas as is the combined oven and boiler plant, it makes available for use half again as much of the surplus gas as did the older type of oven. Modern ovens require for carbonization of the coal less than 40 per cent of the total heat in the gas produced.

The Modern Oven

Fig. 2 illustrates one of the principal types of the modern oven. This type of oven is essentially a closed chamber, heated from the outside, and the volatile matter of the coal is distilled, air being carefully excluded. This point distinguishes it in principle from a beehive oven, where the heat is generated by combustion within the oven itself, with the resulting wastage of everything except the coke. The oven shown consists of a chamber of about 36 feet long, 12 feet high and of a width depending upon the coal that is to be carbonized. In American practice the average width varies from 16.5 to 21 inches. Modern ovens usually have about 2 inches of taper toward the discharge end to facilitate pushing the coke.

The ovens are usually heated by a portion of the gas recovered from coal distillation, although sometimes producer gas is substituted. In all the successful ovens this gas is burned in a series of flues which control the travel of the burning gases and distribute the heat over the entire side of the oven. The success of any oven design depends very largely upon the ability to distribute the heat correctly over the entire surface which forms the wall of the oven. It is by no means an easy problem to control this distribution accurately over an area

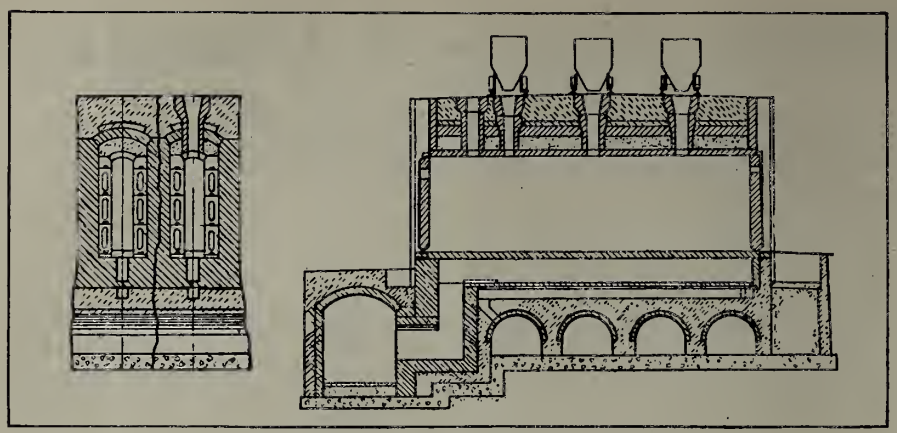


FIG. 1—AN EARLY TYPE OF BY-PRODUCT COKE OVEN

of 432 square feet. In some ovens the flues composing the heating system are vertical and in others horizontal. The oven shown is the chief example of the latter arrangement.

Heating the Oven

Fig. 3 shows the flow of the air and gases through the system. From this it will be noted that one pair of dampers near the stack reverses the air and gas. The cold air enters the system from a fan located at a point near these dampers, flows through one of the two main flues, and is distributed to the regenerators by a system of firebrick slides. The air is heated in the regenerators to about 1000 to 1100 degrees Cent. before entering the flue system of the oven and meeting the gas to be consumed.

This gas is supplied at several points in the flue system. It flows steadily through the supply pipes and its direction in the oven is reversed by the reversal of the current of air, so that no attention need be given to this point by the operator. That is, when the currents are flowing upward through the flue system each gas stream is bent upward and burns in the flue above the gas pipe, which is opposite the partition wall. When the flow is downward, the gas streams are bent downward. By means of these several supplies of gas the heat is supplemented as needed and all the air supplied is consumed by the last admission of gas. The products of combustion pass out to the other regenerator and thence to the reversing dampers and chimney in the same manner as in an open-hearth furnace.

In the earlier types of ovens, when luminous gas was used, much of the heating was done by radiation, but in modern practice, where the benzol is removed from the gas, the combustion is not luminous and the heating is done mainly by conduction. To this end, in the system described it has been found to maintain a reasonably high velocity of the hot gases in the flues. This is attained through the principle which has been developed in some types of hot-blast furnace stoves and other furnaces, where a high velocity of the hot gases transfers heat to the adjacent surfaces by sweeping away the sluggish layers of gas lying against the surfaces, which, if not removed, would form efficient nonconductors of heat.

The total heat delivered to the combustion flues is regulated by the pressure on the supply of air and gas; and the distribution of the heat among the various flues is controlled by a regulation of the relative amount of gas to each flue. Each flue may be inspected through a peephole accessible from the working platform outside.

Operation of By-product Oven

The coal is charged into the oven from a hoppered larry car running on the top of the oven structure, usually through four charging-holes. The fifth hole, shown in Fig. 2, serves to carry off the volatile products of the distillation. The coal is leveled after charging by an auxiliary ram on the coke pusher, the space being left between the top of the coal and the top of the oven for the outgoing gases to reach the point of discharge.

Upon completion of the coking process the doors are raised, and the coke is pushed out by an electrically operated ram. The doors are then lowered and sealed and the oven is ready for another charge. Many attempts have been made to develop a mechanically sealed door, but the conditions of operation make this mechanical sealing a difficult problem, and nearly all plants still use the mud joint. Careful designing of the door and its seat make this mudding a much less serious matter than might be supposed.

Use of Silica Brick

Silica brick is largely used in modern by-product oven construction. There seemed at first many obstacles to its successful use for such construction, the principal objections were the large amount of expansion of the brick when heated and the tendency to spall, due to sudden changes in temperature. When silica brick was first used in the crowns of beehive ovens it was thought that it would be an absolute failure, but it was unexpectedly successful. It was first employed in by-product ovens at the plant of the Cambria Steel Co. and was soon after generally adopted. It has been found that, since most of the expansion takes place below a red heat, the variations in temperature during operation do not give any trouble, and the superior resistance of silica brick to high temperatures and its satisfactory conductivity under operating heats make it a superior material. Notwithstanding its success in American practice, it has not been employed to any extent in Europe.

The cubic capacity of a by-product oven has increased nearly fourfold since its first introduction into this country. The larger capacity reduces the cost of operation per unit of product, and the smaller number of units also reduces cost of construction and repairs. Increases in length and height of the oven chamber have no effect on the product and are limited only by structural and heating conditions. The width of the oven, however, is a more important factor.

In the early days of the by-product oven in Europe it was thought that the lean coals of Belgium, running

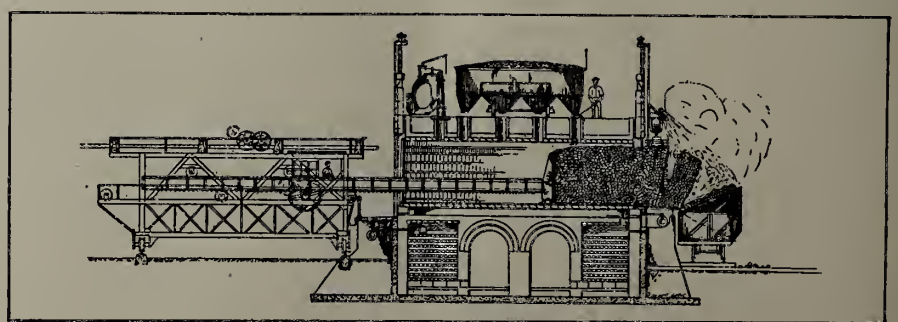


FIG. 2—A TYPE OF MODERN BY-PRODUCT COKE OVEN

as low as 15 per cent volatile, required a very narrow oven, perhaps not over 14 inches wide, while for high-volatile coals a width of 20 inches was not infrequent. American practice has not demonstrated any such simple rule as this, and the reason may be found partly in the fact that oven plants are generally located at the point of consumption of the coke. Hence mixtures of coals can be more easily obtained, and for this reason most plants operate on about the same average percentage of volatile matter. It has not been definitely shown in American practice that a particular width of oven is best suited to coal of a certain composition.

The advantages of a narrow oven are: A faster coking time per inch of width with a given flue temperature; a higher yield of by-products, and a more uniform cell structure as between the portion of the coke nearest the wall and that nearest the center of the oven.

On the other hand, the larger number of operations of the oven crew when handling the narrower ovens increase the labor cost and the repairs. It has yet to be developed what is the best oven width to average these conditions. The widest ovens operating in this country have an average width of 21 inches and the narrowest 15 inches. Some coals require higher temperatures than others to produce the best coke, but it is not clear that this fact will lead to the selection of wider ovens for such coals. It is not clear that any width is definitely the best for a given set of conditions, but much study is being given to this subject, and we may before long have some better data.

The Quality of Coke

It is the physical structure which gives coke its advantage for metallurgical work over other forms of solid fuel, and it is important that the structure should be adapted to the conditions under which the coke is to be used. The blast furnace is the greatest coke consumer. In the days of the beehive oven one kind of coal gave a coke with one certain physical structure, while another coal gave another structure. Furnaces either adapted their practice to the coke, or changed their coke supply. Coke was recognized as hard or soft, porous or dense, and that was about all that was known regarding physical structure.

The by-product oven, with its variable mixtures of coals, variable heats, coking time, width of oven, fineness of coal charged and other controlling factors, permits a control of coke structure formerly impossible. The problem is to determine first, what is the structure best adapted to standard furnace practice, while recognizing that special practice requires modifications of structure; second, what conditions are necessary to produce it.

The production of a high heat at the tuyeres is of the first importance, and the best coke is that which reaches the tuyeres in proper condition to produce the highest temperatures in the tuyere area, and in just sufficient quantity to do the amount of work required. The ideal coke is one which will descend through a furnace shaft to the combustion zone in front of the tuyeres with the least loss from attrition and oxidation, and when it arrives there will burn at the highest possible rate. Of course, these

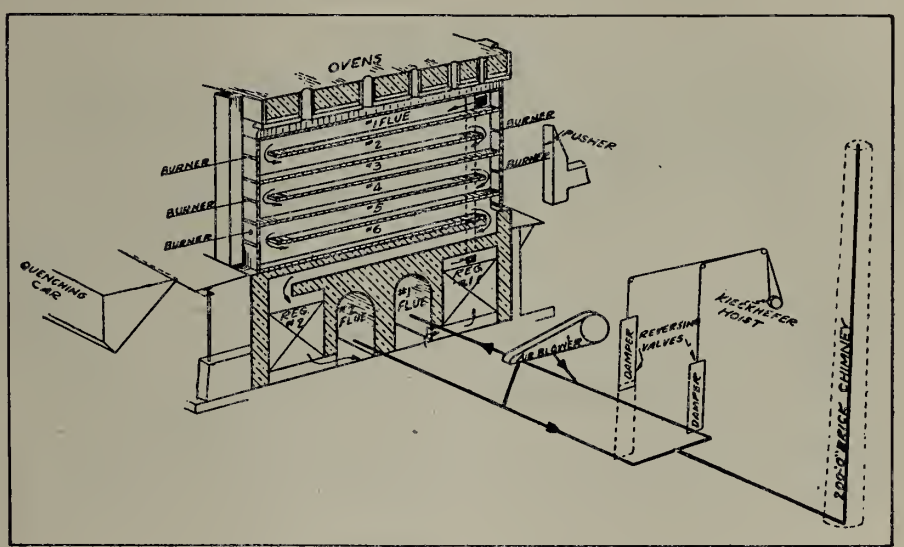


FIG. 3—DIAGRAM SHOWING THE FLOW OF GASES AND AIR

are paradoxical qualities. Walther Mathesius in his interesting paper on "Chemical Reactions of Iron Smelting" stated that this is accomplished by producing coke with an open-cell structure, in which the cell walls themselves are amply strong and well protected by a graphitic coating.

The time of contact of the blast with the coke in the tuyere area can be only a few seconds and the speed of any chemical reaction decreases as the relative quantities of reacting and resulting substances approach equilibrium. Therefore, the farther these relative quantities remain from the status of equilibrium, the higher the rate of resultant combustion. I am disposed to believe that we should, in seeking to produce the best blast-furnace coke, aim to produce an open-cell structure, with cell walls strong and hard. It is not necessarily true that the open-cell structure is the same thing as a high percentage of cell space. The advantage of an open-cell structure is that it gives the oxygen of the air easy access to the carbon. It is entirely possible that a coke of very fine cell structure, having say 50 per cent of cell space, might offer less surface for prompt combustion under practical conditions than another coke containing larger cells but having the same percentage of total cell space.

The composition of the cell wall it is agreed should be hard, thin and strong. The factor suggested by Mr. Mathesius that it should be covered with a graphite coating that is smooth and bright, is a much more complicated matter. What are the conditions of coal mixture and coking which produce this kind of wall? The coal mixture, the degree of fineness of grinding, the coking time, and the heats are probably all factors.

In addition to the blast furnace, foundry cupolas afford a steady market for coke, and in recent years the domestic market has grown to importance. Before the war, sales of coke for domestic use amounted to over 1,500,000 tons per annum. These sales really demonstrated the value of coke as a domestic fuel rather than showed what were the ultimate possibilities of the trade. Foundry coke is usually made in a slower coking time than furnace coke, as cupola practice calls for larger and tougher pieces.

Preparing Coal for Coking

The practice of locating American ovens at the point of consumption of the coke has made it easy to bring together several coals of different qualities, and this has in many cases permitted the production of a better coke by admixture than could be made from either of the coals used alone. For example, a coal of excellent cok-

ing qualities but high in ash can be mixed with a low-ash coal of poorer cokability, or an excess or deficiency in the coking quality of the main coal supply can be corrected by mixture with another coal.

Except in cases where the source of coal supply is fixed, it seems desirable to arrange the plant for the preparation and mixing of as many as three kinds of coal. Means for accurately proportioning the different coals are essential in such a plant. The mixture of coals requires fine grinding in order to bring the particles of the different qualities of coal close together. The general practice is to grind so that from 70 to 80 per cent will pass through a ⅛-inch screen. This fine grinding is also often advantageous where there are many pieces of slate of considerable size in the coal, since each large piece of slate in the coke is usually a center of cracks that tend to shatter the structure. Fine grinding reduces the weight of the coal mass per cubic foot, and consequently the capacity of the oven. With ordinary coals the weight per cubic foot of charge is generally taken at from 40 to 43 cubic feet per ton, depending somewhat on the coal and largely on the degree of fineness.

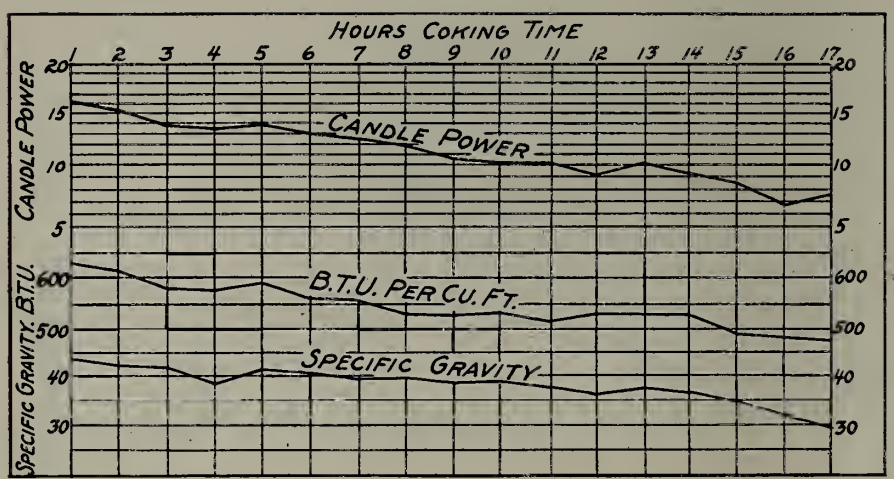


FIG. 4—DIAGRAM SHOWING AVERAGE HOURLY ANALYSIS OF GAS FROM ONE OVEN-COAL 25 PER CENT VOLATILE

Permits the Use of Low-Grade Coals

The by-product oven, with its control of heats, coking time, mixture of coals and fineness in grinding, has permitted the use of many coals for making metallurgical coke which would not have been suitable with the beehive oven. This is important as the best coals are being progressively exhausted. Owing to the extraordinary conditions caused by the war, some coals hitherto considered entirely unsuitable for making metallurgical coke have been successfully used; for example, the unwashed coals of southern Illinois.

The distillation or coking of coal in closed retorts, now generally known as by-product ovens, was first introduced for the purpose of saving the several valuable products contained in the volatile matter of the coal, which were all destroyed in the beehive process. The advantages in the production of coke previously outlined were not then realized. In fact it was often thought that a sacrifice of coke quality must be accepted in order that the by-products might be recovered. It has developed, however, that the best oven conditions for the production of coke are, in general, the best for the production of by-products.

The composition of the volatile matter in bituminous coal is very complex and the changes through which these compounds pass during the process of distillation are complicated. It is not appropriate here to attempt to trace out these changes or to discuss the method of formation of the ammonia, benzol or other by-products. It is well known that only about one-fifth of the nitrogen in the coal combines with hydrogen to form ammonia, and that the remainder is found in the coke and gas.

Attempts have been made to obtain higher yields of ammonia by blowing steam into the coke, somewhat after the manner followed with the Mond producer, which recovers from three to four times as much ammonia but none of these processes has been developed commercially. Higher coking heats tend to break down the combinations to their ultimate elements. For example, the gas produced from high-temperature coking will contain more hydrogen and less marsh gas, and a larger volume will be produced of lower calorific value. When coking at very low temperatures, practically no benzols are produced and the hydrocarbons recovered are of the aliphatic series. At high coking temperatures the tendency is for the toluol, the more complex hydrocarbon, to break down into benzol.

Cooling the Gas

The gases passing off from the oven are heavily laden with various hydrocarbon vapors and with water vapor and consequently carry a large amount of latent heat. So the cooling of the gas and the condensation of the vapors require efficient condensing apparatus and large amounts of water. The gas works manager of early days used to deal gently with the gases in removing the tarry vapors and they were cooled slowly in order to prevent their taking up the benzols from the gas, with injury to the illuminating power. In coke oven practice this precaution is not considered necessary.

Much improvement has been effected in the efficiency of the condensing apparatus since the early days of the tubular cooler, in which the gas circulated around the tubes of an apparatus similar to a vertical boiler, while the cooling water flowed through the tubes on the countercurrent principle. I have in mind one single-stage condensing apparatus 10 feet in diameter and 45 feet in height of effective cooling surface in which 12,000,000 cubic feet of gas per day are cooled on the average from 80 to 20 degrees Cent.; in which the cooling liquor enters the apparatus at a temperature 5 degrees below the exit temperature of the gas, and leaves it at not more than 10 degrees below the entering gas temperature. In such an apparatus very little condensate separates from the gas at a low temperature, and as a result the benzols remain in the gas and the separation of tarry matter from the ammonia liquor is sharp and easily effected.

Removing the Tar

A small quantity of the lightest tar vapors remains in the gas with the benzols. These may be removed by some efficient form of the old Pelouse and Anzin tar extractor, or when the gas is washed with water to remove the ammonia in the indirect process of ammonia recovery, these light tars are efficiently washed out. An efficient system of removing these light tars in a high-tension electrical field has been developed by F. W. Steere, the plan adopted being similar to that used in the Cottrell system, except that the special conditions per-

mit the use of an alternating current of the necessary high voltage. The problem is merely the agglomeration of the minute globules of tar to permit their effective removal by tar extractors of the usual type. This process has been worked out commercially.

Using Tar as Fuel

One of the interesting developments in the operation of by-product ovens in connection with steel plants is the growing use of tar as a fuel for metallurgical furnaces. One plant produces over 20,000,000 gallons of tar per year, in which the entire amount has been utilized for years as fuel in open-hearth and heating furnaces, where its value as fuel is much higher than its value in the ordinary tar market. Generally speaking, the tar used in steel furnaces is handled in the same manner as ordinary petroleum fuel oil, as it has about the the same viscosity. Its use presents no difficulties after the details of application have been worked out. It has a higher fuel value per gallon than ordinary petroleum fuel oil.

It was formerly the practice to extract the ammonia from coke oven gas by scrubbing with water, which has a large capacity for absorbing ammonia at moderate temperatures. This was the old gas works method, and the processes as used in oven plants are the same except as modified to meet the conditions of large volumes and efficient recovery. The ammonia is recovered by absorbing processes in the form of a crude liquor, usually containing from 0.5 to 1 per cent of ammonia.

The liquor usually contains practically all of its ammonia in the free state, whereas the condensate from the coolers carriers considerable amounts of fixed ammonia, sulphate, carbonate, chloride and sulphide. After removal of the tar by decantation the combined liquors are distilled with steam, after setting free the fixed ammonia by means of lime, the product being the crude ammonia liquor of commerce. In other plants the vapors from the still are passed through a sulphuric acid bath and sulphate of ammonia is formed.

Reclaiming Ammonium Sulphate

The socalled direct and semidirect processes for the manufacture of ammonium sulphate have been very generally applied to oven plants in recent years. The direct process requires only the removal of the tar from the gas without any more cooling than is necessary for this purpose, after which the gas is passed through a bath of sulphuric acid and the sulphate recovered. The direct process has been applied to a considerable extent in Europe, where the percentage of chlorides in the coal is quite small. Where the amount of chlorides is relatively large it is necessary to remove them before the acid bath is reached.

This introduces the semidirect process, in which the gas is cooled to remove the chlorides and then reheated and passed into the acid. The fixed ammonia condensed out in the cooling process is distilled and generally the ammonia from the stills is returned to the gas before it reaches the acid bath. The percentage of ammonia that has to be distilled in the semidirect process depends upon the amount of fixed ammonia in the gas and varies from 15 to 40 per cent of the total ammonia in the gases.

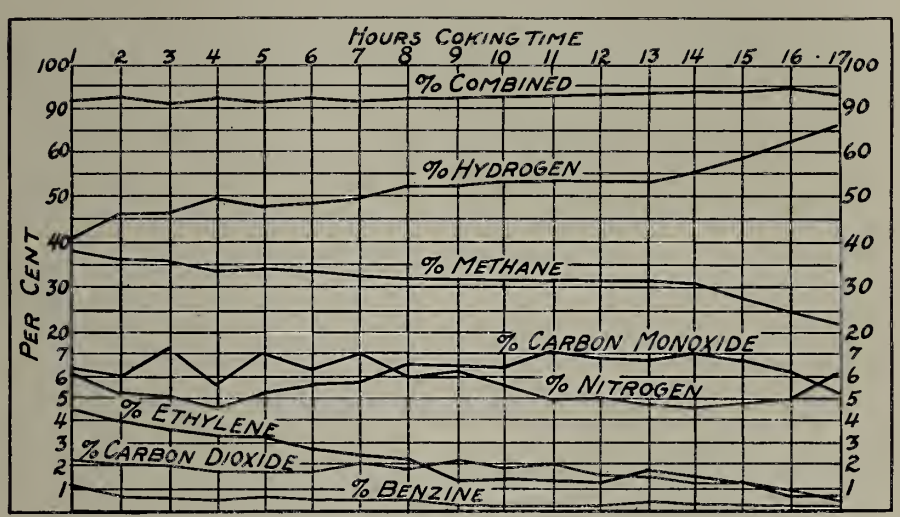


FIG. 5—AVERAGE HOURLY HEATING VALUE, SPECIFIC GRAVITY AND CANDLE POWER OF COKE OVEN GAS ANALYZED IN FIG. 4

Sulphate of ammonia was formerly the only source from which pure ammonia in the form of *aqua ammonia* or anhydrous ammonia was produced. This process consists in the distillation of the sulphate of ammonia using lime to free the ammonia from the sulphuric acid, the small amount of hydrocarbons remaining in the sulphate being removed by charcoal filters or similar means.

If anhydrous gas is to be produced the gases in the top of the still are dried by means of quicklime or other desiccating material, and the pure gas is then compressed and pumped into steel cylinders. *Aqua ammonia* is produced by absorption of the pure gas in distilled water. This process is essentially a simple one, but the purification of the ammonia gas and the necessity for providing against the blocking of the apparatus by accumulations of calcium sulphate scale somewhat complicate the work.

In recent years by refinements in the distillation process it has been made possible to produce pure ammonia direct from the crude weak liquor and this product is equal in quality to that produced from ammonium sulphate by the method described. These processes have the advantage of avoiding the waste of sulphuric acid inherent in the ammonium-sulphate process.

War and the Ammonia Market

The war has introduced many unprecedented conditions to the ammonia producer. Before the war the price of sulphate of ammonia varied, in general, between 2½ and 3 cents per pound. Official quotations are now running from 7.25 to 7.35 cents. While these high figures do not represent the average of actual transactions, any more than the $55 per ton frequently quoted represented prices at which the pig iron of the country was moving last summer, yet they illustrate the unsettled conditions of the market. Recently the government has asked for large amounts of ammonia for war purposes, and this call for ammonia has introduced much discussion as to the best methods of production.

Disposition of Ammonia

In times of peace the great bulk of the ammonia goes into sulphate for fertilizer purposes, and most oven plants have been built for supplying this product. The government's needs have caused many inquiries regarding the changing of these plants to produce other forms of ammonia, but this is usually out of the question on account of the great time and expense involved. Large parts of the recovery plants would have to be entirely rebuilt in order to change

the product. Fortunately there are several practical methods for the conversion of ammonium sulphate into ammonium nitrate, and the synthetic ammonia plants will soon have a large production directly available for this purpose. The total ammonia from all oven plants now built or building is estimated at somewhat over 130,000 tons of ammonium nitrate per annum.

Coke Oven Gas

Since the first introduction of by-product ovens into America many experiments have been made in the use of oven gas for metallurgical furnaces, and several experiments have been recorded describing unsuccessful efforts to apply it to open-hearth steel furnaces, although it has long been used in heating other furnaces, soaking pits, etc. During the last few years, however, the whole subject of using oven gas in open-hearth furnaces has been successfully worked out, and it is now in regular operation in several important steel plants. Since the benzol is now generally extracted from oven gas, it is the practice to burn a certain amount of tar along with the gas to give it luminosity and higher radiating power.

From 12 to 16 gallons of tar, together with from 8000 to 8200 cubic feet of gas, the quantity depending upon its calorific value, are required per ton of ingots produced, and it is found that furnaces fired in this way can be depended upon to produce from 10 to 15 per cent more steel than when heated with producer gas. These figures are based on work at stationary furnaces. On the basis of these figures it may be stated that the surplus gas and the tar obtained in the production of a ton of coke will furnish the necessary fuel to produce a ton of ingots from an open-hearth furnace. Without considering the value of the other by-products recovered, this statement illustrates the importance of the by-product oven as a fuel supply to a blast furnace and steel plant.

Early in the development of the by-product oven in America the principle of the separation of the richer portion of the gas, which comes off during the early part of the coking period, from the leaner portion, was developed in a practical way. This has enabled the oven plants to produce gas for sale having a calorific value much higher than could be produced in ordinary gas works from the same coal. The accompanying charts (Figs. 4 and 5) show the composition of a gas from an oven running on a coal of about 25 per cent volatile matter. analyses being taken each hour during the coking period. At the time these analyses were made the oven was coking at the rate of about 1.15 inches of width per hour. This chart shows the progressive decrease in the percentages of methane and the progressive increase in hydrogen and carbon monoxide, as the coking proceeds.

The separation of the rich from the lean portion of the gas is probably not advantageous when the surplus is to be used for fuel purposes, as, of course, separation introduces some complications into the apparatus, but where a higher calorific value than the average is desired, the separation method is of great value and can be controlled accurately.

Before the general use of the by-product oven, benzol and its homologues, toluol and xylol, or solvent naphtha, were produced from the distillation of tar, which usually contains about 3 per cent of these compounds. Now the main source of supply is coke oven gas, from which the benzols are scrubbed by bringing the gas into contact with a heavy oil of petroleum or tar. The process is usually carried on after the removal of ammonia. The benzolized heavy oil is distilled to drive off the benzols and the heavy oil is cooled and returned to the heavy oil scrubbers. The benzols are recovered in the form of a light oil containing usually about 60 per cent of benzol, 12 per cent of toluol and 6 per cent of solvent naphtha, although these percentages vary considerably with the details of the coking process and the light oil recovery.

Before the war the light oil produced was used largely for enriching illuminating gas, and the refined products were employed in the manufacture of paints, varnishes and other similar industries. At that time many plants were not equipped to recover light oil. Since the beginning of the war the enormous demand for the high explosives, picric acid and trinitrotoluol, familiarly known as T. N. T., has resulted in the equipment of practically all the plants in the country for the recovery of these products. It is estimated that the plants now built or building have a capacity of 101,500,000 gallons of light oil per year. For the production of these explosives the benzol and toluol have to be thoroughly refined by washing in sulphuric acid and by accurate fractionation, which processes require skillful supervision. The removal of the light oils from the gas practically destroys its luminosity, but the reduction in calorific value is relatively small.

Trinitrotoluol is very stable and ignites only at high temperatures, and even then it does not explode. It does not freeze, as does nitroglycerine, and on many counts it has advantages on the side of safety and convenience. When used alone it produces large amounts of carbon monoxide; but this can be entirely prevented by combination with other bodies, such as ammonium nitrate for example, if these are added in proper proportion to produce complete combustion.

When the demand for high explosives ceases after the war a large amount of the benzol now produced will probably be sold as motor benzol. This product is usually a mixture of benzol, toluol and solvent naphtha in the proportions in which it occurs in the light oil, and it is obtained by a comparatively simple process of refinement from the light oil. Motor benzol has a fuel value from 18 to 20 per cent higher than gasoline, and may be used alone with the ordinary carburetor if a somewhat larger proportion of air is used, or it may be mixed with gasoline in any proportion. Pure benzol freezes at 5.18 degrees Cent., and toluol at —180 degrees Cent. No trouble is experienced from freezing, even in the coldest weather, when proper percentages of toluol or gasoline are mixed with the benzol.

The dye and color industry in the United States has greatly expanded during the war, and it will flourish after peace has returned if given proper government protection. This will furnish a large market for benzol, which is the raw material for aniline. Also it seems not improbable that trinitrotoluol will be widely utilized as an industrial explosive. It is claimed that it can be manufactured more cheaply than nitroglycerine, and as a commercial explosive it has many advantages over nitroglycerine compounds.

Pulverized Coal in Brazil

The Central Railroad of Brazil recently inaugurated a series of experiments with its new coal-pulverizing plant at Barra do Pirahy, according to the *Commerce Reports*. The pulverizer is described as being similar in construction to a cement plant. The coal, freed of its moisture, passes into a hopper and is pulverized so that 80 per cent of it can pass through a 200-mesh screen. It is then carried to the locomotive by means of a conveyor screw and blast. This brings the ignitable powder to the mouth of the locomotive furnace, at which point combustion takes place. The first set of experiments were with

American coal and were an unqualified success. The experiments were then continued with a mixture and finally with Brazilian coal from the Jacuhy district, until now somewhat problematically useful. This is a coal that does not burn economically in the usual lump form. It was, however, believed that, once pulverized, it would give good results and would prove to be adaptable to the needs of the railroads. The experiment, as reported, was a success and it was hailed as an auspicious event that represents the solution of one of the most vital national problems in Brazil.

Tin Cast Iron Vessels

A method for tinning cast-iron pots and other utensils for domestic use is offered from a French source, *La Chronique Industrielle.* For household utensils only pure tin is employed and not tin and lead, as the latter forms poisonous salts with the acids of food products. To insure adhesion of the tin the iron is treated to remove the carbon, or otherwise it is then polished by mechanical means. To remove the carbon, the iron is coated with a layer of oxide of iron or manganese, or else is enclosed in a box with the oxide and maintained at a high temperature to burn out the carbon. After four to six hours the iron is sufficiently decarbonized to permit the adhesion of the tin. After this procedure the iron is cleaned with dilute sulphuric acid to which is added a small amount of blue vitriol. It is then immersed in molten tin, or, if the interior of the vessel is to be coated, molten tin with a little sal ammoniac is vigorously rubbed over the surface. It is preferable to heat the iron before applying the tin.

Builds Motors for Big Cranes

An interesting announcement was recently made public by the General Electric Co., Schenectady, N. Y., describing the motors installed by that company on some of the huge cranes constructed to speed up with the government's shipping program.

In all, six large capacity cranes were equipped by the company. Two of these cranes are of 225-ton capacity, the total individual motor rating aggregating 420 horsepower.

A third crane, of the same capacity, was equipped with motors with a total intermittent rating of 850 horsepower. The two main hoist motors each had a rating of 250 horsepower for continuous, and 425 horsepower for intermittent service, giving a hoisting speed for 60 tons of 120 feet per minute, and for 225 tons of 40 feet per minute. Due to the high and variable speeds required, the large current demands could not be handled to best advantage through the usual arrangements of rheostats and contactors so a special system of control was provided.

The remaining three cranes are the largest capacity units of this type ever built, being designed to lift 330-ton loads at a rate of 12.6 feet per minute.

In addition to the heavy capacity shipbuilding cranes two high-speed, alternating-current, hammer-head, coal handling gantry cranes have been installed at the plant of the La Belle Iron Works, Steubenville, O. Each unit is equipped with a 375-horsepower, slip ring induction motor direct coupled to a 40-horsepower, direct-current motor, and hoists a 4-ton bucket of coal at a rate of 500 feet per minute. Dynamic braking is obtained by combining the small direct-current motor with the alternating-current motor so that the former serves as an exciter and gives dynamic braking which is comparable with that ordinarily obtained with direct-current motors on this class of work. One of these cranes is shown in the illustration at the foot of the page.

Scottish Engineers Form Joint Association

As a result of the tendency toward engineering co-ordination, and following a series of meetings held in Glasgow a joint committee of the Institution of Engineers and Shipbuilders in Scotland, and the West of Scotland Iron and Steel institute has prepared an outline for a proposed constitution for a new joint association. The new association is to be the Scottish Engineering, Shipbuilding, and Metallurgical Research association. The draft memorandum for the new constitution proposes the following as the objects of the association: To promote research and other scientific work in connection with the trades and industries included within the scope of the association; to apply for and accept grants from the government for the purposes of the association; to establish, form and maintain museums, collections, libraries, etc., and to translate, compile, collect, publish, lend, sell any literature, statistics and information in connection with the trades or industries concerned.



HAMMERHEAD GANTRY CRANE FOR HANDLING COAL AT PLANT OF LA BELLE IRON WORKS, STEUBENVILLE, O.

Making French Shells of Semisteel

Operation of Cupola and Methods of Molding Described—Physical Properties and Actual Firing Tests Prove Best Results Are Obtained From 20 Per Cent Combined Carbon

SINCE the beginning of the war, the capacity of all of the manufacturing plants of France has been taxed to the limit and many new processes have been developed to satisfy the sudden tremendous and insistent demand for all kinds of materials. The foundry industry has been speeded-up and many new applications for cast products have been introduced. The need for ammunition is great and far exceeds what was conceived necessary, even by the most visionary early in the war.

It is a well known fact that five weeks after the declaration of war, the battle of the Marne ended when the French and Germans had practically exhausted their entire supply of shells. It was a tragic and critical moment and all means were exhausted to obtain shells, even though imperfect. It was at this time that practice shells, made of cast iron and containing only a small amount of explosive, were used and these were produced as quickly as the foundries could turn them out. The 75-millimeter (2.96-inch) steel shell gave such an excellent account of itself that every effort was made to secure this projectile in large quantities, and even small shops were awarded contracts to bore and thread steel bars to produce them in two parts, one for the body and one for the cap. This imperfect steel shell and that made of cast iron saved the day for the 75-millimeter rapid fire gun, which was the most important weapon in use at that time. Steps were taken immediately for the manufacture of forged shells on an extensive scale and the output at present is so great that we are furnishing large quantities of them to our Allies.

A different problem was presented in providing shells for the large guns. With the increase in the diameter of the shells, manufacturing difficulties increased proportionately. More time was required to make the large projectiles and to organize for their production in large quantities. It was then that the feasibility of using cast shells was seriously considered.

It is recognized by ordnance experts that the destructive effect of a projectile increases in proportion to its size more rapidly than in the increase in the weight of the explosive it contains. Therefore, steel had the preference for shells in spite of the great cost of the raw material and the high cost of machining. Cast iron shells, used as substitutes for steel, were of small caliber on account of the great thickness of wall it was necessary to provide to insure adequate resistance to the ballistic action of the powder.

The *fonte acieree,* that is cast material and what is known as semisteel, was carefully considered and finally was selected for producing a comparatively cheap, quickly manufactured and reasonably effective shell. The Germans can vouch for this. Since the beginning of 1915, an enormous number of these projectiles, from 80 to 400 millimeters (3.15 to 15.74 inches), have been made and fired for the cause of civilization. In addition to the semisteel shells an enormous tonnage of grenades and projectiles of all kinds have been made of cast iron in France.

The metal required for semisteel shells is defined by the following data, based on the tests made in this country (France) by the ordnance authorities and railroad companies. The test-piece is a square bar, 40 x 40 x 200 millimeters (1.57 x 1.57 x 7.87 inches) long, cast on end in green sand, with a riser. It is tested on two knife supports, spaced 160 millimeters (6.30 inches) apart, by a falling weight of 12 kilograms (26.41 pounds). The initial drop is from a height of 28 centimeters (11 inches) and the weight is raised one centimeter (0.254 inch) after each blow until rupture occurs. The average breaking height must not be less than 45 centimeters (17.71 inches).

The tensile test piece is 18 millimeters (0.71 inch) in diameter x 150 millimeters (5.91 inches) long, cast on end and turned down to 16 millimeters (0.63 inch). The breaking strain must not be less than 25 kilograms per square millimeter (35,558 pounds per square inch).

Hydraulic tests of 10 seconds duration, before banding, are made at a pressure of 300 kilograms per square centimeter (4267 pounds per square inch) for the shells up to 160 millimeters (6.30 inches) and 200 kilograms (2844 pounds per square inch) for the larger sizes. Other tests after banding are made with compressed air or steam at 5 kilograms per square centimeter (75 pounds per square inch).

A reasonable allowance is made for small defects difficult to eliminate entirely in practice, particularly when a great output is required. Small defects are passed externally in front of the band, provided their depth can be determined exactly with a needle and extend into the metal less than one-fourth of the wall thickness.

No defects are permitted at the back of the band except small, interior depressions due to imperfect coring, provided that the thickness of the irregularity is not more than 2 to 3 millimeters (0.079 to 0.118 inch) and that the bottom of the shell is sound.

No definite analysis is required, provided the physical tests are satisfactory. The metal is a low phosphorus, low sulphur and low carbon iron with a sufficiently high silicon content and low percentage of manganese to leave it soft under the conditions of pouring.

Semisteel Shells

This is one of the most noteworthy and timely contributions to the literature of foundry practice since the participation of the United States in the great world war. For several years the Germans and the French have been bombarding each other with semisteel shells, the product of the foundry. Although probably not as satisfactory as steel shells, nevertheless they cost much less, can be produced more quickly and in much greater quantities than steel shells. Furthermore, the supply of steel in all the warring nations is inadequate to the demand, and semisteel, for shell purposes has proved eminently satisfactory. It is also believed that the Germans are casting their semisteel shells in permanent molds by the process devised by Major Edgar Allen Custer.

All of these facts were in the possession of our ordnance department several years ago, but not a semisteel shell for other than target practice has yet been specified. Our steel shells will not meet our needs and semisteel will have to be resorted to.

The way to proceed is pointed out by the author, E. Ronceray, of the firm of Ph. Bonvillain & Ronceray, Paris, France, largest manufacturers of molding machines on the continent. Their foundry is casting semisteel shells by the hundreds of thousands.

This paper was prepared for the American Foundrymen's association and originally was intended for presentation at the Boston meeting of this organization. Owing to the pressure of war business, Mr. Ronceray was unable to complete his manuscript in time for the convention and subsequent mail delays, have made it only recently available for publication.

Typical analyses of semisteel shells, follow:

	Diameter of shell, 120 millimeters (4.74 in.) per cent	Diameter of shell, 155 millimeters (6.11 in.) per cent
Total carbon	3.25	3.06
Silicon	1.35	1.17
Manganese	0.66	0.61
Phosphorus	0.08	0.08
Sulphur	0.10	0.17

To obtain strong metal, it may be melted either in an open-hearth or electric furnace. These processes insure low carbon metal with some degree of certainty; or, cupola and converter metal may be mixed. Thermic treatment will considerably improve the physical qualities. Tensile strengths of 35 to 40 kilograms per square millimeter (47,781 to 56,893 pounds per square inch) have been obtained regularly by these processes. Metal melted by the foregoing processes, however, increases the casting difficulties as it has a tendency to develop blowholes owing to its lack of fluidity. However, for the heavy tonnages required in a short time, the cupola, well handled, gives satisfactory results and regularly produces metal that passes the necessary physical tests. The bulk of the semisteel shells made in France, either for the Allies, or for ourselves, have been cast of cupola metal and therefore, I will limit my discussion to this process.

The standard cupola, as built in America, is capable of producing good semisteel. The tuyeres, usually one or two rows close together in large cupolas, must be of the standard type, that is, flat and one-sixth to one-fourth of the section of the cupola. It is advantageous to employ a cupola, equipped either with a hearth for holding a certain amount of metal, or provided with a receiver. The use of a receiving ladle is not recommended as very hot metal with regularity of composition is essential. If a cupola is employed, equipped with a receiver, provision must be made to heat the vessel white hot before pouring, or the first metal will be dull.

A blower of ample size is required and it is more advisable to have one of too large a capacity than one that must be driven to the limit to provide sufficient blast.

Lining for the Cupola

The best lining is none too good, as all operating conditions are against its long life. The extended heats necessitated by the large outputs required, the exceedingly hot temperatures needed for good metal the large amount of coke burnt at each melt combined with its low quality at the present time and the large amount of limestone generally used, result in the rapid wear of the lining. Owing to the high cost and scarcity of refractory material in France, many foundrymen have adopted sand linings and it must be admitted that in a great many instances these linings have given equal, if not better results than refractory brick. A good, refractory sand is selected for this purpose and it should be rammed hard between the shell of the cupola and a wood form. It is then carefully dried and blacked. In wearing qualities it compares favorably with the best refractory brick. A thick lining, 12 inches or more, is recommended.

The proportion of steel used in the mixture depends on the composition of the initial iron. If low carbon irons are employed, the amount of steel added must be less than if high carbon pig is used in the mixture. As a rule, the hematite irons now available contain more carbon than required, cold blast iron of low carbon content not being produced here in large quantities. Therefore it is necessary to add a large amount of steel to the charges in order to reduce the carbon in the final product. It is generally recognized that steel, before melting in the cupola, absorbs 1.6 to 2 per cent of carbon. Taking this into account, it is easy to calculate how much steel must be added to reduce the carbon percentage to the correct point. In French practice, up to 40 and even 50 per cent of steel is used. The amount generally charged, however, is from 15 to 30 per cent, according to the quality of the initial iron.

Composition of Final Product

The final product varies for different sizes of shells and according to the methods of molding pursued. The shell casting must be softer for the smaller projectile, or more exactly, for the thinner shell, and also it must be softer when the metal is poured in green sand than in dry sand molds. The physical properties of the test bars do not measure the final quality of the product. Therefore, test bars from the projectiles themselves are necessary. Such tests, together with actual firing practice have proved that the best results are obtained when at least 20 per cent of the total carbon is in the combined form, this percentage being as high as consistent with ease of machining. The total carbon is kept at about 3 per cent. Less than 2.75 per cent gives a sluggish metal which is difficult to handle and liable to produce unsound castings. Above 3.25 per cent carbon results in the production of castings that are too weak.

Several methods are practiced for controlling the combined carbon. One is to alter the amount of silicon; another is to change the amount of manganese which seems to act in opposition to the silicon, and a third is to change the rate of cooling. Silicon precipitates carbon in the graphitic form and, consequently, reduces combined carbon; manganese has a reverse action, while combined carbon increases with the speed of cooling.

Since the amount of manganese in the iron and steel we are using is about right, it has not been the practice to vary this element according to the silicon content. The speed of cooling is not easy to control and the only consideration given this factor is in connection with the change that takes place when the thickness of the shell is varied or the adoption of dry or green sand molding methods. Silicon is the element most easily controlled and its manipulation has made semisteel shell manufacture successful in this country. To ascertain the minimum amount of silicon acceptable, a test is made under the usual working conditions of the plant and the shells that are slightly hardened at the point, are analyzed. These will contain the lowest admissible silicon percentage.

Experience has shown that to obtain a sufficiently strong metal, the empirical rule

T. C. + Si = 4.50 per cent must be satisfied.

This is the maximum amount of silicon.

For instance, if total carbon = 2.80 per cent, then

Si = 4.50 — 2.80 = 1.70 per cent.

If total carbon = 3.10 per cent, then

Si = 4.50 — 3.10 = 1.40 per cent.

The amount of silicon must be kept between the limits of 1.40 and 1.70 per cent, the one corresponding to the minimum of silicon giving the maximum resistance permitted without having chilled castings or shells that are too hard, and the other corresponding to the maximum of silicon, above which the castings would be too weak. Care must be exercised to have these figures refer to the final product and, therefore, provision must be made for silicon losses in the cupola.

In working between these limits, analyses made of the actual castings will show that the percentage of combined carbon will be more than 20 per cent of the total carbon necessary to give a satisfactory shell metal. If this figure is not attained, the physical test will not be satisfactory and the shells, when tested will be shattered into small splinters, almost as fine as dust, whereas when 20 per cent or more of combined carbon is obtained, the splinters will be larger and will be more like those of forged steel shells.

Action of Phosphorus and Sulphur

Regarding the other elements, phosphorus and sulphur must be kept as low as possible, but it may be stated that satisfactory shells can be made with as much as 0.15 per cent phosphorus and 0.12 to 0.15 per cent sulphur. Phosphorus reduces the strength, but increases the fluidity. Sulphur is with-

out much effect on the strength, but it reduces the fluidity and retains carbon in the combined form. Its action is counterbalanced by the manganese. Sulphur, however, has a tendency to produce blowholes when the metal is not poured at high temperatures and when the mold is not gated to prevent the entrance of air into the mold with the iron.

Maximum resistance to shock must not be sought, as the tensile strength will not be satisfactory. It must be remembered that a sample giving a high shock resistance will fail in the tensile test, and *vice versa*. A test bar, breaking under a high falling weight, undoubtedly reveals sluggish iron liable to produce blowholes and to chill at thin points. The tensile test probably will not be satisfactory. Under these circumstances, reasonable limits must be fixed in both directions and the rules outlined will enable this result to be obtained.

If a high figure for the falling test and a low tensile test are obtained, silicon must be added.

If the tensile test is high and the falling test too low, carbon must be reduced.

Steel and ferrosilicon, or high silicon iron are the two agents that will best serve the metallurgist, care being exercised to take into account possible variations in the initial metals used.

Analyses and Rapid Tests

It is helpful, of course, to analyze the initial and final products. Though it is difficult to rely entirely upon the regularity of the materials received, it must be admitted that analyses, properly made, are important. All materials should be analyzed, especially iron, scrap, coke, limestone, sand, core oil and the finished castings. After a short time these analyses will provide a certain amount of fixed data which will enable the metallurgist to handle, with a greater degree of certainty the factors that are liable to change from day to day. For instance, phosphorus, sulphur and manganese will remain about the same for each brand of iron, sulphur for each brand of coke, and limestone and sand do not vary much if received from one source. Silicon loss and carbon gain in the cupola will not change much if the same practice is followed every day.

Other factors, on the other hand, are liable to constant changes; these include silicon in pig metal, moisture in the sand, composition of the core oil, etc. Therefore, analyses must be made as frequently as seems necessary under the circumstances, always keeping in mind that *it is a practical impossibility to work only from analyses*, particularly *on account of the irregularity of the materials used*. In fact, it may happen that the samples analyzed do not represent the average analysis of a car lot, or that a few pigs in the car are entirely different from the balance; also, steel scrap varies in composition, etc. It also must be remembered that if a mistake is made, the analysis of the final product will point out the corrective measures that must be adopted.

Either Keep's or a chill test should be made constantly to determine roughly if the amount of silicon is right. If not, the iron may be pigged and a part of the loss recovered, or the iron can be improved by additions in the ladle, or changes in the subsequent cupola charges. It is the prevailing practice to add powdered ferrosilicon in the ladle when the iron is too hard.

It also may be necessary, when the product is irregular in composition, to pig a certain amount of metal; for instance, to prepare a low carbon metal from hematite iron and a large percentage of steel, to use in place of scrap. If this metal is analyzed it renders more certain obtaining a satisfactory final product. Some firms knowingly increase their foundry scrap of known composition by making the risers much larger than really necessary. These precautions increase the quality of the product, but at a heavy expense in time and money, and they only must be resorted to when all other means have failed.

A useful, rapid test consists of taking a sample of metal every half hour and pouring it against a chill. The sample is plunged into water when set and is broken immediately. An experienced eye can tell quickly the depth of chill that gives the right metal for the needs of the foundry. This depth is not the same for all classes of shells; it must be less for small or thin projectiles, than for heavy ones. I prefer this to another test recommended by the ordnance department which consists of pouring cones into open sand molds from time to time, and after cooling, the points are broken off for the purpose of ascertaining from the fracture if the metal is right.

The operation of the cupola is similar to that for ordinary work. However, the amount of coke used is somewhat more than the average, but not so much as might be imagined. It is generally from 12 to 15 per cent of the charges and this is necessary on account of the necessity of having metal much hotter than is obtained usually if sound castings are to be made. It must be borne in mind that a blowhole which would be unimportant in a machinery casting would not be passed in a shell. Also, it must be remembered that a certain amount of carbon is absorbed by the steel charged before it melts. Some foundries are using up to 20 per cent coke, but the writer considers this bad practice, as satisfactory results are obtained with a smaller amount. However, in spite of the high price of coke, foundries must not be tempted to reduce its consumption to less than what is necessary to obtain the best results. Good shells only are obtained when the temperature of the iron at the cupola spout is about 1450 degrees Cent. and it must never be less than 1250 degrees Cent. when entering the mold. Unfortunately, there are few practical methods, of readily measuring the temperature of a stream of iron.

In charging the cupola, the rules defined by Richard Moldenke may be followed. However, it has been found that better results have been obtained by increasing both coke and iron charges by 50 to 100 per cent over what he recommends. That means that coke charges are 6 to 8 inches high.

Different methods are followed for charging limestone and there is no agreement in the amount used. With the poor grade of coke now supplied in this country, containing from 16 to 18 per cent of ash, some foundries use up to 12 per cent limestone and add it to all charges including the bed. This means that charging 12 per cent coke, as much limestone as coke is used.

The pig iron should be broken into small pieces, but it is still more important to use steel in small, rather than large pieces, as the action of cementation which takes place before liquefaction, takes some time and would not be completed if the pieces are too large.

Tin Imports Rise

Imports of tin into the United States during the calendar year 1917 showed a slight increase notwithstanding the difficulties experienced by American importers in getting foreign export licenses and the fact that the importation of this metal is controlled by the government. Including the approximate content of imported ore, but not including Alaskan ore, the total imports of tin in 1917 amounted to 68,996 long tons against 66,624 tons in 1916, according to figures by the bureau of foreign and domestic commerce, department of commerce. Of 1916 imports 49,415 tons, or 74 per cent, came from England and the Straits Settlements, whereas in 1917 only 41,463 tons, or 60 per cent, came from these two source. Imports from the Dutch East Indies increased to 14,148 tons, or 20 per cent, of the total, Australia, China and Bolivia supplying most of the remaining 20 per cent. A large part of our Straits tin imports came by way of England as usual, but it is expected that the present year will witness an increase in direct shipments.

Brittleness in Electroplated Steel

A Review of Experiments Showing the Relation of Hydrogen to the Characteristics of Iron and Steel—Recent Tests Indicate That Tin-Dipping Before Plating or Pickling Prevents Embrittlement

BY T. S. FULLER

ONE of the serious problems which confronts the makers and users of noncorroding steel springs is the brittleness produced during electroplating. The embrittlement is generally conceded to be caused by the nascent or atomic hydrogen which is liberated at the cathode, although several investigators conclude from their experiments that hydrogen is not the cause of this trouble.

The cooling curve of the hydrogen-iron alloys shows the existence of two distinct evolutions of heat, which occur at about 487 and 261 degrees Cent. It is remarkable that repeated heatings and coolings of low-carbon and electro-deposited iron in vacuo reduce the magnitude of all the now well-known molecular changes—*Ar* 1, *Ar* 2, *Ar* 3, as indicated on the cooling curves. The exhausted electroiron may be recharged with electrolytic hydrogen, by making it the negative electrode of a cell decomposing acidulated water. If the recharged iron be heated in vacuo, as already described, it will be found that the evolutions of heat in cooling, and consequently the points on the curves, will be restored to their original magnitude.

Heyn found that iron heated above 730 degrees Cent. in hydrogen and then quenched in water or in mercury became brittle.

Wedding discusses in detail the relations of iron and hydrogen and develops the theory that the two elements form unstable alloys. The fact that iron takes up nascent hydrogen at low temperatures and is made very brittle thereby, was developed by a number of investigators about 1870-80. Numerous researches showed that the flexibility and elasticity of iron wire and steel springs were greatly decreased by pickling, and the effect is the more marked, the thinner the material. Electrolytic iron may contain nearly 250 times its volume of hydrogen, while the commercial iron averages only 0.5 its volume.

Table I

Effect of Copper-Plating

		Breaking strength, pounds
1.	Untreated	433
2.	Untreated	438
3.	Untreated	435
4.	Untreated	374
5.	Untreated	439
6.	Untreated	418
7.	Untreated	310
8.	Copper plated	69
9.	Copper plated	137
10.	Pickled 20% H_2SO_4—3 min.	198
11.	Pickled 20% H_2SO_4—1 hr.	29
12.	Pickled Sn dipped	38
13.	Pickled Sn dipped	32
14.	Pickled Sn dipped Cu plated	22
15.	Pickled Sn dipped Cu plated	34
16.	Sn dipped (rosin) Cu plated.	300
17.	Sn dipped (rosin) Cu plated.	352
18.	Sand blasted, Sn dipped (rosin) Cu plated	390
19.	Sand blasted, Sn dipped (rosin) Cu plated	318
20.	Sand blasted, Sn dipped (rosin) Cu plated	417
21.	Sand blasted, Sn dipped (rosin) Cu plated	356
22.	Sand blasted, Sn dipped (rosin) Cu plated	410
23.	Sand blasted, Sn dipped (rosin) Cu plated	402

Burgess and Engle found that unheated electrolytic iron dissolved in normal sulphuric and hydrochloric acid almost twice as rapidly by weight as commercial zinc. After heating to 1000 degrees Cent. and cooling slowly, the rate of solution became as low as the least corroded form of iron tested, that is, transformer iron.

Richards and Behr found that nascent hydrogen is more readily absorbed by iron than is gas. They mention earlier observations of the same thing: "Cailletet and Johnson showed in 1875 that iron will take up at ordinary temperatures electrolytic hydrogen deposited upon it, while ordinary gaseous hydrogen has no effect. Johnson's work was particularly interesting. His iron was in the form of soft wire and his simple method of testing for hydrogen was to bend the wire to test its brittleness, since he had discovered the interesting fact that hydrogen imparted this property to iron previously tough. Immersing the wire in acids which react on it to form hydrogen uniformly made it brittle. Making the wire the cathode in neutral, acid, or alkaline solutions had the same effect, but iron anodes were unaffected even in the acid solution. Other wires were placed in a bottle full of water, and hydrogen was made to bubble violently through the water, without any trace of absorption." The occluded hydrogen is slowly

A paper presented at the thirty-second general meeting of the American Electrochemical society, Pittsburgh. The author, T. S. Fuller, is affiliated with the research laboratory, General Electric Co., Schenectady, N. Y.

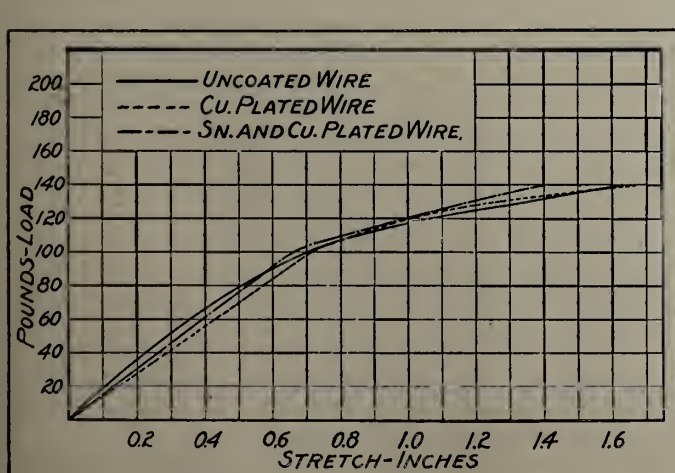


FIG. 1—RELATION OF STRETCH TO LOAD

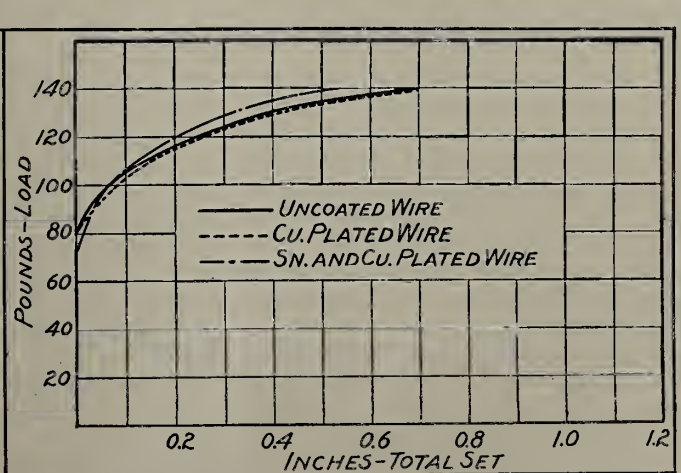


FIG. 2—RELATION OF PERMANENT SET TO LOAD

given off, upon exposure to the air, a little more rapidly in pure water and quickly in ferrous sulphate. The active hydrogen raises the single potential of iron by as much as 0.15 volt. although hydrogen gas has a lower potential than iron.

Reduction During Melting

Burgess says: "Among the properties of electrolytic iron which may give it some added usefulness is its content of hydrogen and the brittleness which results from this occluded gas. This hydrogen may be of some service in reducing oxide in a melt. The brittleness of the electrolytic iron before the hydrogen is driven off makes it easy to break it into pieces suitable for introduction into the steel crucibles."

Charpy and Bonnerot have observed that iron at ordinary temperatures acts as a membrane, permeable to nascent but not to molecular hydrogen. This was observed by experiment with hydrogen liberated from attack of acid on the iron membrane, and also by making the latter cathode solution. Osmosis occurs only when the hydrogen is liberated directly upon the membrane. Pressures as high as 14 atmospheres have been produced by such osmosis into a closed chamber.

Andrew concludes from experiments upon iron and caustic soda that hydrogen, upon being occluded by iron, immediately gives rise to the production of large crystals and brittleness. "It is not contended that hydrogen *per se* is the cause of the crystallization, but rather that it is due to the evolution or occlusion of hydrogen effecting a molecular disturbance.

"Iron gives up the greater part of its hydrogen as the temperature passes through that of the critical stage."

Effect of Stress

He quotes Stromeyer to the effect that contact with cold caustic soda of a concentration of over 90 or 100 degrees Twaddell causes mild steel to become brittle. Tubes and plates crack and rivet heads fly off. This takes place even out of contact with the air where there is little corrosion. Stromeyer states that this brittleness and corrosion occur only when the metal is in tension. Unstressed or compressed metal is not affected.

Guillet mentions that electrolytic iron as deposited is extremely brittle and hard, "due to the occluded hydrogen, and probably also, as will be seen, to interstrain."

Storey found that the extremely brittle and soluble electrolytic iron, heated to between 500 and 600 degrees Cent. gave off a large amount of hydrogen and became ductile and more resistant to acid without undergoing any apparent change in crystalline structure.

Baraduc-Muller conducted preliminary experiments on the gases contained in liquid steel. Ingots were melted and the gases pumped off and analyzed. In one case the gas amounted to 54.2 per cent by volume of the metal. Hydrogen was the principal constituent. The mechanical properties were improved by removal of the gas.

Parr has studied the embrittling action of sodium hydroxide on soft steel, and he concludes: "The evidence seems to show that the embrittling effect of sodium hydroxide on steel is due to the evolution of hydrogen and the absorption by the steel of the hydrogen in the nascent state."

The experiments described in this article were made to find, if possible, a means of preventing the brittleness of electroplated steel springs. All the test samples were made from the same lot of black spring wire 0.120-inch in diameter. Eight or ten turns of the wire were wound on a ⅛-inch mandrel and 3-inch lengths left on both ends of the spring to fit into the grips of the testing machine. This necessitated a sharp bend at both ends of the coil and it was at one of these bends where the break usually occurred. The breaking strength as determined by an Olsen testing machine proved to be the best criterion for comparing the springs treated in different ways.

Table II

Results of Dissimilar Tests

No. 24—Untreated

Diameter of wire, in.	0.117
Mean diameter of spring, in.	0.773
Number of turns	5.000

Load, pounds	Stretch, inches	Total set, inches
000	0.000	0.000
20	0.078	0.000
40	0.250	0.000
60	0.344	0.000
80	0.516	0.000
100	0.703	0.062
120	1.062	0.234
140	1.625	0.687

No. 25—Copper-Plated

Diameter of wire, in.	0.120
Mean diameter of spring, in.	0.782
Number of turns	5.000

Load, pounds	Stretch, inches	Total set, inches
000	0.000	0.000
20	0.125	0.000
40	0.312	0.000
60	0.453	0.000
80	0.578	0.000
100	0.703	0.078
120	1.031	0.234
140	1.656	0.734

No. 26—Tin-Coated (Rosin) Copper-Plated

Diameter of wire, in.	0.123
Mean diameter of spring, in.	0.779
Number of turns	5.000

Load, pounds	Stretch, inches	Total set, inches
000	0.000	0.000
20	0.156	0.000
40	0.281	0.000
60	0.406	0.000
80	0.531	0.0156
100	0.656	0.0625
120	0.984	0.2187
140	1.406	0.5312

Effect of Copper-Plating

The breaking strength of seven untreated test springs (1-7, Table I) was determined. Five of the seven samples broke above 400 pounds, the values ranging, however, between 310 and 439 pounds.

Two like springs were made cathode for one-half hour in a cyanide copper solution. These (No. 8 and No. 9, Table I) broke at 69 and 137 pounds, the treatment in the copper plating solution having cut down the breaking strength to 17 and 35 per cent, respectively, of the average value of the seven untreated springs. Furthermore, the copper-plated samples stretched to two or three times their original lengths.

Test spring No. 10 (Table I) was pickled for three minutes and No. 11 (Table I) for one hour, in 20 per cent H_2SO_4 solution. The former sample broke at 198 pounds, showing a reduction in strength to 50 per cent of the untreated value; the latter broke at 29 pounds, with a reduction in strength to 7 per cent of the untreated value. The latter sample was reduced 0.001 inch in diameter by solution in the acid.

Effect of Tin in Preventing Brittleness

It was then thought that a coating of tin on the steel might prove to be impervious to the action of the atomic hydrogen, and thus allow the spring to be copper-plated without impairing its mechanical properties. This was found to be true. The first test samples which were tin-dipped, however, were pickled for a few seconds in H_2SO_4 previous to the dipping. These (12 and 13, Table I) showed breaking strengths of only 38 and 32 pounds. Nos. 14 and 15, which were pickled, tin dipped and copper-plated, showed breaking strengths of 22 and 34 pounds. The very poor results obtained from these four samples, however, were due to the H_2SO_4 pickle which they received before dipping.

Two samples (16 and 17, Table I), without having been pickled, were

dipped directly into rosin and then into molten tin heated to a temperature of 260 to 300 degrees Cent. These springs broke at 300 and 352 pounds or in the neighborhood of the range of the untreated springs (310-439 pounds).

Samples 18, 19, 20, 21, 22 and 23 (Table I) were sand-blasted, dipped in rosin and molten tin, and copper-plated in the same solution used for the copper-plated springs previously described. These samples showed breaking strength from 318 to 417 pounds, all of which are well within the range of the values for the untreated springs.

The mechanical properties of the samples were not appreciably changed by the tin treatment. Table II shows the results of tests made on three similar, but differently treated springs, made from the same lot of wire as those previously described, but wound on a ½-inch instead of a ⅜-inch mandrel. No. 24 was untreated; 25, copper-plated, and 26, tin-dipped (rosin) and copper-plated. For the same load, all three springs show approximately the same stretch and total set, as may be noted from the plotted results of these tests.

The three curves in Fig. 1 show graphically the relation of the stretch to the load for springs 24, 25 and 26, plotted from data in Table II. Fig. 2 shows the relation of the permanent set to the load for the same springs. The variation is slight.

The facts are all in accord with the assumption that the absorption by the steel of atomic or nascent hydrogen liberated at the cathode is the cause of the embrittlement of steel springs in the plating bath. This embrittlement may be prevented by first dipping the springs in a bath of molten tin. The tin forms a coating on the steel which is impermeable to atomic hydrogen. Rosin may be used as a flux in the tin-dipping. The springs may be sand-blasted, but must not be pickled in acid. Steel springs may be dipped in molten tin at a temperature of 260 to 300 degrees Cent. without appreciably changing their mechanical properties.

Urge Standardized Steel Mill Motors

DESIGN, selection and standardization of steel motors were discussed at a joint meeting of the Cleveland, Pittsburgh, Toledo, Toronto and Detroit sections of the American Institute of Electrical Engineers with the Association of Iron and Steel Electrical Engineers held at the Hotel Statler, Cleveland, on March 8. W. T. Snyder, National Tube Co., McKeesport, Pa., presented a report from the standardization committee in the form of a paper urging the value of standardization of steel mill and auxiliary motors in promoting economy and continuous operation. He stated that because there is no basis of agreement on motor design there are over a million motors in use in the iron and steel industry which require 500,000 armature changes a year and 20,000 spares. This requires a constant investment of over $80,000,000 in spares. This latter amount could be reduced to $20,000,000 if motors were standardized so that parts were interchangeable and emergency motors might be substituted while repairs were made.

The appeal for standardization met with favor from the members present. T. E. Tynes, Lackawanna Steel Co., Lackawanna, N. Y., stated that the need is shown in their plant by the fact that the 19 types of direct current motors in use require 54 separate windings, armatures, brush holders, etc. Further the five types of alternating current motors in use in the company's works require 25 different kinds of repair parts. The greatest difficulty was stated to be in crane motors which require a maximum of rebuilding and improvising in event that the type of motor is changed. D. M. Petty, Bethlehem, Steel Co., South Bethlehem, Pa., stated that the three plants of the company had managed to concentrate on three types of motors, one type for each plant, but the present demands had necessitated mixing them, and they had realized the value of the approximate standardization which had previously existed. He stated that standardization, contrary to the belief of many would result in better design and efficiency. He cited the high development of the incandescent lamp as an example.

Mill Transmission Considered

A paper entitled, Design of Underground Distribution for Electric Light and Power, by George J. Newton did not concern steel mill practice primarily, but in the discussion which followed the problems of steel mill power transmission were outlined. E. Friedlaender, superintendent of the electrical department, Carnegie Steel Co., Braddock, Pa., stated that more study was needed on the subject of insulation. Heat pipes, steam lines, underground water and oil are all enemies of power line insulation when the cables are pulled through underground ducts, as is demanded by the best modern practice. If open manholes are provided there is danger of hot metal or cinder getting into them and destroying the lines. Without manholes there is diffieulty with gas, and repairs are more difficult.

A paper on "Some Considerations in Determining the Capacity of Rolling-Mill Motors," by Robert F. Hamilton, represented a detailed consideration of electric drive for rolling mills in Great Britain. A mathematical development of motor and flywheel design was given.

J. D. Wright, electrical engineer, General Electric Co., Schenectady, N. Y., presented a paper on the selection of auxiliary motors with special reference to side guards, manipulator fingers, tilting and inspection tables. A series of slides demonstrated the features of electric drive for these units and outlined the considerations which governed the selection of motors and control devices. In the discussion which followed, Mr. Friedlaender called attention to the need for counter weights on the roll tables, particularly those of 50 tons or more in weight. He also stated that the full reversing type of motor should be used for raising and lowering the approach tables and for controlling the side guards which line the billets into the roll slots, as both of these are "inching" operations. G. W. Richardson, American Bridge Co., Pencoyd, Pa., suggested that the side guards should have brakes for the reasons suggested by Mr. Friedlaender involving the "inching" operations, but that a full crank revolution was satisfactory in raising and lowering the manipulator fingers to turn the material on the tables. A. E. Menk, Carnegie Steel Co., Homestead Works, Munhall, Pa., suggested the balancing of a tilting table at the center to save part of the energy required to lift the table entirely from one side as is the present practice.

Will Make Ferro

The Anaconda Copper Mining Co., Butte, Mont., will start work immediately on the construction of a plant at the Boston and Montana works at Great Falls, Mont., for electrolytic production of ferromanganese. This is in response to an appeal from the war industries board to Presdent John D. Ryan. Five furnaces will be installed, each capable of handling 250 tons of ore daily. Ore will come from Anaconda's Butte mines and from custom produet. Electric power will be furnished by the Montana Power Co.

Strikes Made Conspiracy

House Passes Bill Which Penalizes Blocking of War Industries—Nation to Aid Workmen

CALCULATED to bring to an end all wage profiteering, an administration bill has passed the house which declares that all strikes called to obstruct war industries are conspiracies. Offenders are subject to 30 years' imprisonment and fine. While Representative Cannon, of Illinois, made an effort to prohibit all war industries strikes, "in order to provide a weapon against the I. W. W." he said, his amendment was defeated and the labor forces inserted an amendment, urged by Representative Lunn, of New York, which specifically permits bona fide strikes to raise wages or better working conditions.

However, since it is the present intention of Washington officials to bring labor more and more under government supervision and protection, it is thought that there is nothing to fear from that direction. Perhaps no one other question is receiving so much attention in Washington right now and it is intended to make conditions of work and wages the best possible for the workingmen. Union labor officials will be asked to play an important part in the war program, and an important official on the shipping board recently predicted that as a result of the way these matters will be handled from this time forward, ship production will speed up in the next four months to an astonishing degree.

Because of these facts, it is believed that nothing is to be feared from the threat of William L. Hutcheson, president of the carpenters and joiners, to appeal to the President, and that failing he will not be responsible for the result. It is expected that if Mr. Hutcheson does appeal to the President, he will be referred back to the wage adjustment board of the shipping board, which now is endeavoring to bring about general agreements with all classes of labor that will insure no abatement of work in the highly important shipbuilding program.

Labor Committee Complete

Associate Supreme Court Justice Louis D. Brandeis has been named general public representative by the five heads of labor organizations, who with five representatives of employers are holding sessions in Washington to frame the basis of a national labor policy for the duration of the war. The employers selected Ex-president William Howard Taft as representative of the general public, making 12 in all on this committee. William Johnson, Washington, head of the machinists' union, was chosen to succeed J. A. Franklin, Kansas City, president of the boilermakers' brotherhood, who was unable to serve on the committee. Mr. Franklin has been appointed by Director General McAdoo as assistant director of the railroad administration's division of labor. He will assist in negotiations with shop trades.

Ship Plants in Speed Contest for Wager

Joseph W. Powell, vice president of the Bethlehem Shipbuilding Corp., Ltd., is authority for the statement that the employes of the Union Iron Works, San Francisco, the great Bethlehem yard on the Pacific coast, have made a wager of $10,000 with the employes of the Fore River branch of the corporation, Quincy, Mass., that they will turn out more destroyers for the navy during 1918 than will the Quincy yards and that the money will go to the city with the better launching record. The Union Iron Works has broken all world's records for quick construction of merchant vessels, while at Fore River it has the world's records, so far as is known, for speed in building a destroyer. The men at the Fore River yards are so confident of winning that they increased the original wager from $5000 to $10,000, employes of the Squantum, Mass., Providence, R. I., and Buffalo branches having joined in with them.

Industrial Situation is Showing Improvement

Recent wage adjustments and other conciliatory measures adopted to prevent tie-ups, walk-outs, etc., back up Secretary of Labor Wilson's statement of a few days ago that the industrial situation in the United States is now in a better state than at any time before the war. Only 17 of the 74 labor disputes before the adjustment board have reached the strike stage. In the first 11 months of the United States' participation in the war, 807 disputes were handled by the department of labor, and these involved 1,200,000 men directly. Conciliation methods settled 509, while the number where the conciliation commission was unsuccessful averaged six cases a month.

A misunderstanding of orders to former Admiral Bowles almost brought a strike at the Hog Island shipyard. It was averted when explanations were made that double time would be paid for overtime instead of time and a half. Employed on boats in New York harbor, 60,000 workmen recently threatened to strike but following a conference of W. B. Squires, acting secretary of the United States board of arbitration with boat owners, agreed to await developments. This department was recently called into conference with 1900 machinists at the Saco-Lowell shops, Lowell, Mass., whose strike was averted by a wage increase of 3 cents an hour. Good work was also done by this board at the plant of the Liberty Ordnance Co., Bridgeport, Conn., where the men walked out following the discharge of a fellow-workman. Overtime beyond eight hours will be paid at the rate of time and a half and Sundays will bring double pay. The men will be told the reasons when they are discharged.

Machinists and their helpers at the Fore River and Squantum, Mass., plants of the Bethlehem Shipbuilding Corp., Ltd., have organized. They will formally present their demands to the United States shipping board at a coming conference in Washington. The men favor the 3-shift plan, and the schedule demanded is as follows: Journeymen machinists, $6 per 8-hour day; helpers, $4.50 per 8-hour day, five days a week and four hours on Saturdays; double time for overtime work, and night workers to be paid 10 per cent increase over the day rate.

Skilled Men Needed

Immediate requirements of the signal corps of the aviation section of the United States army inspire a call for 10,000 skilled machinists, mechanics, chauffeurs, etc. Although the strength of this service is 100 per cent greater than on April 1, 1917, this call is but the precursor of others for the great air army, since 46 men are needed on the ground for each man in the air. Out of every 100 in the service, 98 must be skilled in some

branch of work. Draftees may be inducted into the aviation service by applying to their local draft boards. Men not registered may enlist at any recruiting office. Further information will be supplied by the air division, personal department, Washington, D. C. The field is open for auto mechanics, engine repairmen, gun, tin, copper and blacksmiths, electricians, carpenters, sheet metal workers, wireless operators, tailors, tent and sail makers, vulcanizers, welders, etc.

Electric Process

Of Iron and Steel Making Expands Markedly in Canada

Production of pig iron in Canada last year was approximately 1,172,000 short tons as against 1,169,000 short tons for the year 1916, according to a preliminary report on mineral production in 1917 by John McLeish, chief of the division of mineral resources and statistics, was recently published by the Canadian mines branch. Only 1,157,000 tons of the 1917 figure, however, were produced in blast furnaces, the remaining 15,000 tons being remelted pig iron or reclaimed scrap, produced in electric furnaces. Thus the production of virgin pig iron in 1916 really exceeded that of 1917, as few electric furnaces were employed in Canada in the former year. The total shipments of iron ores from Canadian mines during 1917 were 215,242 short tons, as compared with shipments of 275,175 tons in 1916. Of this amount 197,602 tons consisted of hematite, and roasted hematite and siderite, the remaining 18,000 tons being magnetite and titaniferous ores. As in the past, the Helen and Magpie mines of the Algoma Steel Corp. were the chief producers.

The estimated production of steel ingots and direct steel castings was 1,737,000 short tons of which 1,690,170 tons were ingots and 46,344 tons were direct steel castings. This is a material increase over the 1916 production which approximated 1,428,000 tons. The total production of electric steel in 1917 was probably not less than 50,000 tons as against 20,000 tons in 1916 and 6000 tons in 1915.

Copper production aggregated 108,860,358 pounds as against 117,150,028 pounds, in 1916. Of the total, 86,509,000 pounds were contained in blister copper and in matte produced in Canada, and 22,352,000 pounds were estimated to have been recovered from exported ores. Nickel output was derived almost entirely from the ores of the Sudbury district supplemented by a small quantity from the silver-cobalt-nickel ores of the Cobalt district. Production was 84,471,000 pounds compared with 82,959,000 pounds in 1916.

Vast Magnitude

Of Canada's War Industry Shown—United States Orders Outlined

Toronto, March 9.—Hon. Newton W. Rowell, president of the Canadian privy council, speaking before the Toronto Y. M. C. A., stated that the imperial munitions board had placed orders in Canada for $1,100,000,000 worth of munitions, and that a sum of $875,000,000 already had been expended in respect of these orders in plants established in every province with the exception of Prince Edward Island. There were between 500 and 600 plants engaged in making munitions, employing between 250,000 and 300,000 workers, including at one time as many as 35,000 women. The number of women now engaged in munition work is about 5000. Canada had machined over 53,000,000 shells, 40,000,000 brass cartridge cases of 3½ pounds each, and 58,000,000 copper bands. It is now rendering assistance to the United States, being engaged on orders for 7,000,000 shells, 10,000,000 forgings and 2,000,000 cartridges for the latter government. The sum of $10,000,000 had been spent in aeroplane plants and aerodromes in Canada and 1000 high-grade aeroplane engines are at present being constructed.

The first steel for the four ships to be constructed for the British government at the yards of the Canadian Allis-Chalmers, Ltd., near Bridgeburg, Ont., has been received, and the machinery of the plant is being installed. A force of about 4000 men will be employed. The vessels will be built simultaneously and it is expected that they will be completed this year.

The Ontario government has appropriated $9,054,951 for expenditure on capital account this year by the provincial hydroelectric power commission. The principal items are as follows: Chippewa Creek, development, $4,175,000; Niagara system extensions, $2,865,000; Central Ontario system extensions, $588,000; Severn system, $405,000; Eugenia Falls system, $233,000; and St. Lawrence system, $251,000.

The sum of $100,000 has been appropriated to carry on an extensive investigation into the possibility of developing the peat resources of the province, so as to furnish a substitute for coal. The government has engaged the best expert available in England, who is at work investigating new methods of peat fuel manufacture.

Obituaries

HENRY GRAHAM BROWN, aged 65, vice president and general manager of Brown & Co., Inc., Pittsburgh, manufacturers of merchant iron bars and crucible tool steel, died recently while being taken to Allegheny General hospital, after being stricken with heart failure in Sixth street, Pittsburgh. Mr. Brown was born in 1853, was graduated from Haverford college and came to Pittsburgh 40 years ago. He entered the employ of his father, John H. Brown, who was a member of John H. Brown & Co., steel manufacturers. Later he, with his brother, J. Stuart Brown, and James Neale, took over the business and incorporated it under its present name. He was also vice president of the Clyde Coal Co., and of the Pennsylvania Drop Forging Co.

James Miller Hustead, familiarly known as Captain Hustead, president of the Hustead-Semans Coal & Coke Co., Uniontown, Pa., died recently in Clearwater, Fla. He was born in Smithfield, Pa., Sept. 18, 1827. For the past year or so he had suffered poor health and this winter he journeyed to Florida to recuperate.

H. M. Hollister, aged 80 years, who three years ago retired from a 35-year service with the Fairbanks-Morse Co., Chicago, died recently at his home in Oak Park, Chicago.

George England, aged 68, who for 16 years has been superintendent of the Edgar Thompson Steel Works, Carnegie Steel Co., Braddock, Pa., died recently in that city.

Samuel Farquhar, president of John Farquhar Sons, Inc., Boston, one of the oldest roofing and sheet metal concerns in the country, died at his home in Newton, Mass., recently, after a brief illness. He was born in Boston 76 years ago and after receiving his education, he entered the firm which his father founded and which now is being conducted by his son Frank C. Farquhar. Samuel Farquhar was identified with John Farquhar Sons, Inc., for over 50 years.

Virginia Iron Activity Running High

More Furnaces Now Operating Than at Any Time in History—Two Stacks Making Ferromanganese and Another About to Start—Control of Lynchburg Plant Passes to Lavino Interests of Philadelphia

(*Special Correspondence*)

ROANOKE, Va., March 11.—Of the 20 furnaces in Virginia 80 per cent are operating at the present time, only four being out of blast for one reason or another. Never before in the history of the iron industry in this state have there been 16 furnaces operating at the same time. The four furnaces out of blast are all controlled by various operating companies and are not available as a means of increasing production. Where one of these would be operated some other furnace would be banked or blown out for repairs so that it may be said that the Virginia production, as far as furnaces operating are concerned, has reached its capacity. This is not true as to tonnage, however. Practically every furnace is having trouble with its operation as the result of shortage and poor quality of coke, uncertain labor conditions and severe winter weather.

The two principal railroads serving the furnaces here, the Norfolk & Western and the Chesapeake & Ohio, are handling the business on their own lines in excellent shape, but are badly tied up by embargoes necessitated by the congestion of connecting lines. The Norfolk & Western is showing the result of its superior management, in comparison with the other roads in this field, by moving iron more regularly and in larger quantities than any other road. The Chesapeake & Ohio furnaces are badly congested and practically every plant on that road is accumulating a large stock of iron, all of which is sold and badly needed by customers but cannot be shipped, due to embargoes. Never before has the value of a well conducted traffic department been made so manifest as in the last six months. The two furnace companies in the state equipped with good traffic managers have been able to ship throughout the winter and have little or no iron on their yards tied up by embargoes.

* * *

The Allegheny Ore & Iron Co. has both furnaces in blast although the Buena Vista furnace has been banked intermittently all winter, due to the lack of coke. The Iron Gate furnace is running steadily but being located on the Chesapeake & Ohio exclusively has accumulated a large stock of iron which cannot be shipped. This furnace owes a considerable tonnage of coke to a neighboring furnace which is clamoring for its return and it is rumored that it may be necessary to bank Iron Gate temporarily in order to return this coke. This company is well sold up for the first half but is temporarily out of the market for the second half, due to uncertainty as to whether the steel interests in Pennsylvania, which control the company, will find it necessary to make basic for their own plant because of their inability to purchase iron in the Pennsylvania field.

* * *

The Southwestern Iron Co., whose property in Virginia was formerly called the Goshen furnace, is operating on ferromanganese. This furnace, controlled by Chicago interests, went into blast early last fall and despite the series of unexpected difficulties

Banker's Farsightedness Outdoes Iron Makers' Experience

THE story of the accomplishments of the Princess furnace during the last two years would make a business story of absorbing interest akin almost to romance. This little furnace of 90 *tons daily capacity, located on the James river a few miles south of Clifton Forge, was one of the properties owned by a well known iron interest of Philadelphia and Cincinnati. Having gotten their owners into financial difficulties during the depression following* 1914, *this furnace with other properties was assigned as security to a certain bank in Cincinnati. It is a well known maxim of the pig iron business that during periods of activity the man who makes the best showng in pig iron is the man who knows the least about the business. Since the president of this bank, a shrewd and far-seeing financier, did not know the least thing about the pig iron business, it was a foregone conclusion that he could make a lot of money by operating the property. And that is exactly what he did.*

In August, 1915, *he started operating and piling his entire make. He authorized several established brokers to sell his iron but kept his price about* $2 *higher than the market, advancing it promptly as the market advanced. When, in the early winter of* 1916, *pig iron rose to* $18.50 *and slumped off to about* $17.50 *and everyone else was selling ahead as far as they could persuade customers to make contracts, this furnace increased its authorized price to* $25 *and kept on stocking iron. When iron reached* $25 *in the spring of* 1917, *the Princess price was* $30, *although the company did condescend to accept mail orders around this figure. sumers were scrambling for tonnage and the price was close to the* $50 *mark, this furnace was found to be in the enviable position of having* 50,000 *tons of iron on hand available for sale, and as fast as it could be loaded and shipped it was converted into money. By the end of* 1917, *this little furnace which had only been able to make a reasonable profit when operated by experienced iron interests, had paid off the entire debts and obligations of its former owners and had released both itself and the other properties entrusted to the bank for security. It is said that profits realized from this operation were in excess of* $1,250,000.

A good many of its competitors, who were busy predicting catastrophe to the daring Cincinnati banker, still are figuring on how much longer it is going to take them to clean up their $15 *and* $18 *orders. Today the furnace is back in the hands of its original owners and undoubtedly again is making a reasonable profit, with every indication of continuing to do so.*

encountered at first, it has made a satisfactory record on ferromanganese. It is a common report that $150,000 was spent in rebuilding this furnace, although that statement has never been verified by the owners.

* * *

The Low Moor Iron Co. is operating one furnace at Low Moor and the Covington furnace. Additional stoves are being built at Low Moor to make it possible to operate together both stacks there. The furnace already is equipped with sufficient blowing power for two stacks and the necessary mains and connections are in place. The A stack, which was operated in 1915 and 1916 and blown out when the B stack was lighted in June, 1916, has been relined and put in shape for early operation. It is hoped by the company that both stacks can be operated together in the near future, although it is understood that there is some question as to the present boiler capacity. The Low Moor company has been building a Dwight & Lloyd sintering plant to sinter a large tonnage of pyrites bought by it in South Carolina. Work has been at a standstill on this plant for some time. It is expected to be completed and in operation by summer.

* * *

Control of the Lynchburg furnace of the Oriskany Ore & Iron Corp., built about 1908 by W. W. Taylor and Robert A. Parrish, of Covington, Va., from the proceeds of their profitable operation under lease of the two Allegheny furnaces, which was bought last August by Crocker Bros., of New York, recently has been purchased by the Lavino interests of Philadelphia. It is said that the Lavino interests have purchased the entire outstanding preferred and common stock and will terminate the Oriskany company as an independent organization. The furnace now is known as the Oriskany furnace of Lavino & Co., and is operating on ferromanganese. It is understood that considerably over par was paid for the preferred stock and not much less than $50 per share for the common which is a striking indication of the value of Virginia furnaces as producers of ferromanganese

* * *

The Pulaski Iron Co., under the direction of Gen. Haldeman, of Philadelphia, is moving along smoothly with a new and larger furnace. During the winter of 1916-1917, the Pulaski company dismantled its old furnace and built in its place a 250-ton stack of modern construction which has been operating since early in 1917. The plant is equipped with one Ingersoll-Rand and one General Electric turbine blower, concrete bins and steel trestles. It is the largest single stack in the state. This company is one of the old standbys in the Virginia field and has operated year in and year out with low costs and satisfactory profits. Much of its success is due to its joint ownership with the General Chemical Co. of a sulphuric acid and a sinter recovery plant located at its furnace from which it derives one-half of its ore supply. It also owns its own beehive coke ovens in West Virginia. At the present time the Pulaski company has the largest stock of iron of any furnace in the state, being about 8000 tons.

* * *

The Virginia Iron, Coal & Coke Co. is operating five of its seven furnaces, including one of the two stacks at Middlesboro, Ky. The second stack at Middlesboro is being prepared for blast. All of its furnaces, being located on the Norfolk & Western and the Louisville & Nashville are shipping freely. The company has less than 2000 tons of iron on its yards although it has on its books orders for 175,000 tons for first half and early delivery. One of its furnaces has been running on a bad lining for several months and may have to be blown out any day for repairs. This company, in addition to producing its own coke at the Tom Creek ovens, is a larger shipper of coal for tidewater and domestic consumption.

* * *

John B. Guernsey and Co., of Roanoke, are operating the Old Dominion furnace at Roanoke and the Pocahontas furnace at Graham, Va. Both furnaces are producing foundry iron, although the Graham plant produced spiegel in December and will blow in on ferromanganese during the current month. This company is now the second largest producer in the state and has made remarkable progress in the last year. At the Roanoke furnace it is producing a special grade of high-manganese foundry iron for which it finds a ready sale in the middle west and with car-wheel manufacturers. Several orders for this iron have been placed by the American and Italian governments. The manganese in this special iron is supplied by a manganiferous ore produced at the company's mine nearby. The Guernsey company also operates its own coal mines and quarry. It reports no difficulty with shipments and has less than three days' make of iron in stock. This is one of the few companies in the south maintaining its own traffic department. All of its operations except one mine are located on the Norfolk & Western railway and the Roanoke furnace is also on the Virginian railroad.

* * *

The latest comer in the Virginia field is the Intermont Iron & Coal Corp., operating the Big Stone Gap furnace in the extreme southwestern point of the state. This stack has been operating since the summer of 1917 on foundry iron, most of which moves south and into the middle west. The company is controlled by Tate Irvine and Dr. J. Kelly, of Big Stone Gap, produces most of its coke. It owns mines from which about half of its ore supply is derived. Its plant is equipped with twin stacks, only one of which has been put in condition to operate. Its productive capacity, however, is confined to that of one stack by reason of its limited complement of engines and boilers and stoves.

Rapid Work

Done in Building of Federal Shipyard —Will Launch Soon

Among the feats of rapid construction characterizing the execution of the government shipbuilding program in the east, is the practical completion of the yard of the Federal Shipbuilding Corp., at Kearny, N. J. The company, which is a subsidiary of the United States Steel Corp., already has completed six shipways and the remaining four are 80 per cent done. Vessel construction has been so far advanced that the first boat is expected to be launched by the latter part of April or the first of May. After that, one boat is expected to be launched every two or three weeks and 10 vessels are to be completed by the end of this year. By 1919, it is expected, vessels will be launched at the rate of 20 per year.

The buildings which already have been completed include a 200 x 1000-foot plate shop which is also to house the mold loft; a boat shop 550 feet long, a powerhouse, furnace, joiner, paint and sheet metal shops, a temporary mold loft and a main stores building and two branch stores. The building now being used temporarily as a mold loft, later will be employed as an office. In addition, five auxiliary buildings have been completed. They include an employment office, a temporary hospital and military barracks. Among the unfinished buildings are a forge shop, a permanent machine shop and an office building.

For the completion of the 10 vessels to be launched this year 26,000 tons of plates will be required. Of these, 17,000 tons of hull plates already are on the ground or are in transit.

Parcel Out British Iron

Virtually Rationing Resorted To—Forbid Pipe Making for Stock—Higher Mill Wages Cause Price Inequalities and Irregularity

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 21, 1918.

PRESSURE for pig iron continues very keen, and the iron situation increasingly resembles that of food in the fact that a certain amount of "rationing" has become necessary. No customer is getting all the iron he orders, but the dealer and manufacturer send out supplies as far as they can, in the order of national importance, and with the fullest possible regard to the relation of the customer to the war. Acceptances of new orders are becoming rather rare, and, in all cases, the tonnage booked is materially cut down. We are still a good deal disturbed by labor troubles, and on Saturday last the workers at a number of blast furnaces, on the ground of certain alleged grievances, handed in their notices. There was much discussion and negotiation during the week end, the general result of which was that by Monday the last of the notices had been withdrawn. In order to relieve the shortage of foundry iron, pipe makers have been forbidden to manufacture pipe for stock, orders accordingly being restricted solely to those contracts able to secure the necessary priority certificate.

Buying by the Month

In the north of England buying is now on the monthly system, and most allotments have been made for the month of February. The market manifests a strong tone, with a full maintenance of maximum prices. A considerable amount of buying of foundry and forge iron is being carried through, on behalf of midland and Scottish consumers. Still more could be done if makers could guarantee deliveries; but in this matter the position is improving somewhat as the open weather which has prevailed since the beginning of the year has greatly assisted railway transit. With a little more tonnage available, shipments to allies show some little increase. The warrant stock is substantially unchanged at 442 tons. The make has been reduced a little by the blowing out of a furnace urgently in need of repairs. Hematite continues very much in demand, with supplies continually below requirements. One of the inevitable results of the constant extensions to steelmaking plants has been a great increase in the consumption of ganister, silica brick and other refractory materials. Important extensions have been made in connection with all the known sources of supply. In Derbyshire large quantities have recently been obtained from Dore and Totley, while new operations have been started in Millhouses Woods, in the Sheffield area.

Workmen Are Well Treated

Now that wages have been substantially advanced the question of prices has become urgent. As announced a week ago, puddlers' wages have become 19s 6d $(4.68) per ton, an unprecedented rate of pay in this country. The latest report of the wages board for the two months ended November and December sets out the wages arrangements in detail. The sliding scale adjustment has been effected by the addition of £1 5s ($6) per ton to the ascertainment under the sliding scale. The raising of the selling price by this amount will give the men 12½ per cent advance. One difficult problem was to secure the proper payment of the "underhand puddler", or the puddler's assistant. It is provided that the underhand must be paid, by the forehand, one-third of the amount resulting from the 12½ per cent, and the 2½ per cent accruing under the sliding scale ascertainment—that is of the total of 15 per cent; the puddler receiving 1s 6d (36 cents) per ton advance will pay his assistant 6d (12 cents) as his share of the rise. No serious difficulty has arisen, the men being fairly content with the settlement. There are, however, some troubles still to be dealt with, at foundries and other works not governed by the wages board, where it has not always been easy to apportion the payments, and at the same time carry out the employer's wish to enable the lowest paid workmen to obtain the larger benefit from the advance authorized by the ministry of munitions.

The remaining problem is that of prices. The workmen have been fairly satisfied, but this has been at the expense of the manufacturer. The ministry of munitions very readily gave the men the 12½ per cent. But a rather different spirit is shown when the manufacturer asks that he shall be adequately recouped for this expenditure. The position of the maker of common iron is a very difficult one. This iron now has a maximum of £13 15s ($66) and did not share in the 10s ($2.40) advance made upon marked bars recently. It will be observed that the midland wages board report of selling prices in November and December shows an average selling price of £15 10s ($74.40) as the basis for the payment of wages. The maker of unmarked iron accordingly is paying on the basis of £15 10s ($74.40) for the manufacture of iron which he is not permitted to sell at more than £13 15s ($66). A short time ago when the ministry of munitions was interviewed, details of costs were submitted and it was shown that ordinary iron costs £14 8s ($69.12) to produce, or 13s ($3.12) above the maximum price permitted by the ministry of munitions. The only response yet obtained to an appeal for a better price is a promise of a subsidy of 5s ($1.20) per ton, which the makers point out is not enough to repay them their actual losses.

Price Stability is Upset

The position has become somewhat chaotic. It is a kind of open secret that a great deal of iron is being paid for at prices over the £13 15s ($66). Indeed the stories in circulation show a remarkable gamut of rates running up far beyond any such figure. It is admitted this is an unhealthy state of affairs particularly as some works still are conscientiously adhering to the nominal maximum.

The demand for puddled iron is continually increasing and prices have enhanced. Latterly it has been possible to buy at £12 10s ($60) to £12 15s ($61.20) but makers now easily realize £13 ($62.40). All the mills have a heavy accumulation of work on hand in all departments. The output of the district has been remarkably steady, the 17 selected firms whose sales form the basis of the wages board report producing in November and December 31,034 tons, as compared with 31,504 tons for the previous two months. All works devoted to cable iron have a constant demand, some mills rolling continuously this class of material.

Steel continues very much in demand, with a great call for scrap, much more in fact than can be furnished. Light sheets and plates for aeroplane construction are being much called for.

In the Glasgow district the steel mills are constantly in arrears owing to the steady stream of fresh orders. Nearly all the output of steel is absorbed by the home market, only the most urgent orders from allies receiving consideration.

January Imports Lowest

Tonnage of Iron and Steel Received Only 12,875 Tons, Smallest During War—Pig Iron and Scrap Slump

THE tonnage of imports of iron and steel products in January was at the lowest rate recorded since the beginning of the war. The advance report of the bureau of foreign and domestic commerce shows that only 12,875 tons of these products were shipped into the United States during the first month, compared with 40,910 tons in January, 1917, and 13,769 tons in December, 1917.

The steady decline in imports during the past nine months has been due almost entirely to the falling off in receipts of pig iron and scrap. Only 4226 tons of scrap were shipped into this country in January, 1918. While this tonnage exceeded the December, 1917, figure of 3428 tons, it fell far below the January, 1917, total of 28,066 tons. In pig iron, the imports were only 1492 tons, or about one-third of the December, 1917, total of 5143 tons. January, 1917, pig iron imports amounted to 9428 tons.

Some of the semifinished and finished products show a considerable increase compared with the January, 1917, report. This is especially true of ingots, billets and blooms, structural shapes and rails.

Iron ore imports into the United States were extremely light in January. The total tonnage for that month was 38,081. In the first month of 1917, 97,440 tons of iron ore were received in this country, and in December, 1917, the tonnage was 58,163. For the seven-month period ending with January, the 1918 figure was 549,515 tons, and for 1917, 788,297 tons.

IRON ORE IMPORTS, GROSS TONS

	January,		Seven months ending January,	
	1918	1917	1918	1917
Spain	1,989	34,976	20,796	117,116
Sweden	.....	6,324	17,718	107,937
Canada	491	2,807	141,607	78,265
Cuba	35,601	50,250	350,957	432,845
Oth. countries.	.....	3,083	18,437	52,134
Total	38,081	97,440	549,515	788,297

A study of pig iron exports for the past seven months of the fiscal year shows sharp declines to all countries except England, Canada and Cuba as compared with a similar period a year ago. In the seven months pig iron shipments to France totaled only 3256 tons, a loss of 84,387 tons from January, 1917. There were no shipments at all during January, November or October and in December the total was only 105 tons, in August 400 and in September 729. July's shipments of pig iron to France had the largest monthly total, 2022. That month showed a loss of only three tons from July, 1916. Despite a drop of 110,358 tons from the total of 195,979, Italy's consignment of pig iron in January was the second highest of all countries, being 2620 tons less than England's. Italy's seven months' total in 1917 was the highest of all with France's 87,643 tons being second. There were only 961 tons consigned to Italy in January as against 13,091 tons a year ago.

IRON AND STEEL IMPORTS, GROSS TONS

	January,		Seven mths. end'g January,	
	1918	1917	1918	1917
Pig iron	1,492	9,428	34,631	84,032
Scrap	4,226	28,066	46,791	114,431
Bar iron	5	47	1,710	3,895
Ingots, billets & blooms	4,847	1,884	31,482	12,335
Struc. shapes.	880	197	6,542	664
Rails	822	271	6,343	10,596
Sheets & plates.	107	265	1,018	1,093
Tin & terne pl'te	.....	31	.....	518
Tin scrap	367	718	5,206	4,754
Wire rods	129	3	1,164	2,063
Total	12,875	40,910	134,887	234,381

A decline of 3040 tons in shipments to England in January, compared with a year ago, did not interfere with an increase of 10,338 from the seven months' total of 78,003 of 1917. Gain in Canada's receipts was greater, however, an increase of less than 500 tons in January swelling the seven months' total to 76,848 as compared with 60,620 last year. Cuba's consignment in January was 105 tons, as compared with January, 1917, and in the seven months it received 4060 tons. A year ago the total was 637 tons. The effect of the embargo on neutrals may be seen in the shipments classified for "other countries". Here January's total was only 1351 tons compared with 11,089 tons last year while the seven months' shipments aggregated only 40,726 tons, little more than 63,000 tons less than in the compared period.

Speed Destroyer Work

Plans are ready for the laying of five destroyer keels simultaneously at the new Victory plant of the Bethlehem Shipbuilding Corp., Ltd., Squantum, Mass. Destroyer construction is to be standardized at the plant. Before the war the normal time for the construction of a destroyer was approximately two years. Now bigger and faster boats are to be launched in three months from the laying of the keel and within two months more should be in commission.

Steel Corporation Booked Tonnage Declines

Unfilled orders of the United States Steel Corp., as of Feb. 28, 1918, totaled 9,288,453, while on Jan. 31, they stood at 9,477,853 tons. This represents a decline of 189,400 tons or 1.99 per cent. Improved shipping conditions especially the latter part of the month figured in this loss. On Feb. 28, 1917, the unfilled tonnage figure was 11,576,697, while on Feb. 29, 1916, it stood at 8,568,966. A comparative table follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Feb. 28, 1918..	9,288,453	189,400—	1.99—
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Protest Car Charge

Vigorous protests are being filed by Illinois manufacturers with the war industries board against a proposed charge for placing cars on sidings. The board has announced that $2 will be charged for each car placed on an industrial siding and $1 additional if the car is spotted at any special point. John M. Glenn, secretary of the manufacturers' association, states that these charges would fall on those who have saved the railroads trouble and expense by providing their own sidings.

Plan Army Warehouses

The United States government has bought 300,000 square feet in the central manufacturing district in Chicago for $375,000 and will proceed at once with the construction of several 6-story warehouses estimated to cost $2,800,000. They will be occupied by the quartermaster's and the ordnance stores of the army and are to be completed within six months.

Centralize Authority in War Board

Chairman Baruch Made Individually Responsible for Results Instead of Old Regime of Joint Control—Price Fixing Given Into Hands of Separate Board of Various Government Representatives

WASHINGTON, March 12.—Final authority over practically every side of the war management of industry except that of pricemaking now has been given into the hands of Bernard M. Baruch, the new chairman of the war industries board. This is the way the situation now sizes up after an opportunity has been given to weigh the significance of the President's recent announcement. While Mr. Baruch's appointment does not mean that the war industries board will exercise greater authority, it does concentrate the responsibility. Whereas previously all members of the board jointly were chargeable with the administration of its functions, these duties now primarily rest upon the chairman. The result of this greater centralization of authority is expected to be found in increased efficiency.

President Wilson clearly indicated the new line-up of the board in his letter to Mr. Baruch tendering the appointment to him. He said "the board should be constituted as at present and should retain as far as necessary and so far as consistent with the character and purposes of the organization, its present advisory agencies; but the ultimate decisions of all questions, except the determination of prices, should always rest with the chairman, the other members acting in a co-operative and advisory capacity".

In the same connection President Wilson summarized the duties of the chairman acting as "the general eye of all supply departments in the field of industry". He should (1) act for the joint and several benefit of the supply departments of the government; (2) let alone what is being successfully done and interfere as little as possible with the present normal progresses of purchase and delivery in the several departments; (3) guide and assist wherever necessary as in the allocation of contracts, in obtaining access to materials in any way pre-empted or in the disclosure of sources of supply; (4) determine what is to be done when there is any competitive or conflicting interest between departments in the matter of supplies, as where there is not a sufficient immediate supply for all or where there is competition for the same source of manufacture or supply, or where contracts have not been placed so as to get advantage of the full productive capacity; (5) see that contracts and deliveries are followed up where such assistance is necessary; (6) anticipate the prospective needs of the several supply departments of the government and their feasible adjustment to general industry as far in advance as possible in order that the business men of the country may be given as definite an outlook and opportunity for planning as possible.

A New Price Board Provided

New machinery for the creation of prices is brought about by Mr. Baruch's appointment. This will be made up of a committee consisting of the chairman, members of the board immediately charged with the study of raw materials and of manufactured products, the labor member of the board, the chairmen of the federal trade and tariff commissions and the fuel administrator. With the exception of the raw materials member of the board, yet to be appointed, and the representative of the fuel administration, the make-up of the new price board is known. It is as follows:

Mr. Baruch, chairman and the chairman of the war industries board.

R. S. Brookings, member war industries board representing manufactured products.

Hugh Frayne, member war industries board, representing labor.

W. J. Harris, chairman federal trade commission.

P. W. Taussig, chairman tariff commission.

Member war industries board, representing raw materials, not yet named.

Representative of fuel administration, not yet named.

The new board will have its first broad opportunity to function when the conference is held within the next two weeks with the manufacturers to consider the prices to be fixed on steel materials dating from April 1. It is thought that W. S. Blauvelt, coke director of the fuel administration, will be present at the steel conference, representing that branch of the war management.

The chairman of the war industries board, according to the President's outline, "should be constantly and systematically informed of all contracts, purchases and deliveries, in order that he may have always before him a schematized analysis of the progress of business in the several supply divisions of the government in all departments".

Transportation questions are expected to be taken care of by the "priorities of delivery" section established by the President when he advised that a committee consisting of Mr. Baruch and official representatives of the food, fuel, railroad administrations, the shipping board, and the war trade board be named. Through this committee it is hoped to obtain "common, consistent and concerted action". In priorities of production the chairman is to be assisted and as far as practicable, to be guided by the present priorities organization "or its equivalent". In the function ascribed to the war industries board by the President is included the making of purchases for the allies. Mr. Baruch consequently will become the chief figure in this buying to the extent that the commissions of the allies have allowed the United States to supervise their purchases. Neither Mr. Baruch nor the board actually has the power to make purchases for the departments of the American government.

Still Further Power is Possible

Mr. Baruch's elevation to the chairmanship of the war industries board is interpreted to mean that the way is being prepared for further delegation of power to him by the President if the latter so wills when the Overman bill becomes a law. The indications are that the latter event will take place shortly.

Two vacancies on the war industries board now are up for appointment. One is the chairmanship of the raw materials division vacated by Mr. Baruch. The other the chairmanship of the allied purchasing commission and the vice chairmanship of the war industries board formerly filled by Judge Robert S. Lovett, who has become construction manager of the railroad administration.

Daniel Willard, formerly chairman

of the war industries board, has been re-elected chairman of the advisory committee of the council of national defense. At the same time, Grosvenor Clarke and Walter S. Gifford have been named secretary and director, respectively. This tends to clarify the situation inasmuch as it had been thought when Mr. Willard resigned as chairman of the war industries board he also stepped down from the advisory committee.

Shipbuilding Record is Above Estimates

WASHINGTON, March 12.—Definite figures showing America's progress in building steel ships have just been given out by the shipping board. Up to March 1, the board records the delivery of 26 ships of 200,241 tons. The March record is expected to add approximately as large a tonnage, bringing the total for the first quarter of 1918 close to 400,000 tons.

The detailed figures show that in January, 9 ships of 79,541 tons were delivered. In February, 17 ships of 120,700 tons were delivered. The March record is expected to show the delivery of 23 ships of 188,275 tons. The launchings during the same months also have been disclosed. January shows 16 ships of 112,500 tons launched; February 15 ships of 77,900 tons, while in March 35 ships of 220,591 tons are scheduled for sliding down the ways.

These records indicate that the total tonnage of steel ships produced in the United States in 1918 will surpass the lowest official estimates and may approximate closely the highest mark which the board had set last summer. Last year when the shipping board embarked on its gigantic shipbuilding venture, the avowed goal was 6,000,000 tons in 1918. Hampered by the fact that most of the leading yards of the country were already filled on naval work, the board in the face of its own delays in organizing has lately lowered that estimate. Various officials in public and private, have indicated their belief that a production of from 3,000,000 to 4,500,000 tons in 1918 would be the maximum.

Private estimates have ranged from 2,500,000 tons to 4,000,000 tons. The lowest figure failed to take into account the law of increasing returns and it is this law which the first quarter figures reveal is operating to boost the actual monthly totals of ships delivered.

February's total shows an increase of 40,000 tons or 50 per cent over January. March figures indicate a further gain of 68,000 tons or 57 per cent over February. If each succeeding month this year reveals only a 70,000-ton increase over the preceding month, the year's output will be well over 5,000,000 tons.

In view of delays resulting from labor shortage, irregular operations, and transportation difficulties which have held up materials, this figure may prove to be well above the actual record for the year. But the biggest yards which are being built to fabricate ships have not yet begun to produce. Publicity given during the past few days indicates that splendid progress is being made in completing these yards. Keels are being laid at Hog Island, Pa., ships are assuming shape at Bristol, Pa., while the new yard of the United States Steel Corp. at Kearny, N. J., is practically completed and will record its first launching probably late in April. When the big, new fabricating yards begin later in the year to turn out ships, the estimated monthly increase of 70,000 tons may not prove excessive.

Chairman Hurley of the shipping board in an address a few days ago stated that "we have today 130 yards, 700 ways and 500,000 men. With these we can turn out 1600 ships this year."

Further Regulate Exports of Tin and Terne Plate

Washington, March 12.—To conserve tin and terne plate for essential uses of the United States and the allies and in harmony with the general plan to keep such material from Germany, her allies and countries likely to aid them, complete supplemental regulations restricting its exportation, have been announced by the war trade board. Export licenses will only be granted on shipments to Canada, Japan, China and South and Central American countries, including Mexico and the West Indies, when containers for food for Germany's enemies are to be made; when oil cans are to be made, provided the plate was ordered prior to Aug. 28, 1917; when used for purposes contributory to the war in all licensed countries except Canada, and when destined for Canada to be used for purposes now permitted in the United States.

Applications must be accompanied by affidavits and guarantees since every precaution will be taken that tin exports will be used only for their sworn purpose. Violations are punishable under the espoinage and trading-with-the-enemy acts. No extensions or renewals for licenses issued prior to Feb. 16 for such exports will be made. When a shipment cannot be made during the life of a license, new applications must be filed.

When the board believes that such tin articles as tinned rivets, lanterns, lamp founts, wire, kitchen utensils, tableware, toys, etc., will contribute to America's war cause, licenses may be issued, except to European and African countries. License may also be granted for phosphorized tin, white metal, other tin alloys and empty tin containers if they will assist in the war. No license is required for export of filled tin or lined with tin containers or tin foil used as a wrapper or container of licensed goods.

Propose Higher Rate for Plant Car Service

Washington, March 12.—While railroad administration officials refuse to admit it, it is said authoritatively that the establishment of a charge of $2 a car for placing it on an industrial plant siding and of $1 additional for spotting it within the plant yard has been duly considered. It is stated that the ruling has been drawn up and is ready for promulgation by Director General McAdoo. It is estimated that such charges would net the railroads many millions annually. Complaints from shippers, who charge that railroad representatives making up Director McAdoo's staff have taken advantage of the opportunity, have been filed and members of congress have been enlisted in the fight. Manufacturers claim that permission to make such charges would be highly discriminatory, under present conditions with other costs mounting steadily.

Draft Won't Cripple

That the next draft, which will call approximately 800,000 men to the colors, shall not cripple industry, is the intention of the war department. Secretary of War Baker has arranged that they shall be called gradually as requirements dictate to fill up divisions. Disorganization of industrial and agricultural affairs of the country will thus be reduced to a minimum, and farmers particularly will be benefited. Since revised rules for the instruction of medical advisory boards are being sent out by Provost Marshal General Crow-

der to local boards throughout the country, it is expected that the date of the next draft will shortly be announced. These new regulations required that each man summoned shall be placed in one of four classes: (1)—Acceptable for general military service; (2)—acceptable for general military service after being cured of remedial defect; (3)—acceptable for special or limited military service in a specified capacity or occupation and (4)—rejected and exempted from any military service. Another 75,000 of the old draft still remain to be called before the first quota of 687,000 is completed. These men will be summoned in April. A date for the nert draft will then be announced.

Capital Odds and Ends

WASHINGTON, March 12.—Increases in carload rates per net or gross ton on pig iron by way of carriers in western trunk line territory have been asked by the railroads as follows: Twenty-five cents, northbound, and 75 cents, southbound between Duluth, Ashland, Wis., Gladstone, Mich., Sault Ste. Marie and Chicago; 50 cents, northbound and 25 cents southbound, between St. Paul and Chicago; 50 cents, northbound and 30 cents, southbound between St. Paul and St. Louis; 5 cents northbound, and 50 cents southbound between St. Louis and Duluth; 25 cents from St. Louis and Milwaukee, to points on the east and west banks of the Mississippi river. The carriers also ask an increase of 50 cents in pig iron rates from all points of origin to all points of destination as listed in their various tariffs, except as specified. Where current rates are not over 50 cents the proposed increase is 10 cents, and where current rates exceed 50 cents and not over $1.25 the increase proposed is 25 cents.

Cancellation of commodity carload rates on iron ore from Ishpeming and Negaunee, Mich., to Newberry, Dollar Bay, and Houghton, Mich., and of the interstate carload commodity rate of 95 cents per gross ton on iron ore from Newberry to Boyne City is sought by the Duluth, South Shore & Atlantic railroad.

The Central railroad of New Jersey seeks establishment of rates on copper, copper articles, lead and silver ore, sulphate of nickel, brass ingots and scrap brass based on valuation not in excess of 5 cents per pound or release to 5 cents per pound in case of loss or damage.

Salaries paid by manufacturers, firms or individuals to employes in the war service of the United States may be deducted as necessary expenses in computing net income for income, war income, and excess profits tax.

The federal trade commission has complained against the American Agricultural Chemical Co. of Connecticut and the Brown Co. of New Jersey, charging attempts to suppress competition in the fertilizer manufacturing industry. Hearing will be held April 10.

D. M. Folsom, formerly connected with Leland Stanford University, has been appointed federal oil director for the Pacific coast.

Horseshoe makers will be interested in the fact that despite the demand for war horses and mules, American farmers have employed steadily increasing numbers on their farms. The department of agriculture estimates that there were approximately 353,000 more horses and 100,000 more mules on farms Jan. 1, 1918, as compared with a year ago.

Carriers have asked for cancellation of the basis of rates on iron or steel car stoppers from Columbus, Miss.

The Alabama Great Southern railroad has asked for cancellation of the carload commodity rate of 26½ cents per 100 pounds on cable reels, K. D., and cable-reel material, wooden, straight or mixed carloads, minimum weight 30,000 pounds from Moundsville and Soibert, Ala., to Muncie, Ind.

The Pennsylvania railroad wants an increase from $2.50 to $2.70 per ton in the rate on scrap iron and steel from Lancaster, Pa., to Earlston, Scotia, Vail and Per Se, Pa.

The Southern railroad desires an increase to 8 cents per 100 pounds on machinery or other bulky articles in the transfer charges at Norfolk and Piners Point, Va.

The Baltimore & Ohio railroad lines west has applied for cancellation of the rules governing the stopping in transit of structural iron and steel in carload lots for fabrication at Wilmington, Ohio.

Cancellation of carload commodity rate of $2.84 per gross ton on iron and steel rails and $3.43 per net ton on iron and steel track fastenings from Terre Haute, Ind., to Blair, Wis., has been asked by the Chicago & Eastern Illinois railroad.

The Charleston & Western Carolina railroad wants an increase from $2 to $2.24 per net ton in carload commodity rate on manganese from McCormick, S. C., to Birmingham, Ala., and related points.

Increase of five cents per gross ton in the car load rate on pig iron has been asked by the Chesapeake & Ohio railroad from Beuna Vista, Covington, Glen Wilton, Groshen, Iron Gate, Longdale, Low Moor and Reusens, Va., to Stroudsburg, Pa.

Carriers have applied for cancellation of carload commodify rates on iron ore from St. Louis and points on the Ohio river to Chattanooga, Tenn., Roseville, Ga., and other destinations in this district.

The Lehigh Valley railroad has asked for restriction of the rates on copper ore, bullion, bars, cakes, ingots, matte, pigs, scale, slabs, sulphates and lead and silver ores from and to points named in several of its tariffs to provide that rates apply only when actual value of shipments does not exceed five cents per pound.

The New York Central railroad has asked an increase from $1.48 to $1.80 per net ton on mine rails and ties from Burnside, Cherry Tree, Five Points, Patchen, St. Lu and Westover, Pa., and an increase from $1.84 to $1.90 per net ton from intervening stations, Hawk Run to Johnsonburgh, and Sykes, Pa.

All chemical industries except those specifically exempted by the food control act, manufacturing, storing or distributing fertilizers or ingredients must secure licenses on or before March 20, 1918. Exception is also made so far as licenses have been issued under the proclamation of Jan. 3 relating to ammonia, ammoniacal liquors and ammonium sulphate.

The fuel administration interprets "coal for foreign purposes" to mean coal put in bunkers in any ship bound for a foreign port. This amendment to the order issued Dec. 13, provides that no fuel will be billed at the special bunker price, which allows an additional $1.35 per net ton, until the coal has actually been bunkered. Any coal for government ships or shipped to any governmental possession or dependency does not take a special bunker price.

The Marting Iron & Steel Co.'s request that railroads serving its plant at Ironton, O., be ordered to re-establish an allowance per car moved within the plant enclosure has been denied. The decision is in the "second industrial railways case" and defines the steel company's use of its two locomotives as "plant facility and not as a common carrier." Carriers may not make allowance for switching charges between points of interchange and points of final placement.

Fixed Prices

On Refractories Reported Agitated by Some Buyers—Output Restricted

Refractories interests in the Pittsburgh district are interested in reports that some consumers are attempting to have congress enact legislation fixing the prices for their products. It is claimed that this step has been taken by a number of smaller purchasers, but no information is available to give authenticity to the report. Some makers of iron and steel, it has been asserted, contend that inasmuch as the prices of their products are regulated by the government they should be protected against advances in the prices of materials they buy, including refractories, clay, limestone, etc. Consideration is said to have been given to the plan of incorporating these items in the Pomerene bill, which, as now framed, covers only iron and steel products.

It has been pointed out that prices for refractories have remained stationary since the outbreak of war, despite the increasing costs of labor, operations and materials producers have to buy and in face of the heavy demand for their output. This is held to be sufficient reason for not attempting to regulate prices of refractories. Embargoes still make it difficult to obtain coal, limestone and other requirements and have made it necessary to restrict manufacturing operations.

In the Ohio districts, prices form a minor problem, as the delivery conditions remain abnormally acute. Orders are plentiful regardless of price, but the manufacturers able to make deliveries. One operator reported that during the entire month of February only 7 per cent of the cars ordered were obtained from the railroads, and a total of one day's supply of cars was set during the first 10 days of March. Releases, priority orders and the evident urgency of the steelmakers' needs do not enable the maker of refractories to secure cars.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.

(First Quality)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK

(Second Quality)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 160.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK

(Per Net Ton)

55 per cent	$40.00 base
76 per cent	100.00 base

Ingot Output

Gains in February But is Below Last Year's Record

Steel ingot production in February increased slightly over the January record. The output of 29 steel companies, which in 1916 made 88.14 per cent of the country's total ingot production, was 2,280,901 gross tons in February against 2,203,845 gross tons in January. These companies make monthly reports to the American Iron and Steel institute.

The steel furnaces are operating, however, well below the rate maintained in the last half of 1917. As shown in the following table, these companies averaged in 1917 a monthly output of about 3,000,000 tons or between 700,000 and 800,000 tons more monthly than has been produced in either of the opening months of this year. These figures follow closely the record of pig iron production during the same period. Blast furnaces which during the last half of 1917 averaged a monthly production of about 3,200,000 tons, averaged during January and February only 2,360,000 tons.

Steel ingot production since June, 1917, follows:

Months	Open-hearth Gross tons	Bessemer Gross tons	All other Gross tons	Total Gross tons
June, '17	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
September	2,195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195,832	524,084	13,806	2,733,722
Jan., 1918	1,763,356	429,588	10,901	2,203,845
February	1,812,393	454,457	14,051	2,280,901

Makes Ship Castings

The Marsh & Allard iron foundry has begun operations at Tacoma, Wash., and is specializing in gray iron ship castings. A building has just been completed. Karl E. Marsh and William H. Allard, recently from the east, are the operators. The company is financed by the Safety Investment Co., of which Allen C. Mason is president.

Toluol Supplies

For General Manufacturing to be Distributed—Uncertainty in Sulphate

New York, March 9.—The most important development in the coal tar products market is the appointment by the war industries board of a committee in charge of C. A. Morehead to pass upon applications for toluol for ordinary commercial uses. The need for toluol has reached a most acute stage and manufacturing dependent upon it as a raw material has been widely affected. It is regarded as likely that after the government matures its plan for practically substituting benzol for toluol as a base for high explosives, the supply of toluol for ordinary commercial uses will be broadened. In the meantime, offerings are confined to small quantities by second sellers, asking prices ranging from $5 to $6 per gallon.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	(nominal)
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52 to .55

Per 100 Pounds at Seaboard

Sulhate of ammonia (nominal)	$5.35 to 5.40

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia.....nominal

Constantly increasing government requirements of sulphate of ammonia has caused uncertainty as to contracts expiring at the end of April. Some producers believe that instead of renewing contracts, it will be necessary, after government requirements have been met each month, to distribute the remainder on a pro rata basis. The government this week distributed orders for several hundred tons. A few spot carloads went at advanced prices. The spot market stands at $5.35 to $5.40 per 100 pounds.

Sales of benzol were fairly large, but heavy production prevents any shrinkage in stocks. Pure benzol is quoted at from 35 to 40 cents per gallon, but on large quantities this range can be shaded. Solvent naphtha demand has increased materially and stocks still shrink. The market is strong at 18 to 22 cents per gallon.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ROSS H. McMASTER, who has been assistant general manager at Montreal for the Steel Co. of Canada, Ltd., Toronto, has been appointed a member of the Canadian war mission, of which Lloyd Harris, Brantford, Ont., is the head. He soon will be located in Washington and is now awaiting the call to active service. This commission will have charge of Canadian affairs in the United States and Mr. McMaster will be iron and steel purchasing agent for Canada. This is but a further step looking towards a more complete co-operation in war work between the two countries. Mr. McMaster's experience with the Steel Co. of Canada has extended over a period of years.

H. P. Curtiss, 120 Milk street, Boston, has been appointed as representative of the Clarage Fan Co., Kalamazoo, Mich., in New England territory.

H. J. Tierney, with offices at 1742 Railway Exchange building, St. Louis, has been made representative of the Grip Nut Co. He is president of the Tierney Supply & Lumber Co., Chicago.

William B. Nesbitt, New York, was recently elected vice president of the King Motor Car Co., Detroit, to succeed E. A. Barthel, who resigned recently.

Walter D. Munroe, formerly with the city sales force of Joseph T. Ryerson & Son in Chicago, has been made manager of the Pittsburgh branch, succeeding W. A. Miller.

Samuel H. Weilman has been made eastern sales manager of the Detroit Nut Co., Detroit, with headquarters at 256 Broadway. He will cover the territory east of Pittsburgh and Buffalo.

Adam Shepper, Bay City, was elected president of the Michigan Sheet Metal Contractors' association at its annual convention held in Detroit recently. F. E. Ederle, Grand Rapids, was re-elected secretary.

R. S. Cooper was recently elected vice president and general sales manager of the Independent Pneumatic Tool Co., Chicago. Until recently he was that company's New York representative.

Donat E. Gingras has been made foreign sales manager of the Goodell-Pratt Mfg. Co., Greenfield, Mass., drills and hardware specialties. He has been manager of the Greenfield telephone exchange for several years.

Paul T. Irwin has accepted the position of general sales manager of the Lincoln Twist Drill Co., Taunton, Mass., having resigned as sales manager of the gage division of the Greenfield Tap & Die Corp., Greenfield, Mass.



ROSS H. McMASTER

Orello S. Buckner, who has been a chemist for the Norton Co., Worcester, Mass., for some time, will sail from Vancouver, March 14, for Tokio, Japan. He will represent the company there in an investigation looking towards the increase of its business in Japan.

B. F. McCreary, formerly affiliated with the sales force of the Republic Iron & Steel Co., and latterally in charge of sales for the Matiack Coal & Iron Corp., New York, has been added to the sales force of J. K. Larkin & Co., New York, pipe, nuts, bolts, rivets, etc.

G. W. Bichlmeir, formerly connected with the supply departments of the Missouri Pacific and Kansas City Southern railway companies and latterly as secretary-treasurer with the W. L. Sullivan Machinery Co., Chicago, has accepted an important position with the Walter A. Zelnicker Supply Co., St. Louis.

Harry E. Howard, Spencer, Mass., has been appointed special representative in and has left for Tokio, Japan, for the Norton Co., Worcester, Mass., to succeed Stephan J. Anderson, who returned in February to enlist in the United States naval reserve.

Donald Symington, vice president of the T. H. Symington Co., Rochester and New York, malleable iron manufacturers, who is a captain in the ordnance department, will sail shortly for France. His work recently has been inspecting ordnance material for the United States army.

Frank A. Scott, Cleveland, who resigned as chairman of the war industries board because of ill health, has returned from California much improved, although it is understood he will not resume active duty as vice president and treasurer of the Warner & Swasey Co., Cleveland, until May 1.

Lewis M. McCallum, who for many years has been secretary of the Parker Wire Goods Co., Worcester, Mass., resigned recently to accept an important position with M. S. Brooks & Son, Chester, Conn., manufacturers of wire goods. Mr. McCallum is lieutenant-colonel of the 19th regiment Massachusetts state guard.

E. R. Wendemuth, formerly New York representative of the Pacific Hardware & Steel Co., San Francisco, has been placed in charge of the eastern office, 30 Church street, New York, of the Baker, Hamilton & Pacific Co., San Francisco, which is the new name of the consolidated Pacific Hardware & Steel and Baker & Hamilton companies.

A. W. Calloway, president of the Davis Coal & Coke Co., Baltimore, and of the Terminal Railroad & Coal Co., Pittsburgh, has been appointed director of bituminous coal distribution by Fuel Administrator Garfield. In the distribution, Mr. Calloway will have competent coal salesmen and shippers in charge of the various subdivisions of his work.

W. H. Lloyd, president of the Lloyd Metal Co., Houston, Tex., was elected president of the Southwestern Metal Trades Association of Texas and

Louisiana for the ensuing year at its annual meeting held in Houston, Feb. 22 and 23, which was an unusually interesting gathering due particularly to discussions pertaining to activity in the shipyards along the gulf coast.

T. McCullum, who has been employed by the Duluth, Missabe & Northern railroad, has been made railway representative in charge of northwestern territory for the Garratt-Callahan Co., with headquarters at Minneapolis, Minn., George Dur. Fairleigh, formerly affiliated with the United States Cast Iron Pipe & Foundry Co., now represents the Garratt-Callahan Co. in the southwest with headquarters at Dallas, Tex., and G. E. Wilson will represent the company on the Pacific coast with headquarters at San Francisco.

Bernard M. Baruch

Who Practically Has Been Made Boss of All Americans Engaged in War Industry

BERNARD M. BARUCH, who last week was appointed chairman of the war industries board by President Wilson, probably has more man-power vested in him than any of the dollar-a-year volunteers in Washington at the present time. He has supervision of all raw and manufacured material needed for the United States' part in the great war. He also purchases all American material for the allies. His name in the past has been a synonym for business efficiency and his appointment makes for greater effectiveness in that important branch of the war machine. Mr. Baruch is not yet 50 years of age and was born in Camden, S. C. After being graduated from the College of the City of New York, he became a broker's clerk and soon mastered the details of the business. He became a broker and the fact that when 32 years old he was a millionaire reflects his buying and selling ability. He was interested in many business ventures, railroads and other utilities, where his inborn business instinct brought uninterrupted success. Mr. Baruch came into national prominence in July, 1915, through his public utterances on national unpreparedness and in September of that year he outlined a plan to mobilize business for the war which he presented to President Wilson and which created a favorable impression. In 1916, he was appointed a member of the council of national defense, as head of the raw materials division of the war industries board under which has come the distribution of iron and steel supplies. It was Mr. Baruch who in March, 1917, was delegated to ask the steel manufacturers to reduce their prices to the government. The steel producers proved their willingness to co-operate fully by making the desired cuts. In August, 1917, he virtually withdrew from private business when he sold his seat on the New York stock exchange, to give his entire attention to his increasing duties and responsibilities at Washington. Mr. Baruch, while characteristically a "silent" man, has often proclaimed himself in favor of greater centralization and already has made great strides along that line in his latest official connection.



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BERNARD M. BARUCH

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Profitable Prices Necessary for Output

BITTER attacks on price fixing, made by a group of senators, led by Senator Reed, of Missouri, at Washington, last week reopen the often debated question as to whether price fixing is economically advisable. In the broader sense, many producers of steel, copper and other commodities which have come under the fixed-price plan, are of the opinion that such a policy not only is advisable but essential to the country's economic welfare. They have cooperated with the government to make distribution as successful as possible under the fixed-price plan and have accepted sharp reductions in profits with little complaint. But though they are subordinating their own interests to the government in wartime, they also see peril in fixing prices so low as to curtail production through the inability of the higher cost plants to operate.

Expresses Steel Industry's View

E. A. S. Clarke, president of the Lackawanna Steel Co., in his annual report to stockholders, who has devoted almost his entire attention to working out the government's steel price-fixing policy, in his annual report to stockholders expresses a representative view of the steel industry's attitude toward price fixing. He said in part:

"Consumers of steel throughout the world had for some time realized the probability of such action and the shortage in supply of steel for general consumption which must follow the demands of the United States government for its own requirements, and had, therefore, been in keen competition to supply their own needs. Under the stimulus of this competition prices for all steel products had risen to an abnormally high point, and our government decided that the best interests of the country, looking toward winning the war, called for the fixing of reasonable maximum prices, high enough to stimulate the maximum production, yet such as to prevent undue profits.

"The prices fixed by the government and the committee of the American iron and Steel institute have, with few exceptions, been strictly adhered to, and have resulted in greater stability in the industry. The steel manufacturers, through committees of the American Iron and Steel institute, have also assisted the government in so placing orders for its requirements and those of the allies as to distribute the burden equitably among all the manufacturers of the country."

Urges Maximum Production

But, though the fixing of prices has brought stability to the industry, Mr. Clarke urges that prices be put at a level which will enable the highest cost manufacturers to earn a reasonable profit, as a means of keeping the manufacture of the commodity up to the maximum which is so necessary for America's war making machine.

"A basis of prices that will permit the highest cost manufacturer will secure the maximum production," he said, "which is so essential to the winning of the war and which cannot be had unless prices are such that every manufacturer will have at least a living profit. The final net profits of all will be leveled by the war excess profits tax.

"Costs of production have been increased very greatly, due to higher costs of supplies used and to the increases in wages which have been general throughout the industry, and some adjustment of prices may be necessary in order that manufacturers whose costs are highest may continue to operate without loss."

War Finance Corporation Amended by Senate

Passage of the War Finance Corp. bill by the senate, enabling the government to go ahead with its financial plans, was welcomed in the New York financial district, which believes the bill soon will become a law and will open the way for the next Liberty loan campaign. The new bond issue is to be offered April 6. One material change was made in the measure in the senate. The original bill provided for a capital issues committee of five members, virtually to control all issues of securities of companies having over $100,000 capital. This was to be appointed by the federal reserve board, with the approval of the secretary of treasury and include three of its own members. This committee was to license all issues of securities. The senate, however, hastily changed this provision, to have the President appoint the capital issues committee with confirmation by the senate. In some quarters this amendment was to give the senate control of the selection of men for the committee, with no really sound reason. It was felt that the more the responsibility of such large powers is centralized, the safer the exercise of the law would be, while the danger of politics entering into the program would have been minimized, under the original plan. The house is expected to take action on the measure immediately after it disposes of the legislative appropriations bill. The money market showed a stronger tendency the past week, but Wall street believes as soon as the War Finance Corp. is organized it will exert an indirect but potent influence toward peace in the money market.

Awaits Railroad Buying

President R. P. Lamont, of the American Steel Foundries, in his annual report just issued in pamphlet form, says "the year 1918 starts out boldly" and gave a cheerful forecast of possibilities for the current year. He is quoted as follows:

"We have a large tonnage ahead of the foundries which will keep us busy for six months at least. The miscellaneous business holds up particularly well, and sooner or later the railroads will have to come into the market; a great deal depends upon when they do, but with the large and constantly increasing shortage of equipment it seems certain that as soon as the necessary machinery is provided at Washington the roads must buy large numbers of both cars and locomotives. We have a considerable volume of government work on our books; the margin of profit is small, but it will increase the volume of our business and help carry

overhead. We expect on the whole a satisfactory year."

The company's report shows that it carried $5,531,838 net profits to surplus account, after allowance of $2,287,600 for all taxes. This figures out about $32 a share for the capital stock, as against a little less than $20 in 1916.

Has Fine Initial Year

For the first full year of its operation, ended Dec. 31, 1917, the Transue & Williams Steel Forging Corp.'s gross sales totaled $6,749,771, and after setting aside $360,000 for income and excess profits taxes, the net profit available for dividends was $880,086. While this was equal to $8.80 a share of stock, the corporation paid out dividends amounting to $4.75 a share. The following is the income statement for the year:

For the year ended Dec. 31:	
Gross sales	$6,749,771
Operating profit	1,181,355
Other income	58,731
Total income	1,240,086
Federal taxes	350,000
Net profits for dividends	880,086

Lackawanna Steel Ships High Total in 1917

Production of steel products of the Lackawanna Steel Co. was the heaviest in history, according to President E. A. S. Clarke's message to stockholders which accompanied the financial statement recently published. The company's total shipments decreased 7.35 per cent in 1917 and it is pointed out this is due to the reduced deliveries of pig iron following the sale of the Lebanon properties to the Bethlehem Steel Co. At the average price per gross ton of $64.40, 17,631 tons of pig iron, etc., were sold, an increase of $22.81 over the 1916 average. The balance of 1917 shipments, or 1,184,863 tons of rolled steel products represents an increase of 31,402 tons over 1916. A comparative statement of shipments by product is as follows:

	1917	1916	1915	1914
Stand. rails..	310,655	302,149	276,692	176,877
Light rails..	7,828	1,748	5,327	6,384
Angle bars, fit'gs, etc..	74,606	89,701	74,165	47,788
Struc. shapes	135,329	142,353	111,613	85,568
Plates	111,370	83,981	44,809	25,941
Merch. steel products...	423,046	443,247	229,276	102,259
Sh. bars, slabs, bill., bl'ms.	122,029	90,282	67,487	44,464
Pig iron and misc.	17,631	144,364	94,463	90,461
Total	1,202,494	1,297,825	903,832	579,742

"Your company," Mr. Clarke said, "received during 1917 from mines which it owns, or is interested in, and from other sources 2,105,734 gross tons of iron ore and produced a total of 859,776 gross tons of coke and 975,198 gross tons of pig iron. It also produced 89,592 gross tons of bessemer ingots and 1,492,775 gross tons of open-hearth ingots, a total of 1,582,361 gross tons of steel ingots of all kinds." In speaking of new construction, Mr. Clarke says that while the new 8-inch and 12-inch combination bar mills are not completed, operations had not suffered in any way, since the buildings had been utilized advantageously for other purposes. The new No. 8 blast furnace is about completed. The No. 9 furnace authorized in the year is expected to be completed and in operation about Aug. 1.

War Brings Increase

Because of the entrance of the United States into the war, the past year brought an unexpectedly large increase in the volume of the business of the Worthington Pump & Machinery Corp., according to the annual report, issued recently. To meet the changed conditions, directors have authorized additions and betterments amounting to $3,479,976, of which $2,558,575 was expended during the year. Total bookings last year amounted to $61,130,572, compared with $19,844,452 in 1906. Unfilled orders on hand Dec. 31, 1917, amounted to $41,834,777, an increase of $32,600,056 over Dec. 31, 1916. Sales last year amounted to $28,407,699, compared with $10,655,576 in 1916. The company's manufacturing profits were $6,202,285, which was increased to $6,254,571 through the addition of other income. After allowing total deductions of $1,822,206, including $1,594,857 for federal income and excess profits taxes, there was a surplus for 1917 of $4,432,365, compared with a surplus in 1916 of $1,582,493.

Gains in Last Half

For the six months ended Dec. 31, 1917, the Colorado Fuel & Iron Co., Denver, had gross earnings of $20,739,029 as compared with $17,193,479 in the corresponding period of 1916, a gain of $3,545,550. After all expenses and charges had been met, a balance of $1,647,116 remained, the equivalent of $4.57 a share of common stock, after allowing for preferred stock dividends, the sum of $1,053,678 was carried to surplus.

To Redeem Steel Bonds

The sixth annual drawing of United States Steel sinking fund bonds for the sinking fund was completed by J. P. Morgan & Co., recently. Announcement will shortly be made of numbers representing 1834 $1000 bonds and holders will receive 110 for them, on May 1. A total of $8,662,000 bonds have been taken up by lot since 1913 when the drawings commenced. These have been deposited in the sinking fund. As the interest accumulates, it is added to the money available for drawings. Prior to 1913 bond purchases were made in the open market. Including this last drawing $21,835,000 in bonds have been called in so that the outstaining issue is $178,165,000.

1917 Profits Less

Over a half million dollars less than in 1916 was realized by the Nova Scotia Steel & Coal Co., New Glasgow, N. S., from its operations in 1917. The comparative figures are $1,340,477 for the year ended Dec. 31, 1917, as against $2,104,478 in 1916. Preferred dividends totaled $80,000 while dividends on the common stock were $562,500, leaving a balance of 697,977, which added to the company's previous surplus brought that item up to $4,230,092.

Financial Aid Required

Heavy operating expenses of railroads in the east have caused them to run behind in paying their bills and growing complaints are circulating in iron and steel circles over the delayed payments. This has assumed such a serious aspect that prompt action by the government to finance these purchases is claimed by these producers to be necessary and imperative. The new federal finance corporation when it is in operation is expected to provide relief of such conditions.

Gross Profits Decline

With gross earnings of $8,340,258 for the year ended Dec. 31, 1917, the Semet-Solvay Co., Syracuse, N. Y., earned $2,643,660 less in the year than in the 11 months ended Dec. 31, 1916. The total for the last 11 months of 1916 was $10,983,918. For federal taxes, $3,300,000 was reserved and this with a deduction of $1,178,782 for depreciation, etc., made the balance Dec. 31, 1917, $3,761,302 as against $10,536,612 a year before. Dividends in 1917 totaled $1,599,992 while in 1916 $1,300,000 was paid out, bringing the surplus to $2,161,510 on Jan. 1, 1918. On Jan. 1, 1917, it was $9,236,612.

Gulf States Steel Gains

The Gulf States Steel Corp., Birmingham, in 1917 earned a net income of $5,199,925, against $2,650,006 in 1916, an increase of $1,549,919. After deducting reserves for depreciation and taxes, a balance of $2,882,176 remained.

Many Large Orders Wait on Congress

War Department Projects Extensive Contracts Which Depend on Appropriations Being Made—Extensive Ordnance Construction Will Demand Heavy Machine Tools—Shipyards in Need of Additional Equipment

DELAYED action in congress, it is said, is holding in abeyance a number of important war department contracts which will involve large machine tool purchases. An urgent deficiency bill among other measures is now awaiting congressional action at the request of the war department. This bill provides for an extensive heavy ordnance program. Delay at this time will necessitate speeding up after contracts are awarded. The Browning machine gun has emerged successfully from a series of tests, and important contracts for this arm have been executed or are impending among the large eastern manufacturers of light ordnance. One contract for this gun alone is said to be in excess of $10,000,000. Among the middle western states, heavy ordnance continues to furnish the demand for heavy machine tools. It is understood that the Studebaker Corp., Detroit, has a large contract for 8-inch high explosive shells which will demand the purchase of considerable heavy equipment. In the Cleveland district it is anticipated that contracts will be closed this week involving in excess of $500,000.

The demand for machine tools for shipyard shops continues as the various companies complete their preliminary construction. The American International Shipbuilding Corp. is inquiring for planers and pipe machines for the Hog Island plant where about 25 per cent of the projected shipways are completed. The government is planning the construction of extensions to the Norfolk navy yard. Interest in crane equipment lines is centered on the navy department which will shortly allot a number of cranes, bids for which were received until March 11. Delivery conditions throughout the east are improving slowly, but in the central western states, however, while improvement is noted, machinery deliveries are unstable.

Ordnance Makers Supply Bulk of Inquiries

WHILE a number of miscellaneous orders continually are being placed in the eastern machine tool market, considerable business is being held up as a partial result of slow legislation in Washington. During the past few weeks, the war department has been undergoing reorganization, but progress in this direction has been retarded because of the hesitancy of congress to enact certain legislation now pending. As a result, many contracts scheduled to be placed by the war department by this time are being held in abeyance. However, as these contracts would be for delivery several months in the future, the production of war material has been little affected by this delay. It will necessitate though a speeding up in deliveries when these contracts are placed, and despite certain prevailing conditions it is believed an allotment will be made shortly.

Further Browning Machine Gun Orders Placed

Considerable speculation prevails in the market as to what new demand the manufacture of the Browning machine guns will bring forth. The ordnance department, as a result of the recent successful tests of this gun, has increased orders already on the books of several companies, and has placed a new contract with the New England Westinghouse Co., Springfield, Mass., involving approximately $12,000,000. Other companies known to have contracts for the construction of Browning guns are the Colt's Patent Fire Arms & Mfg. Co., Hartford, Conn.; the Winchester Repeating Arms Co., New Haven, Conn.; the Marlin-Rockwell Corp. and the Remington Arms-Union Metallic Cartridge Co., New York. This latter company recently placed a good-sized order for tools and is still in the market. It is understood that the Savage Arms Co., Utica, N. Y., which has been a large purchaser of tools of late, has now about covered on all of the present requirements of its Utica, N. Y., plant, but is inquiring for several boring and milling machines and other miscellaneous equipment for its plant at Sharon, Pa.

Miscellaneous Tool Demand is of Fair Size

The American International Shipbuilding Corp. is buying a number of pipe machines and other tools for the Hog Island plant. The North American Motors Co., Pottstown, Pa., which is building motor trucks for the government, is inquiring for tools of various types. It is reported that the Submarine Boat Corp., Newark, N. J., which has been inquiring for planers, will extend its list shortly. Among other companies seeking machine tools are the De Laval Steam Turbine Co., Trenton, N. J., the Snead Iron Works, Jersey City, N. J., the American Die & Tool Co., Reading, Pa., and the Baltimore Dry Dock & Shipbuilding Co., Baltimore.

The government has completed plans for additions to the Norfolk navy yard. This expansion calls for the construction of a power house and pattern shop, which will cost in all more than $1,000,000. Kyle & Purdy, builders of yachts, will erect a $150,000 addition to their shipyard at City Island, N. Y. The Continental Shipbuilding Co. has purchased three acres, near Yonkers, N. Y., for the establishment of a yard. The International railroad will build a machine shop at Niagara Falls, N. Y.

Market Interest Centers in Navy Yard Crane List

Much interest in the crane market is centered in the list of cranes for the Washington navy yard. The closing of bids on this machinery has been delayed from time to time, the last date set being March 11. The list includes two 200-ton, one 100-ton, three 25-ton, three 20-ton, nine 15-ton, one 10-ton and two 5-ton electric cranes. It is understood that new bids will be received

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on another lot to be purchased for the Washington navy yard, and that new specifications will be named. The original specifications called for one 20-ton, one 25-ton and two 10-ton electric cranes. The government is reported to have recently awarded a 30-ton electric crane for use in a storage building at the Philadelphia navy yard to Manning, Maxwell & Moore, Inc., New York. This company also recently received a contract from the Union Drawn Steel Co., Beaver Falls, Pa., for a 10-ton electric crane. The E. I. du Pont de Nemours Powder Co., Wilmington, Del., which recently was inquiring for eight locomotive cranes, has purchased five used locomotive cranes.

Volume of New Business Grows Rapidly

A CONTRACT for 8-inch explosive projectiles, which it is reported has been awarded to the Studebaker Corp., Detroit, may have a considerable effect in stimulating machine tool inquiries in the Cleveland district. The Studebaker Corp. has for some time past been a heavy and consistent buyer in the Cleveland market. Prospects for the week are extremely bright. One dealer expects that the coming week will net him approximately $500,000 worth of orders. Deliveries have not improved perceptibly. Another reports that deliveries on certain types of vertical millers cannot be obtained before March, 1919, and that some types of planers cannot be supplied before December, 1918. Following is a list which has been issued by the Studebaker Corp., Detroit, to supply the tool needs occasioned by its contract for gun carriages for 4.7-inch guns: Four 14-inch lathes; seven 16-inch lathes; three 24-inch lathes; two No. 6 screw machines; seven 24-inch sliding head drills; two 26 or 28-inch sliding head drills; six No. 2 plain milling machines; six No. 3 milling machines; three 20-inch shapers; one No. 3 broaching machine. A supplemental list issued by the Standard Parts Co., Cleveland, embodies the following machine tools: One lathe, 36-inch swing x 10-foot bed; one power hack saw; one wet drill grinder; one surface grinder. R. W. Redd, 850 Book building, Detroit, has inquired in the Cleveland market for prices on five 28-inch lathes. The Columbia Axle Co., Cleveland, requires a horizontal boring mill. Two small planers with 22 to 26-inch x 5 to 8-foot tables are needed by the Thomas Spacing Machine Co., Pittsburgh. Inquiry has been made by the Lake Erie Iron Co., Cleveland, for a used 24-inch heavy-duty shaper. Prices on a used geared-head screw machine are requested by the Falls Rivet Co., Kent, O. The John F. Byers Machine Co., Ravenna, O., has asked for quotations on a punch and shear.

Light Machinery Demand in Chicago

BUYING conditions in the machine tool market in Chicago have changed decidedly from the large inquiry which formerly prevailed. At present, inquiry and buying consists almost entirely of small lots or single tools and for lighter equipment. This business appears to be coming from die and tool makers, gear cutters and machine shops generally. The demand is for small lathes and other light machines, much of which can be filled direct from stock. No inquiry for large equipment is pending now and the feeler recently put out by the Arnold Co., Chicago, for a proposed plant to make 155-millimeter shells has not yet developed to a definite point. Considerable difficulty is met in buying second hand machinery as it is found that practically all equipment for which demand exists is busy in shops and that used machinery where available is held at a high figure. Scarcity exists in radial drills, horizontal boring machines, boring mills and milling machines. The Winther Motor Truck Co. is building a new motor truck plant at Winthrop Harbor, Ill., to handle a government order. The C. Kline Forge Co. will build a forge shop at Detroit. The Hercules Gas Engine Co., Evansville, Ind., will build an addition to its engine shop. The Perryville Stove Co., Perryville, Ind., will build a foundry and machine shop each 50 x 100 feet and a clearing room.

Mixed Conditions Prevail in Pittsburgh Market

INQUIRIES from domestic buyers for machinery and machine tools have fallen off, according to sellers in the Pittsburgh district, although the commercial market has been quiet for a long time. Government inquiries for cranes are numerous. While improvement is being shown in making shipments progress is slower than the trade had hoped it would be.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The Mining & Development Co. has been incorporated to do a general mining business with $150,000 capital by E. M. Leavitt, Clyde R. Chapman and Ernest L. McLean.

PORTLAND, ME.—The Maine Power Sales Co. has been incorporated to manufacture iron and steel products with $10,000 capital, by Scott Wilson, E. M. Dyer and Eugene L. Bodge.

BOSTON.—The Centrifugal Gun Corp. has been incorporated with a capital of $1,000,000 to manufacture munitions, by Frank L. Jones, Somerville, Mass., Edwin C. Fisher and Earl L. Ovington, Newton, Mass.

BOSTON.—The Merrill Mfg. Co. has been incorporated, to make fuse plugs and all kinds of electrical and mechanical appliances, for $50,000 by William E. Russell, Thomas B. Sweeny and J. C. Rice.

BOSTON. — The New England Industries Export Corp. has been incorporated to do a manufacturing business with $50,000 capital by R. W. Cox, G. M. Stewart and Thomas Raddin, Newton, Mass.

CHARLESTOWN, MASS.—Fire damaged the factory of the Boston Wagon Mfg. Co., 23 Front street, Feb. 26, causing a loss of $25,000.

FITCHBURG, MASS.—The plant of the Fitchburg Foundry Co. was damaged by fire recently with a loss of $5000.

BRIDGEPORT, CONN.—The J. L. Lucas & Son Co., recently incorporated with a capital of $25,000, plans to build a factory for the manufacture of machinery.

BRIDGEPORT, CONN.—William H. Van Tine, architect, Fisher arcade, Detroit, has prepared plans for a 2-story factory 100 x 300 feet, to be built by D. Flint, Providence, R. I., at a cost estimated at $100,000.

EXPANSION with ROLLING MILL JIM



Say fellows—was out to the Hubbard the other day and the boys showed me the plans of the new steel foundry they're putting up. She sure is a humdinger—electric furnaces and all that. The next time I go over I'll rubber around a lot more and tell you all about it.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

Along the Middle Atlantic Seaboard

ALBANY, N. Y.—A $100,000 plant will be erected by the Albany Perforated Wrapping Paper Co. The proposed structure will be 1-story high and 120 x 300 feet, according to plans of George F. Hardy, architect, 309 Broadway, New York.

BALDWINSVILLE, N. Y. — The Morris Machine Works, East Genesee street, is receiving bids on the construction of a 1-story, 100 x 210-foot foundry, and is in the market for foundry and forge shop equipment. The building will cost about $25,000. Smith & Caffrey, Syracuse, N. Y., are the architects.

BROOKLYN, N. Y. — The Pioneer Iron Works has completed plans for a $12,000 blacksmith and machine shop. J. C. Wandell, 8526 Fourth avenue, is architect.

BROOKLYN, N. Y.—The Sterling Tool Co. has awarded the general contract for a $5000 plant extension, 3 stories high, 25 x 60 feet, to J. Rabinowitz, 743 Thirty-ninth street.

BROOKLYN, N. Y.—The National Lead Co., of which E. I. J. Cornish, 111 Broadway, New York, is president, will build a factory in Brooklyn. William Higginson, 21 Park Row, New York, is architect and engineer.

BUFFALO.—The General Metals Co., recently incorporated, plans to build a factory at 1549 Niagara street. A. N. Steiner is interested.

BUFFALO.—Bids are being taken by the Cousins & Son Boiler Works, 74 Wabash street, for the construction of a 1-story, 85 x 125-foot concrete boiler factory to cost $25,000.

GLENDALE, N. Y.—The Anchor Corrugating Construction Co., 140 Washington street, New York, will erect a $3500 metal working shop here, for the James A. McCafferty & Sons Mfg. Co., 505 Briggs avenue, Brooklyn.

LONG ISLAND CITY, N. Y.—The G. I. Stuebner Iron Works will construct a $15,000 addition to its plant. The building will be a 1-story, brick structure, 50 x 200 feet.

LONG ISLAND CITY, N. Y.—The Irving Iron Works will build an extension to its shops, to cost $3000.

MARINERS HARBOR, S. I., N. Y.—Plans have been completed for the erection of five factory buildings, each 4 stories high and 100 x 125 feet in size for the Proctor & Gamble Mfg. Co., Cincinnati. The Ferro Concrete Construction Co., Cincinnati, will be in charge of the construction.

NEWBURG, N. Y.—The Vulcan Tool & Machine Works recently has been incorporated with $50,000 capital by R. P. Barret, W. C. Whitney and E. C. Chadborn.

NEW YORK.—Plans are being drawn by Louis A. Hornum, architect, 405 Lexington avenue, for a machine shop to cost $7000, to be built by Joseph A. Bolch, 181 Christopher street.

NEW YORK.—Magid Bros. & Kleinman have been incorporated with $9000 capital to operate a metal spinning and stamping plant. L. Kleinman, H. and M. Magid, 747 East 182 street, are interested.

NEW YORK.—A charter has been granted to the Duplexalite Corp., organized with $275,000 capital to manufacture gas and electric lighting fixtures, by L. Roche, L. C. Bunzl and H. O. Walter, 60 Wall street.

NEW YORK.—A charter has been granted to the Stieglitz-Trieber Co., organized with $70,000 capital to engage in the smelting and refining of metals. The incorporators are F. J. Trieber, L. and A. Stieglitz, 228 Pearl street.

NEW YORK.—A charter of incorporation has been granted to the A. W. Moyer Co., Inc., capitalized at $50,000. The company will manufacture machinery and tools. The incorporators include W. P. Moran, 433 West Fifty-seventh street, New York, and others.

NEW YORK.—W. P. Harris & Co., 113 East 138th street, have had plans prepared by F. G. C. Smith, architect, Smith building, Greenwich, Conn., for a 3-story factory extension 25 x 50 feet, to their plant at Walton avenue and 138th street. The building will be of brick fireproof construction, and will cost $20,000.

NIAGARA FALLS, N. Y.—The McKinney-McQuire Construction Co. has the general contract for the construction of a storage building for the Union Carbide Co., of which George O. Knapp, 30 East Forty-second street, New York, is president.

OSWEGO, N. Y.—The Ames Iron Works plans to build an addition to its foundry, to be 50 x 250 feet. The company manufactures steam engines.

POUGHKEEPSIE, N. Y.—The Duesenberg Motors Corp., Elizabeth, N. J., has purchased the plant of the Fiat Motor Car Co., in this city. The Duesenberg corporation, in addition to this expansion, plans to double the capacity of its Elizabeth, N. J., plant at once. The corporation builds airplane, automobile and marine engines.

ROCHESTER, N. Y.—The Iroquois Foundry Co., 108 Browns Race, is having plans prepared for the rebuilding of its plant, which was damaged by fire recently with a loss of $45,000.

WATERTOWN, N. Y.—A charter of incorporation has been granted to Lawrence & Hill capitalized at $50,000, to operate a machine shop. W. M. Lawrence, L. L. Lawrence, 127 West Flower avenue, and A. W. Hill, 324 Academy street, are interested.

BELLWOOD, PA.—The John J. Irvin Co. plans to equip a machine shop in a building it has recently built. The firm is composed of John J. Irvin and Frank D. Miller.

BERWYN, PA.—The F. A. Havens Co. is receiving bids on a foundry building to be erected for the American Bronze Co.

BRADFORD, PA.—The boiler shops of the Boviard & Seyfang Mfg. Co. have been severely damaged by fire, which caused a loss of $10,000, Feb. 27.

BROWNSVILLE, PA.—The 2-story frame foundry of the J. R. Herbertson's Sons Co. has been damaged by fire with a loss estimated at $30,000. The company has been making castings for ships and mining machinery and patterns for these, valued at $10,000, were damaged.

DUNMORE, PA. — The Perpetual Spark Plug Co., 334 East Drinker street, has had plans drawn by the Duckworth Bros. Co., architects, 1 Exchange building, Scranton, Pa., for a 2-story factory, 30 x 186 feet, to cost $30,000. Bids will be called for shortly by the architects.

HOBOKEN, PA. — The Blaw-Knox Co., manufacturer of industrial buckets and pressed steel products, plans to build a 1-story mill to be 120 x 500 feet. C. G. Campbell is in charge.

HUNTINGTON, PA.—The Aetna Explosives & Chemical Co., according to a report, plans to build a $500,000 plant in this city, which is to be turned over for the manufacture of dyes and chemicals after the war, when the demand for smokeless powder decreases.

LATROBE, PA.—Bids are being received by Al. Francis, 41 Conestoga building, Pittsburgh, for a foundry to be built by the Peerless Foundry Co., of which he is manager. The building will consist of a 1 and 2-story molding department 85 x 275 feet, a power house 30 x 80 feet, and a core oven room 30 x 80 feet. The structure will cost about $150,000.

NEW MILTON, PA.—The Tri-County Oil & Gas Co. has been chartered with a capital stock of $25,000. C. L. Pearcy, Earl Pearcy, Clarence Fitzwilliams, B. I. Hudkins and R. J. Nutter are the incorporators.

PITTSBURGH, PA.—A. B. Pegrament has purchased six acres of land in Neville Island, upon which a plant for the manufacture of lubricants will be erected by the Standard Animal Products Co.

PITTSBURGH.—Plans have been drawn by Bernard H. Prack, architect and engineer, Keystone building, for a $50,000 addition to the factory of the Westinghouse Electric & Mfg. Co., Shadyside, Pittsburgh.

PHILADELPHIA.—C. V. Roberts has obtained a permit to build a machine shop to cost $10,000 at Church and Lackawanna streets.

PHILADELPHIA. — L. M. Lieberman's Sons are having plans drawn for a $5000 addition to their power house.

PHILADELPHIA.—The Quaker City Iron Works will erect a 1-story, 59 x 67-foot addition to its plant.

PHILADELPHIA. — A permit has been granted to the Tioga Steel & Iron Co., 3017 North Broad street, for a factory addition to cost $8000.

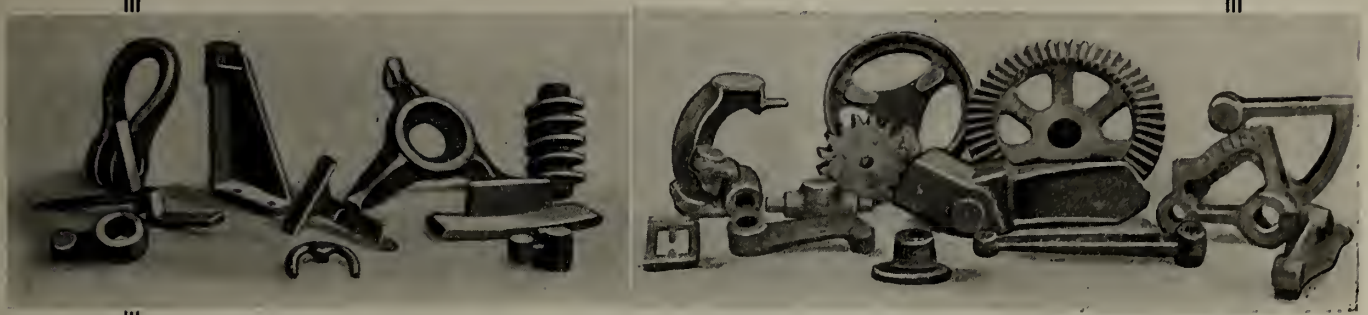
PHILADELPHIA.—The John T. Lewis Co. has secured a permit to erect a furnace house to cost $20,000 at Aramingo and Huntingdon streets.

PHILADELPHIA. — A permit has been granted to Shane Bros. & Wilson, Sixty-third and Market streets, for the erection of a boiler house.

PHILADELPHIA.—The Keystone Supply & Mfg. Co., 919 North Ninth street, plans to add a 2-story factory to its plant. Plans are being drawn by F. E. Hahn, architect and engineer, 1112 Chestnut street.

PHILADELPHIA.—The Pecora Paint Co. has purchased from Samuel B. Bowen several factory buildings at Sedgley avenue and the North Penn railroad, which it will equip for the manufacture of its product.

PHILADELPHIA. — Valuable patterns of castings being made for the government were destroyed in a fire which damaged the Albert Clark Iron Foundry, Thirty-fifth street and Grays Ferry avenue, Feb. 28. The core



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Say you saw it in THE IRON TRADE REVIEW

oven, in which the fire started, will have to be replaced. Total damage is estimated at $3000.

SHARON, PA.—The Sharon Clay Products Co. has increased its capital by $100,000 to provide for enlarging the capacity of its brick plant. George Collard is in charge.

SHARON, PA.—The Concrete Brick & Fence Post Co., Wheeling, W. Va., plans to build a factory here. Theo. Smith, 2909 Jacob street, Wheeling, is in charge.

TITUSVILLE, PA. — The American Radiator Co., 8205 Michigan avenue, Chicago, has awarded to the J. W. Cowper Co., Inc., 725 Fidelity building, Buffalo, contract for a 1-story, 80 x 100-foot factory to cost $25,000, which it will build at Titusville.

WILLIAMSPORT, PA. — The National Foundry Mfg. & Supply Co. plans to rebuild its plant at Hepburn and Canal streets, which was damaged by fire recently, and has awarded the contract to Meredith Hannan, 461 Elmira street. The new structure will be 1-story, 48 x 116 feet, to cost $10,000.

NEWARK, N. J.—The Natural Carbonic Gas Co., McClellan street, has had plans prepared for a 1-story factory addition 30 x 80 feet.

WILMINGTON, DEL.—The Du Pont Powder Co., Du Pont building, is in the market for six or eight locomotive cranes to be used in the construction of a powder plant for the government.

WILMINGTON, DEL.—A building at the plant of the Midvale Steel & Ordnance Co. was recently wrecked by a gale. The building was 70 x 580 feet and was constructed of brick and steel. The loss is estimated at $75,000.

NORFOLK, VA.—The erection of a $50,000 plant, 1 and 2 stories high, is contemplated by the Norfolk Glass Mfg. Co. J. Wiley Halstead is president of the company.

NORFOLK, VA.—Bids now are being received by the Linde Air Products Co., Forty-second street building, New York, for the construction of a $50,000, 1 and 2-story plant in this city.

PORT NORFOLK, VA.—The Smith Shipbuilding & Dry Dock Co. is having plans drawn by Benjamin K. Mitchell, architect, for the construction of a $25,000 addition to its plant.

Activities in the Central States

BEAVER DAM, WIS.—The plant formerly operated as a machine shop and blacksmith shop by the J. S. Rowell Mfg. Co. has been sold to Edward Herzberg and Albert A. and Otto E. Klatt, who will remodel the shop and equip it as a gray iron foundry and a machine shop.

DE PERE, WIS.—The Lawton Co. plans to enlarge its plant for the manufacture of gray iron castings by the addition of a machine shop and a pattern shop. The latter will replace the building damaged by fire recently. The machine shop will require considerable new equipment.

FOND DU LAC, WIS.—The Northern Casket Co., manufacturer of metal coffins, has had plans prepared for a plant addition. W. Mauthe is general manager.

KAUKAUNA, WIS. — The Kaukauna Machine Works and Mayer Bros., Inc., have been united under the name of the Kaukauna Machine Works Co. with $50,000 capital, and will add to the equipment of the present plants.

KENOSHA, WIS.—The Simmons Co., a large manufacturer of metal beds and springs, has added $3,000,000 to its capital stock, which now amounts to $13,000,000. The company is incorporated under the laws of Delaware.

KENOSHA, WIS. — The Winther Motor Truck Co., Winthrop Harbor, Ill., has purchased a site in Kenosha and will start work at once on the erection of a new motor truck plant costing about $125,000. The Winther company has taken large contracts for military trucks.

LAKE GENEVA, WIS.—Reinert & Malsch, Lake Geneva, have received the contract for constructing a $20,000 bridge on Lake street, at the foot of Broad street. F. A. Briegel is city clerk.

MADISON, WIS.—The Do-Electric Mfg. Co., 24 Vrooman block, plans to build a factory. H. A. Smythe Jr. is secretary of the company.

MENOMONIE, WIS. — Plans for a cooperative central heating plant, to be built at a cost of about $75,000, are being completed by Thomas L. Thorsen, Stout institute, Menomonie. Plans call for an initial installation of eight 1200-horsepower boilers with space for four additional units. The building will be 114 x 174 feet, of brick and concrete, with a 175-foot stack. The equipment throughout is to be automatic, including coal and ash handling apparatus, conveyors, stokers, etc. Definite action on the project is held in abeyance until figures of actual costs are available.

MILWAUKEE.—Articles of incorporation have been filed by the General Tool & Mfg. Co. The capital stock is $15,000 and the incorporators are George H. Ahlswede, E. J. Stanek and Fred Zinzow.

MILWAUKEE.—Klug & Smith, consulting engineers, Mack block, are preparing plans for a building, 50 x 300 feet, two stories and basement, at Muskego avenue and North Canal street, for the Milwaukee-Western Fuel Co., 14 Grand avenue. The building will contain a machine shop, and equipment will include a small traveling crane.

MONTFORT, WIS. — The Chicago & Northwestern railroad is completing surveys for a new roundhouse of larger size than the one now in use.

NEENAH, WIS.—The Bruce Boiler Works has been organized by W. A. Bruce and has taken over the main plant of the Pomeroy Paper Mills Co., which will be equipped for structural, boiler and ornamental iron manufacture.

REEDSBURG, WIS.—Sealed bids are being received by Wm. H. Dierken, city clerk, for furnishing cast iron water mains and fittings.

STANLEY, WIS.—The Badger Chemical Co. of Wisconsin has been organized with a capital stock of $500,000 by Chicago and Milwaukee capital and is now completing plans for the establishment of a charcoal, potash, wood alcohol and general chemical refining plant. The company is represented by A. E. Kopps, Bernard Rosenow and Charles Friend, attorney, Milwaukee.

STOUGHTON, WIS. — The Stoughton Wagon Works has been severely damaged by a fire which caused a loss of several thousand dollars. The cupola room of the foundry was damaged most severely.

WATERTOWN, WIS.—The Globe Milling Co., owned by the Shane Bros. & Wilson Co., Minneapolis, will install an additional hydroelectric generator to operate its plant throughout. George Manschot is general manager.

WATERTOWN, WIS.—As soon as weather conditions permit, the Otto Biefeld Co. will begin work on the construction of a brick and steel addition, 66 x 214 feet in size, to provide a foundry to supplement its present boiler, structural and machine shops.

WAUSAU, WIS.—The common council is considering the proposal of the Lull Truck Co., a new motor truck manufacturing concern, to lease the brick and concrete factory erected on city property several years ago but which has been idle for a year or more.

DETROIT.—The Meyers Auto Accessory Co., 35 Twentieth street, proposes to build a 2-story factory 40 x 120 feet.

DETROIT.—The Inland Metal Products Co. has increased its capital from $75,000 to $200,000 to provide for plant expansion.

DETROIT.—The Austin Co., 14320 Euclid avenue, Cleveland, has been awarded a contract for the erection of a 100 x 180-foot building, to cost $25,000, for the Central Aluminum & Brass Mfg. Co.

DETROIT.—Plans have been prepared by Smith, Hinchman & Grylls, architects, 710 Washington arcade, for a factory, assembly room and repair shop to be built by the Denby Motor Truck Co., 443 Holbrook avenue. E. E. Tent is manager of the company.

NILES, MICH.—The Towar Cotton Mills is taking bids on a factory addition, for which plans are being drawn by R. A. Le Roy, Pratt building, Kalamazoo, Mich.

BELLEVILLE, ILL. — The Orben Stove Co., recently incorporated with a capital of $50,000, plans to build a foundry shortly. Incorporators are J. A. Langfelder, J. A. Mueller and others.

CAIRO, ILL.—The Vehicle Supply Co., whose plant was recently damaged by fire with a loss of $60,000, plans to rebuild shortly.

CHICAGO.—Plans are being drawn by Lebenbaum, Marx & Vigeant, architects, 175 West Jackson boulevard, for the factory to be built by the Ilg Electric Ventilating Co., 147 Whiting street.

CHICAGO.—The Amalgamated Machinery Corp., 7210 Adams street, has had plans prepared by W. H. Warner, architect, 10 South La Salle street, for a 1-story brick addition to its assembling plant. Cost of the proposed structure is estimated at $40,000.

PEORIA, ILL. — The Electrical Testing Co., 350 Knoxville avenue, has awarded the contract for a 1-story repair shop to be 60 x 180 feet in size and cost $10,000.

FRANKFORT, IND.—McGaw & Stevenson, architects, 318 Citizens Bank building, Kokomo, Ind., have prepared plans for a 1-story addition, 14 x 60 feet to the municipal



Where Freights Equal the Purchase Price

There is many a place in the world where the costs of freights are more than the original price of the goods. Picture to yourself the merchant who has paid his money and waited six months for the delivery of an order, when those cases arrive. Will he find the contents in good condition; will they have passed the customs without added imposts, and will they have come through a dozen hands without pilfering?

Proper packing for export is one of the most important phases of our international trade. It rightly belongs to the manufacturer to case and mark his shipments correctly and those who have had experience in exporting do so. But the man who seldom receives an order from overseas is, too often, inclined to think that his packing case, that has proved satisfactory for domestic delivery, will do for foreign shipment.

Almost every condition in foreign freight delivery is more severe than in our American service. The exporting houses know these conditions and the shipping instructions they furnish are made to comply with the particular requirements in each case. If these instructions are not followed, the buyer abroad will have to face excessive import fines, the damage of goods and delays in delivery that destroy his confidence in America's vaunted business ability.

"Export Packing" a booklet prepared by our Order Department gives many hints on proper packing for export. It will be sent free to anyone interested in the subject.

FEDERAL EXPORT CORPORATION

115 BROADWAY - - NEW YORK

lighting plant. The addition will cost, with equipment, about $5000.

INDIANAPOLIS.—The American Die Casting Co. has been incorporated with a capital of $100,000 to manufacture die castings. The incorporators are Lawrence Olsen, L. C. Olsen and William R. Jenkins.

INDIANAPOLIS.—A charter of incorporation has been granted to the Briant Specialty Mfg. Co., capitaliezd at $20,000, to manufacture metal specialties. The incorporators are Briant Sando, H. G. Parker and others.

INDIANAPOLIS. — The Parker Tire & Rubber Co. contemplates building a 1-story factory 100 x 400 feet at Southeastern avenue and the Belt railway. The structure will be of reinforced brick and concrete. P. R. Parker, 1014 Merchants Bank building, is president of the company.

KENTLAND, IND.—The Exhibitor Mfg. Co. has been incorporated with a capital of $40,000 to manufacture machinery. The incorporators are Amos D. Morris, C. M. Holloway and others.

KOKOMO, IND. — The Liberty Pressed Metal Co. has been chartered with a nominal capital of $5000 to manufacture pressed metal products. The incorporators are J. W. Johnson, A. G. Seiberling, J. P. Grace and others.

MUNCIE, IND. — The Indiana Steel & Wire Co., South Council street, has increased its capital stock from $150,000 to $450,000 to provide for proposed additions to its plant.

PERRYVILLE, IND. — The Perryville Stove Co. will take bids about March 15 through E. U. Garrett, architect, 9 West Harrison street, Danville, Ill., for a factory addition to include a foundry, machine shop and cleaning room. These departments will be 1-story, 50 x 100, 50 x 100, and 30 x 50 feet, respectively. C. H. Cochran is manager of the plant.

BALLVILLE, O.—The American Gas & Electric Co., 30 Church street, New York, plans to build a power house here to be 25 x 25 feet and cost $10,000.

CINCINNATI.—A charter of incorporation has been granted to the Troy Metal Products Co., capitalized at $300,000. Incorporators include A. G. Stouder, W. H. Bowyer, J. E. Edgar, C. C. Willard and J. M. Spencer.

CLEVELAND.—The Unit Power Wheel Co. has been organized by Don B. Alexander and W. K. Stanley. The company is capitalized at $1000, nominally.

CLEVELAND.—The Gordon Propeller & Mfg. Co. has been incorporated with a capital of $25,000 by F. C. Senick, J. O. Smith, W. G. Smith, Harry E. Moore and P. J. Hemler.

CLEVELAND.—The Elyria Iron & Steel Co. has taken an option on a 2-acre site adjoining its plant at East 131st street and the Belt line railroad. The company plans to enlarge its plant, according to reports.

CLEVELAND.—Benjamin Moore & Co., paint and varnish manufacturers, Marquette road, have purchased a site in the south end on which they propose to erect a large plant to take care of increased business.

CLEVELAND.—A permit has been granted to the American Ball Bearing Co., West Eighty-third street and the New York Central railroad, to build a plant addition to cost about $6000.

Western and Intermountain Territory

FOLEY, MINN.—The citizens will vote March 12 on the sale of $20,000 in bonds to build a waterworks system. George E. Rice is mayor. Plans have not been drawn.

MINNEAPOLIS.—The Gas Traction Foundry Co. is taking bids through Albert W. Potter, superintendent, 2907 South East Fourth street, on the erection of a 1-story 100 x 300-foot foundry addition to be built at a cost of $70,000. Plans have been prepared by W. L. Alban, Endicott building, St. Paul.

ST. CLOUD, MINN.—The Pan Motor Co. will start work shortly on the erection of a drop forge shop and a die shop. George Booth is the company's engineer in charge.

STILLWATER, MINN. — The Twin City Forge & Foundry Co. is building a factory 130 x 400 feet in size, to cost $50,000.

DAVENPORT, IOWA.—The J. P. Hand Co., capitalized at $20,000, has been chartered to manufacture storage batteries and automobile parts by J. P. Hand, B. Simmon and Joseph Lewis.

KANSAS CITY, MO.—The Witte Engine Works, manufacturer of gas engines, has awarded a contract for a 1-story addition to cost $10,000.

ST. LOUIS. — The Bridge & Beach Mfg. Co., Valentine and Poplar streets, has bought a 10-acre site on which a new plant will be erected.

ST. LOUIS.—The Hosch Mechanism Corp., Olive and Fifteenth streets, capitalized at $200,000, has been chartered to manufacture computing machinery. G. C. Hosch and W. E. Hosch are interested.

TEXARKANA, ARK.—The Williams Mill Mfg. Co. has awarded to Harris & Echols, engineers, a contract to build a 36 x 285-foot factory for the manufacture of farm machinery. The building will be of reinforced concrete with sawtooth roof, and will cost $30,000 with equipment.

BLACKWELL, OKLA.—The city plans to build extensions to its electric light and waterworks plants to cost $82,500 and $77,500, respectively. Clyde Butcher is city clerk.

New Business in Eastern Canada

BADEN, ONT.—Elias A. Brubacher will build a mill and will require machinery to cost $20,000, to replace that damaged by fire a short time ago.

BRANTFORD, ONT.—The Flax Harvester Co., Ltd., has been incorporated to manufacture machinery for use in the production of flax with $1000 nominal capital. Thomas H. Tombyll, John B. Pickering, William D. Christianson and others, are interested.

GANANOQUE, ONT. — The Gananoque Spring & Axle Co. is rebuilding its forge shop recently damaged by fire.

HAMILTON, ONT.—The Canadian Shovel Co., Imperial street, has awarded contracts for the erection of an addition to its plant, to cost $25,000.

LONDON, ONT. — The London Street Railway Co. is in the market for electrical equipment for use in rebuilding a number of cars. C. B. King is manager.

OWEN SOUND, ONT.—The Great Lakes Steel Corp., 22 King street east, Toronto, Ont., will commence about April 1 on the erection of a large steel plant at Owen Sound.

PETERBORO, ONT.—The plant of the Peterboro Milling Co. was badly damaged by fire Feb. 25, together with considerable valuable machinery. The plant will be rebuilt and the machinery replaced. The loss was about $30,000.

PORT COLBORNE, ONT.—The second ore bridge of the Canadian Furnace Co. was severely damaged by a gale which swept the district Feb. 26, causing a loss to the company of $100,000.

TORONTO, ONT.—The E. B. Shuttleworth Chemical Co., 19 Dundas street east, is in the market for electric motors.

TORONTO, ONT. — The Commonwealth Steamship Co. has been incorporated to build ships with $750,000 capital stock. Joseph M. Bullen, William Levy, Harold L. Steele and others are interested.

TORONTO, ONT.—The Acme Engineering Co. has been incorporated to manufacture tools, machinery and electrical equipment with $125,000 capital. Ewart R. Lynch, Traders Bank building, D. B. Coleman, F. A. D. Campbell and others are interested.

TORONTO, ONT.—The Ohio-Tuec Vacuum Cleaner Co. has been incorporated to manufacture vacuum cleaners, machinery and tools, with $50,000 capital. Joseph M. Bullen, 44 King street west, Harold L. Steele, W. Osborne and others are interested.

TORONTO, ONT. — Considerable damage was done to factories along the Don river, which overflowed its banks Feb. 26. Among the companies to suffer by water were the Sheet Metal Products Co. of Canada, $50,000 loss; the Wm. Davies Co., $10,000; Wickett & Craig, $7500; the Conduits Co., $5000; the Toronto Plate Glass Mfg. Co., $4000.



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17-Ton Buckets,* capacity 1,250,000 tons per season; *15-Ton Buckets,* capacity 1,000,000 tons per season; *10-Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8-Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	29.50 to 30.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melt'g steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	24.00 to 27.00
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Knuckles, couplers, Chgo.	35.00
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	29.50 to 30.00
Sorings, Chgo.	35.00
Steel rails, short, Chicago	34.50 to 35.00
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	34.00 to 35.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Chgo.	24.50 to 25.50
Stove plate, Cincinnati	19.50 to 20.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	22.50
Stove plate, Birmingham	18.00 to 21.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	28.50
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, St. L.	24.50 to 25.00
Bundled sheets, Cincinnati	20.00 to 20.50
Knuckles, coup., St. Louis	31.00 to 31.25

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis- St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	75.0 cents
Pacific coast (tin plate)	75.0 cents

IRON MILL USE

(Gross Tons)

Angle bars, iron, Chgo.	40.00
Arch bars, transoms, Chgo.	38.00 to 39.00
Busheling, No. 1, Cleveland	32.00
Busheling, No. 1, Buffalo	30.00 to 31.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Chgo.	26.50 to 27.00
Busheling, No. 2 Chgo.	20.00 to 21.00
Cast borings, New York	17.00
Cast borings, eastern Pa.	20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	12.00 to 15.00
Cast borings, Chgo.	18.50 to 19.00
City wrought, long, N. Y.	32.00 to 32.50
Cut forge, Chicago	33.50 to 34.00
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, eastern Pa.	27.50 to 28.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	22.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	33.00 to 33.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	18.25
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago	18.50 to 19.00
Pipes and flues, Cleveland	25.50 to 26.50
Pipes and flues, Chicago	26.65 to 27.75
R. R. mch. cast, No. 1, Buff.	35.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	33.50 to 34.50
R. R. wrgt. No. 1, Birming	27.00 to 30.00
Wrought pipe, Buffalo	28.00 to 29.00
Wrought pipe, eastern Pa.	34.00
Wrought pipe, ungraded, eastern Pa.	30.00

(Net Tons)

Angle bars, steel, St. Louis	34.50 to 35.00
Arch bars & transoms, St. L.	42.00 to 42.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.50 to 27.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, St. Louis	17.00 to 17.50
Iron axles, St. Louis	42.00 to 42.50
Machine turnings, Cinci.	15.50 to 16.00
Machine turnings, St. L.	17.50 to 17.85
Pipes and flues, St. Louis	26.25 to 26.75
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	30.00 to 30.40

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	25.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	42.00 to 42.50
Steel car axles, St. Louis	42.00 to 42.50

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1 cupola east. Pa.	35.00
Cast, No. 1, cupola, Birming.	24.00 to 27.00
Cast No. 1, Cleveland	33.75
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00 to 31.00
Cast No. 1, Chicago	32.00 to 33.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable, Cincinnati	30.00 to 35.00
Malleable, Cleveland	30.00 to 35.00
Malleable, Buffalo	30.00 to 35.00
Malleable, Pittsburgh	30.00 to 35.00
Malleable, east. Pa.	30.00 to 35.00
Malleable railroad, Chgo.	31.00 to 32.00
Malleable agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	26.50 to 27.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, St. L.	26.50 to 26.75

MISCELLANEOUS USES

(Gross Tons)

Boiler punchings, Chgo.	36.50 to 37.50
Reroll. rails, 5 ft. & ov., Pitts.	35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	43.00 to 44.00

(Net Tons)

Locomotive tires, St. Louis	39.50 to 40.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, March 21, 1918 *No. 12*

New Price Announcement Awaited

Industry Pauses for Word From Washington Which Will Determine Regulated Market Conditions in Ensuing Months—Conference Held at Capital—War Department Asks Competitive Bids on Nails Ignoring Fixed Price

WASHINGTON again holds the fixed attention of the whole iron and steel industry. The announcement by the President of the prices and conditions which will prevail dating from April 1 now is awaited following the conference this week between the new price fixing committee of the war industries board and representative iron and steel manufacturers. Weight has been laid upon price inequalities and practical defects of the system developed by the several months' operations under government regulation. This may bring about some modification of existing methods and schedules. One change urgently sought in the interest of greater trade stability is an extension of the period until prices again must come up for review beyond the present quarterly term.

Nail Bids Are Asked

Another interesting development of the regulated price situation is the request for competitive bids by the war department for 30,000 kegs of wire nails. Accompanying the proposal is the statement that the 3.50c maximum price on nails is only a recommended one and has had no Presidential confirmation. This position parallels that taken by the navy department when it was able recently to bring out competitive bids on certain lines below the so-called official levels.

Early inauguration by the government of its large buying of railroad equipment is foreshadowed by the practical completion of the specifications for standardized cars. The original plan to purchase a great block of cars at one time has been modified because of the fear that the railroads might become congested in carrying materials for this manufacture. The present plans call for early bids on about 2700 locomotives and 45,000 freight cars. Heavy demand by manufacturers preparing for government production has produced an acute shortage in the supply of old car wheels.

The agreement of the government to furnish large tonnages of steel for Canadian war production is freeing home capacity there for other purposes. This has resulted in the placing by the Canadian government of 100,000 tons of rails with the Sydney, N. S., producer for sorely-needed replacement work.

Iron Buyers Apprehensive

Apprehension among consumers as to pig iron supplies is spreading as their difficulties to cover are being multiplied. While most of the demand is for last half, a considerable tonnage for shipment by July is required. These inquiries find little free iron available from the furnaces for that delivery. A St. Louis interest, after vainly canvassing the market for 40,000 tons of basic, has put the filling of its needs up to the government. Chicago producers in the week turned down basic inquiries totaling 75,000 tons. Buffalo makers have been fairly swamped. One producer there is declining to quote on 95 per cent of the inquiry. A similar condition exists is other districts. Increasing difficulty to find open furnace space during the next several months for government allocations is resulting in the virtual conscription of tonnage already booked. Indications strongly point to the steady growth of this condition with its attendant complications. Some modification of present differentials is being sought by makers of copper-bearing low phosphorus, silveries and southern charcoal irons.

Direct Coke to East

Two eastern consumers are the beneficiaries of the virtual commandeering of an additional 28,000 tons monthly of Connellsville furnace coke. The government has ordered a prominent producer to ship these companies 100 per cent of their contracts in order to maintain their output of steelmaking iron. This means that other eastern consumers of coke must be curtailed correspondingly. Car conditions in the Connellsville regions continue to improve in an irregular fashion and shipments on contracts are much better. The fuel administration will issue jobbers' and dealers' licenses in coal and coke dating from April 1.

The Iron Trade Review

EDITORIAL

Weak Spots in Germany's Armor

BERLIN bells have rung their paeans of victory and the kaiser's sword has been duly eulogized. Once more the German populace has allowed its craving for bread to be satisfied with promises of a German peace about to be clutched by the mailed fist. And all because the carcass of politically-diseased Russia has become an easy prey for the talons of the vulture. Yet, meanwhile, the allied fleets maintain their grim, inexorable blockade of the seas. Even though Germany may draw at will from Russia's resources, there are many essential raw materials which are effectually beyond German reach. Tin, rubber and nickel are a few of the items which first come to mind, all of them essential in war work.

Russia will yield Germany no tin. Prior to the war, Russia consumed between 2000 and 3000 gross tons of tin, which it imported from the outside world, largely through Germany. Germany consumed about 16,000 gross tons a year, after deducting the excess of tin contained in exports of manufactured tin goods and chemicals over imports of similar goods. In 1913, the last prewar year, Germany produced 11,320 tons of pig tin, largely from Bolivian ore, while it imported 14,040 tons of pig tin. These imports came largely through Holland. During the early months of the war Germany continued to draw heavily upon Holland but imports from Bolivia and the United Kingdom were cut off. Thus, on Jan. 31, 1913, Banca stocks in Holland stood at 3896 tons. On Dec. 31, that year, they had been reduced to 199 tons. The following table shows the nature of pig tin imports into Germany in the years 1913-1916 inclusive:

From:	1913	1914	1915	1916	1917
Holland	11,807	9347	5797	29	....
U. K.	1,351	1985	....	..	....
Other imports	882	....	....	..	....

This table does not show the imports by the underground route through neutrals, but at worst these are insignificant now and growing more so. The allies control all sources of production except the Dutch East Indies and it may be assumed they keep a watchful eye on this source. They know the world's output of tin almost to the last ounce. They know the destination of every shipment and bind the ultimate manufacturing consumer, even in this country, not to resell. Germany needs tin for its manufacture of tin plate, babbitt, bronze, solder, bearing metal, chemicals and other products. Here then is one of the many weak links in the German economic chain. That chain must snap, sooner or later, and Russia's fall only delays the ultimate.

Consumers Sure of Enough Ore

IRON ore shipped direct by railroads from mines in the Lake Superior district to blast furnaces has rapidly become a more important factor in maintaining the country's pig iron production at a high rate. Ten years ago the all-rail movement was barely one-half million tons. Last year it was close to two million tons.

The official figures on shipments of iron ore from the Lake Superior district in 1917, as given on page 729, contain few surprises. The decrease from 1916 amounts to 3.33 per cent, a remarkably low figure in view of the obstacles under which water and land carriers operated during the year. The Steel corporation shipped only 44.34 per cent of the 1917 tonnage against 47.52 per cent in 1916 and against 56 per cent 10 years ago.

The season's total movement was 64,437,003 tons, a supply sufficient to carry the blast furnaces tributary to the district well through the winter season. The vessel and mining organizations charged with the responsibility of supplying iron ore to the furnaces in the lake district—where more than 80 per cent of the country's pig iron is produced—have repeatedly proved capable of satisfying that demand. In view of the lessened consumption of ore this winter, the same agencies can be relied upon even more confidently to match in 1918 their satisfactory records of the past.

Where Real Standardization is Possible

THOUGH there seems to be considerable pertinent argument on both sides of the question as to close standardization of railway car and appliances, manufacturers having much to uphold their side of the case, the matter of steel rails does not offer the same ground for debate. There are only two parties to the question, the steel mills and the railroads. One type of rail, varied only as to weight, would serve all roads and could be made by all mills. Yet there exist a score or more of specifications, the variations being minute differences in measurements of the head, web and flange, differences that seem to everyone except their originators and proponents to be of no consequence. But to keep in the game each rail mill must make and keep ready for use a set of rolls covering each variation set up by any individual road. The tonnage of raw material in the roll yard of any rail mill is tremendous and

the cost of replacement of worn or broken rolls is a large item of continued and repeated expense.

The American Railway association has established a standard rail which is a composite of much experience and apparently should meet the requirements of all roads. Should the central railroad authority decree the use of this rail it is difficult to discern where anyone would be injured.

The adoption of a single standard rail mill would reduce mill equipment to one set of rolls to cover various weights and cut out the present excessive duplication. This seems a simple action and based on sound economic basis for war times.

Wider Distribution of War Contracts

AFTER three and a half years of experience in producing the various accessories of warfare—an experience having a greatly accentuated significance since April 6, 1917—manufacturing interests have reasonable grounds for comparing the government's policy of placing huge war contracts with two or three plants, with the fallacy of placing all one's eggs in a single basket. Business men point to the fact that if the huge war contracts now being placed were divided among a greater number of plants, the serious problem of workmen being drawn from plants throughout any one particular field of industry to serve one or two manufacturers with large war orders, would be greatly ameliorated. It is believed that were the contracts distributed more broadcast, a more equitable adjustment of labor demands would result. Orders now being placed doubtless will be followed by others still larger if the war continues. It would be advisable, therefore, to have as many manufacturers as possible in a position to produce the nation's needs instead of depending upon the favored but overtaxed few, providing this can be done without sacrificing the benefits of quantity production. While the question of labor in this regard is the most important one, other advantages are to be found in the proposed wider distribution of war orders. With 10 manufacturers working on a single contract, the delay and loss resulting from a fire or a strike is far less in scope than that obtaining when calamity strikes one of two or three producers working on the same gross contract. Another factor, not to be neglected, is the beneficial effect upon the overstrained transportation system resulting from reducing the size of consignments and scattering them over a wider distributed territory.

West Relieves Manganese Need

AMONG notable developments of domestic resources hastened by the war is that of the deposits of manganese ore in this country. The assured Cuban production of manganese ore has been disposed of for the remainder of this year. Imports from India, by reason of the scarcity of ships, necessarily are sufficient to take care of only a small percentage of the requirements. The outlook for a continuance of shipments from Brazil is clouded by the embargo against the further movement of ore from the mines to the Brazilian seaboard, an embargo which evidently will not be lifted until that country is assured of a supply of coal from the United States.

The scattered character of the deposits in Virginia makes manganese ore mining in that state an uncertain undertaking and the tonnage produced is not large nor assured. Development of Lake Superior deposits is held up by the lack of methods for concentrating the lean manganiferous ores which abound in that field. Therefore, it is toward the west that the large producers of ferromanganese particularly are turning their eyes at this time. The workability of the ore has been proved and Montana, California and Nevada producers have made sales of important tonnages. The Montana concentrates now being produced from ore low in analysis average around 45 per cent in manganese and 10 per cent in silica. In addition, a considerable tonnage of natural ore containing 40 to 44 per cent manganese and 15 to 20 per cent silica is being mined and sold without concentration. While the silica content is high, the alumina content is very low.

Present opinion among ferromanganese producers is that the high cost of concentration, combined with the heavy freight rates to the east, will prevent western manganese ore from being an important factor under such normal conditions as may be expected to return some time after the war ends. In fact, it seems to be a fair conclusion that western manganese ores are being used only temporarily as a substitute for high grade foreign ore. In this connection the disposition of the estimated 1,000,000 tons of high grade Russian manganese ore at Poti and Batum in the Black sea district is arousing keen interest because of the German-Turkish peace with Russia. Brazilian ore, by reason of the embargo, at any rate is piling up at the points of production and this foreshadows greater offerings as soon as the ocean shipping situation becomes less congested, at prices which will make our own western competition difficult.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 760

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.60

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, delivered.	$250.00
Spiegel, 20 per cent fur.	70.00
Spiegel, contracts, furnace.	65.00 to 70.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh.	180.00 to 190.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1¼ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(¾ x 6 inches, smaller and shorter)

Rolled thread	50-5 off
Cut thread	40-10-5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50-10-5 off
Cut thread	50-5 off
Larger and longer	40-10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60-10-10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70-5 off
Gimlet and cone point lag screws	50-10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products March 20, average for February, 1918, average for December, 1917, and average for March, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices March 20, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Bessemer pig iron, Pittsburgh	$37.25	$37.25	$37.25	$37.45
Basic pig iron, Pittsburgh	33.95	33.95	33.95	32.85
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	36.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	35.70
Lake Superior charcoal, Chicago	37.50	37.50	37.50	37.55
Malleable, Chicago	33.50	33.50	33.50	35.70
**Southern, No. 2, Birmingham	33.50	33.50	33.50	28.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	36.00
Basic, eastern Pa.	33.00	33.00	33.00	34.50
**No. 2X Virginia, furnace	33.50	33.50	33.50	34.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	37.25
Ferromanganese, delivered	250.00	250.00	247.50	275.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	67.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	67.00
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	67.00
Open-hearth billets, Pitts	47.50	47.50	47.50	67.00
Steel bars, Pittsburgh	2.90	2.90	2.90	3.20
Steel bars, Chicago	2.90	2.90	2.90	3.40
Iron bars, Philadelphia	3.50	3.50	3.685	3.509
Iron bars, Cleveland	3.64	3.64	3.64	3.00

	Prices March 20, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Iron bars, Chicago mill	$3.50	$3.50	$3.50	$3.00
Beams, Chicago	3.00	3.00	3.00	3.65
Beams, Pittsburgh	3.00	3.00	3.00	3.45
Beams, Philadelphia	3.185	3.185	3.185	3.759
Tank plates, Pittsburgh	3.25	3.25	3.25	4.20
Tank plates, Chicago	3.25	3.25	3.25	4.60
Tank plates, Philadelphia	3.435	3.435	3.435	5.659
Sheets, blk., No. 28, Pitts	5.00	5.00	5.00	5.05
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	4.70
Sheets, galv., No. 28, Pitts	6.25	6.25	6.25	6.70
Wire nails, Pittsburgh	3.50	3.50	3.50	3.15
Connellsville furnace coke	6.00	6.00	6.00	7.60
Connellsville foundry coke	7.00	7.00	7.00	6.90
Heavy melting steel, Pitts	30.00	30.00	30.00	23.40
Heavy melting steel, eastern Pa.	30.00	30.00	28.75	23.75
Heavy melting steel, Chicago	30.00	30.00	28.90	23.00
No. 1 wrought, eastern Pa.	35.00	35.00	35.00	30.50
No. 1 wrought, Chicago	35.00	35.00	34.75	28.85
Rerolling rails, Chicago	35.00	35.00	35.65	27.25
Car wheels, Chicago	30.00	30.00	30.75	20.30

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 760)

Iron Makers Deluged With Inquiry

Consumers Becoming More Apprehensive Over Supplies as Repeated Efforts to Obtain Tonnage Prove Unsuccessful—40,000 Basic Requirement Put Up to Government—Commandeering Becoming Necessary to Satisfy Allocations

Pittsburgh, March 19.—Interest in the pig iron industry is centered in the conference tomorrow at Washington between the committee on iron and steel products of the American Iron and Steel institute and the war industries board. Evidently there can be no forehanded knowledge as to what action will be taken. Talk regarding the outcome of the conference necessarily is confined to speculation and is conflicting. The prevailing sentiment is, however, that the board will reaffirm existing levels. Moreover, it is desired that the prices, when determined upon, be allowed to continue in effect from April 1 to the remainder of the current year in order to stabilize the market. Inquiries for iron still are numerous, but practically no sales are being made. Furnaces are well committed either for the entire last half or for as long a period as they are willing to obligate themselves. Basic is in most pressing demand. One Pittsburgh steelmaker who inquired for 15,000 tons monthly for the last half as well as for prompt iron has been able to obtain only a relatively small lot. The Pennsylvania railroad is asking for 11,000 tons of low silicon foundry. The Pressed Steel Car Co. is seeking 8000 tons of low silicon foundry and will accept a high sulphur content. Prompt delivery is wanted on this off iron, which is for the production of car wheels. In addition, this maker is seeking old car wheels, but there is an extreme scarcity of these.

Low Phosphorus Sales Heavy

Philadelphia, March 18.—Large sales of copper-bearing, low-phosphorus iron made up the principal business of the past week in the pig iron market in this district. These sales embraced at least 20,000 tons, largely for second half. The largest purchase was by an eastern Pennsylvania consumer who took 10,000 tons for the remainder of the year from one producer, and 2500 tons for last quarter from another. Several smaller tonnages were sold for second quarter and second half. Current inquiry for copper-bearing, low phosphorus involes at least 25,000 tons. Other requirements are in sight. The output of copper-bearing low phosphorus now is sold up for the first half. Inquiry for all grades of pig iron has undergone marked expansion. This is particularly true of foundry. Only a small fraction of the eastern foundry output prior to July 1 still is unsold and there is much speculation as to how the large requirements which are wanted for quick shipment can be met. The Baldwin Locomotive Works wants 3000 tons of cylinder grade and 3000 tons of floor grade, deliveries to start immediately. Many smaller, but equally pressing tonnages are wanted by belated consumers. Large second half inquiries for foundry also are out, including one from the Pennsylvania railroad for 1100 to 1200 tons of high manganese, 1000 to 2100 tons of 1 to 1.25 per cent silicon and 4500 to 9000 tons of 2.50 to 3 per cent silicon, for last half, one for 5000 to 6000 tons of foundry for last half shipment to the Ridgeway, Pa., plant of the Niles-Bement-Pond Co., and others.

Allocations More Difficult

Cleveland, March 19.—Allocations of pig iron for government purposes are

being made with greater difficulty. Early deliveries especially are becoming more out of the question and it is the opinion of those who are directing this distribution that consumption of tonnage already sold is near at hand; in fact, from all practical considerations, it already is taking place. Southern furnaces are being looked to more and more to fill up the gap in northern requirements, especially in basic. It is not believed the higher phosphorus content of southern iron will present any serious obstacles to its use by plants which never before have included it in their mixtures. A lot of 300 tons of No. 2 soft for the American expeditionary force in France is expected to be taken by Alabama makers. For Burlington, Iowa, 300 tons of foundry are wanted for June-August delivery, for government purposes. The Italian government has 2000 tons of bessemer for March-June delivery up for allocation. In the open market, the condition continues where makers are obliged to turn down weekly heavy requests for tonnage. Even long-standing customers have only been allowed a portion of their last half requirements and are in serious doubt where they will obtain the remainder.

Inquiries Bring No Response

Boston, March 18.—There are plenty of inquiries for iron, not only for prompt, but also for second half, but actual business does not foot up large. There is almost no nearby or spot iron available and the furnaces are not much inclined to consider business for the second half until they have made further inroads on standing contracts. A 500-ton inquiry is reported for prompt shipment with no takers. A New Hampshire melter is in the market for 1500 tons of second half malleable, but up to Monday noon, there had been no responses to this inquiry. This consumer has been hard put for iron supplies lately and was able to keep going only by securing 150 tons from another user. On a sale of 400 tons of Alabama special analysis iron, the buyer agreed to secure the necessity government permit. Deliveries on contracts are reported to be good from the Buffalo district but only fair from other regions. From Virginia, they were running good recently, but have been poor the past week. Furnaces located along the Norfolk & Western have done fairly well but those on the Pennsylvania have been hampered by the heavy movement of coal. The New Haven embargo imposed March 12 also still is in force. The reaction in the deliveries likewise is charged to the fact that too many government permits were issued at the same time and as they were good for only two weeks, they expired before they could be honored. Few furnaces on account of the lack of cars could do better than ship half the quantity of iron called for. Indeed, they were swamped and prorating was necessary.

Makers Are Swamped

Buffalo, March 19.—Makers of iron in this district are being swamped in the maelstrom of inquiry but have only meager quantities to sell. For every ton that is shipped, there are a score of other places it might have gone. Instead of inquiring for a specific tonnage, buyers ask "How much can you let us have?" One seller who has no iron to sell and may not have any for the balance of the year if coke conditions do not improve, stated that there was inquiry for 1000, 2000 and 3000-ton lots, and that the aggregate was "thousands and thousands" of tons. Though no Buffalo maker appears to have closed with the Gould Coupler Co. for 15,000 tons of basic, the inquiry is understood to have been satisfied. The Depew company is said still to be in the market for 2000 tons of March-April malleable. Demand for malleable has been heavy lately and one furnace which was running on low silicon has switched to that grade. One maker reports that 95 per cent of all inquiry is being turned down. Coke conditions are still bad though the car supply has improved a little and some headway is being made on old orders. There is some perturbation among producers here owing to the government ordering the diversion of coke supplies which would ordinarily come to them. This is being done, it is said, despite the fact that at least one interest is running 100 per cent on government orders. If the government revises prices downward at least one interest in this district which operates an out-of-town plant states it will have to cease making iron. One of the furnaces of this interest will go on ferromanganese in 60 days and the other if a lower iron price is made. A government allotment of 500 tons of basic was made to a local furnace during the week.

Chicago Out of Market

Chicago, March 19.—Quietness prevails in the pig iron market here except for the importunities of melters who have failed to cover their requirements and find producers practically sold out. This applies particularly to malleable and basic users, many of whom have covered only a part of their requirements. Local producers have sold as fully as they dare for the remainder of the present year. With production under normal because of fuel difficulties and with the government placing added tonnages from time to time, it is difficult to gage the available iron for other users. The large tonnage of basic recently asked by a St. Louis melter is not known to have been placed. Lake Superior charcoal iron makers appear to have covered their entire 1918 production. The last large tonnage remaining has been apportioned among regular customers in a way to serve the industry to the best advantage. Poor quality of coke is causing considerable production of high-sulphur iron but this is being sold readily at the maximum price for regular iron, except that 50 cents is allowed where the sulphur runs unusually high. Melters are using this iron with their regular grades without difficulty. Recent offerings showed a range of 0.054 to 0.19 sulphur. Southern sellers are taking little iron. Those users who have been unable to cover from usual sources find it difficult to obtain tonnage south of the Ohio river. Low phosphorus and silveries are also scarce and buyers are able to get little satisfaction from makers. The western maker of low phosphorus is relining his stack.

Southern Basic Purchased

Cincinnati, March 18.—The scarcity of steelmaking iron is a matter of much concern. Basic users in this vicinity have quietly purchased some iron in the south, but how much is yet unknown. One Ohio river buyer was in the market for 20,000 tons for last half. It is a matter of considerable speculative interest as to how much basic can yet be sold by southern furnaces for this year's shipment. Inquiries that have been pending for some time are only partly closed and some further orders are expected, provided they can be taken care of by producers in that district. Foundry iron has not sold very freely within the past few days. About the only district to draw from is the south, with a few cars of prompt iron that can be picked up occasionally in Virginia. Nothing can be had in silicon iron are turning elsewhere for a supply.

Basic Tonnage Going Begging

St. Louis, March 16.—Users of pig iron in this district are beginning to note tendencies of shortage with increasing alarm. Certain important melters are frank in their declaration that they do not know where or how they are to get supplies to carry them

through 1918. Others express confidence that the furnaces which have always served them will see them through this emergency. The latter declare they have no definite assurances, and further are not acquainted with the booked condition of the furnaces. The fact remains, however, that there is a present scarcity, which appears to be growing. An inquiry from a local steel casting plant for 40,000 tons of basic has gone begging, although wanted for war work.

The main producer in this district has turned down the inquiry, for the reason that his capacity is contracted for throughout the year, and thus far outside makers have not accepted the order. Basic is particularly scarce, though from what could be learned this week, it is almost as hard to obtain malleable and other grades. Reports that the south is offering more foundry iron than would have been thought possible the first of this month, cannot be verified here. Representatives of the Alabama producers are offering little for any delivery. The net result of the uneasiness relative to future supplies is a disposition to draw in on the matter of future business. Fuel conditions have improved somewhat, and also transportation conditions are somewhat better than last week.

Withdrawing from Open Market

Birmingham, Ala., March 19.—Furnace companies in the Birmingham district practically are withdrawing from the open market. There is some selling to regular customers for delivery during the last half of the year, and then in only small lots. Production and delivery continue to receive principal attention and practically no effort whatever being given to the selling. Concentration on production and deliveries is not bringing forth full realization. Coal, coke, ore and other raw materials are none too liberal though the weather conditions are ideal. Embargoes still are effective in some of the larger territories. The railroad car service in home territory or in that immediately adjacent thereto has shown much improvement lately. Though there is still confidence that the government revision, expected this week, will not be downward, much interest is being manifested. It is believed considerable new inquiry will be forthcoming after the price announcement is made. Sales already made will take up considerable of the expected output during the last half of the year. Some furnaces have sold off-grades in quantity as well as low grades as there is a demand for any and all kinds of metal.

More Coke Commandeered

Fuel Administration Directs Approximately 30,000 Tons Monthly be Sent to Two Eastern Consumers—Will License Jobbers

Pittsburgh, March 19.—More coke tonnage from the Connellsville region has been commandeered by the federal fuel administration for eastern furnaces. The W. J. Rainey interests have been requested to furnish a 100 per cent supply to the Alan Wood Iron & Steel Co., Ivy Rock, Pa., and the E. & G. Brooke Iron Co., Birdsboro, Pa. This will involve approximately 30,000 tons monthly and probably will mean that shipments on contracts by this producer with other furnaces will have to be cut down accordingly. Slight improvement in the car supply in the Connellsville region continues to be made. The supply on the Monongahela railroad yesterday and today and that in prospect for tomorrow indicates an increased average for the three days over last week when it was 47 per cent better than the preceding week. A more promising situation also is reflected on the Pennsylvania railroad and its placements on the Monongahela have increased. A decided improvement has been made in shipments on contracts. While the supply of cars on the Pennsylvania railroad is more nearly satisfactory, it continues to be limited and is due almost entirely to the excess number of open-top, free-dumping cars in the east. This situation was brought about as a result of the heavy movement of coal to tidewater and to the New England district. It appears that motive power available is not sufficient to get empties back to the coal and coke districts except in small numbers. On April 1 the fuel administration will begin to issue licenses to legitimate jobbers and dealers in coal and coke. So far as the coke business is concerned, nothing will be done in the way of allowing commissions to middlemen. This step has been decided upon by the fuel administration in order to regulate further both industries. During the week ended March 9 production in the Connellsville region totaled 314,409 tons, as compared with 285,828 tons for the preceding week, according to *The Connellsville Courier*.

Aid Steelmaking Interests

Philadelphia, March 18.—The commandeering of furnace coke the past week for the E. & G. Brooke Iron Co. and the Alan Wood Iron & Steel Co. is aimed to maintain a supply of steelmaking iron for certain works producing war tonnage. The Alan Wood company is making basic for its own consumption, and the Brooke company is producing this grade for the Lukens Steel Co. and other steel companies. A large tonnage of foundry coke also has been commandeered for an important eastern Pennsylvania locomotive builder. This is the first case where foundry coke has been commandeered in this district.

Run Close to Danger Line

Cincinnati, March 18.—Some exasperating delays are experienced in shipping coke that are caused in many instances by the insufficient labor at the ovens. Reports received from oven operators are not at all complimentary as to the class of floating labor that is necessary to be employed from time to time. In some cases it is said that warmer weather has reduced the efficiency of common labor, and especially that in loading cars. The car supply is improving. The movement of shipments also is more prompt. However, foundries are not storing enough coke to keep them operating very far ahead of the danger line and the furnaces are not in much better shape.

Demand Far Exceeds Supply

St. Louis, March 16.—Aside from a slight improvement in deliveries the past week has developed nothing worthy of note in the coke situation. The demand continues vastly in excess of available supplies. Spot sales are confined to a few scattering cars, and there is also very little doing in future business. Best posted factors in the trade estimate that deliveries on material from the Connellsville and Virginia districts have increased about 10 per cent this week, bringing them up to about 60 per cent of normal. The mills and foundries here are doing fairly well, only a few reporting shutdowns, which have been short. Smelters to the southwest are suffering increasingly for lack of coke, and conditions in the west are about the worst since the war started. Deliveries by producers in the St. Louis district proper are running around par, and this is largely accountable for the relative ease with which local plants are weathering the shortage. The leading plant has been disposing currently of a small production in excess of contract supplies.

Report Excess Price Paid

Eastern Dealer Offers More Than Government Maximum for Shell Turnings and Disturbs Situation—More Scrap Weakness Develops

FOR COMPLETE SCRAP PRICES SEE PAGE 760

Buffalo, March 19.—The demand for scrap in this territory is strong and shipments are a little easier. There is a pronounced scarcity of heavy melting steel, the available supply in this territory not being ample to supply the local demand. Producers and dealers are disturbed over a development of the week. Some producers of shell turnings have received within the past 10 days a letter from a large eastern scrap house intimating that it is permitted to pay for steel turnings for special purposes a price in excess of the maximum base announced Feb. 21, and it is understood that prices have been paid for shell turnings above $25 at consuming point. This is being done in the face of a ruling made several weeks ago by the chairman of the American Iron and Steel institute that only first and second cuts of shell turnings could be sold at $25. Such a procedure, dealers and producers say, threatens to disrupt the existing schedule. The letter below quoted appears to be issued with authority and has the injurious effect of creating the sentiment among producers that the radical change is contemplated of allowing shell turnings to come under the classification of low phosphorus steel scrap. The letter follows: "We are in the market for guaranteed low phosphorus steel turnings, 0.04 and under in phosphorus and sulphur, and it occurs to us that your shell turnings may come within our requirements, provided they do not contain a noticeable copper content. For this special purpose, we are permitted to pay a price in excess of the maximum base price fixed by the President, or the differentials as announced by Judge Gary on Feb. 21. Therefore if you are not under contract, we would like to enter into negotiations with you."

Car Wheels Bought Up

Boston, March 16.—Shipping facilities have improved to a point where there is a practically normal movement of scrap to the big consuming centers, most of which are outside New England. This movement largely represents old business, which was tied up by the transportation tangle. There is a fairly good current demand for everything except cast scrap, and in that class cast iron car wheels must be excepted. The big local car wheel plant is so short of pig iron and is experiencing so much difficulty in securing supplies, that it is taking and using about all the old wheels that are offered. It is paying the government maximum of $30, thus crowding out the dealers who cannot sell above that price.

Not a little scrap businesss has been done on the basis of government prices plus commissions. Local prices are unchanged and are firm, save in cast scrap. Wholesale dealers' paying prices per gross ton, f.o.b. shipping point, follow:

Wrought No. 1, yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $22 to $23; stove plate, $20 to $20.50; No. 1 machinery, $32 to $33; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; car axles, steel, $43 to $44; rerolling rails, $31 to $32; bundled barrel hoops, $17.50 to $18; iron boiler plate, $34 to $35; wrought iron pipe, new specific, $28 to $29; steel rails, $26 to $27; No. 1 railroad steel, $26.50 to $27; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $15 to $16; cast borings, $16 to $17; drop forge trimmings, $23 to $24; cast iron car wheels, whole, $30; cast iron car wheels, broken, $35.

Market Weak in East

Philadelphia, March 18.—Pronounced weakness has characterized the scrap market in this district, due to the continued lack of interest by consumers. Although plant operations now are better, the supply of scrap has broadened to such an extent that there is more than enough to go around. As a result, consumers are showing very little interest in new purchases, and they are rigidly inspecting all shipments, so that rejections are more numerous. This development is a welcome one to dealers, who in the absence of a definite ruling, as long as prices were at maximum levels, were unable to charge a commission. The long-continued delay of the American Iron and Steel institute in acting on commissions is proving very embarrassing. Dealers have many contracts pending on which they do not know whether or not they will be entitled to charge a commission. Although a small tonnage of heavy melting steel sold last week at $30, delivered, sales since have been made to dealers at $28.50, and consumers' ideas now are no higher than $29, delivered. No. 1 forge and machine shop turnings are down $1, and No. 1 cupola cast, $2.

Steel Scrap Weakens

New York, March 19.—Weakness is being shown in steel scrap in the east, and as a result prices on a few descriptions have undergone a decline. Less difficulty in shipping to nearby points, and the lower rates, have given the mills in the east a decided preference over those in the west. It now appears that the eastern mills are in a fairly comfortable position. No. 1 steel for eastern consumption now is being quoted at $26.75, New York, a decline of about $1, while old steel shafting and city wrought, short stock, have had a similar drop and are being held at $36.50 and $26.75, respectively. Despite the much freer movement of scrap generally owing to the improvement in transportation, other grades are holding firm. No. 1 cast scrap continues particularly strong. Consumers in some instances are paying the 3½ per cent commission.

Pittsburgh Market Dull

Pittsburgh, March 19.—Despite the improvement in the railroad situation, dealers in iron and steel scrap report that it is more difficult to make shipments today than it was two weeks ago. Permits are not being issued so freely and in consequence deliveries are slow. Business by dealers and brokers is being confined exclusively to shipments on old contracts. No new sales are being made. The market has been brought to a halt by the lack of an official interpretation on the commission question. It was expected that an announcement on this subject would be made by this time. Dealers are not making any offerings. It is evident that consumers are dealing quite extensively with producers.

Market is Stagnant

Cleveland, March 20.—Scrap dealers in this district are resigned to a life of inactivity pending an announcement of the new scrap prices effective March 31. Since American Iron and Steel institute has let the commission matter rest so far, dealers here believe this point will be covered in the new announcement. Stagnation more marked than any in recent years pervades the local market. Even trading in low phos has fallen away off. Producers are unwilling to sell until they know exactly where they

are at. One dealer claims to have sold 100 tons of No. 1 cast, cupola size, at $35; this is the first and only sale of this grade reported in this district to date. The only important railroad list out in this district is one of the Michigan Central. It has been definitely decided that the next meeting of central district members of the American Board of Scrap Iron Dealers will be held April 15 at the Hotel Statler, Cleveland.

Chicago Demand Strong

Chicago, March 19.—Although some deterring effect is exerted in the scrap market by the imminence of a possible change in maximum quotations, considerable activity is manifested by consumers and demand is strong. This is having the effect of increasing quotations on such grades as have not yet reached the maximum. Malleable scrap, busheling, light cast, locomotive tires and arch bars and transoms all are up within the past few days. Scarcity continues in most lines. Much less scrap is coming out than is usual at this season. Considerable dissatisfaction exists among producers and dealers, who feel that maximum prices were decided without sufficient consideration of that feature of the situation. The distinction between cast scrap for open-hearth and cupola use is diverting small cast to foundry use and steel mills are receiving nothing but the heavier prices, which must be broken.

Prices Are Mixed

Cincinnati, March 18.—Not much difference in quotations seems to exist between different markets, as far as the government's figures are concerned. But the buying prices of dealers in this territory seem to be somewhat mixed. Scrap that is used nearby is bringing close to the regular schedule less the freight rate to the largest consuming center which is Pittsburgh. How long this condition will keep up is problematical.

Western Roads Keep Old Plan

St. Louis, March 16.—According to certain dealers here, the market has reached a point where it is possible to purchase and ship profitably to other points. The railroad offerings of the preceding week have all been disposed of, which has had a tendency to soften prices. Stocks with the principal melters are light, and owing to transportation dislocation several of them have been obliged to enter the market to piece out contracts. A canvass of several of the purchasing agents of railroads has been made.

War Sheet Buying Brisk

Mills Receive Various Tonnages of Roofing and Siding Material—Operations Better But Still Far Below Normal

Youngstown, O., March 20.—Orders for several thousand tons of various grades of sheets have been placed by the government with valley mills. The greater part of the allotments call for galvanized grades of various sizes and gages. It is understood they will be used for roofing and siding the ammunition depots, airplane sheds and other buildings now under construction in this country. The orders range from 200 to 800 tons of each gage specified. One mill closed for 2000 tons this week and 1500 tons last week. Shipment will extend over two to three months. Other mills received a proportional allotment. Sales managers contemplate another allotment in the near future.

As a result of the heavy demand made on the sheet mills in this district by the government, some makers are closing only light tonnages of new business and are making only partial shipments of orders already booked. Producers with government orders have been assured of an adequate supply of sheet cars. Domestic demand for black and blue annealed is exceedingly heavy and in several cases the specifications were returned to the prospective buyer because the mill was unable to promise an early delivery due to urgent government business. The general concensus of opinion of the sheetmakers in this district is that the prevailing prices of sheets will stand after April 1. The producers state the cost of production has mounted since the prices were last fixed.

Mill Operations Increase

Pittsburgh, March 19.—Operations of sheet mills in this district have increased somewhat during the past week. The output, however, is far below capacity and the average perhaps is not in excess of 60 per cent. This is due to the small supply of cars and the shortage of sheet bars. Operations of the mills are irregular, and some of them apparently have much less difficulty than others in getting cars. The government continues to take large tonnages of sheets and makers appear to be further behind than ever on deliveries to domestic consumers. Some business which was to have been shipped by July 1 probably cannot be delivered before Sept. 1. No comment is heard in the trade regarding the forthcoming fixing of prices by the government. The levels established on Nov. 5, 1917, were a disappointment to some producers, and it is contended, particularly in the case of galvanized sheets, that the price of 6.25c, Pittsburgh, for No. 28 gage is not adequate.

Western Demand Steady

Chicago, March 19.—Makers of steel sheets find buyers ready to take large tonnages, provided they could obtain them. Present conditions being well known, actual inquiry is not strong and sales are being made only to the government and to agricultural implement makers, who are being given some preference. Other domestic buyers asking sheets for nonessential purposes, from the war point of view, are not being given consideration. Strong demand for export sheets continues.

Indian Ore Sold

New York, March 19.—Several hundred tons of Indian manganese ore which now are afloat to this country, have been sold at $1.35 per unit at tidewater. Negotiations for large tonnages of high grade South American manganese ore for second half delivery now are in process. Consummation of this business is held up pending assurances from the government that vessels will be available for the transportation of this ore.

Sends Buyer to America

An announcement has been made by Philippe Berger, 2 Square De L'Opera, Paris, exporter and importer, that its representative, Leon Belge will be at the Hotel Biltmore, New York, during April and May, where he will supervise the buying of machinery and equipment. Mr. Belge also will consider any propositions that are presented to him by manufacturers for introducing special lines of equipment into Europe.

Tin Mill About Ready

By April 1, the Liberty Steel Co., Warren, O., expects to have its tin plate mill in operation. The unit comprises eight mills with an annual capacity of 600,000 base boxes of tin plate. Four additional mills to increase that capacity to 1,000,000 boxes a year are contemplated. At the company's recent annual meeting, officers and directors were re-elected.

Seeking Bars for Export

Offers Up to 3.60c, Chicago, Made for Foreign Delivery—Old Tonnage Cleaned Up—Shafting Tonnages Demanded

Chicago, March 19.—Although steel mills are heavily obligated for domestic supplies of steel bars, buyers for export continue to seek out possible sources of material, and offers as high as 3.60c, Chicago mill, have been made recently. Mills are not now accepting business except for government purposes and for agricultural implement makers, although the latter's needs are fairly well covered by recent buying. Demand for bar iron is steady, chiefly for small lots and prompt delivery. Activity seems to be on the increase but there is no tendency on the part of buyers and sellers to contract for future delivery. Mills for the most part have contracts for about six weeks' rolling and new business about balances shipments. Bar mills which have been interfered with by lack of fuel are receiving supplies and operating at normal rate. In hard steel bars rerolled from rails, the demand is becoming somewhat heavier than can be filled from the present supply of rerolling rails. Inquiries are received from consumers who usually buy from other producing centers but local mills are unable to take on this business. Scarcity of rerolling rails is becoming acute.

Some Tonnages Are Sought

Pittsburgh, March 19.—Small lots of steel bars are involved in inquiries which are coming to makers in this district. A builder of coal mine cars is asking for 1600 tons and a nut, bolt and rivet producer for 1100 tons. Producers are well filled with contracts for the next two or three months and there is not much available tonnage offered. Operations which had been curtailed owing to the shortage of cars again are increasing and mills will be in a position to take care of large requirements which the implement trade is expected to make before long.

Automobile Trade Interested

Pittsburgh, March 19.—The automobile trade has begun to take moderately sized tonnages of flat steel and mills are making fairly prompt shipments. Prices range up as high as 4.50c per pound, Pittsburgh, the government base. Fairly good demand is coming from makers of oil barrels for hoop steel and deliveries on these tonnages have been promised in from 30 to 60 days. Mills, however, have become so well booked that business taken from now on will call for shipments in from 60 to 90 days. The market for bands is quiet and the government classification on this product which provides a level of 2.90c, Pittsburgh, is said to be so low that small producers have been forced out of the market. When good sized tonnages are sold they go as a general thing to consumers of strip steel at a price ranging from 4c to 4.50c.

Old Orders Cleaned Up

Cleveland, O., March 19.—Shipments from the mills have shown much improvement. Some of the makers have made much progress in cleaning up old orders by following the policy of shipping tonnages as fast as available and to the maximum quantity at which the consumers could accept them. Accordingly there is greater latitude in taking new business from regular customers, though no contracts are being accepted. A Canton producer, starting up its 22-inch mill, announces that it will roll rounds and squares of from 1½ to 6 inches either from billets or blooms from its own steel plant or from those to be furnished by the buyer. An order for 500 tons of screw stock for a northern Ohio maker of war material has been arranged for. It is understood that the British aviation service is preparing to place orders for airplane parts in considerable quantity in this country.

Starting New Mill

Buffalo, March 19.—The new bar mill of the Donner Steel Co. with a daily capacity of 400 tons is expected to go into operation on Wednesday of this week. Bar inquiry keeps up. One Buffalo mill entered 400 tons in miscellaneous business during the week.

Shafting Tonnage Wanted

Pittsburgh, March 19.—The market for cold rolled shafting is dull and reflects less activity than has been manifested for some time. It is understood, however, that the government soon will come into the market for requirements involving about 20,000 tons. A recent inquiry put out for the government for 7000 tons for use by an Ohio consumer has been allocated among makers. The domestic market is expected to remain quiet until after the government has acted upon prices on April 1. Prompt sales are made at the fixed level of 17 off to list, Pittsburgh, and better output has made it possible for producers to make more satisfactory delivery to private consumers. Most of the tonnage taken by them is for second quarter.

Shipments Are Delayed

Pittsburgh, March 19.—Scarcity of cars is making it difficult for producers of nuts, bolts and rivets to ship tonnages. The shortage is extremely acute some days, only to be followed by a much better supply. The government continues to buy freely but has not placed any large orders during the past week. The domestic market is brisk and consumers in this district are especially active in buying. Deliveries on this business are being made in 30 to 60 days.

Cotton Tie Price Uncertain

Pittsburgh, March 19.—Present indications are that the season for cotton ties will be open in May or June. It is not known what the price will be and this matter cannot be determined until after the government has fixed prices on iron and steel products on April 1. Under existing conditions it is not unlikely that the price would be in the neighborhood of 1.85c a bundle, Pittsburgh.

Cast Shells

May be Made by Pipe Foundries—More Government Tonnage

Chicago, March 19.—Dearth of inquiry for cast iron pipe on the part of cities continues to be the outstanding feature. Uncertainty as to how much pipe can be bought for the sum appropriated is reflected in the method of asking bids in the few cases where figures are asked. Fort Wayne, Ind., opened bids March 18 on its season's requirements of 200 to 300 tons. Battle Creek, Mich., will take figures March 26 on 100 to 300 tons. A movement is on foot which may result in cast pipe shops taking on considerable tonnages of cast iron shells, which are in demand by the munitions board and which can be turned out readily in these foundries.

Contracts More Numerous

New York, March 19.—Stocks of cast iron pipe, particularly on sizes ranging up to 12 inches, appear to be the lowest in several months. Shortage of labor in conjunction with the difficulty of the foundries in getting raw material has tended to cur-

tail plant operations. At the same time, governmental and private buying has made a steady drain on supplies. The Westinghouse Church Kerr Co. has awarded 2000 tons for the government's nitrate plant at Sheffield, Ala. Approximately 1200 tons of 6 and 8-inch were figured on for the government explosive plant at Nashville, Tenn. It is believed this material will be furnished by the B. F. Shaw Co., Wilmington, Del., whose plant has just been leased by the Du Pont interests. It is understood the larger sizes for the Nashville plant will be of wood. The Thompson-Starrett Co. has purchased about 5500 tons of 4 to 36's for the Charleston, W. Va., power plant. The Hercules Powder Co. recently placed 1800 tons of 6 and 8-inch pipe with the Central Foundry Co. for its California plant. The John Fox Co. has 350 tons for the naval station at Pelham Bay. This company recently took a contract for 11,775 feet of 4 to 8 inches, for Lodi, N. Y. The government is buying pipe for extensions to cantonments and it is said will be in the market shortly for the requirements of at least two new cantonments. Municipal inquiry continues dull. Amsterdam, N. Y., is understood to be planning to install 8600 feet of 14-inch pipe, and Herkimer, N. Y., 4000 feet of 14-inch and 15,000 feet of 12-inch, but early action appears unlikely. Export inquiries continue to appear. At present there are several sizable tonnages out for the Orient, particularly, Japan and for South America.

Activity in Butt Weld

Pittsburgh, March 19.—A somewhat better demand exists for butt weld iron and steel pipe. The mills are able to give prompt shipment on most of this business, the longest period being 30 days. Lap weld pipe is extremely active. Shipments on this grade are deferred owing to heavy commitments and some makers are entirely out of the market. Others are supplying their regular trade only but in some cases are not able to take care of full requirements coming from this source. Operations of producers have improved considerably, although they are not yet entirely satisfactory and some report that their output has been restricted because of their inability to make shipments to certain points in the east which have been embargoed. The National Tube Co. has issued a new card as of March 15 on California oil country goods, providing slightly increased prices owing to higher freight rates to the Pacific coast effective on that date.

Asks Competition on Nails

War Department Seeking 30,000 Kegs States Present $3.50 Price is Only Recommended and Not Officially Fixed

Pittsburgh, March 19.—Unusual interest is being manifested in specifications sent out by the bureau of engineering, war department, which calls for competitive bids to be opened March 22 on 30,000 kegs of nails for shipment to France. Specifications call for seven sizes including 2, 4, 6, 8, 16, 40 and 60-penny nails and carry a notation pointing out that the President has not approved a price for nails and that therefore the bids will be made on a competitive basis. While the so-called fixed price of nails is $3.50 per 100 pounds, Pittsburgh, to jobbers, it represents only the level recommended by the committee on steel and steel products of the American Iron and Steel institute. This level has been adhered to closely by the trade according to reports. In view of the war department's specifications calling for competitive bids, much interest is being shown as to what levels may be named by makers. The price of $3.50 is held by manufacturers to provide such a small profit that the business is not attractive and it is reported that a higher level may be sought in the war department bids. The bureau of supplies and accounts, navy department, will open bids on March 26 for 40,000 kegs of nails, as heretofore noted. These specifications do not carry the item incorporated by the war department regarding competitive bids. Good sized orders are being taken by makers of nails, most mills confining their sales to car lots of 25 tons or more in order to save transportation space. Manufacturing interests are making active demand for wire and the time of deliveries range from 30 to 60 days. Jobbers appear to be showing less interest in the market. Good demand is also being made for barbed wire, a considerable portion of it coming from agricultural interests of the northwest. Difficulty is being experienced by wire manufacturers in making shipments on account of embargoes. Some mills whose operations continue to be greatly restricted are complaining that the car supply does not exceed 10 per cent of their normal production. Thousands of tons of wire products are piled at mills awaiting shipment and makers are already beginning to have orders cancelled by customers who can no longer wait for deliveries and do not need tonnages since seasons for selling by them have come to an end. More cancellations are in prospect unless immediate relief from car shortage is forthcoming. Makers facing this situation are declining business.

Huge Quantities Distributed

New York, March 19.—Further orders for wire nails and wire rope have been distributed by the government. It is estimated that since this country went to war the government has closed for 500,000 to 600,000 kegs of nails and from 20,000 to 25,000 tons of wire rope.

Easier Conditions

Shown in Tin Plate Operations and Shipments, But Stocks Grow

Pittsburgh, March 19.—Operations of tin plate mills over the country show an increase of about 8 per cent as compared with the preceding week, and this probably means almost 90 per cent of capacity. The car supply has increased considerably, but it is not yet adequate to transport production on a 90 per cent basis, and therefore no inroads have been made by manufacturers on accumulating stocks in warehouses. On the contrary, it is obvious that stocks continue to accumulate although on a smaller scale than has been the case heretofore. The food administration at Washington has been making vigorous efforts to see that production of tin plate is maintained at as high a rate as possible, and that the car supply to transport the output to makers of tin containers is made adequate. Shipments of tin plate destined to the Pacific coast, which were held up at Chicago on account of traffic congestion, have been moved forward and have been followed by others which have been passing through that prominent gateway without any difficulty.

New Furnace Completed

The new No. 8 blast furnace of the Lackawanna Steel Co., at Buffalo will be blown in within a few days. It has a rated capacity of 500 tons daily. The coke bins now are being completed and the finishing touches are being given to the plant. The company also has under construction its No. 9 furnace which is practically similar in size and capacity to the No. 8 stack.

Structural Awards Steady

Total February Contracts Only Slightly Greater Than Those of January—Financial Factor Checks Building Operations

Pittsburgh, March 19.—Shortage of cars is hampering operations of some structural mills in this district and holding up important government orders. Other fabricators report that while they are suffering somewhat from a lack of cars, the improvement in this direction has been sufficient to give them marked relief. Difficulty is being experienced, however, in getting some necessary steel tonnages. Mills are making efforts to accumulate stocks to take care of future contingencies but this has been found to be a slow process. The vast bulk of operations are devoted to government requirements. The domestic market is extremely dull, and, if possible, is narrower than it has been for a long time.

February Shows Gains

New York, March 19.—Structural bookings during February gained slightly, according to the records of the Bridge Builders' and Structural society. Approximately 55½ per cent of shop capacity was contracted for compared with 53 per cent in January. The February bookings aggregated 99,900 tons, or an increase of 4500 tons. A comparative statement follows:

Month	Per cent	Approx. tonnage
February, 1918	55½	99,900
January	53	95,400
December, 1917	121	205,200
November	77	138,600
October	61½	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Buying of structural steel in this territory, while still dull, embraces a slightly better volume of small orders, ranging from 25 to 50 tons, for miscellaneous industrial work. Some scattered buying by railroads also has tended to augment the volume of business placed. It is believed that the steel requirements of the four steel loading plants to be erected for the government in the east will be comparatively light. It is estimated that the total will not be over 5000 to 6000 tons.

General Building One-Fourth

Cleveland, O., March 19.—A survey of the local building situation shows that architects have on their books only 25 per cent of the normal volume of work at this season. Inability of prospective builders to obtain financial accommodations is the main factor blocking these enterprises. A considerable tonnage of reinforcing bars and some structural shape business is in sight at Cincinnati, where the purchase and clearing of land indicates that the long-proposed Dixie terminal may be constructed in the near future. The construction probably will be mainly of reinforced concrete, but the train sheds will require light structural shapes.

Industry Only Buyer

Chicago, March 19.—Tonnages of structural material booked in the west recently are confined entirely to railroad and industrial needs, and are not of importance. The largest tonnage recently closed involves 550 tons for a boiler shop for the Moore & Scott Iron Works at Oakland, Cal., which will be furnished by the Pacific Rolling Mill Co. Fabricating shops continue to receive additional commissions from the Emergency Fleet corporation for ship parts and are busy preparing this material.

CONTRACTS AWARDED

Bridge repairs, New York central, 400 tons, to independents.

Addition to W. R. Grace building, New York city, 300 tons, to Bethlehem Steel Co.

Two bridges, 1400 tons, and crane runways, 500 tons, for Pennsylvania railroad to independents.

Boiler shop for Moore & Scott Iron Works, 550 tons at Oakland, Cal., to Pacific Rolling Mill Co.

Four 100-foot and one 90-foot through turntables for Chicago, Burlington & Quincy Railroad Co., 365 tons, to American Bridge Company.

Structural steel for filter and kiln houses for the Leon Godchaux Co., Ltd., Reserve, La., 189 tons, to Virginia Bridge & Iron Company.

Viaduct from Ferry to north side of Market street, San Francisco, Cal., 103 tons, to Ralston Iron Works.

Addition to the O'Neal Iron Works, Buffalo, 182 tons to the Lackawanna Bridge Co.

CONTRACTS PENDING

Forge building and machine shop for Delaney Forge Co., Buffalo, 620 tons, bids being taken.

Car Program is Reduced

Government Decides Not to Award Great Block at One Time—45,000 Now Planned—Specifications Virtually Complete

New York, March 19.—Buying of rolling stock is exceedingly quiet. There is not even the scattered inquiry from industrial companies which has characterized the market during the past few weeks. With the exception of a few minor details the standardization of cars has been practically settled upon and it is believed that as soon as the President fixes his signature to the railroad bill, orders for cars in large numbers will be forthcoming. It is thought in some quarters that an allotment will be made before the end of this week, although the question of prices will not be settled upon at that time.

According to present indications, bids will be received on about 2700 locomotives and 45,000 freight cars. The cars for the most part will probably be of the larger type, ranging from 50 to 70 tons in capacity. The first allotment of locomotives, it is believed, will involve 900 and the second about 1000, which will leave about 800 locomotives to be acted upon at a still later date. The American and Baldwin companies probably will be asked to build 1500 locomotives between them.

Small Spikes in Demand

Pittsburgh, March 19.—The market for small spikes, which has been brisk for some time, is showing increased activity. Jobbers are putting out additional inquiries and one of them calls for 2400 kegs. There is a shortage of small spikes and some producers are entirely out of the market while others are taking comparatively small lots for their regular customers and are making shipments in from one to two months.

Light Rails Active

Chicago, March 19.—Bookings of light steel rails by the western mill are about equal to output but orders are being taken only for tonnages to be delivered at points free from embargo. Considerable tonnage on the books for export and for ship-

ment to points where railroads will not accept freight are being held back. No further orders of this sort are being accepted. Mills are far

Standard Spikes Taken

Cleveland, O., March 19.—That the makers have been entering some large orders for standard spikes is indicated by the lengthening of deliveries following a period of rather slack demand. Shipment promises now extend to 6 and 8 weeks with leading makers. The Nickel Plate is inquiring for 300 kegs and the Columbus & Southwestern for 200 kegs.

Shortage Feared

In Ferrosilicon of Various Grades—Ferro and Spiegel Strong

Pittsburgh, March 19.—Consumers of 50 per cent ferrosilicon have begun to place their requirements for last half delivery and apprehension is being felt that there will be a shortage of this alloy. Sales for shipment after July are being made at $150, furnace, while tonnages taken for delivery in July have been sold at $165, delivered. The prompt market is quotable at $150, delivered, in carload lots, while sales no less than carload lots have been made at $200, delivered. Heavy demand is being made for the lower grades of ferrosilicon and there appears to be an acute shortage of these alloys. No offerings are being made in the open market. The market for 80 per cent ferromanganese is firm at $250, delivered, for both prompt and contract tonnages.

Manganese Alloys Strong

New York, March 19.—Much strength continues to be shown by both ferromanganese and spiegeleisen. The latter metal now is held at $70, furnace, for 20 per cent and at $67.50 for 16 to 18 per cent on any position this side of fourth quarter. Recent purchases of 5000 to 6000 tons of ferromanganese by the Jones & Laughlin Steel Co. appear to have cleaned up the market pretty well. Bids of $250, delivered, now are not bringing out any metal. A representative of an English maker during the past two weeks disposed of several hundred tons for the second and third quarters at a figure under the domestic price.

Prices on 50 per cent ferrosilicon range from $180 to $190, delivered, on spot and from $150 to $155 on contract. A new producer at Niagara Falls making from 6 to 7 tons daily is offering spot metal. Ferrochrome and ferrotungsten are unchanged.

Steel Shortage Unrelieved

Consumers Find Billets, Sheet Bars and Slabs Very Scarce—Government Assures Mills of Sheet Bars

Pittsburgh, March 19.—Consumers of sheet bars, including manufacturers of sheets and tin plate, are making vigorous but unsuccessful efforts to cover their steel requirements. There is an extreme shortage of this class of steel and mills which are now fully committed are unwilling to make offerings for delivery beyond the period covered by existing contracts. The market for 4 x 4 and other sizes of billets, either open-hearth or bessemer, is extremely quiet so far as actual sales are concerned but there is much inquiry. There is also a shortage of this form of steel. Jobbing mills actively are seeking tonnages of light slabs and platemakers are also inquiring for slabs but are unable to cover their needs. Production of billets and sheet bars has increased, however, and it is believed that before long manufacturers will be in a position to make some offerings.

Expect Buying Movement

Pittsburgh, March 19.—Makers of cold rolled strip steel believe that domestic buyers will come actively into the market soon. Stocks of consumers are reported to be almost exhausted and this leads to the belief that they are about to make purchases. The government is the principal buyer at present and is taking fair sized requirements.

Sheet Bars Limited

Youngstown, O., March 20.—Valley sheetmakers who are working on government orders are practically assured of an adequate supply of sheet bars. One valley producer who depends on outside mills for his sheet bars was notified by government officials that three cars of this material were being shipped to him from a mill in Johnstown, Pa. Sheet bars are being rolled by the mills in this territory only in limited tonnages. The finishing mills are working bessemer steel almost entirely, and so great is their demand that little material remains for rolling sheet bars.

Deliveries Fall Back

Boston, March 16.—There has been no special change in the jobbing steel and iron trade, save that deliveries, which were running fairly good recently, have fallen back again during the past week, reflecting the embargo on the New Haven and the congestion which has developed on connecting roads in Pennsylvania. A steady demand is still noted for products needs in war work, but continued dullness marks the trading in building warehouses.

Plates Sought

By English Buyers for Ship Work—Lake Tonnage Allotted

Cleveland, O., March 19.—English buyers are inquiring for considerable tonnages of plain ship plates in this district. Among some local mills upwards of 90 per cent of production now is going to war work. A new order of more than 2000 tons for the restoration and reinforcement of lake ships which are to be cut in two to go through the Welland canal has been allocated by the Fleet corporation. Cleveland and Buffalo mills are reported as receiving the business. Mill production in plates is considerably better and offerings of universals especially by eastern mills are being taken without priority orders. Eastern makers continue to quote 3.33c for western deliveries.

Car Orders Delayed

Pittsburgh, March 19.—Distribution of government orders is being delayed somewhat by changes being worked out in designs for standardized equipment. It is expected that these details will be completed soon and contracts allocated among builders. The government also has changed its original plan of an initial allotment of between 125,000 and 150,000 cars. Instead, the number will be much less. Decision to reduce the size of the first order is said to be due to the belief that if the distribution was made at one time the railroads would become congested in their efforts to carry the large tonnage of materials and supplies necessary for the production of the cars. Inquiries from domestic consumers for plates are not numerous, consumers apparently appreciating it would be impossible to cover requirements. Makers of plates are hoping that the government will increase the 3.25c, Pittsburgh, price. Those who have to buy pig iron or slabs are especially anxious that this be done.

Washington Price Action Uncertain

Conference of Representative Iron and Steel Manufacturers and Price Fixing Committee of War Industries Board Considers Production and Distribution Factors as Well as Costs—Urge Lengthening of Price Term

WASHINGTON, March 20.—As the representatives of iron and steel manufacturers went into conference today with the new price-fixing committee of the war industries board, there is general uncertainty as to what the government may do with respect to the revision or reaffirmation of iron and steel prices effective April 1. Problems of production and distribution are being given full consideration as well as costs at the conference as the President suggested would be done in making his official announcement yesterday of the personnel of the price-fixing committee. This may lead to some modifications of the present conditions of price regulation if not of the prices themselves. In this connection much emphasis has been laid upon the advisability of extending the term over which prices are effective, beyond the three months period now in effect, in order to stabilize trade conditions.

New Price Board Acts

Iron and steel prices will be the first to be passed upon by the new price-fixing committee operating under the revamped machinery of the war industries board, which was suggested by President Wilson recently when he named Bernard M. Baruch as chairman of that body. With the exception of one civilian member who will be named later, the price-fixing committee now is complete. This committee, as announced by the council of national defense, approved by the President is composed of:

Robert S. Brookings, of the war industries board, chairman.

Brigadier General Palmer E. Pierce, surveyor general of supplies for the war department.

Paymaster John Hancock, of the navy bureau of supplies and accounts.

Dr. H. A. Garfield, fuel administrator.

F. W. Taussig, chairman of the United States tariff commission.

W. J. Harris, chairman of the federal trade commission.

Hugh Frayne, war industries board, representing labor.

Bernard Baruch, chairman of the war industries board.

Partial make-up of this board and an outline of its functions were given in THE IRON TRADE REVIEW of March 14, in connection with the appointment of Mr. Baruch as chairman of the war industries board. As then announced, it will pass upon prices for all basic raw materials purchased by the government and establish a price-fixing policy from time to time to be approved by the President, after costs have been determined by the federal trade commission.

Costs Will Be Considered

In the words of the President in making the appointment:

"The object of the price-fixing committee is twofold. First, it will be a separate body, quasi judicial in nature, for the purpose implied in its name, and it will serve this purpose through being made up of men separated so completely from industrial interests that their motives and actions in the determination of prices can be subject to no suspicion of mercenary interest. Prices will not be made until after costs have been passed upon by the federal trade commission. With costs as a basis the price-fixing committee will then consider problems of production and distribution before arriving at its decisions.

"The second object to be achieved by the price-fixing committee is speed. The committee will sit all the time and will thus eliminate unnecessary delay caused by the consideration of price-fixing problems in different quarters."

Modification of some of the present differentials to eliminate some of the inequalities which are said to have been brought forth by the several months' application of the existing schedule is to be sought by pig iron makers. These matters were considered at a meeting of leading producers or their representatives at New York, March 15. Most of these proposals concern the more or less special grades.

In low phosphorus iron, it has been suggested that a new classification intermediate between copper-free and copper-bearing metal be established. The present schedule lists copper-free iron at $53, furnace, and copper-bearing iron at $50, furnace. It is pointed out that those irons which contain only a moderate amount of copper are given no added value over those which have the maximum amount of this element although exhaustion of superior ores is involved in producing the former grade. It has been suggested that a dividing line be drawn on copper content and that the irons with the lower units be allowed some increase over the present general listing of copper-bearing iron, the same as now is allowed to higher silicon or lower phosphorus as compared to the base analysis.

Makers of silveries are contending that the present differentials under the 10 per cent base are too large and have asked that they be narrowed. The base price, under this proposal would remain unchanged. Southern producers of charcoal iron are advocating that they be allowed an increased differential on the higher silicon metal. It is set forth that some southern capacity has been forced out of blast by inability to operate at the prevailing schedule and some advances are asked.

Jobbers Want Preference

In connection with the approaching review of market and distribution conditions in iron and steel, the jobbers of iron and steel and heavy hardware are calling for some preference in the replacements of stocks. A questionnaire conducted by the American Iron, Steel and Heavy Hardware association shows that its members are filling essential war requirements to the extent of from 60 to 90 per cent of their total business. According to the report of the committee on war service prepared by S. L. Orr of the Orr Iron Co., Evansville, Ind., as chairman, 80 per cent of the active membership purchase 565,500 tons of iron and steel annually.

"A manufacturer supplying 60 to 90 per cent of his output for purposes strictly essential would have no difficulty in securing priority, which at present is not applicable to jobbers' stock shipments, says the committee's report. Warehouse stocks are becoming more and more important to maintain continuous manufacturing operations, so that in view of the increased dependence on us for our most necessary service we feel that we should have recognition and some preference in replacement of stock."

Wants State to Finance Canal Operations

Henry M. Sage, chairman of the finance committee of the New York state senate, has introduced a bill to enable the state canal board to construct, equip and if necessary operate canal boats and other craft as a war emergency measure. An appropriation is provided to enable the state to acquire a controlling interest in corporations to be organized by the state for the purpose, the capital stock of which is limited in the aggregate to $2,000,000. Senator Sage said this is being taken only as a part of the state's contribution to the prosecution of the war. He said: "Unless some such plan as this shall be adopted, the canals representing an investment of approximately $150,000,000, ready for operation from Lake Erie to the Hudson about the middle of May, will remain idle during this critical year of the war and the coal and food situation next winter will be indefinitely more dangerous than it has been this winter. Under the bill the state would continue to own craft no longer than one year after the war, then the craft would be leased to individuals of corporations for operation, the lessees to pay the state a fair value."

Barge Canal to Open

According to the report of State Engineer Frank M. Williams to the New York state legislature, the New York state barge canal is to be open from Lake Erie to the Hudson river by May 15. The construction of a dam across the Genesee river near Rochester and heavy excavation near this and a few other points comprise most of the work still to be done.

"The canal in 1918," says the report, "can carry 10,000,000 tons between the lake and tidewater and thus release thousands of freight cars for use in sections of the country where inland water transportation has not been developed." Mr. Williams points out the urgent need for government aid in the construction of barges.

Near Normal Operations

Chicago, March 19.—Operating conditions among steel and iron mills in the Chicago district have improved sharply and are now almost on what might be called a normal basis. Some delay is still being met in obtaining sufficient cars and fuel conditions, while sufficient, continually run close to the danger line. The leading interest now has 25 of its 29 blast furnace stacks in blast and today every open-hearth furnace at its four plants is producing steel. This is an unusual condition and results from the fact that repairs could be made to these furnaces during the time when only part were in operation. Bar iron mills, which were shut off from fuel supply for a time, are again able to proceed and have sufficient coal to continue operation.

Wire Company Increases

The capital stock of the American Steel & Wire Co., of Fairfield, Ala., has been increased from $100,000 to $2,000,000. Notice of the increase was filed in the probate office in Birmingham a few days ago. William P. Palmer, president, who signed the notice, stated the action was taken at a meeting of directors March 14, 1918.

Colorado's Output Less

In its pamphlet report for the last six months of 1917, the Colorado Fuel & Iron Co. gives its output of iron ore as 407,714 tons. For the year ended June 30, 1917, it was 911,991 tons. While 449,197 tons of pig iron were produced in the fiscal year ended June 30, 196,902 tons was the output in the last half of the calendar year. Finished iron and steel tonnage totaled 232,888 in the six months period and 591,981 tons in the full year. Coal mined, coke manufactured and limestone quarried were 2,109,559, 409,483 and 219,653 tons respectively in the six months ended Dec. 31, 1917, as against 4,386,028, 897,523 and 486,605 respectively in the company's fiscal year. A summary of the financial side of the report previously was published.

Charters Iron Merger

With a capital of $5,000,000, the corporation certificate of the Dayton Coal, Iron & Railroad Co., Wilmington, Del., has been filed with the secretary of state for Tennessee from Dayton, Tenn. H. S. Matthews, Rome, Ga., who purchased the assets of the Dayton company's stock at the bankruptcy sale in Chattanooga last August, heads the new company, which owns coal and ore lands in Rhea, Meigs and Bledsoe counties, Tenn., and in Walker county, Ga. It is expected to have 400 coke ovens in operation at Dayton in the near future and several new mines are to be opened since the work of renovating and re-equipping the property now is in progress.

Form Sales Corporation for Metals Trade

The Champlain Metals Corp., 165 Broadway, New York, has been organized to deal in steel, ferroalloys and chemicals for both the export and domestic trade. It represents exclusively several large eastern steel mills and two large eastern chemical plants. The officers of this company follow: President, Clements Batcheller, formerly connected with the Carnegie Steel Co. and the Tennessee Coal, Iron & Railroad Co. as sales representative; vice president, Ellis O. Friedman, president of E. O. Friedman, Inc., Albany, N. Y., dealer in iron and steel; treasurer, Leonard Kennedy, vice president, Ludlum Steel Co. and formerly affiliated with William A. Reed & Co., bankers; secretary, Hiland G. Batcheller, vice president, Ludlum Steel Co. The sales department is in charge of Wilson W. Gephart, formerly with the operating department of the Illinois Steel Co., Gary, Ind., and R. G. Williams, formerly affiliated with the sales department of the Central Tube Co. In addition to the officers the board of directors consists of Parker Corning, vice president and treasurer, Ludlum Steel Co., and a director in several banks, and Edward Corning, president, Ludlum Steel Co., treasurer Albany Felt Co. and director of the Albany Savings bank.

Complete Boiler Plant

The government's $1,000,000 plant at Field's Point, R. I., where the Bethlehem Shipbuilding Corp., Ltd., will make boilers for torpedo boat destroyers, is practically completed and will be in full operation inside of a month. Work on the plant was begun Oct. 16, 1917. The structure is of steel and glass, 1-story high, 550 feet long and 150 feet wide. It was built along machine shop construction lines, though more heavily than the ordinary building of this type. It is equipped with four power cranes and the latest machinery for boiler work. The first contract will call for 90 boilers for the destroyers under construction at the Fore River and Squantum, Mass., plants of the corporation.

Dr. H. A. Garfield has handed down a ruling allowing purchasing commissions of 15 cents per ton on bituminous coal, 20 cents per ton on anthracite coal east of Buffalo and 30 cents on anthracite west of Buffalo.

Early Iron

Wanted by Various Eastern Users—Little is Available

New York, March 19.—Numerous sizable inquiries for foundry iron are current for shipment by July, but it is a question where the tonnage can be located to supply these. The United States Cast Iron Pipe & Foundry Co. wants 5000 tons, the R. D. Wood & Co. 5000 tons, the Essex Foundry Co., Newark, 4000 tons, and there are many other smaller inquiries. Practically all of this tonnage is wanted for the first half. Only one maker is offering iron for delivery by July. This is a Pennsylvania stack which recently blew in and is making a limited tonnage of foundry iron preparatory to going on gray forge. An Alabama furnace seems to be the only furnace now taking second half tonnage in this district. Additional inquiries include several requests for low phosphorus, basic and malleable.

Montana Ferro Plans Mean Saving of Ships

New York, March 19.—Plans of the Anaconda Copper Mining Co. to make ferromanganese electrically at Great Falls, Mont., as previously announced, it is expected will enable the government to withdraw 10 ships from the foreign manganese ore trade. These operations also will save cars for bringing Montana concentrates to eastern furnaces. It is expected that the plant will be operating by August and September and that it ultimately will have a capacity of 100,000 tons of standard metal per year.

Operation Unchanged

Pittsburgh, March 20. (By wire.)—The Carnegie Steel Co. has not added any blast furnaces to its active list since last week and still is operating 46 ou of 59 stacks. It has held back about placing more in operation owing to inadequate supplies of coke. Supplies of fuel at furnaces have increased owing to improved shipping conditions, but supplies of cars in the region remain an irregular factor.

Representation is Changed

The Debevoise-Anderson Co., New York, has withdrawn as a seller of the by-product foundry coke produced by the New England Coal & Coke Co., Everett, Mass. The Debevoise-Anderson Co. is the exclusive sales agent of the Seaboard By-Product Coke Co., with a new plant near Jersey City, N. J. Rogers, Brown & Co. hereafter will share in the sale of the by-product foundry coke made at Everett. The Wm. J. Breen Co., E. Arthur Tutein, Reed, Fears & Miller and Ally & Page will continue to sell this coke as heretofore.

Convention Called

The spring convention of the National Machine Tool Builders' association will be held May 16 and 17 at the Marlborough-Blenheim hotel, Atlantic City.

Lays Off Men

With 24 out of its 33 mills shut down because of a freight car shortage, the Trumbull Steel Co., Warren, O., has been compelled to temporarily dispense with the services of thousands of men. The same situation prevails in Niles and in other sections of the Mahoning valley.

Sellers May Organize

Philadelphia, March 18.—A meeting of pig iron distributors was held here today to discuss matters of common interest. A committee is to be appointed which will consider the organization of a pig iron distributors' association. The meeting was called by J. G. Miller, Dubois, Pa., president of Reed, Fears & Miller, Inc., sellers of pig iron, coke, etc.

The interstate commerce commission has issued instructions requiring uniform and indestructible marking of freight.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, March 19.—The official aluminum price differentials fixed by the war industries board in respect to the new base of 32c for 98 to 99 per cent ingot, are as follows:

98 Per Cent Minimum Content

Ingot, 50-ton lots	32.00
Ingot, 15-ton lots	32.10
Ingot, 1-ton lots	32.20
Granulated, 50-ton lots	32.20
Granulated, 15-ton lots	32.30
Granulated, 1-ton lots	32.40

94 to 98 Per Cent Minimum Content

Ingot, 50-ton lots	31.20
Ingot, 15-ton lots	31.30
Ingot, 1-ton lots	31.40
Granulated, 50-ton lots	31.40
Granulated, 15-ton lots	31.50
Granulated, 1-ton lots	31.60

99 Per Cent Minimum Content

Ingot, 50-ton lots	32.20
Ingot, 15-ton lots	32.30
Ingot, 1-ton lots	32.40
Granulated, 50-ton lots	32.40
Granulated, 15-ton lots	32.50
Granulated, 1-ton lots	32.60

Alloy

No. 12 alloy, 50-ton lots	32.20
No. 12 alloy, 15-ton lots	32.30
No. 12 alloy, 1-ton lots	32.40

The foregoing prices are fixed f. o. b. producing plants. The usual differentials in the trade are fixed for the various products, such as sheets, wire, tubing, etc. In the case of sheets, the new price will be 40c, f. o. b. mill, as against 46c, previously quoted by the Aluminum Co. of America and 55c to 60c quoted in the outside market. A few scattered sales of small lots of virgin ingot continue reported in the outside market at around 40c, while sheets have been sold at 55c. Such sales are not in accordance with the regulations of the war industries board, however.

The tin market continues as perplexing as ever. No spot Straits tin is offering in this country. Almost the same statement is true of Banca, although an occasional small lot appears and is offered at prices ranging all the way from 87c to 97c. Spot 99 per cent tin, such as Chinese No. 1, A. S. & R., Lamb & Flagg and other brands, are offered at 85c to 86c, New York. No quotations on Straits at Singapore are available. Chinese for March shipment from China is bid 76.50c; Banca for March shipment from Batavia is quoted at 78.50c. The tin situation steadily is growing more serious.

The lead market is soft. The American Smelting & Refining Co. continues to quote 7.25c, New York, and 7.17½c, St. Louis, for prompt March shipment, but quotations as low as 7.20c, New York and 7.10c, St. Louis, are heard in the outside market. Traffic congestion continues to hold up shipments from the west, with the result that metal delivered in the east commands a premium of ½c or more. Some spot lead has sold as high as 7.87½c, New York, recently.

Spelter is dull and weak. Prime western is quoted around 7.40c to 7.50c, St. Louis, for prompt, March and April shipment. The government is taking all available high grade spelter at 12c, St. Louis.

The copper market is devoid of developments. Casting makers are pretty well sold up into May, but spot electrolytic is to be had in less than carload lots, while plenty of May electrolytic is offering.

A sale of 50 tons of spot antimony at 12.50c, duty paid, was made last week. This is the lowest price reported in this market since the outbreak of the war, but it is a little firmer today.

Structures in Steel Fusion Welds

Steel Welds Made by Oxyacetylene and Electric-arc Processes Present Unusual Structures—Differences Between the Two Flames Cause Characteristic Variations in Nature of Welds

THE oxyacetylene process is based on the great and local heat generated by the burning of acetylene in the presence of commercially pure oxygen, the two gases being thoroughly mixed before combustion. It is claimed that the theoretical temperature is somewhat under 4000 degrees Cent., but on account of various losses, the actual maximum temperature is probably about 3000 degrees Cent.

The electric-arc process, using a metal electrode, which is also the filling rod, generates a still higher and more local temperature. The actual temperature of the positive crater of the carbon arc is given as 3500 degrees Cent. No figures have been found for the temperature of the arc using a metal electrode, but it would probably not be different from that of the carbon arc, and probably higher than that of the oxyacetylene flame. The greater localization of the electric arc is due to the fact that it is not surrounded by a large envelope flame, as well as to its higher temperature; while the oxyacetylene white cone, or welding flame, in which the carbon of the acetylene is burned to CO, is surrounded and preceded by a long envelope flame, itself of high temperature, in which the CO is burned to CO_2, and the hydrogen of the acetylene to H_2O. This flame spreads around and over the pieces being welded, heating them to a further distance from the weld than does the electric arc.

These differences between the flames would naturally make some differences in the welds made by them. The greatest of these differences, the writer believes, is due to the more rapid heating and cooling of the electric weld, which causes much less coarsening of the grain of both the weld and the original material, and causes the coarsening to extend a smaller distance from the weld than does the oxyacetylene process; so that the method of making a weld is readily determined, provided it be unannealed. The difference in grain size is seen in Figs. 1 and 2.

In low-carbon steel wire (carbon 0.10 per cent or less) and in wrought iron, the cementite exists as small isolated particles at the grain boundaries. Many times the particles are entirely dark, when etched in sodium picrate, but at other times they seem to have what might be called a type of pearlitic structure. The relief effect is obtained by throwing the light a trifle to one

The author, S. W. Miller, proprietor, Rochester Welding Works, Rochester, N. Y., presented this paper at the annual meeting of the American Institute of Mining Engineers, New York, Feb. 20.

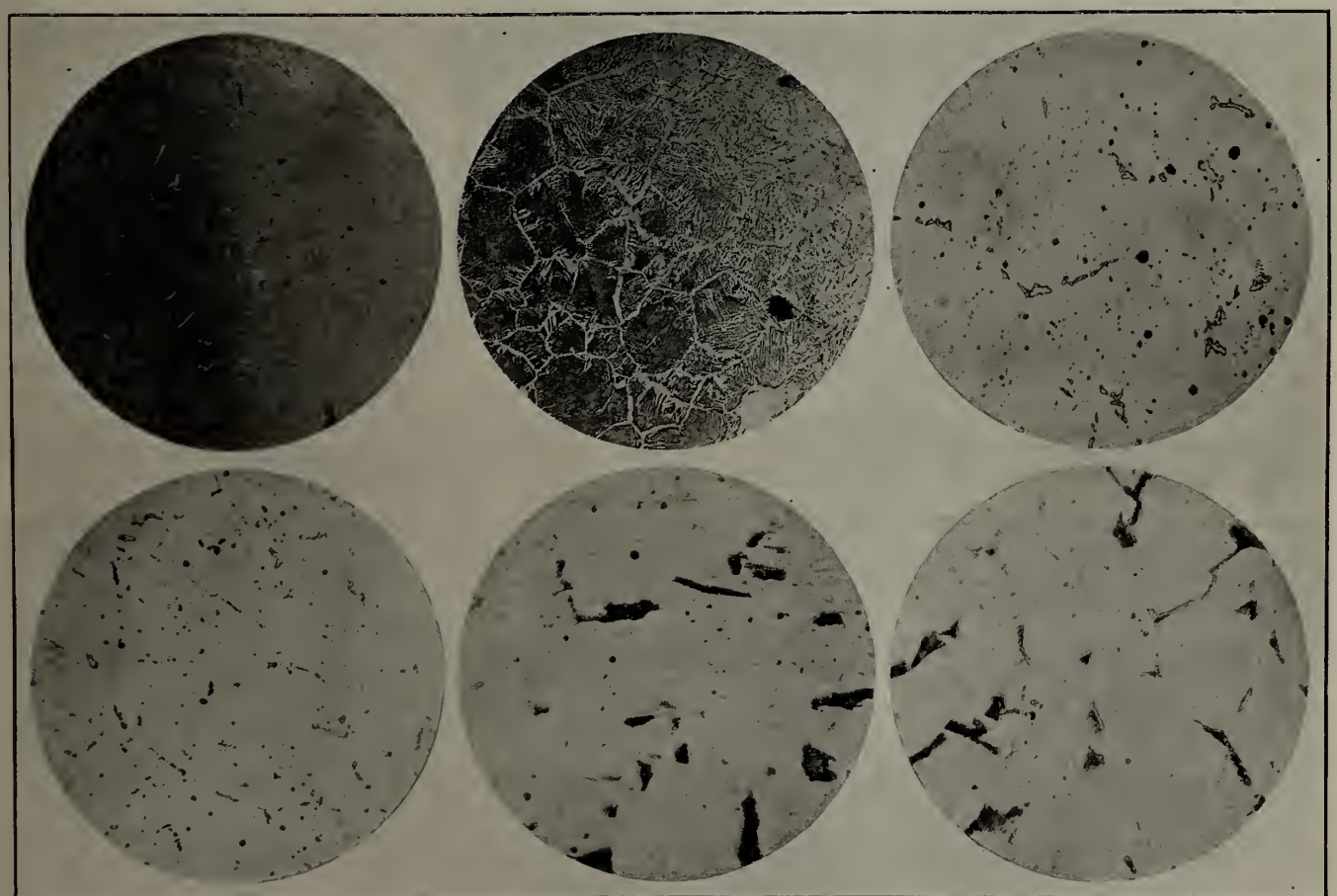


FIG. 1—ELECTRIC WELD, SHOWING COARSENING OF GRAIN IN ORIGINAL MATERIAL. ON LINE OF WELD. X 37. FIG. 2 OXYACETYLENE WELD, SHOWING THE SAME AS FIG. 1. FIG. 3—SPECIMEN RI2. SPOTS OF CEMENTITE AND OXIDE DOTS. IN WELD. X 317. FIG. 4—SPECIMEN RS2. SPOTS OF CEMENTITE AND DOTS OF OXIDE. IN WELD. X 317. FIG. 5—SPECIMEN RV2. PEARLITE, CEMENTITE SPOTS AND OXIDE DOTS. IN WELD. X 317. FIG. 6—SPECIMEN 23. PEARLITE, CEMENTITE SPOTS AND OXIDE. IN WELD. ALL SPECIMENS WERE ETCHED WITH PICRIC ACID

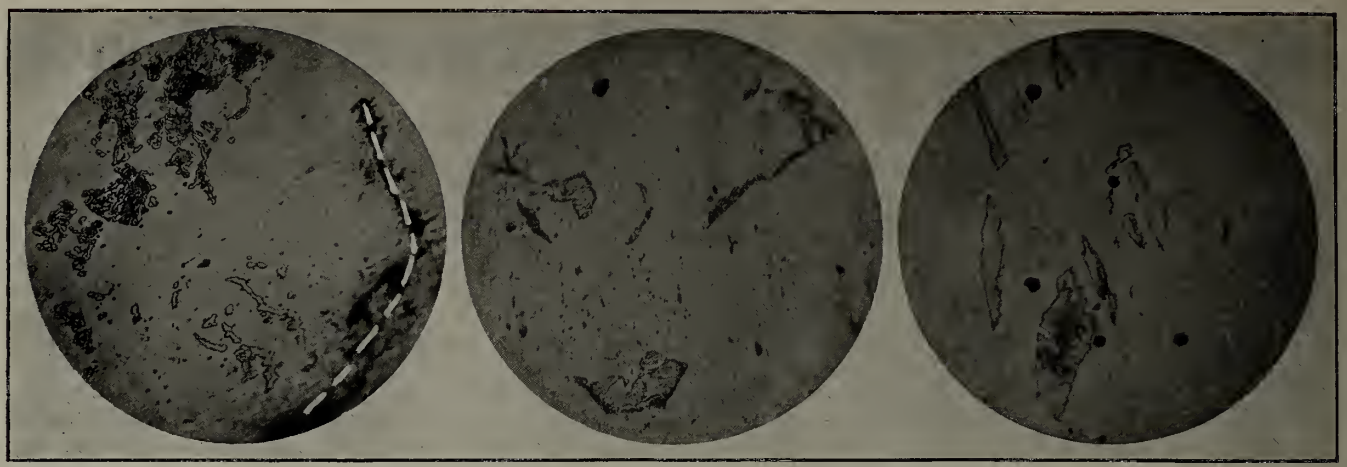


FIG. 7—SPECIMEN LG. CEMENTITE SPOTS AND PEARLITE. IN ORIGINAL JUST NEXT TO WELD. WHITE DOTTED LINE IS LINE OF WELD. ETCHED PICRIC ACID. X 317. FIG. 8—CEMENTITE SPOTS. IN WELD JUST NEXT TO ORIGINAL. ETCHED SODIUM PICRATE. X 317. FIG. 9 — SPECIMEN Q14. CEMENTITE SPOTS PARTLY DARKENED. ETCHED SODIUM PICRATE. PART OF ILLUSTRATION 25. X 887

side in a horizontal plane, and is seen more readily than it can be photographed. Even the dark particles do not seem to be uniformly so at high powers. Also, there is frequently a variety of colors visible, ranging from dark red and brown to black, the usual color being brown. These colors are not visible at less than 400 diameters, as far as the writer has observed, less magnification showing simply darkening of the cementite. The cause of these colors is not clear.

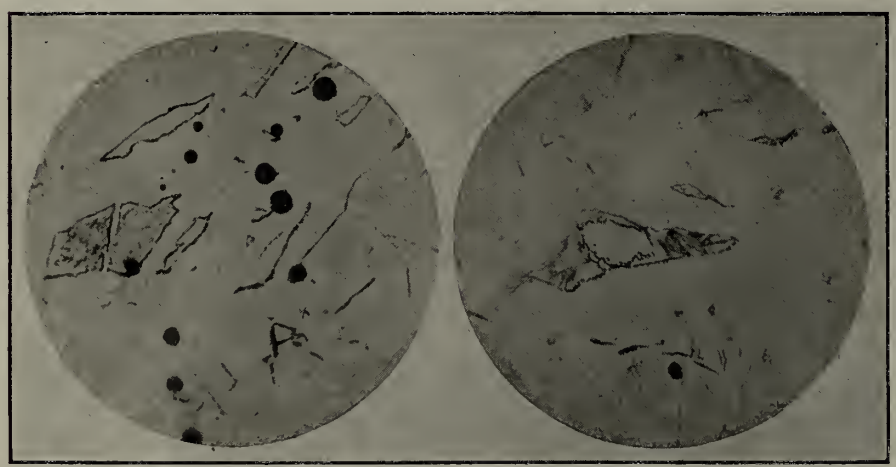


FIG. 10—SPECIMEN Q14. SAME FIELD AS FIG. 9, BUT REGROUND. ETCHED PICRIC ACID. PART OF FIG. 27. X 887. FIG. 11—SPECIMEN Q14. ANOTHER CEMENTITE SPOT. ETCHED SODIUM PICRATE. X 887

The general subject of cementite in low-carbon steel is mentioned because it is important in welding; low-carbon material (not over 0.10 per cent for oxyacetylene, and 0.18 per cent for electric) being usually added. The location and structure of the cementite has, it is believed, an important bearing on the strength of the weld, and it is, therefore, advisable to determine the conditions under which it exists, so that they may be bettered, if necessary, by heat treatment.

With both kinds of welding, there is an agitation of the melted metal. This is violent with the electric method, resulting in there being more or less oxidizing of the iron. In electric welding, there is also the condition that some of the metal passes from the electrode as a spray, materially increasing the oxidation. There is no fusion weld which the writer has examined, that is free from considerable amounts of oxide, which can be seen in its usual

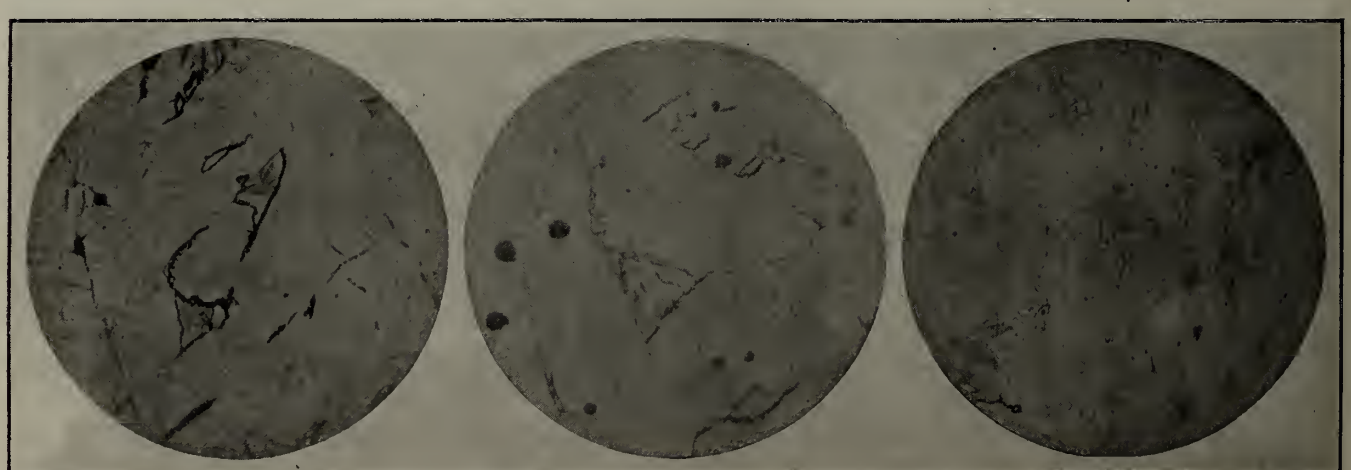


FIG. 12—SAME AS FIG. 11, BUT REGROUND. ETCHED PICRIC ACID. X 887. FIG. 13—SPECIMEN Q14. LOCATION OF LARGER SPOTS OF CEMENTITE. ETCHED PICRIC ACID. X 887. FIG. 14—SPECIMEN LG. ALONG LINE OF WELD. LINE OF CEMENTITE AND PEARLITE SPOTS. ETCHED PICRIC ACID. X 317

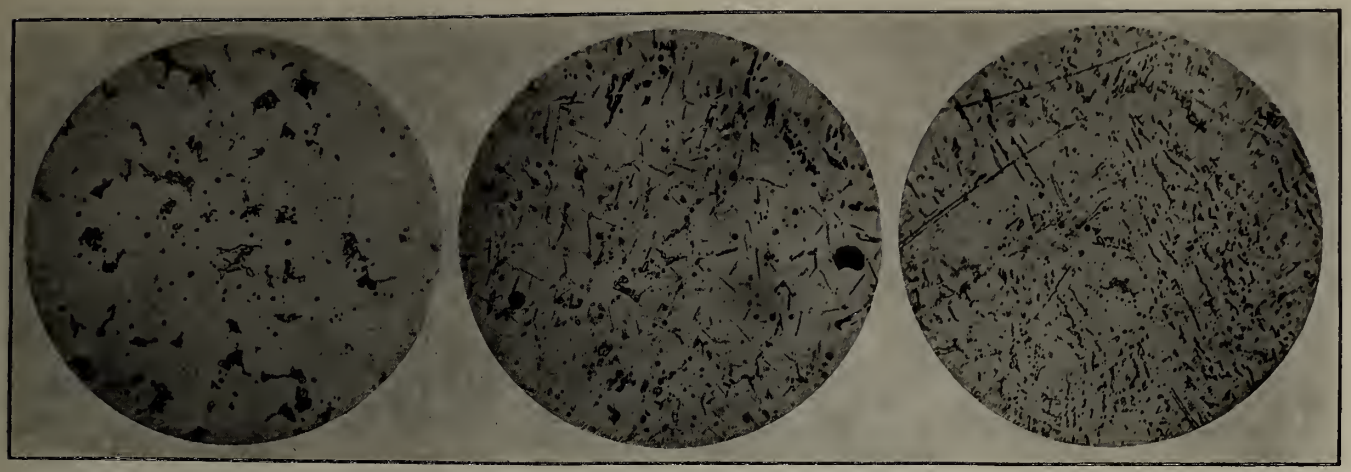


FIG. 15—SPECIMEN Q3. IN WELD JUST NEXT TO ORIGINAL. CEMENTITE AND PEARLITE SPOTS. X 317. FIG. 16—SPECIMEN Q3. IN BODY OF WELD. CEMENTITE AND PEARLITE SPOTS, OXIDE, AND LINES. X 317. FIG. 17—SPECIMEN Q15. GENERAL STRUCTURE OF WELD. X 317

form in many of the photographs; for example, Figs. 3, 4, 16, 18, 22, 25, and 30. It seems probable also that the weld contains large amounts of gases, such as nitrogen, and probably hydrogen in the oxyacetylene process. It would appear that improvements could be made by adding vanadium, manganese, or titanium, or combinations of these elements, to the welding rod. High manganese rod (about 0.60 per cent), and vanadium rod (about 0.15 per cent) do make cleaner oxyacetylene welds, but the difficulty of welding is increased by the slag formed, especially with manganese. It is difficult to float this slag to the surface, and this must be done to make the weld free from inclusions and laps.

Result of Agitation

The agitation of the melted metal referred to, and the melting of the original material, which is usually higher in carbon than the welding rod, cause a mixture of the high and low-carbon materials, especially near the edge of the weld. There is also an amount of carbon burned out during the melting; so that there is a change in the carbon content of the metal from the original toward the center of the weld. In addition, there is a great variation in the heating and cooling rates, and in the chemical composition of the welding rods used in different shops, so that great differences in structures of the welds for this reason may be expected.

The foregoing agitations result in a variety of structures. Figs. 3 and 4 show the same apparent structure of the cementite as appears in low-carbon steel wire. This is also seen in Figs. 6, 7, 8, and 14, which are oxyacetylene welds; and in Figs. 15 and 16, which

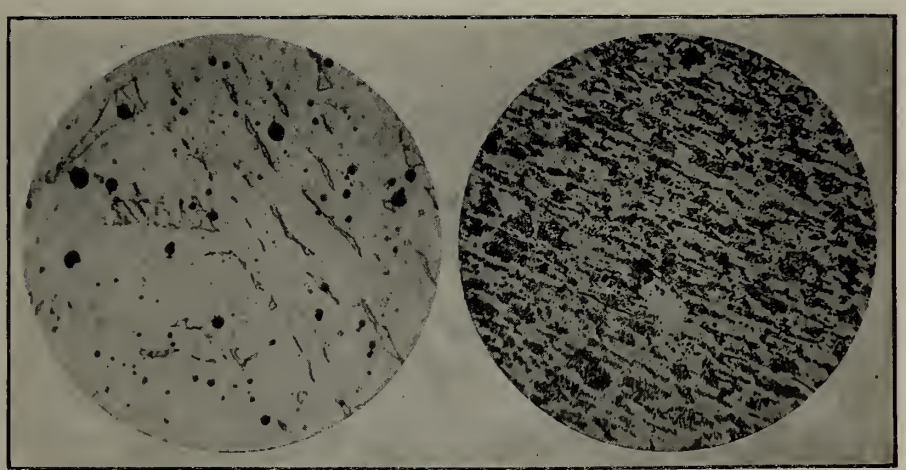


FIG. 18—SPECIMEN Q15. SAME AS FIG. 17, BUT X 887. FIG. 19—WIRE USED TO MAKE WELD N1, AS RECEIVED. ETCHED PICRIC ACID. X 148

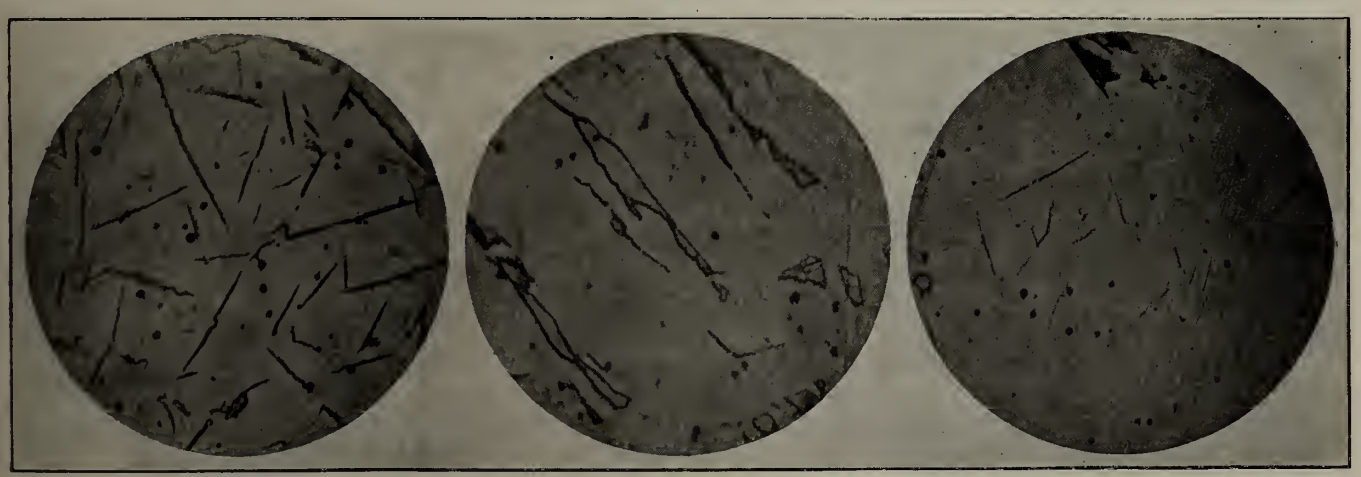


FIG. 20—SPECIMEN N1. CEMENTITE SPOTS AND LINES. ETCHED PICRIC ACID. X 1200. FIG. 21—SPECIMEN N1. CEMENTITE SPOTS. FIELD JUST SOUTHWEST OF FIG. 20. ETCHED PICRIC ACID. X 887. FIG. 22—SPECIMEN N1. X 887



FIG. 23—SPECIMEN 116. ETCHED PICRIC ACID. SHOWS LINES IN ELECTRIC WELD. X887

are electric welds. The weld in Fig. 3 was made with wrought-iron wire, in 4 with low-carbon steel wire, and in 7, 8, and 14 with wrought-iron wire. There is a trace of this structure in Fig. 5, cent manganese. The weld in Figs. 15 and 16 was made with ordinary steel wire, the composition of which is not known.

Appearance of Specimens

All of these photographs, except 8, are taken from specimens etched with picric acid. Fig. 8 shows sodium picrate etching, and the structure is somewhat pearlitic in appearance, although, with picric acid etching, the appearance is the same as in Fig. 14. At higher magnifications, these spots appear as in Figs. 9 to 13, inclusive. There is little difference in the appearance of electric and oxyacetylene welds; in both cases, the particles are partly darkened only. They all, however, darken more or less, sometimes around the edges, sometimes in the center. With picric acid etching, they are brilliant.

The location of the spots is usually at the grain boundaries, as in ordinary steel; but many times they appear to



FIG. 24 — SPECIMEN MVS9, SHOWING LINES IN OXYACETYLENE WELD. X 317

tant, because they seem to be more or less carburized, and at times, even in oxyacetylene welds, lie in a line parallel with the line of the weld, and close to it; and also because it has been the



FIG. 25—SPECIMEN Q14. CEMENTITE SPOTS AND LINES DARKENED BY SODIUM PICRATE ETCHING. X 317. FIG. 26—SPECIMEN Q14. SAME AS FIG. 25, BUT X 887. FIG. 27— SPECIMEN Q14. SAME FIELD AS FIG. 25, AFTER REGRINDING AND ETCHING WITH PICRIC ACID

which was made with vanadium-steel wire of about 0.15 per cent carbon and 0.15 per cent vanadium. The weld in Fig. 6 was made with wire containing about 0.15 per cent carbon and 0.50 per



FIG. 28—SPECIMEN Q14. SAME AS FIG. 27, BUT X 887

penetrate the grains, usually parallel to each other, as in Fig. 13, as a general rule extending to the grain boundaries, but never passing from one grain to another. This parallelism, especially of the elongated particles, can be noticed in Figs. 17, 18 and 21. These are all electric welds, and these bright elongated particles appear much more frequently, from the writer's experience, in electric welds than they do in oxyacetylene welds. They are, however, present in some oxyacetylene welds, particularly those which are rapidly cooled, as shown in Figs. 9 and 10.

At high magnification, Fig. 18 shows in one spot a somewhat pearlitic structure, but the rest of the particles do not appear to show it. Whatever their nature, it would appear that the structure is not a satisfactory one in steel. The spots are evidently harder than the metal surrounding them; and the question of proper heat treatment for their elimination appears to be important, because they seem to be more or less carburized, and at times, even in oxyacetylene welds, lie in a line parallel with the line of the weld, and close to it; and also because it has been the writer's observation that many times they exist where there is a poor union between the original and added materials.

One of the most interesting structures

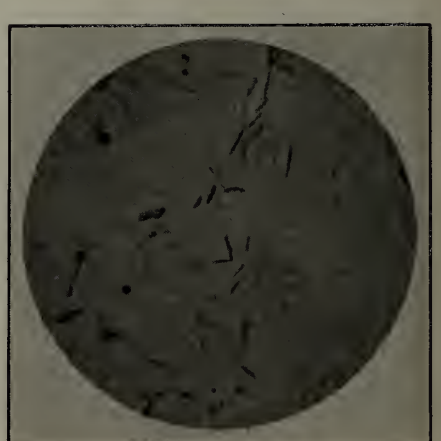


FIG. 29—SPECIMEN Q14. LINES ENDING AT GRAIN BOUNDARIES. X 887

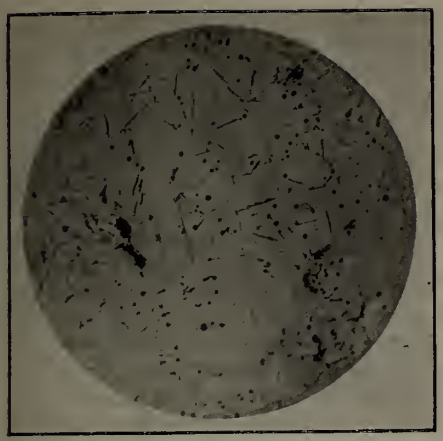


FIG. 30 — SPECIMEN 167X. SHOWING LINES. ETCHED PICRIC ACID. X 317

found in welds made by both methods (but never in a properly made oxy-acetylene weld, as far as the writer has observed), and without exception in electric welds, is that shown in Figs. 16 and 22 to 33, inclusive. The first time it was seriously noticed by the writer was when he observed the field shown in Fig. 30. This specimen (see 167X in the table) is from an electric weld, probably made with ordinary steel wire, although this is not certain. What attracted his attention was the peculiar relative position of the lines in the center of the field. Their relation is better seen in Fig. 31, taken at higher power. It will be noticed that these lines are parallel to the sides and diagonals of a square, and to the lines drawn from the corners of a square to the middles of the opposite sides.

Results With Carbon Steel

The field shown in Fig. 24 was noticed in a weld made in 0.77 per cent carbon steel where the added material was wrought-iron wire. In this case, the location of the lines was confined to a narrow zone just next to the original material; while in electric welds made with wire containing considerable carbon, such as shown in Fig. 19, the weld is full of them, no special location being noticed. In welds made with low-carbon wire, they seem to select the places where the cooling is the most rapid. This is also true in oxyacetylene welds. In both the latter cases, they are uneven and erratic in their distribution. It does appear, however, that welds made with higher-carbon material contain more of the lines than those made with wire containing less carbon. Figs. 20 and 23 are illustrations of welds made with higher-carbon material than in specimen *Q*15, which was made with wire containing not over 0.10 per cent carbon. In specimen *Q*14, which was made by the oxyacetylene process, using a strongly excess-oxygen flame, the lines were found in only two places. These were at the edge of the piece, where it would cool rapidly. The center was entirely free from them. The material used to make this specimen was low-carbon steel wire.



FIG. 31 — SPECIMEN 167X. SAME AS FIG. 30, BUT X 887



FIG. 32—SPECIMEN 167X. SAME AS FIG. 30, BUT FURTHER ETCHED WITH PICRIC ACID. FIG. 33—SAME AS FIG. 31, BUT MORE HEAVILY ETCHED. FIG. 34—SPECIMEN NW1. LINES IN CENTER GRAIN. ETCHED NITRIC ACID. X 317

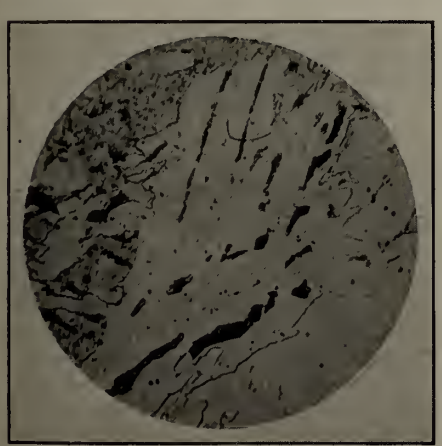


FIG. 35 — SPECIMEN RV2. PEARLITE LINES IN GRAIN. ETCHED NITRIC ACID. X 317

Difference of Opinion

The author has found three references to these lines. In the first reference, they are believed to be oxide; in the second, they are called magnetic oxide; and in the third, they are stated to be cracks or fissures. He believes that none of these explanations is correct, and is strongly inclined to believe that they are very minute plates of cementite rejected along certain crystallographic planes. His reasons are as follows:

First.—They darken when boiled in



FIG. 36 — SPECIMEN RV2. PEARLITE SPOTS. ENTIRE FIELD IS ONE GRAIN. ETCHED NITRIC ACID. X 317

Specifications of Wire Used in the Tests

Specimen	Made with	Original	Process	Remarks
Q3	Steel wire	Steel plate	Electric	Weld
Q14	Wire *D*	———	Oxy-acetylene excess oxygen...	Button
Q15	Wire *D*	Steel plate	Electric	Weld
116	Steel wire	Steel plate	Electric	Weld
N1	Wire *C*	Bar machined steel..	Electric	Weld
LG	Wrought iron wire....	Steel plate	Oxy-acetylene ..	Weld
RI2	Wrought iron wire....	Bar machined steel..	Oxy-acetylene ..	Weld
RS2	Wire *D*	Bar machined steel..	Oxy-acetylene ..	Weld
RV2	Wire *A*	Bar machined steel..	Oxy-acetylene ..	Weld
23	Wire *B*	———	Oxy-acetylene ..	Button
M. V. Sp. 9..	Wrought iron wire....	*77C* steel	Oxy-acetylene ..	Weld
167X	Steel wire	Van. steel plate.....	Electric	Weld
VW1	Wire *C*	*23C*	Oxy-acetylene ..	Button

Analysis of Wire in the Foregoing Specifications

	Wire *A*	Wire *B*	Wire *C*	Wire *D*
Carbon	0.160	0.13 to 0.18	Shown in	not over 0.080
Sulphur	0.034	Max. 0.045	Fig. 29	not over 0.025
Phosphorus	0.015	Max. 0.050	.....	not over 0.020
Manganese	0.190	0.40 to 0.60	.....	not over 0.150
Silicon	0.110	.....	.....	not over trace
Vanadium	0.190	.....	.....	.....

No further information as to composition of wire is at hand than given above. "Button" means that wire was melted down into a button weighing about 25 grams, and cooled in air.

sodium picrate. This is shown in Figs. 10, 22, 25 and 26.

Second.—They are more numerous with high-carbon wire than with low.

Third.—When heated above the critical range, say to 750 degrees Cent., for 5 minutes, and allowed to cool in the furnace from 750 degrees Cent. to 710 degrees Cent. at the rate of 7 degrees per minute; from 710 degrees Cent. to 695 degrees Cent. at the rate of 3 degrees per minute; and from 695 degrees Cent. to 635 degrees Cent. at the rate of 8 degrees per minute, the lines disappear.

Other tests showed that a considerably quicker cooling rate, an average between the above limits of 14 degrees per minute, was also sufficient.

It also appears that under certain conditions in welds, particles that are evidently pearlite may assume the same directions. Fig. 34, from a specimen made by melting the wire shown in Fig. 29, shows parallel plates of pearlite structure in the center grain, the grain boundaries being clearly defined. Fig. 35 shows two directions of pearlitic masses in the same grain. Fig. 36 shows pearlitic spots extending in two directions, although mostly in one. The grain, from which this photograph was taken, more than covers a 4 x 5 plate, and the directions were the same in the entire grain. One peculiarity of these lines in welds is that they widen considerably by prolonged etching. Figs. 32 and 33 show this when compared with Figs. 30 and 31. Under the microscope, they appear to resemble etching pits in that they are deeper in the center than at the sides, and this depth appears to increase as the etching is prolonged. They also have the appearance of being stepped when the light is thrown by the reflector in the right direction.

There is also, in many cases, a faint white line which can be seen in Fig. 33 in the center of two of the lines and in Fig. 23. It is possible that this is the edge of a plate of cementite, although it may be due to an optical effect.

The author has ventured to call attention to these peculiar structures for two reasons: *First.*—Because of their probable practical importance in connection with the strength of welds. *Second.*—Because of their probable theoretical importance in connection with the deformation of iron and steel.

Chrome Ores in Southern Pennsylvania

THE war has increased so greatly the demand for chrome steel for use in making armor plate, projectiles, and high-speed tools that the domestic production was multiplied almost eightyfold between 1914 and 1916.

From the beginning of the chrome industry until the civil war the mines of chrome ore in Maryland and Pennsylvania were practically the only sources of supply for the entire world. Up to the latter part of the nineteenth century almost all these mines were owned or operated by the Tyson Mining Co., Baltimore. When the importation of Turkish ores lowered the prices of chrome ore in the United States market, home production was reduced, and the Pennsylvania deposits of the ore were consequently relegated to the position of a reserve supply.

Since the eastern mines were closed, in 1882, or thereabouts, the chrome ore produced in the United States has been mined almost entirely from deposits on the Pacific coast, and the output has been declining, while the imports from foreign sources, chiefly from South Africa and New Caledonia, have been steadily rising.

The imports in 1916 were almost double those in 1914. The reports of the United States geological survey show that the domestic production in 1916 was 47,035 tons and that the imports were 115,945 tons, so the total available supply in 1916 was 162,980 tons. In 1917 the domestic production was only about 40,000 tons and the imports, computed from reports for the first nine months of the year, fell to 103,000 tons. The total quantity of chrome ore available for consumption in 1917 was therefore only 143,000 tons as contrasted with 162,980 tons available in 1916.

In November, 1917, E. F. Bliss, of the United States geological survey, examined the chrome-bearing rocks of the state-line serpentine belt of southern Pennsylvania and discovered deposits of chromite occurring from Bald Friar, on the Susquehanna river, through the southern part of Lancaster and Chester counties, Pa., and the northern part of Cecil county, Md. The ore occurs both as massive, compact chromite in nodules and pockets of variable size in a serpentine gangue, and as a spotted ore in which grains of chromite are rather evenly distributed through the serpentine. The pockets that contain the massive ore are so irregularly distributed that prospecting is largely a matter of chance, but in view of the theory recently advanced that chromite is formed through segregation, by gravity or otherwise, along the bottom or sides of an igneous instrusive mass, it is of high practical significance to the prospectors to note that most of the Pennsylvania deposits lie along the north edge of an apparently southward-pitching mass of serpentine. Four of the old mines are situated on the actual contact of serpentine and crystalline schists.

Nine abandoned mines on or near the serpentine boundary were examined. These mines extend from the old "Line Pit", three miles east of Susquehanna river, on the Mason and Dixon line, for a distance of nine miles eastward. Four of the shafts, of which the deepest is at the old Wood mine, long renowned as a collecting ground for rare minerals, disclose massive ore. Specimens of ore from the Wood mine were reported

to assay as high as 56 per cent of chromic oxide and to average 48 per cent. The remaining five mines and one old pit in an isolated area of serpentine about three miles north of the Maryland-Pennsylvania line, near the village of Texas, Lancaster county, show disseminated or spotted ore, known among the chrome miners of that region as "birdseye". In the prosperous days of the eastern chrome industry this ore was apparently not considered sufficiently valuable to repay the cost of concentration, because the massive ore could easily be cobbed and handsorted, the product being of sufficiently good quality to meet the demands of that period. Now that the country is certain to be short of chrome ore, which is urgently needed to supply the large demands of an industry that has become vital, the question of concentrating low-grade ores assumes new importance.

At several old mines in Lancaster county and at three in Chester county there appears to be a fair grade of concentrating ore. Estimates of the quantity of ore available are difficult to make, owing to the lack of other than surface indication, but the facts that at one mine about 2000 tons of spotted ore are lying on the dumps and that rock taken a few feet below the surface at a point about a mile and a half east of the mine contains spotted ore of the same character, indicate that a considerable quantity of similar ore may lie below the surface.

Analyses of average samples from the dumps mentioned above show 33.27 to 34.27 per cent by weight of chromite in the ore. An analysis of the chromite recovered by concentration from the samples shows 48.79 per cent of iron and alumina and 51.21 per cent of chromic oxide. The ore, which is nonmagnetic, occurs in black grains of brilliant luster. The gangue is a massive green serpentine that contains little or no asbestos, a fact that is of practical interest, for the presence of considerable asbestos in chrome ore makes concentration more difficult. Fragments of massive chromite found in the dumps indicate that nodules of massive ore, in addition to the spotted ore, are distributed through the serpentine. The nearest railway shipping point is less than two miles distant and is accessible by good roads.

Inasmuch as an ore that runs 33 per cent by weight of chromite contains about one part of chromite to two parts of waste, three tons of this spotted ore should contain one ton of chromite. About 60 per cent of the chromite content of such ores can be recovered, so that after proper allowance for losses in treatment, five tons of this ore should yield one ton of chromite.

In view of the facts stated concerning the geologic relations of the chromite deposits in this region and of the favorable market for the ore, the possibility of discovering and exploiting new deposits in southern Pennsylvania, as well as the practicability of working over some of the old mine dumps, should receive the attention of mining men who are interested in supplementing our inadequate domestic supply of chromite.

Boilers Reclaim Melting Furnace Heat

BY C. D. TOWNSEND

AFTER considerable investigation of the various kinds of boilers, including horizontal, marine, and others, an upright water-tube boiler finally was selected as the equipment best suited for the utilization of waste heat from melting furnaces. The fact that the floor space required was comparatively small was an important factor in determining the choice. The next question was size, and the results of deliberations with the engineers were that it was preferable to have the boiler over-size rather than under-size. A 250-horsepower boiler was estimated to be of sufficient size, considering the grate area of the furnace; but because of what might be called a superheated gas after it has passed over a bath of molten metal, and because of its velocity, greater capacity was deemed advisable and a 400-horsepower boiler was finally decided upon as being adequate for any emergency.

In order to utilize the waste gases from the furnace and get constant results from the boiler, and also to keep the boiler under steam pressure all the time, it is best to have two furnaces and an auxiliary fire-box connected with the boiler. By running the furnaces one at a time during the day, a full head of steam can be kept on the boiler, except for intervals during the time of charging the furnaces, and for a short period while the cold stock is being thoroughly heated. This takes care of all firing necessary on the boiler for at least 9 hours of the day. During the balance of the day the boiler can be kept under pressure with a slight amount of fire through the auxiliary fire-box. One furnace is operated while the other is being repaired; and then the order is reversed.

Aiding Temperature Control

The temperature control in the furnace and the efficiency of the boiler can be very materially aided by the addition of an induced-draft fan in the base of the stack. By operating this fan with a variable-speed motor or steam engine, the furnace draft can be regulated as desired. The use of the fan tends to hasten the time of melting and, due to the velocity with which the gases are drawn through the boiler, the efficiency is increased. The temperature in the base of this stack is approximately 800 degrees Fahr., and the temperature at the back bridge-wall of the furnace is about 2500 degrees Fahr. These figures show that a large volume of waste gas is used in making steam. With this equipment approximately 246,000 pounds of water are evaporated per day. In the auxiliary fire-box, from one to three tons of coal per day are used, according to requirements.

As before stated, connecting two 20-ton furnaces to the auxiliary fire-box of the boiler insures constant operation while furnace repairs are being made. With the use of the auxiliary fire-box, the boiler is kept under pressure during the night and at other periods while the furnaces are not in operation. By keeping the boiler constantly under pressure and heat, the danger of breakdowns caused by contraction and expansion is minimized.

The boiler should be set as close as possible to the back bridge-wall of each furnace in order to utilize all the waste gas possible. This can be accomplished by setting the furnaces parallel to each other or at right angles to the boiler, which arrangement should be figured out to best suit local conditions. To take care of the tremendous amount of gases that pass through the boiler during the period of melting, it is advisable to set the boiler eccentric with the casing, leaving the greatest area on the front or steaming side of the boiler so that the extremely hot gases have a chance to rush up the front side and become effective nearer the top of the boiler. On the other hand, if the boiler tubes are set close to the casing, the intense gases and impinging flames will

do most of their work on the tubes near the bottom of the boiler.

The water supply for a waste-heat boiler should be absolutely assured. It is best to have two independent sources of supply, since it is obvious that, if for any reason the water supply should fail, a heavy loss and probable calamity would result.

In the writer's opinion the most desirable use of a waste-heat boiler is when the full steam capacity of the boiler can be utilized. This can best be accomplished by using the waste-heat boiler in conjunction with a battery of hand-fired boilers, the steam pressure to be equalized and balanced by their use. In this way the waste-heat boiler serves as an auxiliary or a fluctuating source of steam supply to a boiler plant. If the steam line of a waste-heat boiler is connected directly into the steam log or header of the regular power-plant boilers, the hand-fired boilers can be run to the entire accommodation of the waste-heat boiler; that is, the hand-fired boilers can pick up the power load and carry it until the waste-heat boiler begins to come into service. Then the hand-fired boilers can be gradually slacked off and the fires banked, taking the full steam supply from the waste-heat boiler and thereby acting as a safety valve or regulator for it. It is apparent that in a waste-heat boiler there is no such thing as control of the steam supply. If all the steam that is made cannot be used, it has to be wasted.

A waste-heat boiler requires constant attention. It is most important to remember that the boiler is a fire-eater, and that to keep it on the ground the water supply must be *positive* and intelligently supplied. The boiler should be washed down and the tubes inspected for defects at least every three weeks, and the flues should be turbined, if necessary, not less than every six weeks. It is very important that treated water should be used to minimize the collection of boiler scale. Soot should be blown off the tubes at least three times a day. In fact, every possible care should be exercised to keep the tubes clean.

A 400-horsepower boiler connected with a 20-ton furnace operating at capacity will produce steam at the full capacity or a little in excess of the actual capacity of the boiler after the iron has been reduced to a semi-fluid state or say for 8 to 9 hours per day. There is no effect noticeable on the furnace operation and, in fact, the furnaces are operated entirely in disregard to the boiler connection. The fuel ratios do not change; neither do the furnace firing operations. In fact, the entire furnace conditions are absolutely normal, and should proceed in utter disregard of the boiler.

Another method of utilizing waste-heat is to set a boiler of convenient size alongside the neck of the furnace. With a variable speed induced-draft fan at the base of the boiler stack, sufficient gas could be diverted into the boiler to heat water or produce steam for various shop purposes, such as toilet uses, heating, etc.

Radium has increased nearly threefold in price, since the war commenced. From approximately $1,000,000 an ounce early in 1914, it has advanced to about $2,800,000 an ounce. Practically the world's entire supply comes from the carnotite ore mined in Colorado and Utah, from which also are produced the rare metals uranium and vanadium.

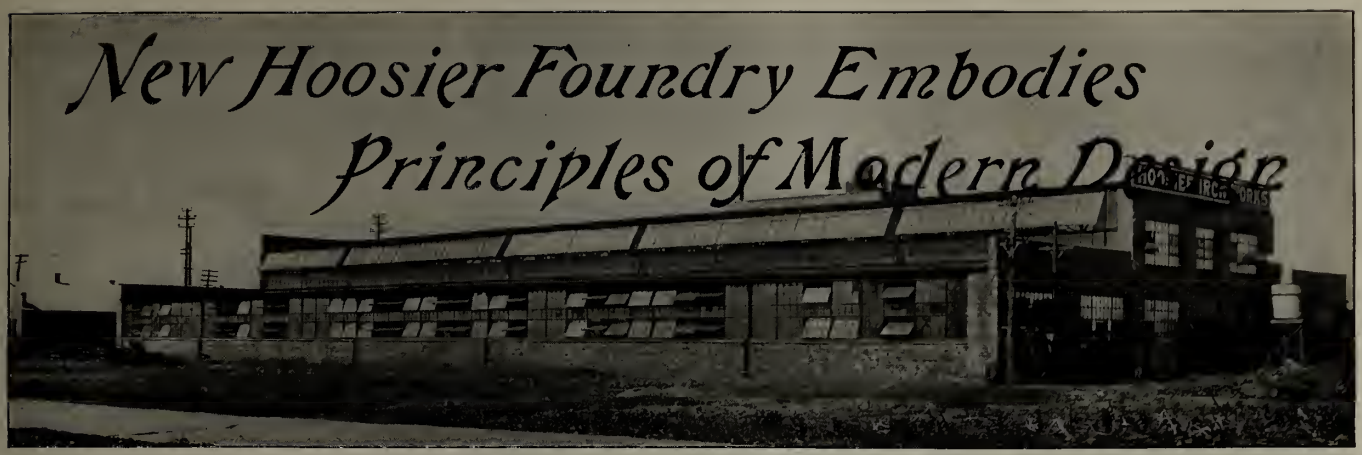
Cooling Forgings By Compressed Air

A method of cooling forgings by compressed air has been developed by J. W. Dunphy, a Canadian engineer. Steel containing 0.42 per cent carbon, 0.063 silicon, 0.034 sulphur, 0.025 phosphorus, and 0.48 per cent manganese, which with appropriate heat treatment when cooling under atmospheric conditions gave a yield point of 18 tons and a tensile strength of 36 tons per square inch with 27 per cent elongation, after being cooled by compressed air is said to have improved its yield point to 22 tons and its tensile strength to 44 tons per square inch with 25 per cent elongation. The forging was a 9.2-inch shell, and the air consumption 2100 cubic feet per minute. The air was used at a pressure of 80 pounds per square inch and was delivered from a pair of 2-inch pipes, plugged at their ends, surrounding the forging and with fifty 3/16-inch holes each on its side facing the forging, while a 3-inch pipe with one hundred 3/16-inch holes along its length and ending in a special nozzle to cool the nose of the shell, cooled the inside. It took five minutes to reduce the forging from furnace heat to 800 degrees Fahr. While being cooled it rested on a pair of 4-inch rollers, one of which was driven by a compressed air motor, while the other ran as an idler. The 3-inch pipe supplying the compressed air to the cooling pipes was about 10 feet long, and had a loose joint at the top, so that all the pipes could be lifted and swung away when the forging was changed.



WASTE HEAT BOILER, SHOWING AUXILIARY FIRE BOX AND MELTING FURNACES

New Hoosier Foundry Embodies Principles of Modern Design



Light, Ventilation and Crane Facilities are Features of the new Hoosier Foundry, Kokomo, Ind.

THAT all foundries are practically alike, except for differences in size and equipment, is the opinion formerly held by many old school foundrymen. A generation ago, any old building, light or dark, sanitary or not, served for a foundry. Light was not deemed necessary and windows were seldom cleaned. Broken panes were stuffed with rags and the openings were closed with boards. Little effort was made to lessen the dust arising from various operations. Man power carried all burdens not too great for human endurance.

But a new school of foundrymen and of engineers has developed during the last decade or so. Cleanliness, light and ventilation, together with complete provisions for carrying loads by mechanical means, have served to make the modern foundry far superior to its predecessors. The recently completed plant of the Hoosier Iron Works, Kokomo, Ind., designed by Frank C. Chase, industrial engineer, Chicago, is an excellent illustration of modern foundry construction.

Features of New Plant

In designing the new foundry for the Hoosier Iron Works, the details of construction were so planned as to obtain a maximum building capacity with a minimum investment, without lessening in any degree the strength and solidity of the structure. The foundry is lighted by a maximum of window space. Ventilation is obtained through large, movable glass areas. The cupolas are enclosed in a brick building to prevent the circulation into the workshop of dust which arises from dumping. Of particular interest is the fact that every foot of the floor in the central and side bays is served by some type of crane. The crane equipment is unsually complete. The various units are adapted to the requirements of the particular duties necessary in their individual locations and to the loads they may be called upon to carry.

The foundry building is 130 feet wide and 240 feet long, divided into a central bay 50 feet wide and side bays 40 feet wide. The central bay is 30 feet high. Gypsum tile, light and fireproof, is used for the roof. This tile is laid in 5-foot courses. This construction permits the use of light roof trusses, thus effecting a considerable saving in the cost of the steel. The bays are 15 feet high at the eaves. Ten feet of glass running the full length of the building is pro-

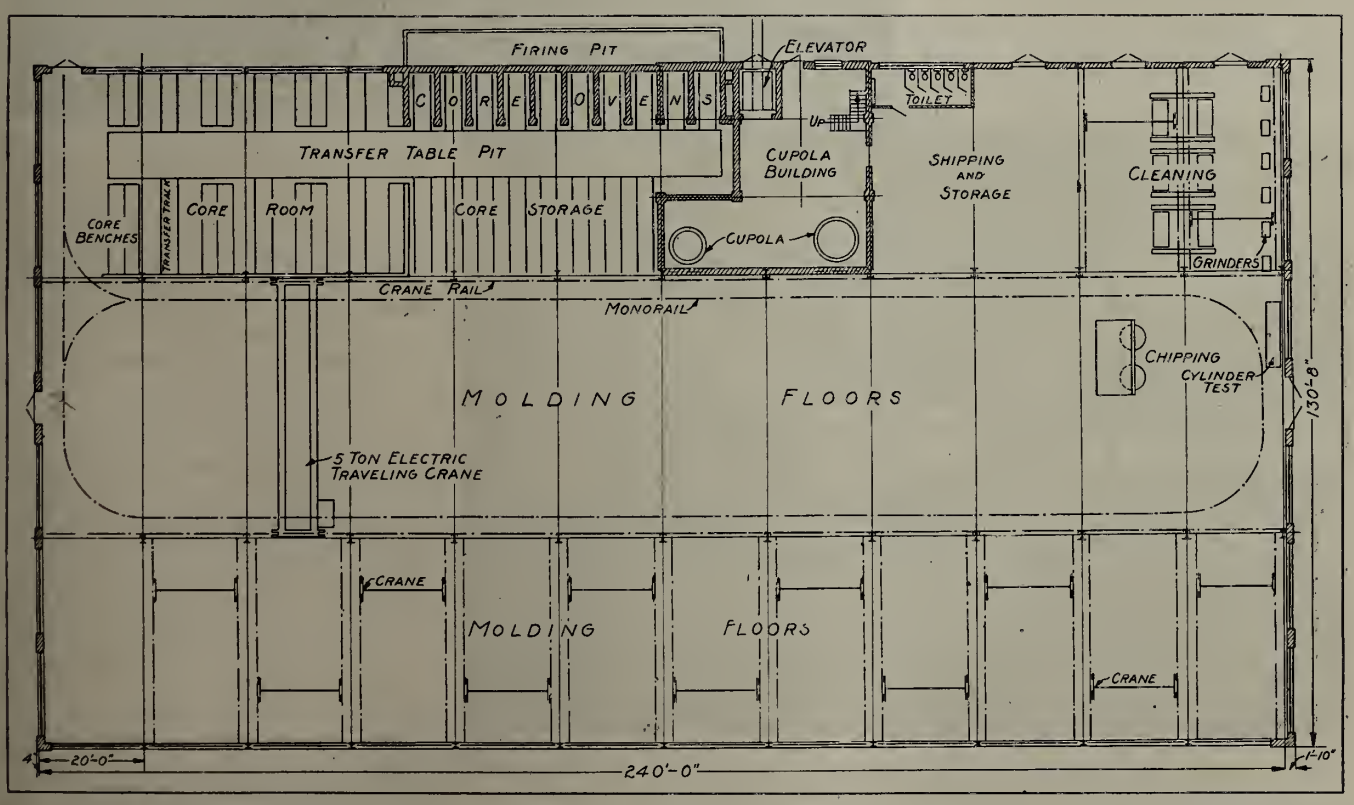


FIG. 1—FLOOR PLAN, SHOWING HOW THE CRANE EQUIPMENT IS ARRANGED TO SERVE ALL PARTS OF THE FOUNDRY



FIG. 2—A SIDE BAY WITH BRILLION CRANE IN BACKGROUND

vided in the monitors above the side bays. The upper 6 feet of this is continuous top-hung sash, which opens the full length of the wall. Each side bay has 9 feet of glass containing two rows of pivoted sash. The glass is continuous from column to column, there being no brick pilasters to reduce the glass area.

Crane Equipment

The comprehensive crane equipment is indicated in Fig. 1. The central bay is spanned by a 50-foot crane with one 5-ton hoist, made by the Whiting Foundry Equipment Co., Harvey, Ill. It travels the entire length of the foundry and handles all heavy work. It is planned to have all the large castings made in the central bay, thus leaving the side bays, with lighter equipment, for the lighter work. Circling the central bay and passing the opening of each division of the side bays, is a monorail consisting of a 12-inch I-beam, equipped for use with either electric or hand trolley. A switch connects with an extension of the monorail leading out to the material yard, with a *Y* to allow loads to be taken to either side of the bay.

Side Bay Cranes

Each division of the side bays is 20 feet wide and is quipped for cranes made by the Brillion Iron Works, Brillion, Wis. These cranes are of 1-ton capacity and travel on I-beams that extend to within a few inches of the monorail. The foundry is equipped with six of these cranes. Details of



FIG. 4—VIEW OF MAIN BAY SHOWING MONORAIL TROLLEY

crane equipment may be seen in several of the accompanying illustrations. By means of these various units every operation of transportation is performed by cranes except the transfer of pig iron from the storage yard to the cupola elevator.

Arrangement of Cupolas

The melting equipment, consisting of two 72-inch cupolas, is housed in a 3-story brick building, 40 x 40 feet, occupying two 20-foot divisions in one of the side bays. Fig. 3 shows the position occupied by the cupola building. Light and ventilation are provided by ample window space. By thus separating the cupola room from the main foundry, gases and dust caused by dumping the cupolas are prevented from entering the workroom. The second or mezzanine floor



FIG. 3—GENERAL VIEW OF MAIN BAY—CUPOLA BUILDING IS AT THE RIGHT —MEANS OF LIGHTING AND VENTILATING ARE CLEARLY SHOWN

contains the positive pressure blower and the furnaces are charged on the floor above. An elevator opening from the pig iron yard and from the lower floor of the cupola room serves the buildings. A stairway is also provided. The construction is fireproof throughout.

The equipment of the cleaning room is unusually complete. A 2-ton crane with an air hoist aids in handling heavy castings. Ten tumbling mills and a cinder mill, 12 grinding stands and two sand-blast machines are in use in this department. The sand machines are equipped with dust collectors exhausting to the exterior of the building.

Preparation of sand for the molder is an important preliminary to the production of good castings. A centrifugal sand-mixing machine is employed to temper the sand. Six electric riddles handle the sand after tempering. On the molding floors, 31 molding machines of various types are employed, giving a large output of castings for the number of molders employed. The types of molding machines vary according to the kinds of molds being made.

The core ovens are situated in the side bay close to the cupola building. Two cylindrical core sand mixers prepare the sand. A 2-ton crane with air hoist takes the heavy lifts. Four car-type core ovens, each 7 x 13 feet and four 3-section drawer-type ovens, provide ample capacity for baking cores. Air pressure for the air hoists and other foundry purposes is derived from two compressors each 12 x 7½ x 12 inches. All machinery is operated by direct-connected motors.



FIG. 5—TUMBLING BARRELS AND GRINDERS IN ONE CORNER OF BAY

The Hoosier foundry specializes in automobile and machine tool castings, and has a daily capacity of 50 tons. The Hoosier Iron Works was incorporated in October, 1916. Work was started on the foundry in November. The first heat was poured April 11, 1917. The officers of the company are: J. W. Johnson, president; George Kingston, vice president; J. P. Grace, secretary and treasurer; John E. Fogarty, manager.

The Sales Engineer Views the Foundry

MUCH has been written in reference to the lack of business methods in the foundry industry as a whole, and to the lack of appreciation of the importance of adopting progressive modern methods and labor-saving devices. Undoubtedly this criticism has been well merited, but it is also true that much has been done toward bringing the foundry up to a productive point comparing favorably with other lines of manufacture.

It would not be an exaggeration to say that for the past five years the method of producing castings has been revolutionized. The number of pieces produced in plants per man unit has been increased in some instances 500 to 1000 per cent. This has been due principally to the installation of molding machines, means for bringing iron to the floors, sand handling devices and equipment for handling the molds from the machines.

Labor Demands Greater Share of Profits

Never before in the history of the foundry industry have the demands for greater output been so insistent as at this time. Labor is constantly demanding a larger share of the profits of the industry, and I am sure that every right-minded man wants to see the rewards of labor increased. However, labor rewards cannot be increased by simply forcing up prices on one another, in order to get this increased wage. If the increase is to be permanent and such as can be met by the manufacturer, the production must be speeded up—where we are now getting one mold we must get at least three from no greater increase in the labor unit. To do this means better equipment and more knowledge of its use and possibilities. Those foundries that are operating entirely under old hand methods are being called upon to pay a higher wage than can possibly be afforded, and in many plants the hand molder is almost an impossibility when comparing the wages demanded to the production he is willing to turn out. This condition has forced many foundrymen to install not only molding machine equipment, but methods for handling iron in pouring off the work, and in fact any equipment that will save labor and reduce the number of men required.

It is generally stated as a fact that molders do not take kindly to molding machines, or in fact to the use of any other modern device that may be placed in the foundry. In many plants this has been demonstrated to be true, although the writer knows of plants where union molders in good standing work on molding machines and turn out a production in some cases 1000 per cent greater than was done when the work was made by hand. Moreover, the wage earned is more than double any union scale in the country.

Prepare Against Curtailment of Production

In stating this fact it is not intended to open up a discussion as to which is the better method—that of trying to work molders on machines or breaking in laborers to operate them—but rather to bring up the question before the foundry industry and to ask if it is looking far enough ahead with sufficient vision to meet the requirements. Is it taking the opportunity to organize the plants and to equip them so that their production will not be cut down? This is the important thing whether operating with molders or so-called

handy men. In these days when men are so scarce and the need of increased production is great proper means must be found to work both molders and handy men to their capacity.

It is the writer's opinion that the success or failure of modern equipment and particularly molding machines in any given plant depends on the state of mind. Unless complete co-operation is given from the head of the plant down through the superintendent, foreman, patternmaker or others in charge, no very considerable success will be obtained from either the working of molders on the machines or the use of laborers. The thought and co-operation necessary to make a success must be such as to make a careful analysis of the cost of production on given patterns, an understanding of the proper rigging of the patterns and the kind of flasks to be used, and the price basis established on a quantity production that will largely increase the wage of the operator as well as bring a largely increased production to the plant. It is not possible to get a largely increased production unless the operators are to share in this increase.

I have come in contact with owners of plants where a few machines have been installed, whose sole concern seemed to be how much they could cut the molding price on all patterns that they put on machines, and the idea uppermost appeared to be that the price of the equipment should be returned to them in the first few weeks or months of operation. Naturally no large production is ever obtained in plants where this policy is pursued. Unless the men in immediate charge of foundry production first make a careful study of the possibilities of the equipment which has been installed as to the amount of work it is capable of turning out and establishes a production that is somewhere near the capacity of the equipment, they are not in position to fix a price or a wage that will insure the machines being operated at their capacity. If the equipment installed is capable of earning 100 per cent on the investment, the responsibility of realizing this must be shared in a liberal way with the men who are asked to operate it.

A Word About the Foundry Foreman

It would seem at this point that a word regarding the foundry foreman would be worth considering. We cannot hold a man responsible for what he does not know and it is a certainty that most of the failures to get satisfactory production from machine equipment come from ignorance both as to the possibilities of the equipment, the amount of production that should be obtained and the wages that should be paid to get the production. There are foundries now operating in which this matter has been investigated so thoroughly and with such a broad vision that the matter of production and wages is causing them no trouble. It is not probable that these problems will bother the owners of these foundries greatly in the future, for they have builded well and they will keep well to the front, whatever demands may be made upon them. They will be in a position to properly meet all the varying changes, as they come up.

It would seem that the foundry industry as a whole could make no better investment than at every opportunity to have their foundry foremen, superintendents and those in immediate charge of production, visit modern plants, study equipment on exhibition at the different foundry shows, and encourage them to think along lines of conducting the foundries on business principles.

The foregoing remarks cannot be applied to all foundries, owing to conditions that exist as to buildings, room for installing equipment, etc., which will not permit of operating modern equipment to the maximum production, but it is the writer's belief that if plants now operating under these handicaps are to continue in the production of castings and to meet competition, these conditions will have to be changed.

How Work Speed Affects Grinding

BY HOWARD W. DUNBAR

WITH variable work speeds in cylindrical grinding, it is possible to secure a wider range of wheel service than variable wheel revolutions could ever give. Satisfactory and nearly uniform results are secured from wheels varying from 2000 to 5500 surface feet per minute in speed and a variation from true grade within practical wheelmaking limits. Therefore, no necessity exists for variable revolutions for the grinding wheel, or close accurate limits of speed and grade of the grinding wheel.

Occasionally it becomes necessary to provide a change in the wheel revolution so that when a large wheel is worn down to a relatively small one, its surface speed can be brought back more nearly to the maximum limit. Recent experience, however, has led to the belief that the most efficient wheel for standard cylindrical grinding is one in which the hole is of such a size that the surface speed will be approximately 4000 feet when the wheel is worn out. This represents the low limit, and 6000 feet, when the wheel is new or full size, represents the high limit. The normal speed is then selected to give the highest possible efficiency.

Some grinding machine manufacturers are occasionally asked why they do not make machines provided with means for varying the spindle speed. One answer to this question is that the wide range of work speeds provided accomplished all that variable wheel spindle speeds could ever accomplish and, again, the method is simpler and less expensive. The means necessary to provide a graduated change of speed for the wheel spindle must be more complicated and expensive than means to provide for a change of speed in the work drive mechanism. Again, a given range of work speeds produces a wider range of effect than a much greater range of wheel spindle speeds could possibly give.

As an illustration, to obtain the same range of effect at variable wheel spindle speeds as can be obtained with a variable work speed of from 20 to 138 revolutions per minute, a change in spindle speed from 169 to 1233 revolutions per minute would be required. This represents a surface speed from 6400 feet, the highest speed that is considered safe, to 890 surface feet per minute. The latter is so slow that the wheel would wear away rapidly and be useless if the grade were soft enough to be effective at 6400 feet per minute surface speed.

After the work speed has been adjusted to obtain the best results, great care should be exercised to maintain a constant revolution of the wheel with no slippage of belting or momentary slowing up, due to lack of power. With irregular speed, minute particles of the material being ground adhere to the wheel face. This causes the wheel to cut less freely with the result that production is delayed and more power required. Wheels under heavy cuts slacken in speed sometimes to one-half normal and frequently they nearly stop. The disadvantage of this is not clearly understood. Grinding machines should not continue in operation with

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insufficient and irregular power. The quality and production of work suffers because constant power is not provided, if soft enough wheels for the power available are not used.

To maintain the wheel speed constant and to make all variations to suit conditions by adjusting work speeds, seems to be the most convenient plan.

Labor Conditions in Munitions Plants

INTERESTING data on labor conditions in munition plants are included in a report on industrial efficiency in British munition factories, recently issued by the bureau of labor statistics, department of labor, Washington.

The bulletin presents the results of an exhaustive investigation in England, supplemented by experimental tests and comprehensive medical studies of individuals, covering the comparative efficiencies of workers on day and night shifts, with a view to determining whether or not hours worked at night unfavorably affect the capacity of the workers, and if so, the extent to which this impaired efficiency is reflected in reduced output.

It may be stated at the outset that the data collected are in all cases prejudicial to night work, which is therefore, although necessary in the present crisis, to be considered undesirable. But granting that night work must be performed, the committee found that the rate of output on the night shift is substantially the same as on the day shift, where both shifts are manned on the discontinuous system, but that continuous night work is productive of definitely less output than discontinuous night work. Among men working on a continuous day system it appears that the rate of output may be less and the loss of time greater than when they work on a discontinuous system, while among women of 19 years of age and upward, working for alternate weeks on day and night shifts, the timekeeping seems to be even better maintained than when working on permanent day shifts. The practical conclusion at which the committee arrives is that both men and women can more profitably be organized under the discontinuance than under the continuous system of night work.

Causes of Lost Time

The causes and conditions of lost time were considered by the committee from two standpoints—lost time due to uncontrollable causes, chiefly sickness, accidents, weather, etc., and lost time attributable to controllable causes, that is, intemperance, overtime work, discontent with working conditions, etc. Particularly is the unprofitableness of extensive overtime emphasized, the committee showing how time gained by extraordinary hours may be lost in normal hours even under favorable factory conditions. This high percentage of loss, it was found, is mainly due to a very high sickness rate, itself the result of long hours on heavy work since the beginning of the war. In four selected cases where timekeeping was reasonably good and records carefully made, the unavoidable loss, chiefly due to sickness, was more than half the total loss. The strain of long hours seems to have had its effect not only upon operatives, but on officials and foremen who have broken down in considerable numbers.

Another fruitful cause of lost time characterized by the committee as "uneconomical" and "unprofitable" is the practice long followed in Great Britain of requiring workers to put in a brief period before breakfast, the pause for the morning meal and the noonday meal constituting the so-called "two-break system" in contradistinction to the "one-break system," where operatives go to work after breakfast. In one factory working 53 hours per week and requiring work before breakfast, 30.9 per cent of the men lost 5 per cent of the possible normal hours, while in another factory also working 53 hours per week and requiring no work before breakfast only 1 per cent of the men lost 2.38 per cent of the possible normal hours, both on account of sickness.

In considering the matter of incentives to work, with special reference to wages, the committee was impressed by the fact that earnings influence the health and efficiency of workers, and that output may be influenced by the wage system in force. Many munition workers are paid for the time during which work is done, but this system was found to have no direct influence in stimulating inclination to work, since some workers may keep well within their powers while others, whose inclination to work is greater, may feel it is a grievance that extra work brings with it no extra rate. Payment by the piece, however, seems to bring a direct stimulus to bear upon the natural inclination to work. An illustration of these facts is presented in a table giving a comparison of time wages and piece rates, showing that 17 girls drilling fuses and working on the piece-rate basis in one week increased their output by 24 per cent on the day shift and by 40 per cent on the night shift, over what they were able to accomplish when doing the same work on a time-rate basis. Similarly, three girls retapping fuses by hand, working on a piece-rate basis, increased their output 28 per cent on the day shift and 48 per cent on the night shift over their output when working on a time-wage basis. For a wage scheme to act as an incentive to workers, it must be easily understood and equitably adjusted, must offer opportunity to spend the money earned, must create in the workers a desire to earn more, and must not lead to overspeeding. If the work is repetition work, such as is carried on in munition factories, especially if it be monotonous, it would seem that piece rates may be expected to give a greater output than time wages. Appended to the report is a discussion of wage systems at present in force in munition factories.

Time Lost Through Sickness

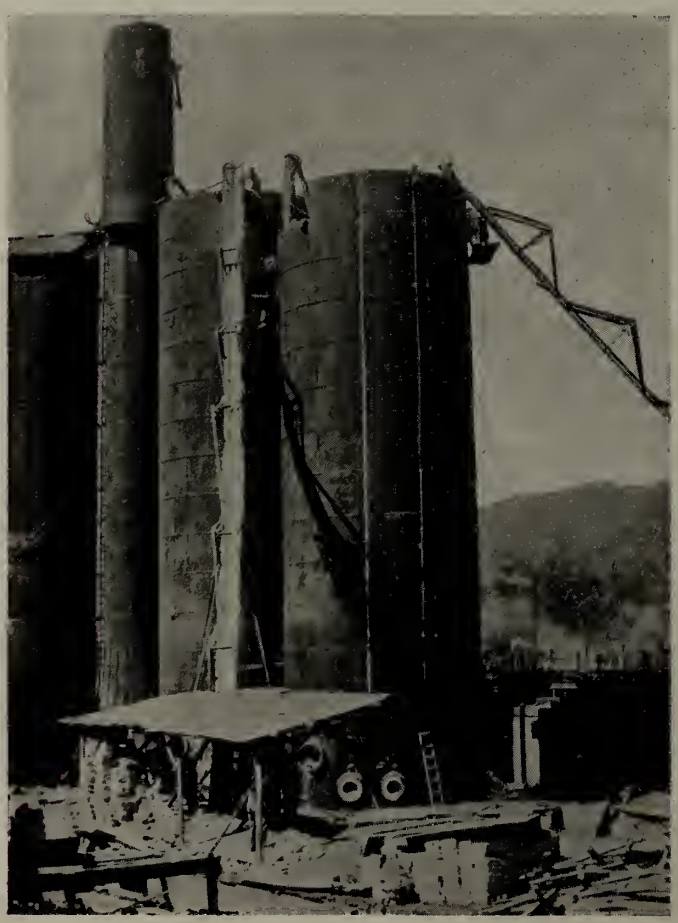
The medical studies, comprising Part II of the report, deal with examinations of 1543 men over military age, 1509 boys, and 1326 women and girls employed in factories in all parts of the country. Though evidence was found of strain and fatigue, the majority of the workers appeared to be in good health at the time of the examinations "and the medical examiners undoubtedly found less ill health than they anticipated." However, the committee does not assume that because no serious breakdown in health has yet occurred the risk of future breakdown is negligible. With reference to the men, sleepiness on the night shift, headache, footache, and muscular pains, coupled with nervous symptoms, are noted as the most common signs of overwork. Among the 1543 men examined the time lost during 12 months from all causes was 12,964 days, of which 20 per cent was due to accident and 80 per cent to sickness. The examination of women and girls emphasized the importance of adequate provision for the health and comfort of the workers.

The report describes the factory and social environment of the employes, and information is given as to the conditions under which workers lived and labored during the period covered by the investigation, including such matters as nature of the food eaten, housing and transit, the amount of sleep obtained by workers when on day shift and night shift, respectively, and the employment of married women.

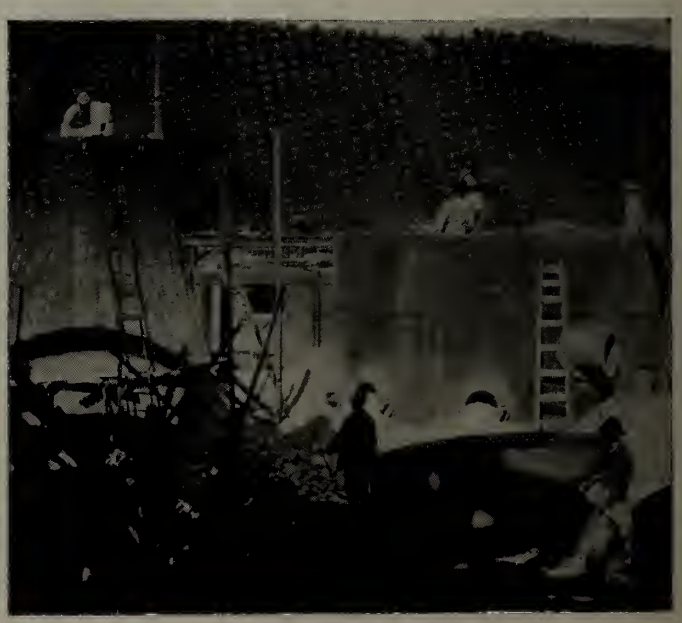


Ships Battelle Stack Overseas

Old Alabama Furnace of Lookout Mountain Coal & Iron Co. Which Was Sold to the Tata Iron & Steel Co. of Sakchi and Shipped to India Now Nears Its Destination



WHEN the Battelle, Ala., blast furnace of the Lookout Mountain Coal & Iron Co. was erected in 1903, its owners would have been the last to picture its ultimate location far overseas. The Battelle blast furnace has been dismantled, shipped, and is nearing its destination at Sakchi, India. The Tata Iron & Steel Co. of Sakchi, expects to have the furnace reconstructed and operating before the end of 1918. The Battelle



unit consists of an 85 x 19-foot stack and four 4-pass Whitwell stoves which are 80 x 20 feet in size. Through its American engineers, Perin & Marshall, of No. 2 Rector street, New York, the movable part of the property of the Lookout Mountain company in the upper portion of Alabama was purchased by the Tata interests. Perin & Marshall awarded a contract for dismantling and loading the entire plant to the Crawford-Vaughan Boiler & Locomotive Works of Birmingham, Ala. Some idea of the care which was used in dismantling may be gained from the fact that more than 90 per cent of the fire brick used in the installation was salvaged. The work was completed in 60 days. Among the more important components of the furnace unit which was removed are the following: One 250-ton stack; a complete skip hoist and revolving top; a cast shed 80 x 150 feet in size; four hot blast stoves, 80 x 20 feet in size; one draft stack, 10 x 180 feet;







a standpipe 20 x 70 feet, and 20 boilers of 125 horsepower each. Hoists and engines were removed from the top of Lookout mountain where the company's coal mines are located, placed on trucks, and by means of winches lowered more than a mile down an incline of approximately 45 degrees. Crushers and boilers from the ore mines on the far side of the mountain were dismantled and transported by wagons over the mountain road to Sulphur Springs for further shipment via railroad to seaboard.

Approximately 250 railroad cars were required to handle the furnace and its equipment. The contract was completed on time and to the satisfaction of the engineers. The average number of men employed was 250, and in order to care for and feed this number special arrangements were made. After the dismantled stack arrived at seaboard, it was put on ships and dispatched to its destination via the Panama canal and over the Pacific to the port of Calcutta.

Huge Merger Effected in Germany

A huge merger or arrangement within the German industry, probably the most comprehensive hitherto recorded, is the taking over, through more or less compulsory liquidation, of the de Wendel interests, and their passing into German ownership. The price amounts to about 350,000,000 marks, and the largest concerns in the German industry are interested in the venture, according to an article recently published in *Engineering*, London. It is further understood that an optional portion is being reserved for the German empire. The syndicate which takes over the de Wendel undertaking comprises Fried-Krupp, August Thyssen, the Gelsenkirchen concern, the Roechling concern, the Gute Hoffnungs Hutte, the Phoenix Co., and other members of the German steel union. It also includes concerns not belonging to the so-called "mixed group," and works which participate in the manufacture of high quality steel will have interests in the combine. The allotment of portions will to a great extent be arranged according to the iron and steel production of the different works. Among the special works admitted into the new concern is also that of Felton & Guilleaume, Mulheim, whose reason for joining is a desire to insure a more ample supply of iron ore for the Collart blast furnaces and steel works in Steinfurt, the whole of the share capital of which is held by the Felten & Guilleaume company. The allotment of the de Wendel Co. apportioned to Felten & Guilleaume is 3 per cent, and the same share has been given to the Mannesmann tube works in Dusseldorf. The share capital, according to the present arrangement, will be 100,000,000 marks, the rest of the purchase money being obtained through the medium of loans and long-term credits. The German empire is understood to be taking over 50 per cent of the entire share capital, another important move towards getting its hand into industry. The domicile of the de Wendel iron ore mining and iron works is Hayingen.

Chinese Mining Practice

The acting British vice-consul at Canton, China, recently made public interesting information regarding the Chinese mining industry, particularly on activities in the provinces of Kuangtung, in which Canton is situated, and Kuangsi, on the western border. Both rare and common minerals, including gold, silver, antimony, wolfram, realgar, molybdenite, iron, manganese, cinnabar and tin, may be found in these two provinces.

The huge demands of the war stimulated China into some attempts to reap the advantages of a prosperous era. Chinese syndicates were formed by the dozen to snatch some of the profits of the high prices offering, but inasmuch as most of them entered the field in a speculative spirit, and their promoters were ignorant of the technicalities of mining, as well as of the world's markets, most of them soon collapsed. Under such circumstances it is not surprising that no real mining, in the proper sense of the word, has been done. The surface of the deposits is merely scratched, and the workings, which consist of gopher holes driven into the hillsides, are abandoned as soon as the lack of ventilation or the presence of water makes them unsafe. The real body of the ore or mineral is never reached at all. The coal that finds a local market is of an inferior quality, but experts are satisfied of the existence of vast beds of excellent steam coal, which only require efficient mining methods and supervision to yield handsome profits.

New Tool Room Device

To locate and bore holes accurately in jigs, gages, dies and other tools calls for a degree of skill that is developed only through long practice. With the object of providing means for handling this class of work in a rapid manner by an ordinary machinist, the Precision System, Mount Joy, Pa., has recently placed a master tool on the market.

This device consists of a cast iron plate, 10 x 14 inches, provided with slots to accommodate the bolts that are used for clamping the work in place. At the ends and back of the plate hardened steel strips are placed. These are used for setting a series of gage blocks which are employed for locating the work to be bored.

At the back of the plate are two uprights which carry a bracket. This bracket is adjustable for height, its range being 7 inches, and at its outer end are inserted hardened steel bushings. These bushings guide a boring bar.

As the operator determines his distances by means of the gage blocks, it is apparent that accurate work can be done. The degree of accuracy depends wholly on the skill exercised in locating the work on the plate.

The complete outfit consists of the base plate, uprights and bushing bracket, together with two sets of 1, 2 and 3-inch gage blocks; six bushings, 0.250, 0.312, 0.412, 0.500 and 0.625-inch, respectively; two complete clamps and one universal boring bar. The manufacturers say that other makes of gage blocks can be used with this device.

Magnesium Production in 1916 and 1917

According to statistics prepared for the United States geological survey by Frank L. Hess, four companies were responsible for the production in 1916 of all the magnesium in the United States, 75,400 pounds, valued at $311,570. In 1917 five companies produced 115,800 pounds, valued at $233,600. In spite of an increase of 65 per cent in quantity there was a decrease of 25 per cent in value, for the average price fell from $4.13 a pound in 1916 to $2.10 a pound in 1917. The price early in 1916 reached $5 a pound. Late in 1917 it fell to $1.85 a pound.

In 1916 magnesium was made by the Electric Reduction Co., Washington, Pa.; Norton Laboratories, Lockport, N. Y.; Rumford Metal Co., Rumford, Me.; and General Electric Co., Schenectady, N. Y. The Electric Reduction Co., finding it more profitable to use its power for other purposes, produced no magnesium in 1917. The American Magnesium Corp., the successor of the Aviation Materials Co. at Niagara Falls, and the Dow Chemical Co., Midland, Mich., both produced some magnesium in 1917 but the latter was prevented from operating at full capacity by shortage of coal. The General Electric Co., which in 1915 had been forced to make magnesium for its own use, closed its plant in 1917 when the industry became well established.

To Tap Peruvian Coal Fields

A new railroad is to be constructed in Peru, from Huancayo to the coal deposits at Jatunhuasi, a distance of 46.6 miles according to an announcement made recently by Vice Consul Lynn W. Franklin, Callao-Lima, Peru. The road, it is estimated, will cost $1,500,000 and will tap coal fields on the main ridge of the Andes mountains. The money for the project has been guaranteed by the Italian bank at Lima, Peru.

The coal vein has an altitude of from 11,000 to 15,000 feet and dips at an angle of 30 degrees. Its running width is from 3 to 11 feet and its length approximately 40 miles. Mining to a depth of 2000 feet, it is believed that more than 50,000,000 tons will be accessible. The cost of mining a ton of coal has been estimated at $3 and its transportation to the coast, a distance of 260 miles, at $5.50, making the aggregate cost of production $8.50. The high cost of transportation is due to the mountainous nature of the country. Tests indicate that the coal is of good quality, averaging about 12 per cent ash, and can readily be employed for coking purposes.

1917 Lake Superior Ore Shipments

All-Rail Movement of 1,938,102 Tons Carries Season's Total to 64,437,003 Tons—Official Figures Showing Tonnage Forwarded by Each Mine and by Ranges Last Year

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BY R. V. SAWHILL

THE rail shipments of iron ore from the Lake Superior district in 1917 aggregated 1,938,102 tons, making the total movement for the year 64,437,003 tons. These totals have just been determined by the official figures compiled by THE IRON TRADE REVIEW. The 1917 shipments showed a loss of 2,221,463 tons from 1916, when 66,658,466 tons were forwarded. This decrease was 3.33 per cent of the total movement during 1916, which year had shown a gain of 41.01 per cent of the 1915 movement.

The lake movement in 1917 was 62,498,901 tons, compared with 64,734,198 tons in 1916, a loss of 2,235,297 tons. The all-rail shipments of 1,938,102 tons, compared with a rail movement of 1,924,268 tons in 1916, a gain of 13,834 tons, or only 0.72 per cent. The all-rail movement was the largest of any year in the history of the district. The record of all-rail shipments since 1907 is as follows:

	Gross tons		Gross tons
1917	1,938,102	1912	785,769
1916	1,924,268	1911	662,719
1915	953,947	1910	813,639
1914	707,829	1909	903,270
1913	876,638	1908	587,893

Shipments from the Lake Superior district by independent companies again were well above those of the Unted States Steel Corp. In 1917, the independents forwarded 55.66 per cent of the total tonnage, compared with 52.48 per cent in 1916. The 1917 record is the highest since the formation of the Steel corporation. Last year was the sixth successive year in which the independent companies have moved more than one-half of the ore shipped from the Lake Superior district. In 1915, the independents shipped 52.37 per cent of the total, compared with 50.99 in 1914, 50.94 in 1913 and 50.54 in 1912. In one other year since 1905 have the independents shipped the majority of the tonnage, that being 1910, when their percentage was 50.14. The percentage in 1906 was 47; 1907 and 1908, 44; 1909, 49.64, and 1911, 47.30. The strength of the independent ore interests is clearly revealed by their record of having forwarded more than one-half of the season's tonnage in seven of the last eight years.

The following table shows the shipments and percentages of the Oliver Iron Mining Co., the Steel corporation's mining organization, for each of the last 10 years:

Year	Gross tons	Percentage
1917	28,571,977	44.34
1916	31,673,131	47.52
1915	22,518,613	47.63
1914	16,039,654	49.01
1913	24,502,244	49.06
1912	23,845,363	49.46
1911	17,282,499	52.70
1910	21,661,143	49.86
1909	21,397,866	50.36
1908	14,123,957	56.00
Total	221,616,447	48.80

Shipments from the Mesabi range in 1917 were 41,445,211 tons, against 42,525,612 tons in 1916, a loss of 1,080,401 tons. Its percentage of the total shipments was 64.32, against 63.80 in 1916; 62.95 in 1915; 65.62 in 1914, and 68.15 in 1913. The Gogebic range again ranked as the second largest shipper, forwarding 7,981,684 tons, against 8,489,685 tons in 1916, a loss of 508,001 tons. Its percentage in 1917 was 12.39, against 12.74 in 1916; 11.59 in 1915; 10.90 in 1914, and 9.07 in 1913. The Menominee range also showed a decrease in the tonnage forwarded, its shipments for 1917 being 6,045,750 tons, compared with 6,364,363 tons in 1916, a loss of 318,613 tons. Its percentage was 9.38, against 9.55 in 1916; 10.54 in 1915; 9.83 in 1914, and 9.94 in 1913. The loss in tonnage on the Marquette range was 521,857 tons, the 1917 shipments being 4,874,150 tons, against 5,396,007 tons in 1916. Its percentage was 7.56 in 1917, against 8.09 in 1916; 8.68 in 1915; 7.61 in 1914, and 7.94 in 1913. The Vermillion range shipments were 1,530,692 tons, against 1,947,200 tons in 1916, a loss of 416,508 tons. Its percentage was 2.38, against 2.92 in 1916; 3.67 in 1915; 3.10 in 1914, and 3.14 in 1913.

All ranges with the exception of the Cuyuna forwarded less ore in 1917 than in the previous year. For all ranges except the Cuyuna and Vermillion, however, the 1917 mark easily surpasses that of any year prior to 1916. In the case of the Vermillion, the high-water mark was set in 1902, when 2,084,263 tons were shipped.

Shipments from the Cuyuna range continue to increase, passing the Vermillion total for the first time this year. The tonnage forwarded from the newest range last year was 2,422,884, compared with 1,716,218 tons in 1916, a gain of 706,666 tons. The Cuyuna's percentage of the total shipments for 1917 was 3.76, compared with the 1916 percentage of 2.57. In 1915 the Cuyuna's percentage was 2.40; in 1914, 2.62, and in 1913, 1.47.

Eleven mines shipped more than one million tons last year, these mines being the Adams, Canisteo, Fayal, Hull-Rust, Kerr, Mahoning, Morris and Sellers on the Mesabi; Newport, Norrie Group, and Wakefield on the Gogebic. In 1916, 12 mines shipped more than one million tons, these mines being the Burt, Canisteo, Fayal, Hull-Rust, Leonidas, Mahoning, Morris, and Sellers on the Mesabi; Newport, Norrie Group and Wakefield on the Gogebic, and Cleveland-Cliffs Group on the Marquette. In 1915 there were seven mines which reached this figure, they being the Burt, Canisteo, Hull-Rust Mahoning, Morris and Sauntry-Alpena on the Mesabi and the Norrie Group on the Gogebic. In 1914 only four mines shipped more than one million tons,

Comparative Shipments by Ranges, 1917-1916

	1917	1916	Decrease
Mesabi	41,445,211	42,525,612	1,080,401
Menominee	6,045,750	6,364,363	318,613
Gogebic	7,981,684	8,489,685	508,001
Marquette	4,874,150	5,396,007	521,857
Vermillion	1,530,692	1,947,200	416,508
Cuyuna	2,422,884	1,716,218	*706,666
Mayville and Baraboo	136,632	219,381	82,749
Totals	64,437,003	66,658,466	2,221,463
By lake	62,498,901	64,734,198	2,235,297
By rail	1,938,102	1,924,268	*13,834

*Increase.

Graphic Record of Shipments by Ranges for the Past 28 Years

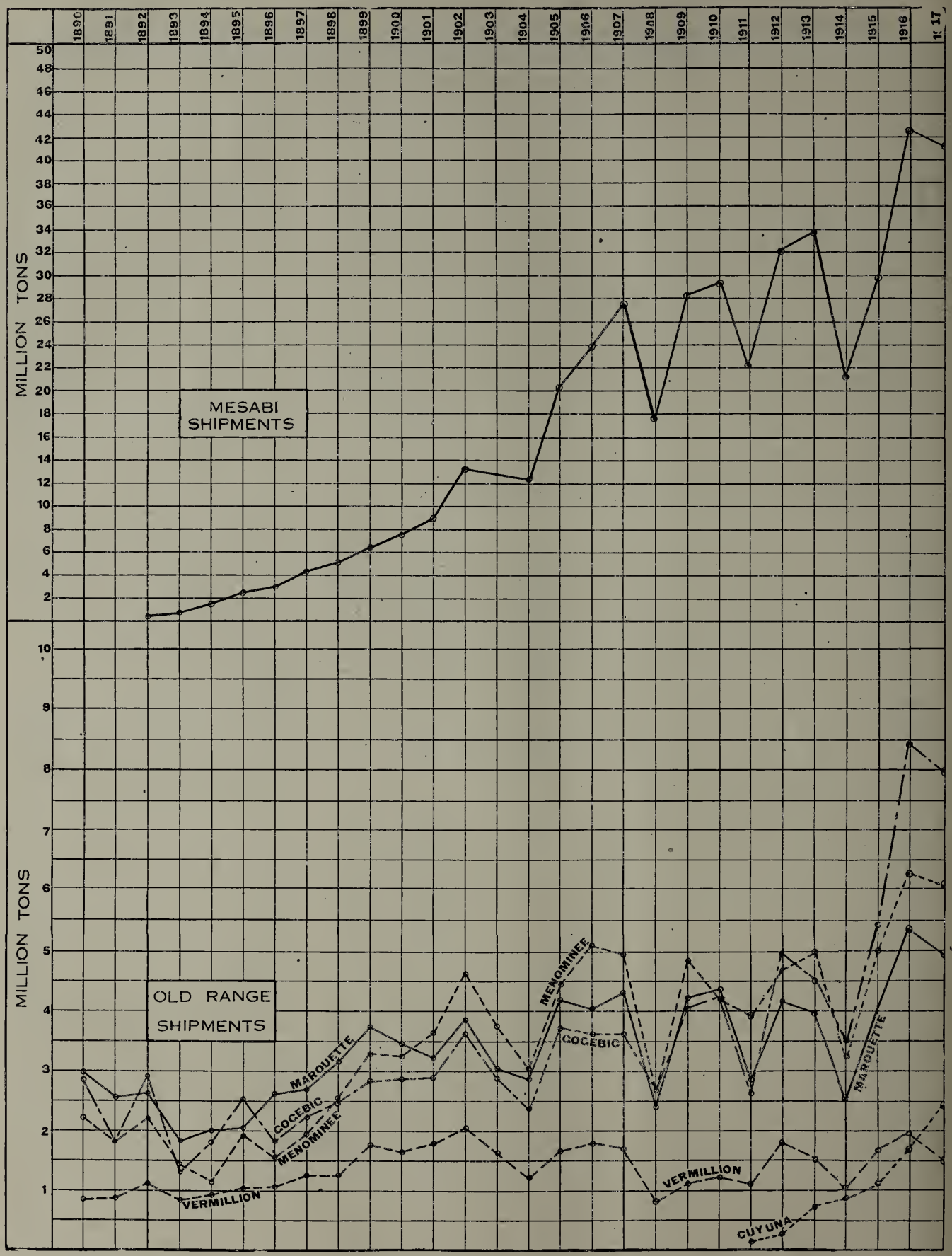


CHART SHOWING SHIPMENTS OF IRON ORE FROM MESABI RANGE, 1892-1917; OTHER RANGES, 1890-1917

Official Record of Shipments from Lake Superior District in 1917 and 1916, Gross Tons

MESABI RANGE

	1917	1916		1917	1916		1917	1916		1917	1916
Adams	1,546,546	961,500	Genoa	180,923	274,172	Leonard-Burt	448	482,580	Sauntry-Alpena	596,049	933,937
Adriatic	90,283	220,818	Gilbert	.....	70,187	Leonidas	795,826	1,147,105	Schley	777	78,093
Agnew	110,001	102,150	Glen	443,446	284,889	Lincoln	276,678	286,128	Sellers	1,575,057	1,344,121
Albany	455,182	468,291	Grace	81,815	81,289	Lone Jack	.....	61,994	Shaw	1,841	.....
Alexandria	136,795	.....	Graham	238,904	228,406	Mace	373,780	470,794	Shenango	680,258	979,658
Arcturus	314,049	.....	Grant	.....	110,604	Madeira	7,125	.....	Shiras	191,042	172,518
*Atlas	15,977	.....	Hanna	136,114	124,021	Madrid	43,943	.....	Sliver	168,953	156,638
Bangor	155,053	223,576	Harold	145,966	216,567	Mahoning	2,524,110	2,215,788	Smith	253,223	.....
Belgrade	218,596	180,532	Harrison	19,251	32,876	Majorca	112,394	.....	Spruce	352,563	463,179
Bennett	783,826	672,572	Hartley-Burt	310,264	.....	Malta	.....	66,573	St. James	184,885	36,066
Biwabik	342,570	428,944	Hawkins	721,211	602,760	Meadow	96,191	50,763	Stevenson	344,872	349,960
Bray	56,011	.....	Helmer	259,777	395,615	Midget	113,003	.....	Susquehanna	609,198	764,249
Brunt	112,289	162,290	Higgins	.....	162,216	Miller	312,875	252,404	Thorne	74,997	81,692
Burt	692,017	1,060,487	Hill	.....	552,104	Minnewas	.....	11,027	Tioga	80,758	4,275
Canisteo	1,643,226	1,943,745	Hill Annex	250,889	.....	Missabe Mt.	62,931	539,913	Troy	.....	6,631
Cavour	5,043	134,632	Holland	6,523	29,448	Mississippi	99,983	.....	Union	229,380	241,991
Chester	354,824	73,401	Holman	835,464	610,281	Mohawk	267,204	185,313	Uno North	177,028	70,588
Chisholm	382,184	263,820	Hudson	78,963	110,510	Morris	1,605,701	1,609,971	Uno South	99,992	.....
Clark	266,710	251,226	Hull-Rust	6,461,443	7,665,611	Morrow (new)	69,554	.....	Utica	245,314	326,360
Commodore	405,827	579,285	Itasca	197,472	275,108	Morton	1,832	44,940	Victoria	71,597	71,614
Corsica	389,083	292,228	Jean	78,522	3,927	Myers	41,974	58,898	Wacootah	73,908	101,970
Crosby	187,938	110,652	Judd	50,278	50,263	Norman	128,861	320,937	Wanless	195,552	141,726
Cyprus	29,024	15,913	**Julia	43,694	.....	North Eddy	163,974	104,710	Warren	94,030	.....
Dale	10,423	29,971	Kerr	1,586,409	539,675	No. Harrison	305,810	422,825	Webb	210,593	140,279
Deacon	117,711	98,634	Kevin	35,846	265,868	Ohio	.....	23,665	Weed	87,111	113,447
Dean	769,660	687,878	Kinney	184,591	465,263	Ordean	383,968	395,591	Whiteside	31,301	.....
Duncan	5,013	5,198	Knox	78,266	70,235	Patrick	95,888	.....	Winifred	16,249	69,765
Dunwoody	369,739	.....	La Belle	71,546	14,765	Pearson	9,443	.....	Woodbridge	236,442	279,284
Eddy	.....	11,782	Lamberton	20,187	.....	Perkins	80,942	79,281	York	55,131	.....
Elba	122,459	130,384	Warren 40	12,792	47,481	Pettit	192,920	178,917			
Fault	33,710	.....	Langdon &			Philbin	204,510	110,922			
Fayal	2,037,705	2,288,799	La Rue	330,349	253,402	Prindle	.....	10,995	Total	41,445,211	42,525,612
Fowler	11,137	29,711	Laura	105,515	188,569	Quinn	85,297	226,360			
Franklin	73,855	54,002	Leetonia	402,868	656,876	Ruddy	3,331	57,300			
Frantz	78,302	.....	Leonard	305,537	316,468	Rutland	49,021	.....			

*Formerly Roberts.
**Formerly Bessemer.

MENOMINEE RANGE

	1917	1916		1917	1916		1917	1916		1917	1916
Amasa-Porter	116,148	80,492	Chatham	244,934	188,808	Homer	202,351	161,286	Riverton Group	.....	174,992
Antoine (Clifford)	115,823	113,101	Chicagon	90,786	100,640	Indiana	46,480	44,162	Rogers	117,323	81,842
Aragon	276,434	244,478	Commonwealth (Buckeye)	.....	81,479	James	171,001	167,115	Spies	6,310	.....
Balkan	261,014	229,195	Cottrell	.....	75,089	Judson	60,235	162,519	Tobin	188,590	146,113
Baltic	89,307	110,965	Davidson	223,990	164,248	Loretto	193,950	174,173	Tully	121,426	236,302
Bates	141,890	73,188	Ernst	70,416	74,879	Michigan	.....	28,483	Virgil	.....	36,307
Bengal	260,377	140,961	Florence	47,193	28,240	Monongahela	.....	21,922	Wapama	16,032	.....
Berkshire	57,791	38,467	Fogarty	37,291	89,506	Munro	46,960	17,621	Warner	74,814	33,751
Bristol (Claire)	188,907	462,559	Forbes	.....	121,010	Odgers	169,668	53,177	Wickwire	242	13,265
Carpenter	269,387	240,114	Gt. Western	7,692	.....	Penn Iron Mining Co	459,784	427,266	Youngs	23,197	53,691
Caspian	411,705	448,631	Hemlock	.....	72	Pewabic	153,256	301,125	Zimmerman	219,873	145,716
Chapin	682,349	557,485	Hiawatha	62,847	187,070	Ravenna	37,848	3,476			
			Hilltop	36,239	.....	Richards	43,890	29,382	Total	6,045,750	6,364,363

MARQUETTE RANGE

	1917	1916		1917	1916		1917	1916		1917	1916
Adams (Amer. Min. Co.)	22,560	7,820	Cleve. Cliffs Group	946,410	1,036,775	Maas	313,399	267,946	Stegmiller	41,526	65,420
American (Sterling)	142,526	245,969	Empire	38,392	47,110	Mary Charlotte	247,854	228,374	Stephenson	496,713	355,166
Austin	44,421	64,521	Gwynn	188,070	143,708	*Morris-Lloyd	303,253	339,603	Volunteer	.....	106,988
Beaufort (Ohio)	108,901	40,009	Holmes	53,726	3,379	Negaunee	573,760	523,736	Washington	12,605	6,631
Breitung (Hematite)	191,952	153,607	Iron Mt. Lake	.....	5,893	Princeton (Swanzey)	150,375	.....			
Cambria	114,031	195,612	Isabella	63,446	134,938	Queen Group	88,178	283,775	Total	4,874,150	5,396,007
Chase	.....	72,345	Jackson	47,836	.....	Republic	168,250	209,060			
			Lake Angeline	54,673	.....	Richmond	148,834	181,154			
			Lake Superior	312,459	422,525	Rolling Mill	.....	253,943			

*Formerly shown separately as Morris and Lloyd.

GOGEBIC RANGE

	1917	1916		1917	1916		1917	1916		1917	1916
Anvil	54,407	.....	Eureka	191,630	207,959	No. Newport	13,737	48,070	Tilden	108,641	110,733
Ashland	38,164	82,715	Geneva	113,804	86,922	Ottawa (Odanah)	215,401	309,554	Townsite	25,970	.....
Asteroid	93,265	89,876	Ironton	244,517	148,191	Palms	481,465	529,751	Wakefield	1,144,411	1,061,730
Brotherton	84,524	107,813	Keweenaw	130,374	121,014	Plymouth	658,265	330,427	Yale (West Colby)	73,633	149,155
Cary	253,260	308,834	Mikado	30,833	23,741	Puritan	224,082	308,534			
Castile	82,248	133,162	Montreal	458,658	530,813	Royal	30,302	11,527			
Colby	353,880	423,553	Newport	1,003,229	1,315,980	Sunday Lake	198,144	188,771	Total	7,981,684	8,489,685
Davis (Wis.)	28,234	4,997	Norrie Group	1,646,606	1,855,863						

VERMILLION RANGE

	1917	1916		1917	1916
Chandler	202,828	311,793	Section 30	223,123	226,089
Consolidated Vermillion	16,464	1,436	Sibley	198,378	237,258
McComber	4,068	.....	Soudan	150,668	142,688
Pioneer	352,497	507,086	Zenith	382,666	482,783
Savoy	.....	38,067	Total	1,530,692	1,947,200

MAYVILLE-BARABOO RANGES

	1917	1916		1917	1916
Cahoon	42,635	87,802	Mayville	93,997	125,970
Illinois	.....	5,609	Total	136,632	219,381

CUYUNA RANGE

	1917	1916		1917	1916
*Algoma	22,097	24,035	Meacham	160,677	25,207
Armour No. 1	80,435	77,034	Merritt	28,003	.....
Armour No. 2	273,812	341,147	**Omaha	61,170	50,454
Croft	149,899	68,867	Pennington	165,895	206,085
Cuyuna Mille-Lacs	112,554	90,564	Rowe	151,048	180,239
Cuyuna-Sultana	62,651	35,169	State Lease	81,394	331
Ferro	62,674	14,501	Thompson	177,426	185,032
Hill Crest	175,940	19,431			
Ironton	64,446	51,769			
Joan No. 1	3,490	.....	Total	2,422,884	1,716,218
Joan No. 4	4,875	.....			
Kennedy	247,421	166,915			
Mahnomen	284,686	146,602			
Mangan	52,291	32,836			

*Formerly Hoch, also Iron Mountain.
**Formerly Wilcox.

	1917	1916
GRAND TOTAL	64,437,003	66,658,466

they being the Leonard, Mahoning, Sauntry-Alpena and Canisteo, all on the Mesabi. In 1913, eleven mines reached the 7-figure mark in shipments, they being the Adams, Canisteo Fayal, Genoa, Hull-Rust, Leonard, Mahoning, Sauntry-Alpena and Uno South on the Mesabi and the Norrie Group and Newport on the Gogebic. Eleven mines also reached that figure in 1912, they being the Canisteo, Dale, Genoa, Hill, Hull-Rust, Leonard, Mahoning, Sauntry-Alpena and Uno South on the Mesabi, the Norrie Group on the Gogebic and the Cleveland-Cliffs Group on the Marquette.

The wonderful Hull-Rust mine was the leading shipper last year, forwarding the immense total of 6,461,443 tons, or more than the shipments from any of the ranges excepting the Mesabi and Gogebic. The shipments from this mine in 1916 were 7,665,611 tons, its previous record being made in 1913 with 3,457,608 tons. Two other mines shipped more than two million tons last year, the Mahoning with 2,524,110 tons and the Fayal with 2,037,705 tons. The Mahoning was the leading shipper in 1915, with 2,311,940 tons. The Hull-Rust has been the leading shipper in eight of the last 11 years, the Hill leading in 1911, and the Leonard in 1914.

The following new mines shipped in 1917:

On the Mesabi: Alexandria, of the Hanna Ore Mining Co.; Arcturus and Shaw, of the Oliver Iron Mining Co.; Dunwoody and Warren, of the Tod-Stambaugh Co.; Fault and Rutland, of the Kingston Mining Co.; Lamberton, Patrick and Smith, of Butler Bros.; Majorca, of Pickands, Mather & Co.; Midget, of Winston & Dear; and York, of Coates & Tweed.

On the Menominee: Spies, of the Cleveland-Cliffs Iron Co.; and Wapama, of the Wapama Iron Co.

On the Cuyuna: Joan No. 1 and Joan No. 4, of the Joan Mining Co.; and Merritt, of the Merritt Development Co.

On the Gogebic: Townsite, of Coates & Tweed.

On the Vermillion: McComber, of the Mutual Iron Mining Co.

The total of 20 new shippers in 1917 is two less than in either 1916 or 1915, the new mines opened in those years numbering 22. In 1914, 16 new mines were opened; 20 in 1913; 13 in 1912; and 12 in 1911. Thirteen of the new mines shipping last year are located on the Mesabi, two on the Menominee, three on the Cuyuna and one each on the Gogebic and Vermillion. Shipments from the new mines totaled 1,737,759 tons in 1917, compared with 2,357,850 tons in 1916; 1,203,213 tons in 1915; 677,182 tons in 1914; 831,567 tons in 1913; 361,904 tons in 1912, and 1,769,423 tons in 1911.

Shipments from Canadian mines in 1917 were as follows: Helen, of the Algoma Steel Corp., 90,059 tons, and Magpie, of the Algoma corporation, 174,774 tons. The Helen shipped 37,272 tons in 1916; 220,771 tons in 1915; 80,860 tons in 1914; 42,550 tons in 1913, and 48,838 tons in 1912. The Moose Mountain, which was idle in 1917, shipped 5338 tons in 1916; 40,444 tons in 1915; 29,457 tons in 1914; 102,238 tons in 1913, and 39,061 tons in 1912. The Magpie shipped 187,809 tons in 1916; 107,560 tons in 1915; 98,070 tons in 1914, and 19,934 tons in 1913. The shipments for the Canadian mines are not included in the total for Lake Superior ore shipments.

In 1917, 246 mines shipped, compared with 233 mines in 1916; 209 in 1915; 196 in 1914; 223 in 1913, and 194 in 1912. Of those shipping last year, the Mesabi had 122, Menominee 41, Marquette 25, Gogebic 27, Cuyuna 21, Vermillion 8 and Mayville-Baraboo 2. In 1916, the Mesabi shippers numbered 107, Menominee 45, Marquette 27, Gogebic 25, Cuyuna 18, Vermillion 8 and Mayville-Baraboo 3.

The following table shows the average shipments of all of the mines on the six leading ranges and of the whole Lake Superior district for 1917 and 1916 in gross tons:

AVERAGE MINE SHIPMENTS

	1917	1916
Mesabi	329,715	397,436
Gogebic	295,618	339,585
Vermillion	191,336	243,400
Marquette	194,966	119,852
Menominee	147,457	141,430
Cuyuna	115,275	95,345
Lake Superior district	261,939	286,087

Large Ore Chart

A chart 26 x 30 inches has been published by THE IRON TRADE REVIEW, *which shows annual shipments of each mine since* 1898, *a period of 20 years, together with the grand total for every mine since the opening of the district. The chart is similar to those issued annually by* THE IRON TRADE REVIEW *prior to* 1912, *but is larger, more complete and more legible. The chart can be secured from* THE IRON TRADE REVIEW, *Penton building, Cleveland, for* $1.

Shipments by Ports and All Rail, Gross Tons

	1917	1916	1915	1914	1913	1912
Escanaba	7,156,854	7,457,444	5,649,289	3,664,451	5,399,444	5,234,655
Marquette	3,207,145	3,858,092	3,099,589	1,755,726	3,137,617	3,296,761
Ashland	7,597,841	8,057,814	5,146,772	3,363,419	4,338,230	4,797,101
Two Harbors	9,990,901	10,735,853	8,642,942	5,610,262	10,075,718	9,370,969
Superior	13,978,741	12,787,046	8,342,793	11,309,748	13,788,343	14,240,714
Duluth	20,567,419	21,837,949	15,437,419	6,318,291	12,331,126	10,495,577
Total by lake	62,498,901	64,734,198	46,318,804	32,021,897	49,070,478	47,435,777
Total by rail	1,938,102	1,924,268	953,947	707,829	876,638	785,769
Total	64,437,003	66,658,466	47,272,751	32,729,726	49,947,116	48,221,546

Shipments by Ranges, Gross Tons

	1917	1916	1915	1914	1913	1912
Marquette	4,874,150	5,396,007	4,105,378	2,491,857	3,966,680	4,202,308
Menominee	6,045,750	6,364,363	4,982,626	3,221,258	4,965,604	4,711,440
Gogebic	7,981,684	8,489,685	5,477,767	3,568,482	4,531,558	5,006,266
Vermillion	1,530,692	1,947,200	1,733,595	1,016,993	1,566,600	1,844,981
Mesabi	41,445,211	42,525,612	29,756,689	21,465,967	34,038,643	32,047,409
Cuyuna	2,422,884	1,716,218	1,136,113	859,404	733,021	305,111
Mayville and Baraboo	136,632	219,381	80,583	105,765	145,010	104,031
Total	64,437,003	66,658,466	47,272,751	32,729,726	49,947,116	48,221,546

Increases Ferro Output

The production of ferroalloys in Canada in 1917, chiefly ferrosilicon, but including also spiegeleisen, ferromolybdenum and ferrophoshorus, reached a total of 40,329 tons, valued at $3,471,934, as against a total in 1916 of 28,628 tons, valued at $1,777,615. Exports amount to 33,212 tons valued at $2,616,924, or an average of $78.79 per ton; imports to 12,828 tons, valued at $2,029,990, or an average of $158.25 per ton.

Lay First Keel

The Newburg Shipyards, Inc., on March 14 laid the keel for a 9000-ton steel freighter for the government at its yard at Newburg, N. Y. This is the first of ten 9000-ton vessels to be built for the government. The plant has four ways. Steel for the ships it is to build is being fabricated by the American Bridge Co. Irving T. Bush is chairman of the Newburg Shipyards, Inc., and T. C. Desmont president.

Puts Duty on Ore

The Mexican government, according to a dispatch from the American representative in Mexico, has placed an export duty on manganese ore of 3 per cent ad valorem, based on New York prices.

Canada Plans Plate Mill

Government Takes Bids on Rolling Plant and Steel For Ships—Tin Plate Arranged For—Rail Tonnage Placed

OTTAWA, March 18.—One of the largest contracts ever awarded by the Canadian government is on the point of being placed in connection with the construction of a rolling mill to produce steel plates for the government's shipbuilding program. It is expected that $60,000,000 will be spent between now and June. 1919, and a large proportion of this sum will go into the necessary steel. The different Canadian steel corporations were asked to submit proposals for the construction of a rolling mill estimated to cost $3,500,000 and to state the price at which plates would be supplied. While the government order will not necessarily be confined to one mill, the impression is that no more than one mill will be erected at present. Propositions have been submitted by the Dominion Steel Corp., Sydney, N. S.; the Nova Scotia Steel & Coal Co., New Glasgow, N. S.; the Hamilton Steel Co., Hamilton, Ont.; the Algoma Steel Co., Sault Ste. Marie. Ont.; and the United States Steel Corp., Ojibway, Ont. The proposals are with the minister of marine, Ottawa, Ont. It is rumored that the Dominion Steel Corp., Sydney, has submitted the lowest figure.

The war trade board of Canada has been successful in making arrangements with the war trade board of the United States, whereby canners in Canada will be enabled to obtain supplies of tin plate from the United States at an approximate price of $7.75 per base box of 100 pounds. An order-in-council has been prepared by which the Canadian government will take power to purchase on behalf of the canners the total supply of tin plate necessary to meet the requirements of the canning industry. The individual canners will through their organizations indicate their requirements to the government, supplemented by the guarantee of a chartered bank, and in due course the government will see that tin plate is shipped to them. It is estimated that through the work of the war trade board a saving of $600,000 a year will be effected for the food canning industry of Canada.

An order for 100,000 tons of 85-pound rails to lay about 800 miles of track has been placed by Hon. J. D. Reid, minister of railways, with the Dominion Iron & Steel Co. The rails are to be manufactured at the company's plant at Sydney, N. S., and all are to be delivered by the end of July. Rolling will begin on April 1, and it is hoped that during April, 10,000 tons will be ready for use in making replacements on Canadian railroads. In May, June and July, it is expected that the rail mill will be producing up to its full capacity and that deliveries will reach 30,000 tons a month. The filling of this order will create a supply large enough to provide for replacements on the Canadian Pacific and Grand Trunk systems. The rails required by the Canadian Pacific and Grand Trunk lines will be supplied by the government at cost, plus transportation charges. The government has made arrangements with the imperial munitions board whereby the Dominion Iron & Steel Co., which has heretofore been turning out munitions steel, will roll rails during the next four months.

The minister of railways also is arranging for new rolling stock and locomotives for Canadian railways. The railway department is ordering 7500 new freight cars, 150 locomotives and several hundred new colonist sleepers as well as other passenger cars. The freight cars will include a large number of coal cars. All the new equipment will be ordered on government account, but deliveries will be allotted to all railways as need requires. Prices submitted in the tenders received are very high compared with pre-war prices. Box cars now cost from $2600 to $2800 each, as compared with $1400 each before the outbreak of war. Locomotives have increased in cost by 150 per cent and now run at about $60,000 each. In an effort to reduce costs through pooling orders by the government, officials of the railway department are investigating costs of raw material and of manufacture, and arrangements may be made with the manufacturers for governmental purchase of iron and steel supplies at minimum cost, through co-operation with the United States government.

All ships under command of the section commands of the first naval district, Rear Admiral Spencer S. Wood, will be repaired on the Lockwood property, East Boston, Mass. waterfront which the government recently commandeered and which it now is reclaiming. It is said that the consideration was in excess of $100,000. Congestion at the Charlestown navy yard will be relieved by this step.

To Resume Development

Approximately 45,000 acres of coal, iron and manganese lands in Bartow and Cherokee counties, Georgia, have been released for development by the Georgia Iron & Coal Co., Atlanta, Ga., as a result of a decision of the New Orleans federal circuit court of appeals. The case decided is that of the Georgia Iron & Coal Co. against the Georgia Steel Co. The referee in bankruptcy for the Georgia Steel Co. decided the Georgia Iron & Coal Co. had no lien on the property. This ruling was reversed by Federal Judge William T. Newman, of Atlanta, and has been sustained by the higher court. Operations will be resumed in all probability on a blast furnace at Rising Fawn, Ga., with a daily capacity of 175 tons, which has been idle during the litigation. Joel Hurt, Atlanta, Ga., who with his associates are interested in the Georgia Iron & Coal Co., has been negotiating with the government for some months concerning the deposits of manganese ore upon the property and the company expects to soon resume mining of manganese.

Describes Trench Life

New England foundrymen to the number of 100 or more were addressed by Capt. Leslie N. Vickers, of the British army, at the monthly meeting of the New England Foundrymen's association at the Exchange club, Boston, Wednesday evening, March 13. Capt. Vickers' speech was, "Out of the Trenches", but he covered the whole field of active military operations in an absorbingly interesting fashion. President Aborn of the association presided. The annual report of the association showed cash on hand at the end of the calendar year of $2400, an increase for the year of $600. The membership increased in a year by 30, and stood at 189 members on Dec. 31.

The Tri-M Machine Co., Wheeling, W. Va., with a site at Warwood, W. Va., has been organized by R. J. McCullagh and others and on Monday, March 11, began the construction of a 40 x 80-foot shop. The plant will be equipped with modern machinery and will handle all kinds of light and heavy work.

Appliance Show Unaffected by War

Manufacturers of Railway Equipment Ignore Prevailing Uncertainties in Their Field by Holding Greatest Exhibition in Chicago—Iron and Steel Companies Take Prominent Part in Displays

CHICAGO, March 18.—Although faced by many uncertainties for the future because of government control of railroads, manufacturers of railroad appliances now are presenting in this city one of the most complete and interesting exhibitions that ever has been assembled. The Coliseum and its annex are filled with displays of the devices that make railroads efficient, constituting the annual exhibition of the National Railway Appliances association. This exhibition is being held in connection with the nineteenth annual convention of the National Railway Engineering association which is in session at the Congress hotel. Numerous standard appliances that assist railways to maintain their tracks, to increase the safety of employes and passengers and the general public, and contribute to the general excellence of their physical condition and operation are being shown.

Railroads frequently are referred to as the largest users of steel and iron and products made of these materials. While this statement usually brings up a mental picture of the steel rail and the locomotive as conspicuous examples, the use of steel goes deeply into every portion of railroad use. An inspection of the appliance exhibition indicates that steel and iron make up the major part of almost everything that goes into a railroad's equipment. Although at this time iron and steel producers are driving their plants to capacity to meet the unprecedented demand for material needed in the war, and most of them have nothing to sell, there is no falling off in the exhibits of these companies.

Two Classes of Exhibits

Adopting a rough classification, the exhibits divide themselves into two general classes. Safety and signaling made up of electrical and compressed air devices to protect crossings and also used in the operation of trains, form a large section of the exhibits. Rails and track appliances constitute the other large section. In addition to these classes are many specialties not so easily grouped. Motor cars for use of track inspectors and workers; bridge timber; creosoted, concrete and steel ties; culverts, tanks, wire and cable; special car types and miscellaneous railway equipment exhibits.

The Coliseum is dressed for the occasion in an unusually elaborate way with the national colors and pictures of national leaders. Exhibit spaces are separated by fence sections in gilt and uniform signs mark the various displays.

Some of the exhibits are unusually artistic. The Carnegie Steel Co., always an exhibitor, has built a rustic garden in its space, with hedges, flower pots, ferneries, a fountain and rustic seats in the nooks. The company's products are exhibited in an unobtrusive way on small tables. Rails and track fastenings make up most of the actual exhibit.

The Associated Manufacturers of Malleable Iron have taken larger space than usual. This association is conducting an exhibit calculated to impress observers with the great utility of malleable iron for railroad work where strength and durability are desired. This is an active exhibit and tests of the material are being carried on. A wedge-testing machine, a miniature pile driver and other testing devices demonstrate the punishment that can be administered before fracture of the metal takes place. A twisting machine gives a similar illustration from another angle and a tensile strength machine also is in operation. An interesting detail of this exhibit is a malleable iron truck wheel made for use on the Liberty truck. This has been tested to destruction and showed high resistance. Although the pressure was applied to only a portion of the rim, and that the weakest, the wheel withstood 68 tons and was fractured only when 78 tons had been applied.

The American Steel & Wire Co. presents an interesting exhibit of its varied line of products. Wire in all forms, fencing, reinforcement, nails, building and car hardware make up some of the general classifications. The myriad uses to which wire is applied are well indicated by this exhibit.

The Ayer & Lord Tie Co., manufacturer of creosoted ties and paving blocks, has an attractive exhibit of its products with demonstrations of the utility and lasting qualities of wood so treated, both for track work and floors.

The Lackawanna Steel Co. has confined its exhibit to track fastenings and appliances, though many sections of steel rail also are shown.

The Page Steel & Wire Co. shows two special types of wire, coppered wire, which resists corrosion by virtue of its copper coating, and Armco welding wire. The latter is replacing Swedish iron for use in the welding flame, to build up metal in repairing and welding.

The exhibit of Fairbanks, Morse & Co. covers a wide range. Several types of motor cars for inspection and track work are shown, as well as electric motors, pumping machinery and scales.

The Armco Culvert Manufacturers, an association of manufacturers of a similar product who group themselves for publicity purposes, shows a large line of iron culverts, mostly corrugated metal, various types of highway and danger signs. An interesting collection of specially illuminated pictures of the application in actual practice of the culverts, is presented.

The National Malleable Castings Co. presents a large variety of malleable castings actually in use by railroads. The Chicago Malleable Castings Co., another large manufacturer of this material, also presents a wide variety of railroad appliances.

The Chicago Bridge & Iron Works shows miniatures of its railroad tanks and water storage devices.

The Bethlehem Steel Co. presents steel rails and track accessories, switch stands and numerous other devices for use in connection with the roadbed.

The Cast Iron Pipe association has an exhibit to demonstrate the long life of cast pipe under adverse conditions.

The Ajax Rail Anchor Co. shows a short section of track equipped with its device to prevent creeping of rails and also a testing machine to indicate the pressure that will be withstood by the anchor before it ceases to restrain the rail from moving.

There are numerous exhibits of special frogs, switches, crossings, special car types, grip nuts, rail anchors, rail joints, storage batteries, special wire and cable and general electrical apparatus.

The American Railway Engineering association is holding its nineteenth annual convention at the Congress

hotel, Tuesday to Thursday of this week, with a comprehensive program covering all details of railroad operation and maintenance. The Railway Signal association held its annual meeting in the Auditorium hotel Monday.

Exhibitors as the appliance show are as follows:

Adams & Westlake Co., Chicago.
Adams Motor & Mfg. Co., Chicago.
A. G. A. Railway Light & Signal Co., Elizabeth, N. J.
Ajax Rail Anchor Co., Chicago.
Alexander Crossing Co., Clinton, Ill.
Alexander Milburn Co., The, Baltimore.
Alger Supply Co., Chicago.
Allith Prouty Co., Danville, Ill.
American Hoist & Derrick Co., St. Paul.
American Kron Scale Co., New York.
American Steel & Wire Co., Chicago.
American Vulcanized Fibre Co., Wilmington, Del.
American Valve & Meter Co., Cincinnati.
Anti-Creeper Corp., New York.
Armco Iron Culvert Manufacturers, Middletown, O.
Asbestos Protected Metal Co., Pittsburgh.
Associated Manufacturers of Malleable Iron, Cleveland.
Austin Co., The, Cleveland.
Ayer & Lord Tie Co., Chicago.

Baker, John Jr., Chicago.
Barrett Co., The, Chicago.
Benjamin Electric Mfg. Co., Chicago.
Bethlehem Steel Co., Chicago.
Brach Supply Co., L. S., Newark, N. J.
Boss Nut Co., Chicago.
Bridge & Building Association, Chicago.
Bryant Zinc Co., Chicago.
Buda Co., The, Chicago.

Carbic Mfg. Co., Duluth.
Carnegie Steel Co., Pittsburgh.
Cast Iron Pipe Assn., Chicago.
Chicago Bridge & Iron Works, Chicago.
Chicago Flag & Decorating Co., Chicago.
Chicago Malleable Castings Co., Chicago.
Chicago Pneumatic Tool Co., Chicago.
Chicago Railway Signal & Supply Co., Chicago.
Chipman Chemical Engineering Co., Inc., New York.
Cleveland Tractor Co., Cleveland.
Crerar Adams & Co., Chicago.

D. & A. Post Mold Co., Three Rivers, Mich.
Detroit Graphite Co., Detroit.
Diamond State Fibre Co., Chicago.
Dickinson, Paul, Inc., Chicago.
Dilworth, Porter & Co., Inc., Pittsburgh.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Domestic Engineering Co., The, Dayton, O.
Duff Mfg. Co., Pittsburgh.

Edison, Thos. A., Inc., Bloomfield, N. J.
Edison Storage Battery Co., Orange, N. J.
Electric Railway Improvement Co., Cleveland.
Electric Storage Battery Co., Philadelphia.
Eymon Continuous Crossing Co., Marion, O.

Fairbanks, Morse & Co., Chicago.
Fairmont Gas Engine & Railway Motor Car Co., Fairmont, Minn.
Federal Signal Co., Albany, N. Y.
Frictionless Rail, The, Boston.

General Electric Co., Schenectady, N. Y.
General Railway Signal Co., Rochester, N. Y.
Graver Tank Works, East Chicago, Ind.
Grip Nut Co., Chicago.
Gould Storage Battery Co., Chicago.
Gurley, W. & L. E., Troy, N. Y.

Hatfield Rail Joint Mfg. Co., The, Macon, Ga.
Hall Switch & Signal Co., New York.
Hayes Track Appliance Co., Richmond, Ind.
Hazard Mfg. Co., Chicago.
Hoeschen Mfg. Co., Omaha, Nebr.
Hubbard & Co., Pittsburgh.
Hegeman-Castle Corp., Chicago.

Ingersoll-Rand Co., New York.
International Filter Co., Chicago.
International Steel Tie Co., The, Cleveland.
Iowa Gate Co., Cedar Falls, Iowa.

Johns-Manville, H. W., Chicago.
Jordan Co., O. F., East Chicago, Ind.
Julian Beggs Signal Co., Terre Haute, Ind.

Kalamazoo Railway Supply Co., Kalamazoo, Mich.
Kaustine Co., Buffalo.
Kelly-Derby Co., Inc., Chicago.
Keppler Glass Constructions, Inc., New York.
Kerite Insulated Wire & Cable Co., New York.
Kettle River Co., The, Minneapolis.
Keystone Grinder & Mfg. Co., Pittsburgh.
Kilbourne & Jacobs Mfg. Co., Columbus, O.

Lackawanna Steel Co., Lackawanna, N. Y.
Layne & Bowler Co., Memphis, Tenn.
Lehon Co., The, Chicago.
Long, Chas. R., Co., Louisville, Ky.
Lufkin Rule Co., Saginaw, Mich.
Lipman Refrigerator-Car Mfg. Co., Beloit, Wis.
Macomber & Whyte Rope Co., Kenosha, Wis.
MacRae's Blue Book, Chicago.
Madden Co., The, Chicago.
Marsh & Truman Lumber Co., Chicago.
Massey Co., C. F., Chicago.
McGraw-Hill Publishing Co., New York.
Mercury Mfg. Co., Chicago.
Monroe Calculating Machine Co., Chicago.
Mudge & Co., Chicago.
M. W. Supply Co., Philadelphia.
Miller Train Control Corporation, Danville, Ill.

National Carbon Co., Inc., Cleveland.
National Concrete Machinery Co., Madison, Wis.
National Indicator Co., Long Island City, N. Y.
National Lead Co., New York.
National Lock Washer Co., The, Newark, N. J.
National Malleable Castings Co., The, Cleveland.
National Railway Appliances Assn., Chicago.
National Surface Guard Co., Chicago.
Nichols & Bros., Geo. P., Chicago.
Northwestern Motor Co., Eau Claire, Wis.

Ogle Construction Co., Chicago.
Okonite Co., The, New York.
O'Malley Beare Valve Co., Chicago.

P. & M. Co., Chicago.
Page Steel & Wire Co., New York.
Patterson, W. W., Co., Pittsburgh.
Peyton Safety Rail Joint Co., Centralia, Ill.
Pocket List of Railway Officials, New York.
Polk-Genung-Polk Co., Chicago.
Positive Rail Anchor Co., Marion, Ind.
Post, G. A., New York.
Pittsburgh-Des Moines Steel Co., Pittsburgh.
Protective Signal Mfg. Co., Denver, Colo.
Pyrene Mfg. Co., Chicago.

Q. & C. Co., New York.

Rail Joint Co., The, New York.
Safe Lock Switch Machine Co., Lexington, Ky.
Sellers Mfg. Co., Chicago.
Signal Accessories Co., New York.
Silver Steel Tie Co., The, New York.
Simmons-Boardman Publishing Co., New York.
Simple Gas Engine Co., Menasha, Wis.
Snow Construction Co., T. W., Chicago.
Southern Pine Ann., New Orleans.
Squire-Cogswell Co., Chicago.
Standard Asphalt & Refining Co., Chicago.
Swain Co., Chicago.

Templeton Kenly & Co., Ltd., Chicago.
Toledo Scale Co., Toledo, O.
Track Specialties Co., New York.
Tyler Underground Heating System, Pittsburgh.

Union Switch & Signal Co., The, Swissvale, Pennsylvania.
U. S. Wind Engine & Pump Co., Batavia, Ill.

Verona Tool Works, Pittsburgh.
Volkardt Co., Inc., Stapleton, N. Y.

Walls Frogless Switch & Mfg. Co., The, Kansas City, Mo.
Waterbury Battery Co., Waterbury, Conn.
Wayne Oil Tank & Pump Co., Fort Wayne, Ind.
West Coast Lumbermen's Assn., Seattle.
Western Electric Co., Inc., New York.
Wyoming Shovel Works, The, Wyoming, Pa.

Yale & Towne Mfg. Co., New York.

Metal Trades Re-elect

Former officers were re-elected by the Chicago branch of the National Metal Trades association at its twentieth annual meeting at the Mid-day club, March 14. O. A. Olson was continued as president, G. A. Roth vice president and William Ganschow treasurer. Paul Blatchford, secretary for many years, was elected to the same position and Walter du Verdie was continued as manager of the employment bureau. An address on the war was made by S. J. Duncan-Clark, war analyst for the *Chicago Evening Post*. A campaign was started to forward the candidacy of John W. O'Leary of Chicago for president of the National Metal Trades association at the forthcoming annual meeting in New York.

Completing Tin Mill

Officials of the Hudson Sheet & Tin Plate Co., Inc., New York, expect to have their new plant at Marietta, O., in operation by May 20. The plant is now in the course of construction and when completed will consist of four hot mills, two stands of cold rolls, five complete tinning machines, and one 3-arm pickling machine. The latter will be furnished by the Mesta Machine Co., Pittsburgh. The mills are being built by the Aetna Foundry & Machine Co., Warren, O. Officials of the company expect to enlarge the mill next July.

Metal Trades Hard Hit By Strikes

Survey Just Completed Reveals Difficulties Attending Operation During Six Months After America's Entry Into War—Union Labor Most Involved—6,285,519 Workdays Lost in 1156 Strikes

A RECENT survey of strikes in wartime by the national industrial conference board, shows that in the first six months of America's participation in the war, approximately 3000 labor disturbances of this kind occurred in industrial establishments throughout the country. To 2521 concerns thus affected a questionnaire was sent and data were secured from 1156. It was developed that in these plants, representing less than half the number 283,402 employes were made idle and the number of days of production lost was 6,285,519, or 22.22 days per worker. The report points out that it would require the labor of 251,400 persons for a whole month to make up for the reported loss of production. A manufacturing plant employing 1000 workmen would have to operate 300 days a year for 21 years to offset the time thus lost.

Metal Trades Most Affected

The metal trades head the list of industries disturbed by strikes with 374 establishments affected. Employes made idle numbered 78,727 while the number of workdays lost approximated 1,230,804. The shipbuilding industry comes next with 75 strikes, 47,174 workmen affected with 1,072,501 workdays lost. Coal and copper mining are third and fourth. These four industries contributed 46.1 per cent of the strikes, 61.7 per cent of the workers made idle and 66.3 per cent of the workdays lost. First on the list of demands made by strikers is increased wages. Of the total 1156 establishments affected, in 445 the strikes were for that reason. Employes thus made idle totaled 84,931, which meant the loss of 1,208,658 workdays. In 230 strikes, the demand was for closed shop and higher wages. Here 67,358 employes were made idle and 1,397,701 workdays were lost.

Summary of Settlements

The report states that the largest number of strikes, 552, or 45.2 per cent, were settled by private conferences, in 42.7 per cent of which cases the demands of the strikers were granted, in 30.3 per cent compromised and in only 27.0 per cent refused. Days lost numbered 1,360,757. In 371 cases, however, federal or state mediation became necessary and here 3,717,918 workdays were lost. Because other employes were hired in the case of 113 other strikes, only 352,686 days were lost.

In its summary, the national industrial conference board states that nearly three-fifths of the disputes occurred in establishments where the majority of the strikers were members of trade unions, and the percentage of time lost was the highest in connection with these strikes.

The advisory committee of the national industrial conference board consists of the following: L. A. Osborne, chairman, vice president, Westinghouse Electric & Mfg. Co., Pittsburgh; W. H. Barr, president Lumen Bearing Co., Buffalo; W. H. Van Dervoort, president, Root & Van Dervoort Engine Co., East Moline, Ill.; C. A. Crocker, president, Crocker-McElwain Co., Holyoke, Mass.; E. A. Smythe, president, Pelzer Mfg. Co., Greenville, S. C. The committee represents 16 national associations with over 18,000 manufacturers of all kinds as members. Among the organizations represented are the National Association of Manufacturers, National Council for Industrial Defense, National Erectors' association, National Founders' association, National Metal Trades association, etc.

Gompers Defends Policy

In an address at a meeting called by the National Civic Federation, held in New York City recently to discuss after-war problems, President Samuel Gompers, of the American Federation of Labor, vigorously defended organized labor's war policy.

Asserting that the Bolsheviki and other radical elements have been and are trying to misrepresent American organized labor, Mr. Gompers said:

"There are conditions of industrial politics and law altogether different in the United States than in any other country. There is something about the labor movement in America of which you may be assured—it must be altogether American.

"Further, the labor movement of America will not be represented at any conference in any country where the representatives of an enemy nation are present.

"I'm not going to give up the American labor movement with its great achievements of today to look for the chimerical, fantastical Bolshevik promises of tomorrow."

Labor Costs Jump

Mounting cost of labor is graphically shown by the recently published annual report of the Republic Iron & Steel Co., This revealed that whereas in 1915, the average wage of employes was $771. in 1917, it rose to $1211, an increase of $440 or 57 per cent. This is practically covered in the five so-called 10 per cent wage advances given iron and steel workers generally during 1916 and 1917, and is typical of what has taken place throughout the country. The actual cash outlay is but a part of the higher cost, however, it is pointed out, since it is the concensus of opinion in the Mahoning valley district that it now takes three men to do what two men did before the war. Some manufacturers even state that now it takes two men to perform the work one did two or three years ago.

Promotes Painstaking Work in Plant

To instill a spirit of carefulness in its employes as well as to stimulate production, the Westinghouse Electric & Mfg. Co., Pittsburgh, has issued a number of illustrated posters, 18 x 21 inches, printed in red, white and blue. One of these shows an actual view of a shattered gun on a French battlefield, the disastrous result of a premature explosion of a defective shell. It bears the following statement: "A defective shell wrecked this 4.5-inch howitzer, imagine the gun crew's fate. The Huns could do no worse. Make perfect shells and lessen the perils of our boys at the front." Another shows an interior view of the Westinghouse munition plant and beneath it is printed the following: "Back up the boys at the front. They need all the shells you can make and need them quick. Don't forget the more shells you can make, the sooner the boys can come home. Remember good shell makers in this shop are as necessary as soldiers in the trenches." Already the psychological effect upon the workers has been noted and great care is being exercised in their work.

Ford Tractors

Soon to be on Open Market—Reduced to War Boards

Detroit, March 18.—The Ford tractor, now being manufactured in volume by Henry Ford & Son at Dearborn, a suburb of Detroit, will be placed on the American market May 1, it is officially announced. The company now is completing the delivery of tractors to England and Canada and has been turning out 80 a day. Ernest Kanzler, production manager, has announced that 1000 tractors will be sold to the Michigan war preparedness board at a price of $750 each. They are being sold only to governments and states at a small margin of profit.

C. H. Wills, mechanical superintendent of the Ford Motor Co., has perfected a new 18-cylinder liberty motor which produced more than 75 horsepower. The motor is lighter than any previous model of its kind and operates with less vibration.

Essex Motor Co. has leased its plant at 452 Franklin street to the Commercial Motor Body Corp. of New York for three years. The Essex Motor Co., a subsidiary of the Hudson Motor Co., will begin the manufacture of a low-priced car within a few months.

The American Steel & Wire Co. has let contracts for the erection of a one-story brick and steel warehouse.

The National Twist Drill & Tool Co. is having plans prepared for the erection of a four-story brick, steel and reinforced concrete addition.

The Buhl Malleable Co. plans erection of an addition to its core shop.

The Paige-Detroit Motor Car Co., which has taken a large volume of government truck work, proposes to purchase the business and assets of the Signal Motor Truck Co.

Plans are being discussed for refinancing the Regal Motor Co. with a view of resuming production on a large scale. The Security Trust Co. now is receiver.

Commerce Motor Car Co., George Kellogg, secretary, has booked a $2,000,000 contract for trucks with the war department. The company is issuing $100,000 of treasury stock to expand its plant.

Tool Steel in Demand

Tool steel inquiries, directly or indirectly related to government business flood the northern Ohio market, and makers declare their chief difficulty is in making deliveries. The mills still have to contend with railroad embargoes. Stocks are piling up at the mills and a continuance of better weather conditions will likely solve the problem. An inquiry is current for a large tonnage for a Marion, O., tractor manufacturer, whose output in 1918 will possibly be 5000 tractors. While an increased amount of tool steel is being used in the manufacture of trucks and tractors, this represents largely diverted tonnage. Some makers are turning down inquiries from airplane manufacturers, because of the specifications for tool steel used in airplanes, while others have fitted themselves to take care of this business.

Obituaries

JOSEPH KINTER SMITH, vice president of the Pittsburgh Piping & Equipment Co., Pittsburgh, died recently while returning from Palm Beach, Fla., where he had gone to recuperate, having been in ill health for some time. At St Augustine he stopped off to spend a few days. His condition became critical and he was taken to the East Coast hospital, where an operation failed to save his life. Mr. Smith was born in Brookville, Pa., and located in Pittsburgh when a youth. For many years he was associated with the Best & Co., manufacturers of piping work, and 15 years ago he aided in the organization of the Pittsburgh Piping & Equipment Co., of which George H. Danner is president.



JOSEPH KINTER SMITH

Elisha Judd Steele, who since 1875 has been identified with the Coe Brass Co., now a part of the American Brass Co., Torrington, Conn., died recently at his home in Torrington, aged 75. When the merger was effected, he was made superintendent of the Coe branch. Later he held successively the positions of assistant secretary, secretary and treasurer and in 1913 was made vice president in which capacity he served until he retired in October, 1916.

Fred G. Clark, who for over 30 years has been identified with the foundry business in Bangor, Me., died at his home in that city, recently, aged 57.

Henry S. Cole, Pawtucket, R. I., aged 80, died at his home in that city recently. He was engaged in the manufacture of steam fire engines and cotton machinery under the firm name of Cole Bros., for many years.

Frank J. Hurley, New York, traveling representative of the Independent Pneumatic Tool Co., Chicago, died at his parents' home in East Orange, N. J., after a lengthy illness of Hodgkins disease, aged 29.

Nathan H. Reed, founder of the Somerville Iron Foundry Corp., Somerville, Mass., died recently in Winchester, Mass. He was born in Bedford, Mass., May 28, 1848, and located in Somerville when a young man.

Mahon H. Hoagland, aged 47, head of Hoagland & Son, Rockaway, N. J., steel manufacturers, died at his home in that city recently from the effects of pneumonia. Mr. Hoagland was fuel administrator for Morris county, New Jersey.

Isaac Stephenson, former senator from Wisconsin, who in 1911 organized the Stephenson Charcoal Iron Co., Marquette, Mich., died at his home in Marinette, Wis., March 15, aged 88. He owned vast mineral and lumber lands in northern Michigan and Wisconsin, and a part interest in the 80-ton blast furnace of the Stephenson company at Wells, Mich. The Stephenson mine at Gwinn, Mich., is now being worked by the Cleveland-Cliffs Iron Co., Cleveland.

Sulphate Orders

For High Explosives Distributed by Government—Toluol Being Taken

New York, March 16.—Orders for several hundred tons of sulphate of ammonia for use in the manufacture of high explosives again were distributed by the government this week. With the exception of this business, activity in this product was light. Spot carloads, however, are going at higher prices. The market now may be quoted at $5.40 to $5.50 per 100 pounds at tidewater. Large sales of benzol have been made and the total business placed during the past week was considerably in excess of that for any similar period recently. The greater portion of this business involved spot shipment. Despite these large sales, stocks of benzol continue large and the undertone is far from strong. The market continues at 35 to 40 cents per gallon, although this level could be shaded materially on important quantities.

The committee in charge of C. A. Moorhead, recently appointed by the war industries board to supervise the distribution of toluol, has made considerable progress in co-ordinating the requirements of the various departments of the government. So far, no toluol for ordinary commercial use has been released, but it is expected that at least small quantities will begin to be available soon to consumers for essential requirements. Large additional quantities of toluol were requisitioned by the government during the past week. The government continues to pay $1.50 per gallon at producer's plants for this.

Demand for solvent naphtha which has reflected a consistent expansion of late, continues to grow, with the result that stocks are shrinking. This is particularly true in view of the fact that production of late has been slightly reduced. Solvent naphtha continues to be quoted at 18 to 22 cents per gallon. The market on naphthalin continues exceedingly strong, and is quoted at 10 to 12 cents per pound. This quotation is almost entirely nominal, however, as there is practically no business. Producers now have more business on their books than they can take care of.

Charter is Obtained

The Suwanee Iron Co., of Kentucky, has filed a charter of incorporation with the secretary of state at Nashville. The capital is placed at $500,000 and the purposes of the corporation are to construct or purchase iron furnaces, the manufacture of iron, charcoal and by-products from wood. J. M. Overton is president and the directors are J. M. Overton, C. Cooper and D. I. Miller. The stockholders are J. M. Overton, Nashville; J. M. Dickinson, Chicago; W. E. Clow, Chicago; J. P. Williams, Nashville; D. I. Miller, Grand Rivers, Ky.; and Lizzie O. Ewing, May Overton, H. C. Irwin and W. D. Hardeman, of Nashville. The principal headquarters are at Grand Rivers, Ky.

Hoist Manufacturers Will Co-ordinate Aims

With a view to co-ordinating the total experience in electric hoist design a number of the leading manufacturers have arranged the Electrical Hoist Manufacturers' association. The following companies are represented in this organization: The Brown Hoisting Machinery Co., Cleveland; Detroit Hoist & Machine Co., Detroit; Euclid Crane & Hoist Co., Euclid, O.; the Franklin-Moore Co.; Link Belt Co.; Roeper Crane & Hoist Co., Reading, Pa.; Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.; Sprague Electric Works, New York; the Yale & Towne Mfg. Co.,

The association holds monthly meetings to study the needs of hoist users and to develop standardized methods of presenting information to the purchaser of hoisting machinery

The membership is confined to manufacturers of monorail electric hoists. The officers at the present time are: F. A. Hatch, chairman, Shepard Electric Crane & Hoist Co.; F. W. Hall, vice chairman, Sprague Electric Works; and C. W. Beaver, secretary-treasurer, the Yale & Towne Mfg. Co.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	(nominal)
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Per 100 Pounds at Seaboard	
Sulhate of ammonia (nominal)	$5.40 to 5.50

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Russian Rails

Rolled in This Country Bought by Canada Replace Heavier Sections

Toronto, March 18.—Hon. J. D. Reid, Canadian minister of railways, practically has completed arrangements for securing the rails needed for track renewals on the government railways and the Canadian Northern railway system. The purchase of 355 miles of 67-pound rails, rolled in the United States under orders placed by the Russian purchasing commission, has been completed and some of the steel now is on its way to Canada. Negotiations for an additional 150 miles of rails also manufactured for Russia have nearly been concluded. It is also proposed to take up some 350 miles of 80-pound rails on the Hudson Bay railway and obtain about 100 miles from yards and sidings on the National Transcontinental, and 120 or 130 miles more of heavy sections from the St. John Valley railway in New Brunswick, owned by the government of that province. These 80-pound rails will be used in replacing worn rails on the government and Canadian Northern systems where the traffic is heavy. A certain portion of the rails replaced can be straightened and shortened for use in renewals. The light Russian rails will be used for replacing the 80-pound rails on the Hudson Bay and other roads, where the traffic is lighter and less frequent than on the railways requiring new rails.

The Canada Blower & Forge Co., of Kitchener, Ont., has been closed down by order of the imperial munitions board at the instigation of the inspections branch. The reason assigned is that certain of the shells turned out were useless for purposes of warfare.

Building Ore Barges

In order to carry iron ore through the New York state barge canal from the Lake Champlain district to the New York harbor points, the Ore Carrying Corp., a subsidiary of Witherbee, Sherman & Co., is building a new barge fleet. One of the new barges was launched March 16 from the yard of John B. Heaney, South Brooklyn. The most important unit of the fleet will be a 152-foot steamer for towing the barges. This steamer also will have capacity for carrying 800 tons of cargo. It is to be launched next week from the yard of Ira S. Bushey & Sons, Brooklyn. Other launchings will take place as fast as the rest are completed.

Germany to Get Manganese from Ukraine Mines

Germany now has access to large deposits of high grade manganese ore, according to F. A. Ray, professor of mining engineering, Ohio State university, in relating his experiences in Russia to the Cleveland Engineering society on March 5. He characterized the release of the manganese and wheat of Ukraine as the greatest blow which the allies have suffered. He stated that the only comforting feature is the complete demoralization of the Russian mining and transportation systems, which may delay Germany in obtaining manganese from the large Ukraine deposits. The latter lie about 400 miles from the German border.

Professor Ray described the coal deposits of Russia from first hand knowledge obtained as a member of the commission sent from this country to investigate the mineral resources of the three great divisions of Russia and of Siberia. The most valuable coal from a metallurgical viewpoint occurs near the hematite beds of Ukraine and in the neighborhood of the Nicopol manganese deposits. There are 16 steel plants in this region, which supplied a quantity of structural steel for bridge work and industrial uses previous to the war. Professor Ray described and showed photographs of one bridge across the Volga which had 14 steel truss spans, all constructed complete in this steel region.

Previous to the war Germany received some manganese from the Nicopol region, and a certain quantity of the coal which is of coking quality. Since the dissolution of Russia and the peace agreement with Ukraine, Germany will control the railroads of this region and undoubtedly will make use of the manganese.

The Optenberg Iron Works, Sheboygan, Wis., manufacturer of boilers, tanks, stacks, machine tools, etc., is working on a large contract for drills to be used in France. The plant specializes in radial drills.

The Greenfield Tap & Die Corp., Greenfield, Mass., recently opened its new administration building on Sanderson street, Greenfield, Mass., and on Tuesday, March 5, held open house. In this building, the administration work of the corporation's widely scattered plants is co-ordinated.

The name of the Midland Machine Co., Detroit, manufacturer of molding machines and foundry equipment, has been changed to the Grimes Molding Machine Co., to more closely identify this concern with the name of the machine which it builds. Manufacturing operations now are being carried on in a new plant recently completed that provides double the facilities of the former works and the output will be increased threefold.

Takes Ship Contract

The Alliance Shipbuilding Corp. has been newly organized and has established headquarters in the Woolworth building, New York. The yard will be at Nyack, N. Y. It has taken a contract for one 4000-ton steel vessel for the government.

Iron Works Leased

A lease has been signed by the Puget Sound Machinery Depot of Seattle and the National Iron Works, Spokane, whereby the former company takes over the plant of the latter for use in connection with filling important war contracts. The lease runs for three years with option on a two years' extension. The Puget Sound Machinery Depot which is also constructing a large plant at Seattle will make engines and auxiliary machinery for the ships now building on Puget sound. Some additional equipment will be installed in the Spokane plant.

A Word With the Editor

Appreciation of Mr. Yeatman

To the Editor:—

I have just read the interesting note in your issue of Feb. 28, regarding Pope Yeatman, under the heading "Men of the Iron Trade". You mention some things but omit others of equal or greater importance. You say truly that "Mr. Yeatman is regarded as one of the highest authorities in the world on mining affairs and properties." During his long connection with the Guggenheim interests, it was commonly said that he was "the most highly paid expert in the world, receiving $125,000 a year salary." I cannot vouch for this, but I can say from my own personal knowledge and experience, that he is, without exception, the most modest and retiring great man that it has ever been my good fortune to know. Not only the south, but the whole country, may well be proud of the patriotism of such a man as Pope Yeatman, when we learn that, in sharp contrast to the sinister reports of "graft" in some lines of government contracts, Mr. Yeatman has closed up all his offices and moved to Washington to serve his country, devoting his entire time and talents for the period of the war in consideration of $1 a year! Such a record is an inspiration to us all.

Yours truly,
ALEX. E. OUTERBRIDGE.

Philadelphia.

Lake District Ship Inspection

TO THE EDITOR:—

My attention has been drawn to an editorial in your issue of March 7, criticising inspection methods of the United States Shipping Board Emergency Fleet Corp., in which the following quotation occurs:

"The Emergency Fleet corporation has placed orders for a great many marine engines and is pressing for deliveries. Yet there is at least one foundry in the state of Ohio where there are several large cylinder castings out in the yard waiting for the skull-cracker ball that would now be in the machine shop were it not for petty exactions of certain subordinate inspectors. The cumulative effect of this maladministration of our inspection service is delayed production and shortage of important materials."

For your information and the information of your readers, you are advised that no such condition exists in this district, which comprises the entire Great Lakes, so far as this office is aware. There are no engines under construction for any ship within the jurisdiction of this office to which the conditions referred to in your editorial apply.

Since the organization of this district, this office has found it necessary to condemn only two cylinder castings out of several hundred and you are requested to make this correction in justice not only to the Emergency Fleet corporation but to the engine builders concerned.

Very truly yours,
H. PENTON,
District Officer.

Cleveland, March 8, 1918.

The cylinders referred to while in the state of Ohio, and personally inspected by a member of the staff of THE IRON TRADE REVIEW, were not located in the Great Lakes district and were inspected by a branch of the Emergency Fleet corporation not connected with the Great Lakes district.—THE EDITOR.

Unfold Huge War Building Program

Ordnance and Munition Plant Construction for War Department Will Entail Outlay of Tremendous Sum—Steel Requirements Will be Large—Cost Plus Contract Method Will be Followed in Work

WASHINGTON, March 19.—The war department's proposed program of ordnance and munitions plant construction looms as the factor likely to offset the tremendous drop in new private work and as another source from which heavy demands will be made upon the iron and steel and other branches of business serving the building industry. The army is going into extensive construction of warehouses, storage depots and factories, both in this country and abroad. This type of construction will require more steel tonnages than did the early program of only the building of cantonments. It has been estimated the proposed building schedule will run into the expenditure of more than $300,000,000 which will make the entire program, completed and proposed, aggregate far above $500,000,000.

Announcement here that the energies of contractors would be turned into government instead of private channels was made with the statement by Maj. W. A. Starrett, chief of the emergency construction division of the war department, himself one of the leading builders, that the cost-plus contract system, used in the awarding of the early contracts, will be followed. This statement indicates the army's decision to continue along present lines despite the criticism which has been expressed in many quarters. The army feels the present 3 or 4 per cent net earned by contractors under the plan is ample profit, but places a limit of $250,000 on any contract.

To Build Many Warehouses

Major Starrett has said that 31 storage warehouses will be built along the Atlantic coast and in the central part of the United States, an undertaking for which the army has made an outlay of $100,000,000. Some of the completed warehouse layouts are expected to cost as much as $15,000,000 each. Another $100,000,000 will go into power, gas, nitrate and other war material factories. The remainder will be required for flying field buildings, quartermasters, ordnance and other bureau construction.

Concerning the percentage contracts, Major Starrett said:

"The percentage contract has been a success, because in its details it was well conceived; because it gave the contractor a fair, but only a fair profit; because it obtained for the government at a minimum cost a service that the contractor was able to render and which the government was in no position to render itself. It was fair, and the government got value received.

"And since the cantonments, other government programs have come up, but they have all had the same characteristics. They had to be started before they were worked out in detail, and in each case the system of sending the government and the contractor into the field together, there to work out the problem in which they are joined in a common interest, has worked out successfully.

"The question has often been asked whether the compensation is not high. The answer is that it is much lower than the average peace time compensation for similar service. The contract, as it is now in force, pays 7 per cent for small operations (under $100,000) scaling down to 2½ per cent on very large ones with only 2½ per cent allowed on subcontracts, and the limit of fee on any one contract, however large, of $250,000. Out of this fee the contractor has to pay his own overhead costs, and, therefore, the fee is not all profit by any means. At the present time the contractor is averaging between 3 per cent and 4 per cent profit.

"Several of the contractors that built cantonments have asserted that their overhead ran as high as $100,000. This would leave $150,000 seeming profit. But then there is the corporation income tax. To a going concern with a reasonably profitable general business at least 60 per cent of that profit must be returned to the government in taxes. That would leave $60,000 as net gain. If any considerable part of that goes to the income account of any one stockholder the government again gets 30 per cent personal income tax. The profit commences to look small. Can anyone say that the use to the government of a great going business organization that costs anywhere from $100,000 to $300,000 a year to run is not worth the modest net amount that is here indicated on an operation where skill, experience, teamwork and business ability in large affairs can easily be made to count for literally hundreds of thousands of dollars of saving?"

The production division of the ordnance bureau is working out plans for the division of manufacturers into districts and a closer contact with these districts. Col. Guy H. Tripp, New York, formerly chairman of the Westinghouse Electric & Mfg. Co., now chief of the production division of the ordnance bureau, is working out the details of the plan for a decentralization and closer contact with the manufacturing district. The different munition zones will have headquarters at Pittsburgh, Cleveland, Rochester, Boston, New Haven, Detroit, Cincinnati, Chicago, New York and Philadelphia. In the Chicago district, William Butterworth, president of Deere & Co., Moline, and president of the Illinois Manufacturers' association, has become associated with E. A. Russell, vice president of the Otis Elevator Co., who has been made civilian chief of that district. The Illinois Manufacturers' association also is establishing a bureau at Washington to co-operate closer with the ordnance department.

Boston Gets Huge Export Base

By a recent sale of South Boston water front land and flats to the government for approximately $1,330,000, Boston is destined to become the nation's greatest embarkation port. Chairman John N. Cole of the state waterways commission told the legislative committee on metropolitan affairs that he had received a letter from General Goethals consummating the deal. Construction of the greatest army export base in the world, at an estimated cost of $20,000,000, will be carried out under the direction of the cantonment division of the war department, which is directly responsible to Assistant Secretary of War Crowell.

Plans drawn by Boston architects for a mammoth storehouse of reinforced concrete nearly half a mile long and eight stories in height with a paralleling two-story steel pier shed of about the same length and a pier 2700 feet long, call for an expenditure of about $16,000,000. Equipment will cost between $3,000,000 and $5,-

000,000 additional. These plans have been submitted to the war department for approval. The contract for the construction of the base has been placed with William F. Kearns & Co., of Boston.

Foreign Business Branches Must Get License

Washington, March 19.—Branches of United States corporations and other American houses in neutral or allied countries must now obtain an enemy trade license from the war trade board before performing contracts involving trading with an enemy or an enemy's ally. Two exceptions to this rule prevail; foreign branches of American firms may deal in enemy commercial paper when refusal might result in failure to collect the debt, or will be a violation of local law, and branches of American banks are authorized to receive enemy paper for collection and to participate in clearing house transactions in the ordinary course of business, notwithstanding enemy membership in the clearing house involved. Foreign branches may also pay or receive rent under existing leases to or from enemies or enemies' allies.

The order which is rescinded by this latest determination of the war trade board was announced Jan. 4, 1918, as follows:

"The war trade board has authorized branches of American corporations and other American houses established and engaged in business in neutral countries and in countries associated with the United States in the war to accept and pay drafts, to deliver goods, warehoused or otherwise stored, and to perform other similar acts, nothwithstanding such acts may involve trading with 'enemies' or 'allies of enemies', when such acts are necessary to prevent a breach or violation of a law or commercial obligation enforcible in the courts of the country in which such branch is established; provided, however, (1) that nothing herein contained shall be held or construed to authorize said corporations, houses or their branches to hereafter undertake or enter into contracts or business or commercial transactions which will involve trading with 'enemies' or 'allies of enemies' in order to carry out or perform the same; and (2) that every case involving transactions of trading with the 'enemy' or 'enemy allies' be reported to the war trade board within thirty (30) days after the occurrence thereof, upon a form to be furnished by the war trade board."

Commodity Freight Rates Get General Increase

Washington, March 19.—The interstate commerce commission has granted a general increase of about 15 per cent in commodity rates to railroads east of the Mississippi and north of the Ohio and Potomac rivers. This supplements a similar increase allowed in June, 1917, in class rates. These new rates will go into effect within a few weeks with the filing of new tariffs by the railroads. The order applies only to large quantity shipments of coal, brick, grain, foodstuffs, oil, stone, cement, lumber and other staple products shipped under the "commodity" classification. While it is estimated that this ruling will add about $58,000,000 to eastern railroad revenues, it will not increase their earnings, since that amount will revert to the government. With the raise in commodity rates, existing differentials or relationships between cities or districts are to be preserved.

Other cases considered and acted upon by the commission are anthracite coal, increased 15 cents a ton maximum; brick, clay and related articles, increased 15 per cent, from Canton, O., vicinity to Ohio, Indiana and Illinois; rates from other producing centers in western Pennsylvania, West Virginia, other parts of Ohio and northern Kentucky, to be figured on existing differentials from the Canton basis; cement, lumber and forest products, increased 1 cent per 100 pounds regardless of distance.

Striving to Speed Up Wooden Shipbuilding

Washington, March 19.—Systematic effort to speed up wooden ship construction is being made by James O. Heyworth, manager of the wooden ship construction division of the Emergency Fleet corporation. In his letter to builders of this class, Mr. Heyworth says:

"From personal inspection of yards and reports of traveling engineers, it is evident that construction methods, elasticity of plants and equipment and storage equipment and facilities are widely divergent. While some yards work 400 men per ship, others are able to work only 160, when the peak of construction of the ship is ready for them. While in some yards an old shipbuilder was doubtful whether he dared saw to exact size and left sometimes 3 inches to be later reduced, experience shows that in the Ferris standard type, the plans are so accurate that much woodwork can be safely done by sawing to exact dimensions.

"Shipbuilders in each district should form an association to hold meetings every two weeks for the purpose of showing by photographs, drawings or papers the best practice obtaining elsewhere. Minutes should be properly prepared and distributed among the district's shipbuilders. This is no time to work on the old basis for wooden ship construction. The country needs ships more than anything else. Real co-operation between district shipbuilders worked out in a proper manner can double our production in the next six months."

Industries Protest Lump War Tax Payments

Washington, March 19.—Concern felt by iron and steel producers and by other large iron and steel business men if the government shall enforce the letter of the law enforcing the payment of excess profits taxes before June 15 is expressed in a letter addressed by President James A. Campbell of the Youngstown Sheet & Tube Co. to Senator Pomerene and laid by the latter before Secretary McAdoo. Mr. Campbell said that his company had invested between $16,000,000 and $18,000,000 in government bonds and certificates and would be unable to take any of the new Liberty loan if the payment of excess profits taxes by June 15 was enforced. Other protests against this provision have been coming to Washington from business men and bankers in all sections. It is pointed out it will be practically impossible for banking accommodations to be provided to all classes of business in order to permit the tax payment to be made simultaneously and in a lump amount; furthermore, the strain upon liquid financial resources will be dangerous.

In view of the situation, Representative McFadden has introduced a bill in the house providing that the excess profits taxes may be paid in four equal partial payments at the option of the tax payer under regulations to be provided by the commissioner of internal revenue. These dates would be June 15, Aug. 15, Oct. 15 and Dec. 15. Taxes for succeeding years are to be paid in a similar manner.

Export License is Needed to Get Rail Freight

Washington, March 19.—Furnishing of equipment for export shipments by railroads has been made contingent upon the issuance of a license by the war trade board; the presentation of the license number; a proper marking of the bill of lading to show that the shipment is for export; and the bill of lading bearing the license number. The meeting of these requirements has been made antecedent to the supplying of the railroad freight room, by a circular issued to all the railroads by the division of

transportation of the United States railroad administration. This action has been taken in order to insure co-ordination of the railroad operations with the recent proclamation of the President, that all exports must be licensed by the war trade board.

Fuel Administrator Plans More Prosecutions

Washington, March 19.—While extreme leniency has characterized the fuel administration's attitude toward violators of its orders, according to H. D. Nims, legal director and assistant to Dr. Garfield, in the future the power of the Lever act will be made to operate upon any and all offenders. To date, 424 complaints have been filed, but criminal prosecutions have been instituted in but 83 cases to date and most of these are against the "little fellows". With this legal machinery in operation the filing of many more complaints is anticipated.

Capital Odds and Ends

WASHINGTON, March 19.—The following figures have been received from the signal corps, aviation section, of the materials necessary for a single airplane of simple type, exclusive of all materials for the engine: Nails, 4326; screws, 3377; steel stampings, 921; forgings, 798; turnbuckles, 276; veneer, 57 square feet; wire, 3262 feet; varnish, 11 gallons; dope, 59 gallons; aluminum, 65 pounds; rubber, 34 feet; linen, 201 square yards; spruce, 244 feet; pine, 58 feet; ash, 31 feet; hickory, 1½ feet.

* * *

The house naval affairs committee has increased an item of $94,000,000 for naval aviation to $188,000,000 and provided for an increase in the number of marine corps officers.

* * *

The Delaware & Hudson railroad has applied for increases ranging from 1.9 cents to 2.3 cents per 100 pounds in the commodity carload rates on machinery, electrical appliances and electrical supplies Schenectady to New York.

* * *

The 20,000 binoculars, spy glasses, telescopes, sextants and chronometers received by the navy department have not met the demand. "Keep them coming," Assistant Secretary Roosevelt says.

* * *

By the increase of the parcels post maximum weight to 70 pounds for first, second and third zones and to 50 pounds for others, new facilities will be opened for transportation of hardware and tools.

* * *

The Los Angeles & Salt Lake railroad desire elimination of routing via the Colorado Midland railroad in connection with the rates on ore and concentrates from points on its line to Blende, Colo.

* * *

An agreement has been concluded between the war trade board and representatives of the Spanish government that minerals, including iron pyrites, are to be exported without restriction from Spain. Assurance is given Spain that the United States will supply her with cotton, petroleum, etc.

* * *

By increasing the $50,000,000 munitions plant housing bill to $60,000,000 and inserting a clause, the house committee has made provision for erecting buildings in Washington to house the great influx of government clerks.

* * *

The Pennsylvania railroad asks for cancellation of the switching rate per car on iron ore from stock pile and thawing plant to unloading point or from stock pile to thawing plant at certain points in Ohio, Pennsylvania and West Virginia.

* * *

The shipping board has issued a booklet giving practical suggestions for traversing the war zone. The regulations cover the berthing of passengers, plugging shell holes, fastening bulkheads, tunnels, doors and other vital parts.

* * *

Since the maintenance of the nation's gold output has such an important bearing on finance, there will be no curtailment of gold mining activities in the effort to curtail nonessential output to release fuel, materials and labor for important uses.

* * *

After President Wilson signs the railroad bill, one of the first acts of the railroad administration will involve the expenditure of approximately $100,000,000 for about 2700 locomotives and 45,000 freight cars, distributed among American builders.

* * *

The food administration is delighted with Ohio's action in placing $1,000,000 in banks to loan to farmers for farm tractors and the opening of a tractor school at Columbus. It is hoped other states will encourage greater use of tractors to aid farm production and offset losses in the labor supply.

* * *

A strike of rivet headers at Lorain, O., was averted recently by intervention of the department of labor, and pending a ratification of an agreement, 500 men employed in the Elyria, O., plant of the Willys-Overland Co. agreed to return to work March 11.

Starts Ferro Plant

The Seattle Smelting Co., Inc., Seattle, Wash., is making ferromanganese by the electrolytic process. Many transformer troubles prevented successful operation at the start but the work now is under way again and 20 tons of ore are being smelted per day with a 2-ton output of metal. A three-phase, open-top electric furnace of 5 tons capacity is being used. The sources of ore supply are Montana, British Columbia and Oregon. When transportation from the Olympics in Washington has been solved, another field will be opened. A 13,000-volt transformer which steps down to 60 volts is being used. This is the only plant in the west outside of Tacoma that is making ferroalloys The officers of the company are August Mehlhorn Jr., president; Henry G. Runkel, secretary-treasurer, and George W. White, chemical engineer.

Builds Steel Foundry

The La Plant-Choate Williams Co., Cedar Rapids, Iowa, successor to the La Plant-Choate Mfg. Co., will install a 5-ton acid open-hearth furnace for the production of steel castings for its own use and the surplus capacity will be devoted to castings for the jobbing trade. John S. Williams, formerly affiliated with the Commonwealth Steel Co., Granite City, Ill., Gould Coupler Co. and the Welland plant of the Canadian Steel Foundries, Ltd., will have charge of the steel casting department. The new company is incorporated with $150,000 capital, and will commence the erection of new buildings immediately. The officers of the company follow: President, E. W. La Plant; vice president, John S. Williams, and secretary and treasurer, R. E. Choate.

The annual meeting of the Worcester branch, National Metal Trades association, will take place in Mechanics' hall in that city, Thursday evening, March 28. Jerome R. George, chief engineer of the Morgan Construction Co., and a councilor of the national association, is president of the branch.

The Walter A. Zelnicker Co., St. Louis, is at the present time distributing bulletin No. 235-238 devoted to specifications of rails, locomotives, cars, tanks, machinery, steel piling, etc., held in stock by that company.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

M. H. ANDERSON is now actively engaged in the production of war materials in the capacity of operating vice president of the Symington-Anderson Co., Rochester, N. Y. Mr. Anderson is in charge of the new gun shop of the Symington-Anderson Co. which was described in detail in the Feb. 7 issue of THE IRON TRADE REVIEW. It is believed this plant is one of the most complete and efficient gun shops in existence today. It was built under Mr. Anderson's personal supervision and many of his ideas are incorporated in its construction, arrangement and equipment. Mr. Anderson is a man of wide experience in the manufacturing field. He was associated with the Allis-Chalmers Mfg. Co. for 15 years as superintendent. Subsequently he became connected with the Bethlehem Steel Co. and before leaving this corporation he was in complate charge of all manufacturing. He resigned his position at Bethlehem on March 1, 1917, after eight years' service, in order to become affiliated with the Symington-Anderson Co., which was specifically organized for the execution of a government contract for a large number of 75-millimeter field guns. As previously mentioned in the article in the Feb. 7 issue, which was published with the approval of the war department, the Symington-Anderson Co. will make the guns complete except for the recoil mechicanism and carriages. These will be furnished by other contractors. Mr. Anderson is a man of force and a natural student. With his varied experience at Bethlehem, particularly on ordnance work, he is exceptionally well qualified for the important task in which he is now engaged as vice president and general manager of a gunplant which will be called upon to play a vital part in helping to win the war. Mr. Anderson has complete charge of all operations, shop layout, machinery designs and installation problems. In addition to the gun plant, he is a director of the various other Symington companies.

J. I. Larimer, formerly assistant general superintendent of the Joliet plant of the Illinois Steel Co., Chicago, succeeds as assistant superintendent of the South Works George L. Danforth Jr., who recently was made asistant general superintendent. Charles T. Mason takes Mr. Larimer's former position and J. H. Walsh has been appointed superintendent of rolling mills at the South Works, a newly created title.

A. J. Reuter has been made Portland, Oreg., representative of the Baldwin



M. H. ANDERSON

Locomotive Works, having been transferred from San Francisco.

Allan A. Templeton, president of the Detroit Seamless Steel Tubes Co., is directing the senatorial campaign of Truman H. Newberry.

Albert E. Newton, vice president and general manager of the Reed-Prentice Co., Worcester, Mass., who was in great danger from blood poisoning, has successfully passed the crisis and is recovering.

G. W. Burrell, formerly assistant works manager for the Wellman-Seaver-Morgan Co., Cleveland, has been promoted to the position of works manager to succeed C. A. Boyd, who resigned recently.

Floyd K. Smith has been chosen vice president of the Donner Steel Co., and will assume his new duties about June 1. He was vice president of the Valley Mold & Iron Corp., Sharpsville, Pa., until early this year. Prior to that he was secretary-treasurer of Banning, Cooper & Co., Pittsburgh.

L. K. Diffenderfer, who for several years has been treasurer of the Thomas Iron Co., Hokendauqua, Pa., resigned recently to accept an important position with the Wharton Steel Co., Wharton, N. J.

D. E. Zollner, who formerly had charge of sales in the tool steel department of the Bethlehem Steel Co., in Cleveland, has joined the aviation corps. So far as is known, he is stationed at Columbus.

G. F. Mitchell has resigned as assistant structural sales agent of the Bethlehem Steel Co., Philadelphia, to take charge of the fabricating department of Morris, Wheeler & Co., Philadelphia.

I. E. Edwards has been made works manager of the ingot mold foundry of the Marshall Foundry Co., Josephine, Pa. He recently resigned as chief engineer of the Valley Mold & Iron Corp., Sharpsville, Pa., after 12 years of service.

A. K. Sutherland has been made general superintendent of the Barnes & Kobert Mfg. Co., Milldale, Conn., nuts, bolts, etc. He has been mechanical superintendent of the Trumbull Electric Mfg. Co., Plainville, Conn.

E. B. Winsted resigned recently as general sales agent in northern Illinois and Wisconsin of the Janesville Machine Co., Janesville, Wis. He has been made manager of the Indianapolis branch of the Stover Engine & Mfg. Co., Freeport, Ill.

Harry Stambaugh, who was secretary of the William Tool Co., Youngstown, O., until it was taken over by the United Engineering & Foundry Co., has been appointed assistant treasurer of the Republic Rubber Corp., Youngstown.

Frederick Holbrook, Boston, has been appointed head of the Hog Island shipyard near Philadelphia by Rear Admiral Bowles, who relieved President Dwight Robinson of the American International Corp. of the duty of managing that plant.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

J. LEONARD REPLOGLE at a meeting of the directorate, March 15, tendered his resignation as chairman and director of the Wharton Steel Co., Wharton, N. J. This action, Mr. Replogle explained, was due to the pressure of his duties at Washington as director of steel supply which has made it necessary for him to cut loose from his business connections. W. H. Breevort was elected president of the Wharton Steel Co. to succeed John E. Perry, who resigned as of March 1. Charles B. Ellis was elected a director to succeed Mr. Replogle, and J. H. Hillman Jr. of Pittsburgh, was elected to the other vacancy in the directorate. Mr. Brevoort, the new president of the Wharton Steel Co., previously had no connection with the iron and steel business. For many years he has been prominently identified with gold, copper and silver mining companies in the west.

R. Cairncross Campbell has been appointed by the American International Steel Corp., 120 Broadway, New York, to organize and manage its far eastern department in Tokio, Japan. He will leave shortly and will establish temporary quarters at the Grand hotel, Yokohama.

A. F. Case, when he returns from Europe in April, will assume the duties of engineer in charge of coal handling equipment for Wellman-Seaver-Morgan Co., Cleveland, to succeed Frank E. Hulett, who recently resigned. He formerly assisted Mr. Hulett.

H. L. McKinnon, vice president, C. O. Bartlett & Snow Co., Cleveland, presented a paper on "Sand Conveying Problems", illustrated by lanter slides, at the March meeting of the Pittsburgh Foundrymen's association, held March 18 at the Americus club, Pittsburgh.

S. T. Plimpton, who for 12 years was associated with the Western Electric Co., New York City, and later purchasing agent for the Springfield, Mass., and Plainfield, N. J., factories of the Bosch Magneto Co., has been made purchasing agent for Wellman-Seaver-Morgan Co., Cleveland.

George J. Jackson was recently elected president of the National Conduit & Cable Co. to succeed E. S. Perot. Morton A. Howard was made vice president to succeed E. S. Perot Jr. Mr. Jackson was an important factor in the company prior to its refinancing in 1916, but retired for a time because of ill health.

William A. Klinger, formerly consulting engineer and concrete contractor, Milwaukee, is now located in Washington as designing engineer of reinforced concrete ships with the United States shipping board of the Emergency Fleet corporation. He is secretary of the Concrete Builders' association of Milwaukee.

Charles Piez, vice president and general manager of the Emergency Fleet corporation, will address the twelfth annual meeting and dinner of the National Metal Trades association, Indianapolis branch, at the Claypool hotel, Indianapolis, Monday evening, March 25. Alfred Kauffmann of the Link-Belt Co., Milwaukee, is president of the society.

J. B. Mansfield, who in 1912 became superintendent of the J. E. Bolles Iron & Wire Works, Detroit, and later became vice president, was elected president and general manager at the company's annual meeting recently. J. E. Bolles, who founded the concern 30 years ago and had served as its president since its incorporation, was made chairman of the board.

W. H. Groverman, Minneapolis, was recently named district representative for bituminous and anthracite coal supply on Lake Superior docks as well as those on the western shore of Lake Michigan. He will represent all individual dock companies, facilitate appointments and distribution of coal and supervise prompt and equitable allotment of emergency orders among shippers.

Stanley P. Rockwell, Bristol, Conn., a metallurgist, in charge of eastern territory for the E. F. Houghton Co., Philadelphia, oils and mill supplies, has received a captain's commission in the ordnance reserve corps. He has been assigned to duty in the arsenal at Springfield, Mass. Formerly, Mr. Rockwell was assistant metallurgist for the New Departure Mfg. Co., Bristol, Conn., resigning in December, 1916.

Victor E. Edwards, inventor of mechanical cooling beds, flying shears and other devices for rolling mills, who is vice president of the Morgan Construction Co., Worcester, Mass., has been appointed consulting engineer in the ordnance department of the United States army, at the proving grounds at Aberdeen, Md. He declines to accept a commission and has enlisted for the duration of war.

H. F. Finney, who formerly represented the Chicago and St. Louis territories of the Independent Pneumatic Tube Co., manufacturer of pneumatic tubes and electric drills, has been placed in charge of the company's branch office at Pittsburgh. He succeeds R. T. Scott, who has been promoted to the office of eastern manager with headquarters at 170 Broadway, New York.

John W. Brassington, formerly chief engineer of the American Writing Co., Holyoke, Mass., has resigned as of April 1, to enter the employ of the Emergency Fleet corporation, and John Moles, Erie, Pa., succeeds him. Mr. Brassington assisted in the building of the first American submarine under the direction of Simon Lake at Baltimore in the early nineties.

Landers Sevier, who recently was elected vice president and director of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., began his commercial career in 1887 in a minor position on the Alabama Great Southern railroad, where he has been connected ever since, save for 2½ years when he was general freight agent in the Birmingham district for the Seaboard Air Line railroad. For several years he has been general executive agent of the Southern railway system and his experience fits him to assume the duties of the vice president's office of the Sloss-Sheffield company wherein he will have charge of its transportation problems. Later he probably will take over some of the work in the sales department.

William A. Morgan, resigned recently as vice president and general manager of the Curtiss Aeroplane & Motor Corp., Buffalo, because of ill

health. He retains his position on the board of directors. Shortly after America entered the war, Mr. Morgan sold his interests in the Buffalo Copper & Brass Rolling Mill to the American Brass Co., and retired from business. He took the Curtiss appointment with the understanding that his salary be given the Red Cross. Without waiting for the government to act, he built and financed the present plant, completing construction in 69 days. He resigned on Oct. 1, 1917, and again a few weeks ago, upon his return from California, where he was recuperating. Neither resignation was accepted and two weeks ago he was re-elected.

Iron and Steel Men in War Machine

W. S. Blauvelt, Coke Director, Fuel Administration

WARREN S. BLAUVELT, assistant to Fuel Administrator Garfield, probably has had as much to do with the development of the recovery of coke by-products which since the beginning of the war has become so vital to the country's military as well as commercial interests as any other individual. It was the knowledge he possessed of coal as applied to the coking and by-product industry that led to his appointment. In his present post he decides for the government all questions relating to the distribution of coke fuels, prices of coke in various districts and various methods for conserving the supply of coke and other fuels. Mr. Blauvelt's technical training commenced in a practical way in the Singer Sewing Machine Co.'s shops at Elizabethport, N. J. He left this work to enter the Columbia School of Mines. Before he could be graduated he accepted a position at Asbury Park, N. J., in electrical street railway work, which was in its infancy at that time. He then located in Easton, Pa., continuing in the street railway business and after enrolling in Lafayette College for an engineering course, moved to Great Falls, Mont. While there as well as later in Chicago, he was identified with railway work. When he removed to Detroit in 1897, he entered the employ of the Solvay Process Co., and developed a Mond gas producer plant which had just been introduced in this country from England. In 1901 when the Solvay Process Co. built its first block of 30 by-product Semet-Solvay ovens in Detroit, Mr. Blauvelt was made superintendent of the Solvay Process and the Semet-Solvay companies, retaining that position for about 14 years. Resinging in 1915, he was employed by the Steere Engineering Co., Detroit, and did consulting and engineering work for various companies. Now all his time is given to the government. It was Mr. Blauvelt's idea to stimulate production of by-product coke and the resulting coal tar products so essential to military needs by making the government prices on by-product coke the same as beehive fuel.



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WARREN SCOTT BLAUVELT

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Clear Up Snarls in War Tax Application

NUMEROUS rulings and interpretations handed down by Commissioner Daniel C. Roper of the internal revenue department are beginning to bring some semblance of order out of the bewilderment with which the financial community at first regarded the present war revenue act. With the aid of their lawyers and tax experts, and in many cases with advice from tax collectors, the various corporations which recently have issued their reports for 1917 have been able to arrive at some estimate as to the probable amount of their taxes. In most cases it is believed these estimates will meet with the government's approval, but in others it is possible the federal tax collectors may differ in their ideas of the amount of invested capital and other items. During the past week the treasury department issued a supplement to the excess profits primer giving questions and answers covering returns by individuals and corporations under circumstances not covered by the primer.

Holds to Dividend Ruling

Commissioner Roper also has handed down a definite ruling on income from dividends, in which he refuses to change his position that dividends paid in 1917 out of earnings of previous years are to be regarded as 1917 income of the recipient, and taxable as such. He makes an exception of dividends paid during 1917 in excess of earnings during the period elapsing between Jan. 1, 1917, and the date of the dividend payment. The statement follows in part:

"Thus, if a corporation distributed dividends in 1917, such dividends will be deemed to have been paid from the earnings of 1917, and the recipient, if an individual, will be liable to additional tax, if any, and if a corporation, to income tax, at the rates for the year 1917, unless it is shown to the satisfaction of the commissioner of internal revenue that at the time such dividends were paid, the earnings up to that time were not sufficient to cover the distribution, in which case the excess over the earnings of the taxable year will be deemed to have been paid from the most recently accumulated surplus of prior years, and will be taxed at the rate or rates for the year or years in which earned.

"The rule may be applied as follows: Assume that a corporation with a capital stock of $10,000,000 had surplus earnings of $500,000 a year in excess of the amount of dividends paid, making its total surplus on Dec. 31, 1915, $500,000, and on Dec. 31, 1916, $1,000,000.

"On Dec. 31, 1916, it declared a dividend of 2 per cent, payable Feb. 15, 1917. Unless it is shown to the satisfaction of the commissioner of internal revenue that its earnings from Jan. 1 to Feb. 15 were insufficient for the payment of the $200,000 distributed as a dividend on Feb. 15, the entire amount so distributed will be deemed to have been paid from earnings of 1917, and will be taxable in the hands of the stockholders at the 1917 rate. If, however, it is established to the satisfaction of the commissioner of internal revenue that its earnings up to Feb. 15 were but $100,000, then $100,000, or half of the total dividend paid by the corporation on Feb. 15 would be taxable in the hands of the stockholders at the 1917 rates, and the other half would be deemed to have been paid from the surplus of the corporation of 1916 and would be taxable to the stockholders at the 1916 rate. If the dividend paid on Feb. 15 were of such amount as to exceed the ascertained 1917 earnings up to the date of payment and also the 1916 surplus of the corporation, the amount of such excess would be deemed to have been paid from the surplus of 1915 and would be taxable in the hands of the stockholders at the 1915 rate.

How to Apply Rule

"All dividends received in 1917, even though paid by corporations from earnings of previous years, constitute income to the recipients for 1917. The method of ascertaining the precise rate applicable to such portions of dividends received in 1917 as within the above rules are to be taxable at rates prevailng for previous years, is as follows: The amount of the income of the recipient to which the 1917 rates are applicable is first ascertained. To such amount is then added the amount of income of the recipient liable to tax at the 1916 rates and the table of 1916 rates applied to see in which brackets such income falls; the income liable to 1915 rates then added and the table of 1915 rates applied to it. For instance, an individual has $20,000 of income liable to 1917 rates and $25,000 of dividends liable to 1916 rates. The total would be $45,000, of which $20,000 would be taxable at the 1917 rates, $20,000 to $40,000 at the 1 per cent additional tax rate under the 1916 table and $5000 at the 3 per cent additional tax rate under the same table. If he had another $25,000 dividend liable at 1915 rates, the first $5000 would fall in the bracket between $20,000 and $50,000 at the 1 per cent additional tax rate, and the other $20,000 in the second bracket of $50,000 to $75,000 at the 2 per cent additional tax rate under the 1915 table.

"In order that this office may verify the correctness of the rates, taxpayers reporting dividends received at other than 1917 rates, under the various columns in block F of from 1040 will be required to render a statement at the time of filing the return, or at a subsequent date, showing the corporations from which dividends taking other than 1917 rates were received, with the amount of dividend received from each.

Warning is Sounded

Commissioner Roper also recently warned against bulletins issued by several trade organizations advising their members that increment or appreciation of property values as ascertained by appraisal may be treated as earned surplus or undivided profits and included in invested capital for the purpose of the excess profit tax. He said that the law expressly places the computation of invested capital upon the basis of cash and other property actually put into the business and not upon that of present valuation or appraisal of its assets.

La Belle's Steel Output Greatest in History

Net earnings of the La Belle Iron Works in 1917 were equivalent to 56.5 per cent a share on the $9,915,400 outstanding common stock, as compared with 32.2 per cent in 1916.

The company's annual report, just made public, shows a balance after deducting $5,189,302 excess profits taxes of $6,396,927, against $4,488,601 in the year previous. In 1915 the balance was $927,847, and in 1914 it stood at $273,244. The aggregate

value of shipments for the year was $31,656,268 as compared with $19,598,155 in 1916. The company's comparative income account follows:

	1917	1916
Total income	$14,198,404	$6,434,318
Mining exhaustion, depreciation, etc.	1,406,843	675,565
Net earnings	12,791,560	5,758,752
Inventory reserve	1,200,000	1,000,000
Discount on bonds sold	.....	191,151
Prem. on bonds purch.	5,330	79,000
Excess profit tax	5,189,302	.....
Balance	6,396,927	4,488,601
Dividends	1,983,080	1,388,156
Surplus	4,413,847	3,100,445
Surplus Jan. 1	5,656,763	3,056,318
Exting. lease values	550,000	.....
Balance	9,520,611	6,156,763
General depreciation	.....	500,000
Total surplus	9,520,611	5,656,763

In his report, President R. C. Kirk says:

"While the production of open-hearth steel for the year again exceeded the production during any similar period in the company's history, the tonnage of finished goods produced was less than that for the preceding year. This reduction was due to the greater scrap loss involved in the manufacture of certain war materials and inability of the roads to furnish adequate transportation facilities."

The report shows that pig iron produced in 1917 was 260,182 tons compared with 257,623 in 1916; ingots, 419,491 tons against 416,783 tons; billets and slabs, 350,053 tons against 350,426 tons; finished material, 394,249 tons against 416,827 tons.

The company produced during the year 364,940 tons of iron ore, an increase of 3.4 per cent over the previous year. The by-product coke plant of 94 ovens placed in operation March 1, 1917, produced 307,103 net tons of furnace coke, 4,254,194 gallons of tar, 5499 net tons of sulphate of ammonia, 669,320 gallons of benzol and 179,023 gallons of toluol. During the year the company acquired 3581 acres of steam coal in West Virginia and 3045 of coke lands in Pennsylvania.

Expects Post-War Demand

In 1917 the net earnings of the National Acme Co., Cleveland, were $3,664,301. This is equal to $7.32 a share or 14.65 per cent, after allowing $1,500,000 for federal taxes. Net sales totaled $16,630,563, and the net profit from operations was $5,218,984. From this last figure, $109,851 was deducted covering royalties paid, bad debts and experimental expense, and $56,068 was added covering royalties received, interest and exchange, etc.

President W. D. B. Alexander in the annual report says in part: "Following the close of the war the indications are excellent for a good foreign business, both in Gridley and Acme screw machines. It is estimated that the demand will continue for two or three years at least, after which general world conditions then prevailing will presumably govern as to the future demand."

Nova Scotia Gain Large

A consolidated statement of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., and its subsidiary the Eastern Car Co., shows total current assets in excess of liabilities of over $10,000,000. Combined profits from operations, after depreciation, interest charges, etc., for the year ended Dec. 31, 1917, totaled $3,069,449. Net profits of $2,093,336 remained after making allowance for income tax, commissions, discounts, etc. After interest on bonds of both companies, bank loans, etc., the net gain was reduced to $1,340,477, which added to the Jan. 1, 1917, surplus of $3,532,114 made the total surplus $4,872,592. Dividends paid totaled $3,142,500 leaving a surplus of $1,730,092 to be carried.

Earnings Are Reduced

The Yale & Towne Mfg. Co., Stamford, Conn., reports net earnings of $2,867,510 for the year 1917, compared with $3,386,426 in 1916. Net profits were $1,989,991, or $40.21 a share, compared with $2,723,847, equal to $57.56 a share, for the previous year. Dividends were $989,614 compared with $1,513,539 in 1916. The income accounts compare as follows:

Official Changes Made by Sloss-Sheffield

Directors of the Sloss-Sheffield Steel & Iron Co. last week elected Waddilll Catchings chairman of the board, succeeding Col. J. C. Maben. Mr. Catchings recently resigned as president of the company to enter the banking house of Goldman, Sachs & Co., New York. The directors likewise elected Landers Sevier, to the vice presidency. Mr. Sevier previously was made a director. Other officers re-elected are: President, J. W. McQueen; secretary and treasurer, Russell Hunt; assistant secretary and assistant treasurer, Charles J. Farrell; assistant treasurer, L. D. Burr; auditor, Hugh Franklin. President McQueen, in a statement to stockholders, expressed belief that the outlook for the company in 1918 was good, despite the uncertain conditions. The statement in part follows:

"The past year has been one presenting extreme difficulties in your company's operations. Interruptions in transportation made it impossible for the company to ship large quantities of pig iron on hand which had been sold and which was urgently needed by the buyers. Other conditions affected operations in a marked way. The abnormal conditions affecting your company's operations during the year seemed to your management to necessitate the maintenance of your company in a strong cash position, particularly in view of the early maturity of a portion of your company's only bonded indebtedness of $4,000,000. Therefore, your management deemed it prudent to be conservatice in respect to its dividend policy.

Radiator Net Increased

Appreciable progress was made by the American Radiator Co. in its profit record during 1917. Net profits, after providing $1,000,000 for federal taxes and after all other deductions, totaled $3,261,871 as against $2,604,067 in 1916. In his statement to stockholders, President C. M. Wolley said:

The profits of the Canadian, English, French and Italian companies aggregated $932,356 and the combined net profits of the parent and constituent companies were $4,214,427. The profits of the parent company were equivalent to 24.8 per cent on the common stock, and the combined profits to 32.6 per cent.

President Wolley says: "It is obvious that on the downward swing of commodity prices, if such shall take place, a heavy loss may be incurred in materials and product meanwhile accumulated and the company during the last three years of ascending costs has accumulated a reserve of $1,250,000 to maintain the integrity of its inventories.

"The company's cash balance Dec 31 was $2,681,155 and during the year improvements were made in the sum of $1,490,166."

Earnings Show Increase

With an increase of $281,002 over the net earnings of 1916, the United States Cast Iron Pipe & Foundry Co. reports net earnings for 1917 of $1,820,744. After all charges and deductions, the balance for the year is $1,324,140 which is equal to $11.18 a share on $12,000,000 preferred stock, against $10.90 a share in 1916. While $144,000 was reserved for depreciation in 1916, in 1917 this was increased to $403,640. A comparative income account follows:

	1917	1916
Net earnings	$1,820,744	$1,539,742
Other income	42,351	30,154
Total income	$1,863,095	$1,569,896
Depreciation reserve	403,640	144,000
Interest	117,314	117,255
Balance	$1,324,140	$1,308,641

Await Greater Ordnance Production

Machine Industry Sees Indication of Heavier Buying of Equipment and Wider Distribution of War Orders to the West in Munition Zone Plan— Demand for Light Tools Continues Steady

RECENT developments in the war situation are reflected by the attitude of machinery dealers, who express the belief that munition and ordnance work will not only continue but will be greatly extended in the next few months. Eastern arms factories as indicated last week are absorbing the business involved in supplying the Browning gun, and although new equipment will be required, the fact that the machine gun requires few operations other than those performed in making rifles probably will limit the tool demand in this field. A shifting of war contracts westward is indicated by the fact that central western machine shops are being urged to perfect and extend their equipment, and by the opinion expressed in many quarters that eastern plants are booked to capacity. The plan under consideration for the creation of 10 munition zones is believed suggestive of this condition. This decentralization also would indicate the westward trend of impending orders. Buying is limited where private enterprise is the motive, and the high prices and shipping conditions probably serve to aggravate this tendency. The light tool demand continues scattered but consistent.

Intensified interest in the paramount shipping problem is resulting in more projected shipyards. The senate commerce committee which is approaching the end of an extended investigation of the ship problem will make recommendations for new yards which will require extensive crane equipment. Wilmington, N. C., and Brunswick, Ga., are points mentioned as the probable locations for shipbuilding plants. The present crane demand is light, following the extensive inquiry which terminated in bids received by the navy department last week.

New Munition Orders to be Distributed Westward

THE eastern machine tool market is characterized by a steady, even flow of inquiry. Although a few fairly large lists are appearing, demand is made up for the most part by small lots needed by manufacturers in replacing old machines and in rounding out equipment. Some machinery is being bought quietly by the companies holding contracts for the manufacture of Browning machine guns, but the extent of these purchases is not known. It is believed, however, that the total number of new tools to be purchased will be relatively small, as considerable equipment used in the production of rifles will be devoted to this work. Of the companies working on Browning gun contracts, the Colt's Patent Fire Arms Co., Hartford, Conn., is understood to be the latest to close on additional equipment.

War Orders Shift Westward

While there still are a number of miscellaneous inquiries, the eastern machine tool market now appears to be the slowest in some time. This is accounted for in a large measure by the gradual shifting of war contracts from the east to the west, where plants are not so heavily booked. In line with this policy of wider distribution of contracts, the war department recently announced the establishment of munition zones, which embrace the chief industrial centers of the country. There are 10 of these zones with headquarters established as far west as Chicago. This, it is believed, will not only make for decentralization, but will bring the government in closer contact with the manufacturers.

Rumors still persist that contracts for heavy artillery will be placed shortly, which not only will result in considerable expansion among plants in the east, but will, in some instances, bring about the establishment of entire new plants. Nevertheless, no marked increase in demand in this market is anticipated for the immediate future. Several dealers have advanced their prices on sensitive drills 10 per cent.

Miscellaneous New Government Work Impends

The large inquiry which recently was put out by the Wright-Martin Aircraft Corp. for equipment for its New Brunswick, N. J., plant, has not as yet been closed. This is practically the only large list in the eastern machine tool market at this time. The gas defense service of the government has established a plant at Long Island City, N. Y., and recently has purchased several miscellaneous tools. The Brooklyn navy yard is inquiring for a couple of punching machines and other equipment. Considerable interest is manifested in some of the items carried in the naval appropriation bill, which recently was approved by the house committee on naval affairs. Included in the appropriations are $48,309,520 for new naval batteries and $24,194,045 for other ordnance. The establishment of a $4,000,000 drydock at Charleston, S. C., is proposed in the bill; also a $300,000 power house at Philadelphia and $200,000 power house at New York. Another yard at Charleston, S. C., is to be established by the shipping board for the construction of merchant vessels.

The senate commerce committee, it is understood, will ask for an appropriation for two additional shipyards along the Atlantic coast, Wilmington, N. C., and Brunswick, Ga., being mentioned as possible sites. It is proposed that one of these yards shall be owned and operated by the government, and the other, perhaps, will be erected by private owners under a contract similar to that drawn up for the Hog Island plant. The Baltimore Dry Dock & Shipbuilding Co., Baltimore, has been awarded a government contract for the construction of six steel tankers of 6000 tons deadweight capacity. The Baltimore company recently purchased some new equipment, and



A three-thousand-year-old quality standard, religiously adhered to, and up-to-the-minute manufacturing methods are responsible for Agathon successes.

In three short years Agathon Alloys have risen from a mere name to their present position of eminent supremacy.

Agathon Steels will serve your purpose best.

AGATHON Nickel Steels
AGATHON Chrome Nickel
AGATHON Chrome Steel
AGATHON Chrome Vanadium
AGATHON Vanadium
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AGATHON Special Analyses

The Central Steel Company

Massillon, Ohio

Sales Offices

Detroit Office: 326-27-28 Ford Bldg. F. Walter Guibert, District Representative.

Cleveland Office: Hickox Building. The Hamill-Hickox Company, District Representatives.

Chicago Office: 1370 People's Gas Bldg. 122 S. Michigan Blvd. C. H. Beach, District Representative.

Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager.

Syracuse Office: 621 University Blk. T. B. Davies, District Sales Manager.

J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.

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is understood to still be in the market. The United States Rubber Co. has purchased, for a consideration of $500,000, the plant of the American Locomotive Co. at Providence, R. I., which formerly manufactured automobiles, but recently has abandoned this work. The Uniontown Foundry Co., recently organized, will build a foundry at Uniontown, Pa.

Crane Demand is Light

Demand for cranes at this time continues light, although a fair amount of business is before the market. The Pennsylvania railroad has not closed as yet on its inquiry for one five and one 10-ton electric crane, neither has it placed the 336 one-ton jib cranes recently inquired upon for the government for shipment to France. No announcement has been made by the government relative to the allotment of cranes, on which bids were opened March 11, The Stone & Webster Co., Boston, is inquiring for a coal handling crane, with a 2-ton bucket, for the Buffalo General Electric. The General Electric Co., Schenectady, N. Y., is in the market for several electric cranes, of five to 15 tons capacity for its plants at Everett and West Lynn, Mass. The General Electric Co. recently closed on a 20-ton electric crane, with a 20-ton main hoist and 5-ton auxiliary, for its Everett plant, this business going to the Northern Engineering Works, Detroit. This latter company has just received an order for three 15-ton electric cranes from the Vulcan Iron Works, Jersey City, N. J. The Morgan Engineering Co., Alliance, O., has been awarded a contract by the Tindel Morris Co., Eddystone, Pa., for one 60-ton and two 10-ton electric cranes.

Light Machine Orders Predominate

SUBCONTRACTORS and those who recently have received orders for airplane work and motor parts furnish the bulk of the inquiries for light machinery in the Cleveland district. During the present week a number of contracts passed verbally during the last two weeks have been executed. One jobber reports $62,000 in orders for small multiple spindle drills. Anticipated munition orders are the basis upon which a number of machines of various classes are held on option, one large order being held in abeyance pending a letting which has been postponed in Washington. Delivery conditions remain most unsatisfactory in this district. Inquiries for heavy forging equipment, it is stated by one dealer, indicate the development of a new condition in ordnance manufacturing. Eastern manufacturers have absorbed the greater part of the early light ordnance and munition orders, and the heavy ordnance work which is contemplated will probably be carried out by middle western plants. A 48-inch boring mill is inquired for by Heppenstall Forge & Knife Co., Pittsburgh. Rickert-Shafer Co., Erie, Pa., is in the market for a universal grinder. The Bedford Foundry & Machinery Co., Bedford, Ind., has inquired for an 1100-pound steam hammer. The Borden Co., Warren, O., desires one Potter & Johnson automatic machine. The Keystone Driller Co., Beaver Falls, Pa., wishes an 1100-pound steam hammer, and C. A. Turner, Inc., Pittsburgh, is inquiring for a 1500-pound steam hammer.

Enlarge Potential Munition Plants in Chicago

MACHINERY dealers in the Chicago market find a continued quiet market, most inquiry and selling being of lighter equipment and single tools or small lots. The aggregate of this dealing is fairly large but does not compare with the total involved in sales of former months, when large installations were being bought. A tendency has become manifest for concerns equipped for making shells and gun carriages to accede to the request of the government and enlarge their facilities further, some even doubling their equipment along these lines. An instance of this is the Winslow Bros. Co., which is about ready to begin work on a large government contract and is seeking equipment for practically double the capacity now provided. The projected munition plants which have been under consideration in a vague way for this city have not materialized and inquiries as to possibilities of obtaining equipment have not been acted on. Some concerns preparing to enter the munition field are delayed by nonarrival of material and machinery.

Pittsburgh Consumers Await Government Prices

DOMESTIC buying of machinery and machine tools is extremely limited in the Pittsburgh district. Sellers continue to receive inquiries on government business, a considerable portion of which involves cranes for munition plants. Shipments from plants are better and it is believed that after the government has acted on prices for iron and steel products on April 1, private consumers will come into the market more freely. Buying has been withheld by them on account of high prices and deferred deliveries.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

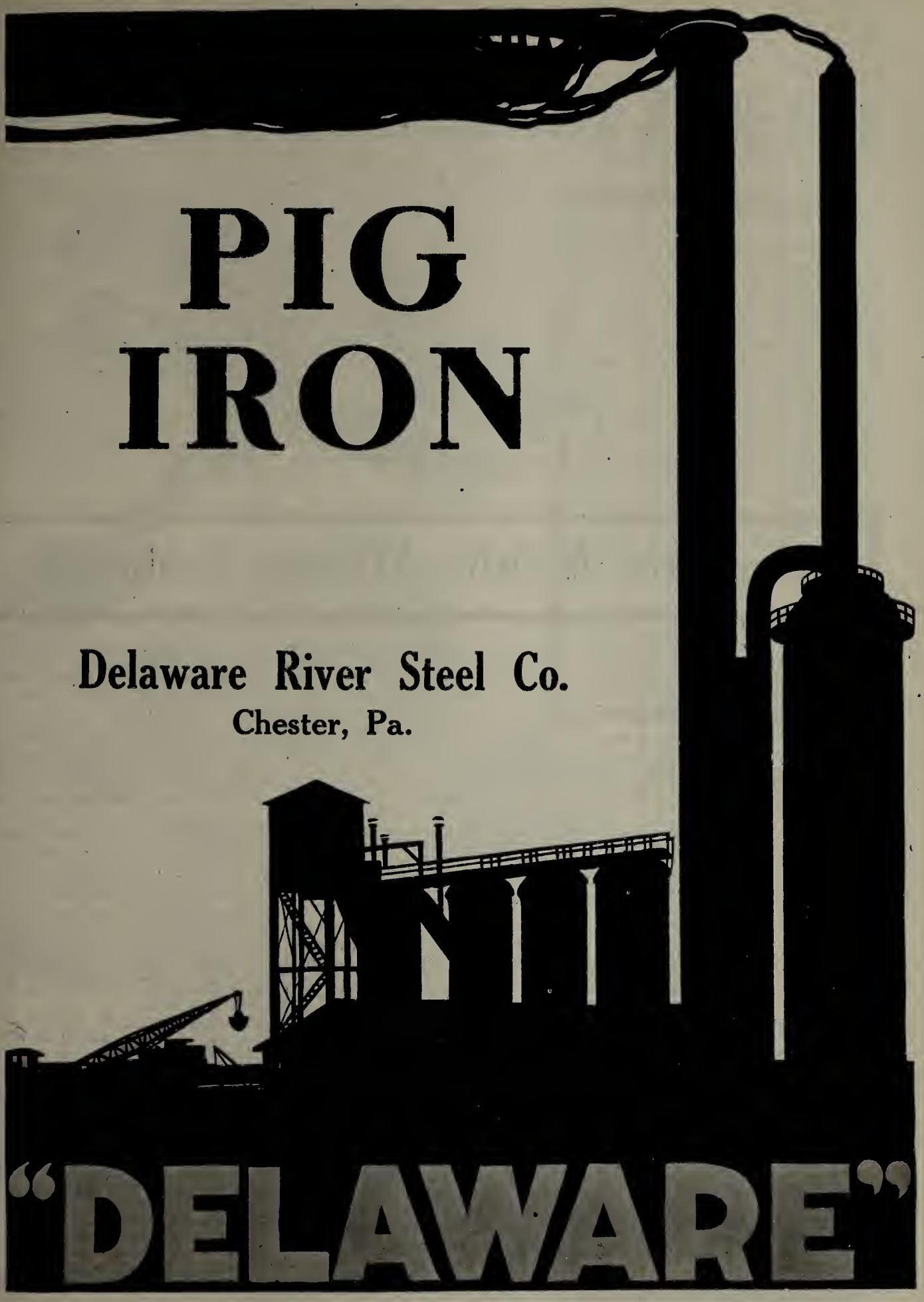
AUGUSTA, ME.—The Shand Safety Window Hardware Co. has been incorporated to manufacture building materials with $300,000 capital, by E. M. Leavitt and Ernest L. McLean.

PORTLAND, ME.—The Dorr Miller Differential Co. has been incorporated to manufacture appliances, devices, machinery, etc., for railroads, automobiles and trucks, with $750,000 capital. George T. Spear and Frederick V. Chase are interested.

ATTLEBORO, MASS.—New bids will be received by F. P. Sheldon & Son, engineers, Providence, R. I., on the proposed $50,000 pattern storage building to be erected for the Howard & Bullough-American Machine Co. Plans call for the construction of a 2-story building, 74 x 400 feet.

BOOTHBAY HARBOR, ME.—The M. & M. Machinery Co. has been incorporated with a capital of $5000 to manufacture machinery, by Ernest F. Merrow and Simon P. MacAskill, Boothbay Harbor, and Harold K. Merrow, Hyde Park, Mass.

BOSTON.—The Fire Protection Securities Co. has been incorporated to manufacture all kinds of machinery and appliances to protect



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buildings from fire. The company was organized with $5000 capital, by L. W. Gale, Frederick H. Nash and W. R. Pond.

BOSTON.—The Jalisco Mining Co. has been incorporated with $100,000 capital by Harry N. Canoll, V. H. Mayr and M. A. Maguire.

BOSTON.—The J. L. Bertsch Co. has been incorporated to manufacture gas and electric fixtures, etc., with $15,000 capital, by Joseph L. Bertsch, R. B. Walsh and J. J. Murphy.

BOSTON.—The Boston Metal Works Inc. has been incorporated with $7500 capital by A. G. Decatur, Arthur J. Driscoll and G. N. Canata.

BOSTON.—The Consolidated Mfg. Co. has been incorporated with $50,000 capital by Samuel Bergson, Harry Bergson and F. A. Cleary.

BOSTON.—The Centrifugal Gun Corp. has been incorporated to manufacture munitions with $1,000,000 capital by Frank L. Jones, Somerville, Mass.; Edwin C. Fisher and Earle L. Ovington, Newton, Mass.

BROOKFIELD, MASS.—The power station of the Warren, Brookfield & Spencer street railway was damaged by fire March 4, with a loss of $75,000.

SPRINGFIELD, MASS. — The Gilbert & Barker Mfg. Co., pumping equipment, has purchased a large tract of land, valued at $11,500, adjoining its plant, and will build an addition for the making of war products.

WALPOLE, MASS.—Lockwood, Green & Co., engineers, Boston, have awarded the general contract for the erection of an addition to the plant of the Lewis Mfg. Co. to W. J. Bishop, Boston.

WESTFIELD, MASS. — The Hamilton Abrasive Co., which has been incorporated with $50,000 capital by F. D. Hamilton, Louis M. Fuller and H. B. Putnam, will build a brick, concrete and steel, fireproof, 40 x 200-foot factory, a 2-story, 32 x 50-foot crushing plant and other plant additions.

EAST GREENWICH, R. I.—The Gallaudet Aircraft Corp. has let the contract for a mill construction, 1-story, 180 x 200-foot machine shop, a 2-story, 25 x 52-foot addition to its machine shop, and two other 1-story additions to its manufacturing plant on Chepiwanexet island, to cost $55,000.

EAST PROVIDENCE, R. I.—Fire in the forge building of the Eastern Bolt & Nut Co., March 8, which was engaged in war work, caused several thousand dollars damage.

BRIDGEPORT, CONN. — The Remington Arms-Union Metallic Cartridge Co. has let the contract for a brick, 1-story, 61 x 417-foot addition to its factory on Seaview avenue, to cost $30,000.

BRIDGEPORT, CONN. — The Yalelmus Corp. of New Jersey will build a 2-story factory building at 128 Thompson street.

BRISTOL, CONN.—The plant of the Peck & Young Mfg. Co. was damaged by fire with a loss of $8000 March 11.

HARTFORD, CONN. — The Capital City Lumber Co. will erect additions to its plant, to cost in all $30,000. The proposed work calls for the erection of three 2-story buildings, 32 x 72 feet, 38 x 53 feet and 38 x 22 feet, respectively; also a 1-story building, 31 x 75 feet. Ford, Buck & Sheldon are the engineers in charge of the work.

NEW BRITAIN, CONN.—The tinning room at the plant of Landers, Frary & Clark was damaged by fire March 11 with a loss of $5000.

NEW LONDON, CONN.—Plans are being drawn for a brick, 1-story, 60 x 148-foot storage battery building for the government at the submarine base.

WATERBURY, CONN. — The Waterbury Electrical Repair & Engineering Co. has been incorporated with $10,000 capital by Leon M. Mitchell, Frank Clearwater and George V. Bird.

WATERFORD, CONN. — The Connecticut Ship Building Co. has been incorporated with $500,000 capital by Emaraw J. Eaton, Jonathan Starr and John J. Lawless, New London, Conn.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Brooklyn Union Gas Co., 176 Remsen street, has had plans prepared by the Bartlett-Hayward Co., 100 Broadway, New York, for an oil tank building to cost $8000. The structure will be 73 x 95 feet.

BROOKLYN, N. Y.—The George W. Baker Shoe Co. has purchased a site on Third avenue, between Baltic & Warren streets, for a plant to cost approximately $200,000. The tentative plans are being drawn for a structure, 50 x 200 feet.

BROOKLYN, N. Y.—A charter of incorporation has been granted to the A. Bassett Iron & Wire Works, capitalized at $10,000. The incorporators include Alexander Bassett, care of the company, Edward Breit and Solomon Schub.

BUFFALO.—The Buffalo Wagon Works will build an addition to its plant. Joseph A. Brown, architect, is drawing plans calling for a 2-story structure, 11 x 50 and 33 x 43 feet.

BUFFALO.—The Westinghouse Electric & Mfg. Co. is planning to build a plant 145 x 280 feet to replace the one which was recently damaged by fire.

BUFFALO.—The Hesshin Boiler & Tractor Corp. will build a plant soon. Address George E. Smith or Edward H. Butler, Buffalo, N. Y.

BUFFALO. — The Automotive Engineering Trefts and John C. Trefts, Hamburg, N. Y., Corp. has been chartered to manufacture carburetors, motors and engines. The capital is $125,000 and the incorporators are H. R. H. Richards, E. McM. Mills and H. C. Spratt.

BUFFALO.—The Brown Car Wheel Works Inc. has been granted a charter to manufacture car wheels. The capital stock is $500,000. Howard G. Brown, Buffalo; George M. are incorporators.

CITY ISLAND, L. I., N. Y.—Kyle & Purdy, yacht builders, will erect a $150,000 addition to their shipyard. J. Robert Kaplan, architect, has filed plans recently, calling for a 3-story hollow-tile building, 155 x 180 feet.

EAST MT. VERNON, N. Y.—The Triplex Safety Co. is having plans drawn for a factory and office building, to cost $50,000. Charles Ward Hall, 140 Nassau street, New York, will be in charge of the construction.

CORTLAND, N. Y.—The Cortland Specialty Co. will erect an $8000 addition to its chemical plant. The proposed structure will be one and two stories, 67 x 177 feet.

FREEPORT, L. I., N. Y. — Plans have been prepared for a factory to be 1-story, 55 x 100 feet, for the Columbia Bronze Corp. The structure will cost $15,000. Contract has been awarded to William G. Miller, Inc., 24 South Grove street.

NEW YORK. — The Dukeshire Steel & Forge Co., Inc., has been organized with $25,000 capital to engage in the manufacture of iron and steel forgings. The incorporators include W. F. Dukeshire, W. B. Dukeshire and B. F. Schwartz, 299 Broadway, New York.

NEW YORK.—The Putnam Mining Corp. has been chartered with $250,000 capital to engage in a mining, quarrying and metallurgical business. The incorporators are C. S. G. Fettretch, 3089 Broadway; A. Grometstein, 570 West 156th street, and others.

NEW YORK.—A charter of incorporation has been granted to the Hidalgo Steel Co., Inc., organized with a capital of $30,000 to manufacture machinery and hardware. The incorporators are A. F. Zoeller, H. H. Meyer, 253 Broadway, and E. H. Wells, 150 Nassau street, New York.

NIAGARA FALLS, N. Y.—The International railroad plans to remodel its machine and repair shops at the foot of Spruce avenue. L. C. Connette, Ellicott square, Buffalo, is president of the company.

NORTH TONAWANDA, N. Y.—The Wagenschuetz Hardware Co. has been incorporated with a capital of $20,000. The incorporators are L. A. Wilke, F. F. and G. Wagenschuetz, and others.

PHOENIX, N. Y.—The Three Rivers Machine, Tool & Die Corp. has been organized with $30,000 capital to take over the plant of the Oswego Machine, Tool & Die Works. The officers of the new company are Maxwell R. Karge, president, Charles F. Loomis, secretary and treasurer, and others.

POUGHKEEPSIE, N. Y.—The Ideal Tool

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts, Washington:

One boring and drilling machine;
One vertical boring mill;
One planer;
One crank slotting machine;
Three crank shapers;
Two upright drilling machines;
One radial drill;
One gap grinding machine;
Two emery grinders;
One hacksaw;
Several engine, extension turret, and buffing lathes;
One pipe expanding and flanging machine.

These tools are listed under schedule number 1732 and are to be delivered at Philadelphia. The date of opening is not specified.

THE NATION IS COUNTING ON SPEED



—Speed in the air, on the land, and on the sea—on the battlefields of France, in the munition factories of our great cities—and on the vast agricultural fields of the country. Everywhere we must have SPEED—and then MORE SPEED.

And wherever extra speed is applied, there will be an unusual strain or exertion which must be met. Ordinary machines will not do—we are at war—we must have machines that will be able to keep up the pace set by the wheels of war.

TODAY—whether you are building airplanes, motor trucks or farm tractors, you must have castings of exceptional quality—you must have castings built to meet SPEED STRAINS.

SPECIFY OHIO STEEL CASTINGS and YOU WILL NOT BE DISAPPOINTED.

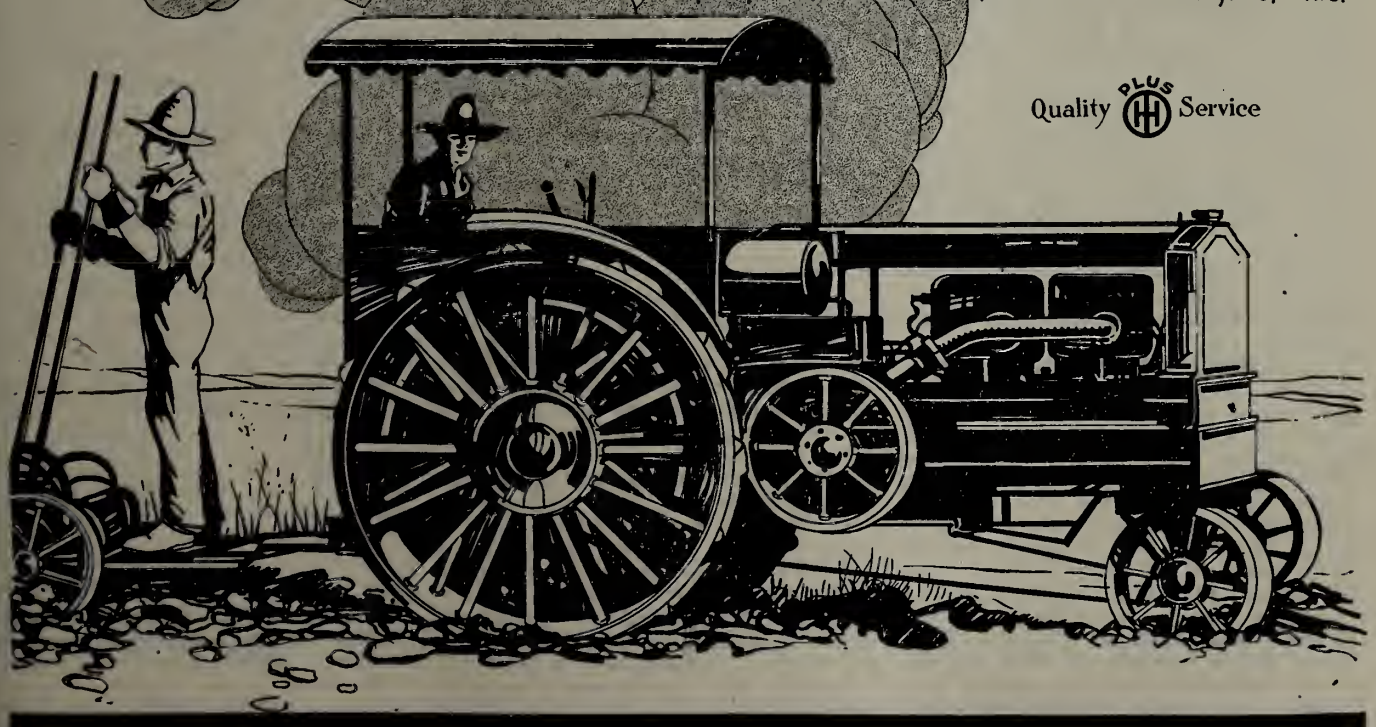
Let us figure on your requirements.

The Ohio Steel Foundry Co.

PLANTS

Springfield, Ohio Lima, Ohio Bucyrus, Ohio.

Quality PLUS Service



& Machine Co. has increased its capital from $10,000 to $25,000.

ROCHESTER, N. Y.—The Castle-Wilmot Co., 800 St. Paul street, has had plans prepared by O. W. Dryer, architect, Cutler building, for a 2-story factory addition, 28 x 124 feet, and a 1 and 2-story addition, 14 x 60 feet in size.

UTICA, N. Y.—The Genesee Motor Car Co. has increased its capital from $5000 to $100,000.

YONKERS, N. Y.—The Continental Shipbuilding Co. has leased waterfront property at Ludlow Station, opposite Yonkers, for the building of wooden ships. The property contains three acres of upper land, one acre under water, a dock and other structures. S. P. Masten is president of the company.

CORRY, PA.—The plant of the Raymond Mfg. Co. was damaged by fire recently. The company held contracts for the manufacture of springs for Curtis airplanes.

HILLSVILLE, PA.—The crusher building and trestle at the plant of the Union Limestone Co. have been severely damaged by fire, the loss being estimated at several thousand dollars. The damage will be repaired at once.

KITTANNING, PA.—The Kittanning Iron & Steel Co. has taken over the plant of the Kittanning Plate Glass Co., which it will equip as an addition to its plant.

MILTON, PA. — The Milton Mfg. Co., maker of pressed steel products, has awarded to Sauers & Moore, 66 Broadway, New York, the general contract for a 1-story pump house, 30 x 92 feet, to cost $10,000.

PHILADELPHIA. — Bids were received March 7 by Samuel T. Wagner, engineer, for the construction of an engine house and machine shop, to be built by the Philadelphia & Reading railroad.

SHARON, PA.—The Sharon Waterworks Co. plans to build a bridge with 70-foot spans. The estimated cost is from $40,000 to $50,000.

EAST ORANGE, N. J.—The Union Drawn Steel Co. has been incorporated with $1,500,000 capital stock to manufacture steel products. F. H. Advence, Poughkeepsie, N. Y.; Thomas McConnell and Samuel Heppenstall, Pittsburgh, are the incorporators.

ELIZABETH, N. J.—Levering & Garrigues, 652 West Twenty-third street, New York, have been awarded the general contract for a 1 and 2-story plant addition, 160 x 440 feet, for the Duesenberg Motors Corp. J. M. Didrickson is architect.

ELIZABETH, N. J.—The Stubner Chemical Works Inc. has been incorporated with $100,000 capital to manufacture chemicals. C. L. Rimlinger, M. M. Clancy and C. M. Egner, Wilmington, Del., are incorporators.

GIBBSTOWN, N. J.—A portion of the plant of the Du Pont Powder Co. was damaged by fire recently, with a loss of $60,000.

HOBOKEN, N. J. — The National Tube Co. has increased its capital stock from $80,000,000 to $85,000,000.

MAYS LANDING, N. J.—The Bethlehem Steel Co. has begun the work of constructing the big plant for the Atlantic Loading Co. The plant will be operated under the immediate direction of the government.

NEWARK, N. J.—The American Thermostat Co. has been chartered with $125,000 capital to manufacture thermostats. Albert S. Bevens, Louis Hodecker and Donald W. Smith are incorporators.

PASSAIC, N. J.—The National Anode Co. has been incorporated with a capital of $100,000 to manufacture copper castings. The incorporators are Albert R. Bray, William F. Rothlisberger, Newark, N. J., and others.

WILMINGTON, DEL.—Preliminary plans have been completed for a $10,000,000 plant to be erected in this city by the Sugar Refining Co. J. H. Ott & Co., 1731 Real Estate Trust building, Philadelphia, will be in charge of construction.

HAGERSTOWN, MD.—The Western Maryland Railroad Co. has awarded to the Price Construction Co., Baltimore, the general contract for the erection of a $10,000 addition to its driving wheel shop.

PERRYVILLE, MD.—The Atlas Powder Co. will erect a $7,000,000 powder plant at this point. The F. T. Ley Co., Inc., 19 West Forty-fourth street, New York, is engineer and builder.

Activities in the Central States

ANTIGO, WIS.—Joseph Sharon Jr. contemplates building a plant for the manufacture of a patented steel testing frame for automobiles.

APPLETON, WIS.—The city commission has received from the war department the plans submitted for the proposed new Lawe street bridge over the Fox river. Arrangements are being made to call for bids early in April. The bridge will cost between $20,000 and $25,000.

APPLETON, WIS.—The Reliance Motor Truck Co. has awarded contracts for the erection of a one-story brick and steel factory building, 75 x 300 feet, and equipment is now being purchased. T. M. Purtell, 821 College avenue, Appleton, is secretary of the company.

BELOIT, WIS.—The N. B. Gaston & Sons Co., manufacturer of scales, is building an addition to its forge shops, machine shops and foundry.

BRODHEAD, WIS.—The Power Engineering Co., Minneapolis, has been engaged by the city to prepare plans for the reconstruction and enlargement of the existing hydroelectric light and power plant at a cost of about $35,000. A new flume and concrete power house, with a new water wheel and generator of the umbrella type are provided for. The system will be changed from direct current to alternating current.

GREEN BAY, WIS.—The Northwest Engineering Works has leased the machine shop of the Hartman-Greiling Co. which it will enlarge for the fabrication of steel. The company has also awarded to the Ludolf M. Hansen Co. the contract for the erection of a new boiler shop and an addition to the one now in use. The new building will be 30 x 100 feet in size, of steel and concrete construction.

LOWELL, WIS.—The Lowell Light & Power Co., W. S. Pease, general manager, will construct about 8 miles of transmission lines this year.

MARINETTE, WIS. — The Weidemann-Lindem Co., lumber manufacturer, will build a 2-story addition to its mill and factory.

MARSHFIELD, WIS.—The Winona Oil Co., Winona, Minn., plans to build a warehouse and tank system of 50,000 gallons capacity. Louis Crossen is local manager.

MILWAUKEE.—Improvements costing more than $200,000, including a complete new electrically-operated coal-handling bridge, will be made by the Milwaukee-Western Fuel Co. at its coal dock, Sixteenth and Canal streets, in the Menomonee valley. A contract has been awarded to the Mead-Morrison Co., Boston, for installing the new equipment. In addition, the company has awarded contracts for the erection of 600 feet of coal hoppers and a new fireproof building to contain a machine shop, blacksmith shop, and repair shop. The work is to be completed in time for the opening of navigation.

MILWAUKEE.—Bids received March 2 for the construction of a 3-span reinforced concrete bridge over the Milwaukee river at Green Tree road, have been rejcted and new bids will be asked. The bridge will have one 70-foot and two 60-foot arches.

MILWAUKEE.—Articles of incorporation have been filed by the United States Smelting Works. The capital stock is $10,000 and C. Brabant and F. E. Jenkins are the incorporators.

MILWAUKEE.—The owners will rebuild the light manufacturing building at 222-224 Fourth street, occupied by the A. C. Electric & Novelty Co., which was badly damaged by fire recently. The A. C. company will need much new equipment.

NIAGARA, WIS.—W. S. Shields, consulting engineer, 8 South Dearborn street, Chicago, is preparing plans and will soon take bids for the improvement of the local waterworks and sewer system at a cost of $45,000. A new pumping plant, a 50,000-gallon reservoir, and several motor-driven centrifugal pumps will be required.

CADILLAC, MICH. — The Acme Motor Truck Co. plans to build a 2-story addition to its plant.

CHARLOTTE, MICH.—The Hancock Mfg. Co., manufacturer of brass specialties, has increased its capitalization from $100,000 to $200,000.

DOWAGIAC, MICH.—The Rudy Furnace Co. will erect a molding room 60 x 100 feet and a main plant addition 100 x 100 feet in size.

DETROIT.—The Flower & Stevenson Mfg. Co., Clayton and Parkinson streets, will build a foundry addition to cost $180,000.

DETROIT.—The C. Kline Forge Co., 64 St. Aubin street, will build a forge shop costing $30,000. A. Clubb Jr., 117 West Fort street, is architect.

DETROIT.—The Michigan Stamping Co., Mack street, will build a 1-story pickling plant.

ECORSE, MICH.—The Ecorse Foundry & Machine Co. has increased its capital from $200,000 to $500,000 to provide for expansion of its plant.

GRAND RAPIDS, MICH. — The foundry and machine shop of Butterworth & Lowe, 217 Huron street, have been damaged severely



The World Is Still Young

Half the world's population still depends on the most primitive methods of transportation. Man back, mule pack and the two-wheeled cart carry on the commerce of as many people as all the railroads—and much of the most profitable export trade of the United States is delivered this way.

The export merchant knows the intricate routes over which his orders will be shipped—he knows what severe handling they will receive—and he knows the strict regulations that govern their importation into these countries. It is for this reason that he specifies certain forms of packing that may seem to be over-strict to men used to American freight service; nevertheless it is worth the manufacturer's best personal efforts to comply with these instructions to insure the safe delivery of his goods to the foreign consumer.

We have prepared a booklet showing conditions that prevail in overseas shipping that will help your packers in building better shipping cases. We will be glad to send it to you on request.

FEDERAL EXPORT CORPORATION

115 Broadway New York

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by a fire which swept the plant March 1. The pattern shop will have to be replaced.

HOUGHTON, MICH.—The Seneca Mining Co. will rebuild its machine and forge shops, which were damaged by fire recently.

JACKSON, MICH.—The plant of the Mutual Motors Co. will be remodelled for the manufacture of projectiles for the government. Work will start April 1.

KALAMAZOO, MICH. — The Leonard Tractor Co., recently organized, proposes to build and equip a $300,000 plant here. The organizers have a contract from the Canadian government for 3000 tractors.

LANSING, MICH.—The Reo Motor Car Co., which has a contract for caterpillar tractors from the government, plans to install new machinery.

MARQUETTE, MICH.—The chemical plant of the Pioneer Iron Co., recently damaged by an explosion, is being rebuilt.

MIDLAND, MICH. — The plants of the Dow Chemical Co. here and at Mt. Pleasant have been taken over by the government, which will expend $2,000,000 on their enlargement.

MUSKEGON, MICH.—The Continental Motors Corp. plans the erection of a new drop forge plant.

PORT HURON, MICH.—The Muelier Metals Co. has spent $405,000 in building and equipping its plant. Two hundred and fifty-thousand dollars worth of equipment has been ordered.

PORT HURON, MICH. — The American Machines Corp., a subsidiary of the American-Canadian Resources Co., manufacturer of munitions, has purchased the plant of the American Machinery Co. here, which it will enlarge. The corporation has a $500,000 shell contract.

SAGINAW, MICH.—The Erd Motor Co., manufacturer of tractors and motor trucks, plans to add 48,000 square feet of floor space to its factory and to install additional machinery. B. G. Appleby is president.

STEVENS POINT, WIS. — The Jackson Milling Co. has awarded the contract for flume gates and other structural steel for the new $500,000 hydroelectric power plant it is constructing on the Wisconsin river north of the city. L. A. DeGuere, Grand Rapids, Wis., is supervising engineer.

WEST ALLIS, WIS. — Considerable new milling machine and other machine tool equipment is being installed by the Standard Separator Co. at its plant on Burnham street.

PEORIA, ILL.—The Electrical Testing Co. is building a 1-story repair shop 60 x 180 feet to cost $10,000.

WINTHROP HARBOR, ILL.—The Winther Motor Truck Co. has started construction of a new motor truck factory group to cost $125,000. This expansion is necessary to handle a recent government contract for military trucks.

ANDERSON, IND.—The Hill Pump Co. has received a $2,500,000 contract to manufacture steam turbines and gears for naval vessels. The company will increase its capitallization from $250,000 to $750,000 and will make extensions to its plant.

EAST CHICAGO, IND. — The Hubbard Steel Foundry Co. has let contracts for an additional steel foundry building, 100 x 600 feet in size, of brick and steel construction. A 3-ton Snyder electric furnace has been contracted for and a 5-ton open-hearth furnace will be installed also.

EVANSVILLE, IND.—The Hercules Gas Engine Co., J. D. Craft, manager, will build an addition 180 x 450 feet, estimated to cost $150,000, on which bids will be taken about March 15.

GARY, IND.—The Hubbard Steel Foundry Co. has awarded the general contract to the Northwestern Bridge & Iron Co., Milwaukee, for the erection of a new foundry addition of brick and steel, with steel sash sides and monitors. The building will require 450 tons of structural material.

INDIANAPOLIS.—The Van Briggle Motor Device Co. has increased its capitalization from $150,000 to $300,000.

LAWRENCEBURG, IND. — The pattern shop of the August D. Cook Co., manufacturer of pumps, was severely damaged by fire recently, with a loss estimated at $10,000.

MICHIGAN CITY, IND.—The Joseph W. Hays Corp. has been incorporated with a capital of $275,000 to manufacture machinery. The incorporators are Frank R. Warren, Floyd A. Deahl and others.

MUNCIE, IND.—The Indiana Steel & Wire Co. has increased its capitalization from $150,000 to $450,000, and will build additions to its plant.

SOUTH BEND, IND.—The Johnson Motor Wheel Co., capitalized at $100,000, has been chartered to manufacture machinery and wheels by A. C. Schubert, O. C. Decker and Herbert E. Marshall.

SOUTH BEND, IND.—The Columbia Battery Co., capitalized at $10,000, has been chartered to manufacture storage batteries by William B. Starr, Frank L. Stedman and O. M. Knoblock.

BUCYRUS, O.—A charter of incorporation has been granted to the American Steel & Machinery Co., capitalized at $500,000. The incorporators include S. H. Tolles, R. C. Hyatt, John M. Garfield and others.

CANTON, O.—The Luntz Iron & Steel Co. has been chartered with $100,000 capital. The incorporators are D. S. Luntz, F. S. Luntz and others.

CINCINNATI.—A charter of incorporation has been granted to the Grant Machine Co., capitalized at $20,000. The incorporators include Louis H. Friedman, Joseph Greenbaum, Geoffrey Goldsmith and others.

CINCINNATI.—The R. K. Le Blond Machine Co. has awarded the contracts for the erection of a $35,000 addition to its plant. Zettel & Rapp, architects, are in charge of the construction.

CINCINNATI.—The Nolte Machine Screw Products Co. has purchased a site adjoining its present plant on Freeman avenue, on which it will build a factory addition, 25 x 125 feet in size. Plans already have been drawn. Some new machinery and equipment will be required.

CLEVELAND.—The Cleveland Metal Products Sales Co. has been chartered with $25,000 capital. The incorporators include George B. Folk, Frank H. Pelton, E. G. Rushforth, Norton McGiffin and others.

CLEVELAND.—The Cleveland Hardware Co. has obtained a permit to build a 1-story, 60 x 200-foot addition to its machine shop at 3240 East Seventy-ninth street, to cost $6000.

CLEVELAND.—The Van Dorn Iron Works Co., 2697 East Seventy-ninth street, has obtained a permit for the erection of a 50 x 120-foot machine shop to cost $8000. Contract for the construction work has been awarded to the William Dunbar Co., 8201 Cedar avenue.

CLEVELAND.—Ernest McGeorge, engineer, Leader-News building, has awarded to the

Commercial Activities Cover Extensive Field

FOLLOWING the consolidation between the Pacific Hardware & Steel Co. and Baker & Hamilton of San Francisco, the new organization under the title, Baker, Hamilton & Pacific Co. has opened eastern offices at 30 Church street, New York. E. R. Wendemuth is office manager.

The Cameron Clay Products Co. has removed from Cameron, Pa., to Emporium, Pa., where home offices will be maintained.

A. L. & M. I. Goldstein have purchased the stock and equipment of the Cleveland Belting & Machinery Co., which will be scrapped and sold. The Cleveland Belting & Machinery Co. will continue in business at 1922 Scranton road, Cleveland, with a fresh line of second hand machinery.

Cyril J. Bath & Co., machinery dealers, announce the removal of offices from the Leader-News building to the stock rooms at 721 St. Clair avenue N. E., Cleveland.

The Trussed Concrete Steel Co. has simplified its name to the Trus-Con Steel Co., maintaining the same organization and the same plant and sales offices at Youngstown, O.

The Vanadium Alloys Steel Co., with works at Latrobe, Pa., has opened an office at 1015 Citizens Bank building, Cleveland.

F. H. Wheeler, founder and president of the former Wheeler & Holcomb Co., Chicago, manufacturers of safety garments and appliances, has inaugurated a similar business under the style of the F. H. Wheeler Mfg. Co., with offices in the Kimball building, Chicago.

The Permutit Co., manufacturers of water softening and water rectification apparatus, formerly located at 30 East Forty-second street, New York, announces its removal to 440 Fourth avenue, New York.

D. Fechheimer, formerly with Joseph Joseph & Bros. Co., scrap iron and steel dealers, has opened an office at 20 East Jackson boulevard, Chicago, to engage in buying and selling scrap iron and steel, relaying rails, railway supplies and metals.



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17-Ton Buckets,* capacity 1,250,000 tons per season; *15-Ton Buckets,* capacity 1,000,000 tons per season; *10-Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8-Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

A. A. Lane Construction Co. the contract to build a factory for the Ohio Electric & Controller Co., 5900 Maurice avenue. The building will be 60 x 80 feet and will cost $6000.

CLEVELAND.—G. F. Mitchell & Sons, sheet metal manufacturers, have had plans prepared for a 2-story plant at 2503 Cedar avenue, 60 x 150 feet in size, to cost $35,000.

CLEVELAND.—The Cleveland Heater Co., plans to install considerable new equipment at its plant.

CLEVELAND.—The Cleveland Electric Illuminating Co. has obtained a permit to erect a 2-story turbine and boiler house, 105 x 161 feet in size, at 720 East Seventieth street. The cost of the proposed structure is estimated at $600,000.

CLEVELAND.—Plans have been prepared by S. H. Weis, architect, Schofield building, for a foundry to be built at Bessemer avenue and East Seventy-ninth street, for the Lake Erie Smelting & Refining Co., 7900 Bessemer avenue. The J. P. Stodder Co., 809 Leader-News building, will award the contract. The building will be 1-story, and 60 x 103 feet. Cost is estimated at $18,000.

COLUMBUS, O. — The Pennsylvania railroad has awarded contracts for the erection of two additions to its repair and machine shops.

COLUMBUS, O.—The Columbus Conveyor Co. has been incorporated with $40,000 capital. The incorporators are W. H. Jones, Samuel T. Isaac, Robert E. Belt, H. F. Belt and O. A. Wheaton.

ELYRIA, O. — The pressure regulating building of the Cleveland, Southwestern & Columbus railroad has been severely damaged by an explosion of gas. Considerable machinery will have to be replaced.

FREMONT, O.—A charter of incorporation has been granted to the Solid Steel Scissors Co., capitalized at $10,000. The incorporators include Dr. George Zimmerman, Hurd J. Miller, Charles L. Halter, E. L. Bogue and Bert J. West.

HAMILTON, O.—The Columbia Machine Tool Co. has increased its capital from $50,000 to $100,000 to provide for plant extensions and the purchase of new equipment. Fred E. Goldsmith is president of the company.

LIMA, O.—The city plans to build a machine shop to cost $12,000. J. I. Heffner, city clerk, may be addressed.

LORAIN, O.—It is reported that the Cromwell Steel Co. contemplates adding several new open-hearth furnaces to its plant.

LORAIN, O.—The Cleveland Salt Works plans to erect a new chemical manufacturing plant here. The general offices of the company are at Cleveland.

MANSFIELD, O. — The Ohio Mechanical & Electrical Maintenance Co. has been incorporated by William H. Thompson, Guy E. Thompson, Ellsworth G. Clark, Harry Calhorn and others.

MT. VERNON, O.—The plant of the L. S. Denney Steel Plate & Boiler Co. has been severely damaged by fire.

NORWOOD, O.—A. V. Carroll, 3548 Mooney avenue, Cincinnati, manufacturer of lathes, will receive bids until March 15 on the construction of a 1-story, 60 x 150-foot factory to be erected in Norwood.

SALEM, O.—The Salem Lighting Co. has had plans prepared by Day & Zimmerman, Inc., 611 Chestnut street, Philadelphia, for a boiler house addition to be 1-story high and 31 x 40 feet in size. The building will cost about $30,000. The general contract has been awarded to the Walker & Curley Co., East End Trust building, Pittsburgh.

TOLEDO, O.—The W. G. Nagel Electric Co. has purchased the plant of the Advance Machinery Co. adjoining its works, which it plans to equip for the manufacture of its own product.

VAN WERT, O.—An explosion of gas followed by fire caused a loss of $1000 at the plant of the Van Wert Gas Light Co., recently.

YOUNGSTOWN, O.—The Trus-Con Steel Co. has awarded to Whitehead & Kale, Detroit, the contract for erecting a factory addition 30 x 400 feet, to cost about $200,000.

YOUNGSTOWN, O.—The Brier Hill Steel Co. plans to erect a large machine shop, in addition to a tandem plate mill and an additional blast furnace. The machine shop will be completely equipped with the most modern devices.

COVINGTON, KY.—The Foundry Equipment & Metals Co. has been incorporated with a capital of $10,000 to manufacture tools machinery, and equipment. Frank X. Bertsch, Coalton, Ky., is in charge.

PIKEVILLE, KY.—The Big Elkhorn Coal Co., capitalized at $100,000, has been organized by W. W. Justice, W. K. Elliott, M. C. Justice and others for the development of 700 acres of coal lands at Betsey Lane on the Chesapeake & Ohio railroad. It is expected that the company will begin coal shipments within 60 days.

New Business in Eastern Canada

ARMAGH, ONT.—Bids will be asked by the Armagh Electric Co. in April on machinery and equipment for a proposed power plant to cost $40,000.

COBOURG, ONT.—Swaddling & Sons Ltd. have been incorporated to manufacture machinery, automobiles and parts, with $40.000 capital stock, by Charles J. Swaddling, John F. McGuire and others.

FORT WILLIAM, ONT.—E. G. Peniman, Graham & Horne block, has the general contract and the Dominion Bridge Co., Canada building, Winnipeg, Man., the steel contract for the building of a steel shipbuilding plant for the Canadian Car & Foundry Co., 1209 Laughton avenue, Fort William.

GALT, ONT.—The Galt Foundry Co. Ltd. has been incorporated to carry on business as founders and machinists with $40,000 capital stock. Norman B. Colvin, Daniel Buchanan, William E. Demill and others are interested.

GUELPH, ONT.—Dr. J. A. Armstrong, president, the Oakoal Co., Royal Bank building, Toronto, Ont., will have charge of construction work, the purchasing of machinery, furnaces, etc., for the plant his company will build at Guelph, to cost about $60,000.

HAMILTON, ONT.—The Hamilton Bridge Works Co. is building an addition to its plant and will shortly be ready for the installation of new machinery. Cost is estimated at $25,000.

LONDON, ONT.—The plant of T. M. Knowles, recently damaged by fire with a loss of $15,000, will be rebuilt immediately and new machinery will be purchased. Thomas Knowles, 36 Weston street, is manager of the company.

OTTAWA, ONT.—John A. Pearson, architect of the parliament buildings, will receive tenders up to March 25 for switchboards, panel boards and transformers required. Plans and specifications can be obtained from the general contractor, P. Lyall & Sons Construction Co., Ltd., Ottawa.

TILLSONBURG, ONT.—The main building of the Huntley Mfg. Co. was severely damaged by fire March 6, causing a loss of about $100,000, partly covered by insurance. A large quantity of machinery was damaged.

TORONTO, ONT.—The Canadian National Carbon Co. Ltd. has been incorporated to manufacture iron, steel, molybdenum and copper products with $1,200,000 capital stock. Howard A. Harrison, 2 Wilton Crescent; Robert E. Laidlaw, William N. Robertson and others, Toronto, are interested.

TORONTO, ONT.—R. A. Lister & Co., Ltd., has been incorporated to carry on the business of iron and brass founder, mechanical engineer and machinery manufacturer, with $1,000,000 capital stock, by Sir Robert A. Lister, Dursley, Gloucestershire, England; Charles A. Lister, Bristol, Eng.; Walter J. Ellis and Reginald Howell, Toronto, Ont., and David N. Jamieson, Winnepeg, Man.

TORONTO, ONT.—The Rapid Radiators Ltd. has been incorporated to manufacture radiators, thermostatic controlling devices and machinery, with $40,000 capital stock. Jacob Greenberg, 24 King street west; John Campbell, Gordon T. Griffiths and others, Toronto, are interested.

WELLAND, ONT.—The Metals Chemical Development Co. Ltd. has been incorporated to manufacture chemical compounds, machinery, equipment, etc., with $40,000 capital stock, by Arthur W. Holmested, Room 43, 20 King street east, James L. Ross, Lancing B. Campbell and others, Toronto, Ont.

WINDSOR, ONT. — The Cadwell Brick Co. Ltd. has been incorporated to manufacture brick, tile, terra cotta, sewer pipe, etc., with $200,000 capital stock. Charles W. Cadwell, Oscar E. Fleming, Windsor, Ont.; Robert K. Russell, Toronto, Ont., and others, are interested.

MONTREAL, QUE. — The Tolland Mfg. Co., Ltd., has been incorporated to manufacture iron, steel and other metals from the ore to the finished product with $50,000 capital stock. Waldo W. Skinner, William G. incorporators.

MONTREAL, QUE.—The George F. Ross Machinery & Supply Co. Ltd. has been incorporated to manufacture machinery, tools and supplies, with $200,000 capital stock, by George Davenport, Ledger E. Potvin, Leo Delage and others, Montreal.

SHAWINIGAN FALLS, QUE.—The Shawinigan Water & Power Co. will erect a plant for the manufacture of acetic acid on a large scale for the United States government, which will finance the enterprise.

HANNA



M. A. HANNA & CO.

Sales Agents

Iron Ore
Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
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Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

M.A. HANNA & CO.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
City wrought, short, N. Y.	26.75
Frogs, switches, guards, St. L.	29.50 to 30.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melt'g steel, east. Pa.	28.50 to 29.50
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	25.00 to 26.00
Hydraulic press. sheets, Cleve.	29.50 to 30.00
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Knuckles, couplers, Chgo.	35.00
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	37.50
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	29.50 to 30.00
Springs, Chgo.	35.00
Steel rails, short, Chicago	34.50 to 35.00
Steel rails, short, Cleveland	35.00
Steel rails, short, St. Louis	34.00 to 35.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	19.50 to 20.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	19.00 to 22.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	28.50
Stove plate, Pittsburgh	20.00 to 21.00

(Net Tons)

Boiler plate, cut, No. 1, St. L.	24.50 to 25.00
Bundled sheets, Cincinnati	20.00 to 20.50
Knuckles, coup., St. Louis	31.00 to 31.25

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis- St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	75.0 cents
Pacific coast (tin plate)	75.0 cents

IRON MILL USE

(Gross Tons)

Angle bars, iron, Chgo.	40.00
Arch bars, transoms, Chgo.	47.50
Busheling, No. 1, Cleveland	32.00
Busheling, No. 1, Buffalo	30.00 to 31.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Chgo.	29.50 to 30.00
Busheling, No. 2, Chgo.	20.25 to 21.25
Cast borings, New York	17.00
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	12.00 to 15.00
Cast borings, Chgo.	19.00 to 19.50
City wrought, long, N. Y.	31.50 to 32.00
Cut forge, Chicago	33.50 to 34.00
Forge flashings, small, Cleve.	28.00 to 28.50
Forge flashings, large, Cleve.	28.00 to 28.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	33.00 to 33.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	18.25
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
Pipes and flues, Chicago	27.25 to 28.25
R. R. mch. cast, No. 1, Buff.	35.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	33.50 to 34.50
R. R. wrgt. No. 1, Birming.	28.00 to 30.00
Wrought pipe, Buffalo	28.00 to 29.00
Wrought pipe, eastern Pa.	33.00 to 34.00
Wrought pipe, ungraded, eastern Pa.	30.00

(Net Tons)

Angle bars, steel, St. Louis	34.50 to 35.00
Arch bars & transoms, St. L.	42.00 to 42.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.50 to 27.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, St. Louis	17.00 to 17.50
Iron axles, St. Louis	42.00 to 42.50
Machine turnings, Cinci.	15.50 to 16.00
Machine turnings, St. L.	17.50 to 17.85
Pipes and flues, St. Louis	26.25 to 26.75
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	30.00 to 30.40

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	25.00
Shafting, New York	36.50
Shafting, eastern Pa.	40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	42.00 to 42.50
Steel car axles, St. Louis	42.00 to 42.50

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1 cupola east. Pa.	33.00
Cast, No. 1, Birmingham	25.00 to 27.00
Cast No. 1, Cleveland	33.75
Cast, 1, heavy, N. J. points	33.25 to 33.75
Cast, 1, machy., N. J. points	33.25 to 33.75
Cast No. 1, Chicago	33.00 to 34.00
Cast. No. 1, Pittsburgh	28.00 to 29.00
Malleable, Cincinnati	30.00 to 35.00
Malleable, Cleveland	30.00 to 35.00
Malleable, Buffalo	30.00 to 35.00
Malleable, Pittsburgh	30.00 to 35.00
Malleable, east. Pa.	30.00 to 35.00
Malleable railroad, Chgo.	33.00 to 34.00
Malleable, agricultural, Chgo.	33.00 to 34.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	26.50 to 27.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, St. L.	26.50 to 26.75

MISCELLANEOUS USES

(Gross Tons)

Boiler punchings, Chgo.	36.50 to 37.50
Reroll. rails, 5 ft. & ov., Pitts.	35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	44.00 to 45.00

(Net Tons)

Locomotive tires, St. Louis	39.50 to 40.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, March 28, 1918 *No. 13*

Industry Discounts Price Changes

Reduction in Steel Works Raw Material Aimed to Favor Producers of Finishing Lines Especially in Plates—Heavy Bookings of Steelmaking Iron for Second Quarter Rewritten in Accordance with Revision Clause in Contracts

LITTLE effect upon market or producing conditions is expected from the price reductions of $1 a ton in basic pig iron, $1.10 in bessemer iron and $1 in scrap, officially announced by the President effective April 1. These reductions are in accord with those widely anticipated by the industry during the past week and to a large extent they have been discounted. The price revision has been confined to steel works raw material, in order to favor those producers of finished lines who have been working around or below cost. This especially applies to non-integrated plate producers. It is understood the government authorities considered it more advisable to reduce raw material costs to the mills than to inaugurate the granting of increases in the prices of finished steel.

The industry is much disturbed by the decision of the price committee of the war industries board to conduct continuous hearings of complaints, suggestions and requests regarding fixed prices. It is believed this will entail constant unsettlement of trade conditions and general confusion which inevitably will react upon the present orderly methods of co-operation between the industry and the government regarding prices.

Prices Cut on Bookings

A heavy tonnage of basic pig iron booked for the second quarter will be billed $1 lower on shipment to accord wih the official price reduction. This is by virtue of the revision clauses in contracts providing delivery beyond April 1, which were inserted to conform with the President's request. Considerable tonnage of second quarter bessemer also is affected by the price change. Makers of basic and bessemer are well reconciled to the reductions, which are not large enough to entail any serious realignment of their operations. From all sides reports come of an overwhelming amount of unsatified inquiry for iron especially in steel making grades. One Chicago interest was forced to turn away 150,000 tons. As viewed in that district the present pig iron situation is the tightest ever known in the northern market. At Pittsburgh it is estimated that inquiries for basic for the last half involve 250,000 tons and for foundry and bessemer not less than 100,000 tons. A Central Pennsylvania consumer has increased his purchase of low phosphorus iron to 24,000 tons. It is believed that the new price announcements may stimulate some selling for second quarter.

War Demands Far Heavier

Large steelmakers have been advised of the tremendous new requirements which the government is about to bring forth for delivery during the last half of the year both to itself and its allies. This tonnage will be made up principally of shell steel and ship material. It is expected that distribution of 3,500,000 tons of shell steel will be taken up actively next month. Of this amount, 500,000 tons will be for the allies. In addition, Great Britain is seeking a surprisingly large tonnage of ship plates on this side. As the curve of shipbuilding rises, the government is manifesting a more vigorous attitude in pushing plate shipments. The mills have been requested to limit shipments of plates to domestic buyers to 25 per cent of their full output, thereby assuring the government of a minimum of 75 per cent. Recent allotments by the Emergency Fleet corporation have reached the highest total yet and all plants capable of rolling ship plates are booked full to July 1, and in some cases to the end of the third quarter. The Submarine Boat Corp. is bringing up a new requirement of 100,000 tons of fabricated ship steel. In view of the great magnitude of the government's war demands now in sight, leading steelmakers at present can see little tonnage to be spared for the open market. Accordingly, they have adopted new selling policies which practically are equivalent to their withdrawal from the market.

Present coke prices have been reaffirmed. Some large interests, however, with sliding scale contracts for furnace coke will benefit slightly from the lower price of basic pig iron.

The Iron Trade Review.

EDITORIAL

A Method of Confusion

CONFUSION and unsettlement are spelled by the new proposal of the price-fixing committee of the war industries board to hold continuous hearings on requests, suggestions and complaints bearing upon the maximum price schedules in effect in iron and steel. In the abstract, this proposal may appear as an equitable arrangement for preserving the best interests of all concerned. In practice it is likely to prove the exact opposite.

The gratifying unanimity and co-operation which the government has enjoyed heretofore from the iron and steel manufacturers in carrying out its policy of price regulation has been due chiefly to the methods employed. To a large extent the responsibility of the carrying out and enforcement of this regulation has been placed upon the manufacturers themselves. When the government declared the suspension of the laws of supply and demand, in iron and steel was a war necessity both for itself and its allies, THE IRON TRADE REVIEW urged that price regulation be made co-operative, instead of compulsory. This in fact has been the policy pursued. The results of the past several months of market control by this plan have more than justified its soundness and practical worth. The government with a minimum of exercised authority on its part has witnessed a radical readjustment of prices and a prompt response to its every need. Friction has been altogether lacking. The iron and steel industry has more than kept the faith. The fact that the government itself has been so reluctant to order changes in the fear of upsetting interrelated prices even where probable warrant has appeared here and there, testifies eloquently how well the industry has carried out its self-imposed revision.

The basis for the complete success of the past five months of federal market control is the fact that the government has been dealing with the industry as a unit and not with integral factors. Such differences as have existed among iron and steel makers, and there have been several, have been ironed out and adjusted among themselves. Practical considerations of the broadest character have dominated these discussions. Maximum production thereby has been safeguarded and the government has got results, without disadvantage.

The proposal of the price-fixing committee to conduct an open and continuous court for weighing every complaint or demand will tend to disrupt the methods that have produced such effective relations between the government and the iron and steel industry. The committee aims to take upon itself the function of assimilating and harmonizing conflicts of interest which the industry in the past has performed for the government, largely and well. And it is only fair to say that it is far less equipped by practical knowledge and discernment to do so. In the interest of trade stability, iron and steel leaders have been pointing out the advisability of applying any fixed price schedule to a longer period than three months as at present. If the price-fixing committee now is to keep open to constant question and attack every price in effect, the unsettlement promises to be continuous and unending.

The Demand For All-Around Men

THE progressive manufacturer smiles when asked if he employs all-around machinists. He considers the all-around man as a relic of those bygone days wherein modern machine-shop efficiency was unknown. Doubtless it is true that men who are trained to do one thing and that one thing well are the most economical in the long run—hence the operator, as he is termed—the man who runs a turret lathe, manufacturing automatic, cylindrical grinder, etc.

Shortly after the United States became involved in the European conflict, the thousand-and-one industries that had secured contracts for ships and supplies demanded machinists in large numbers. Shipyards building steel vessels, especially, needed skilled machinists. Right at this point, for the first time in many years, was shown the fallacy of neglecting to develop all-around machinists.

The operators were willing enough, to be sure, but they lacked the broad training to do the necessary planning required of the all-around machinist. Many of these so-called machinists, it was discovered, were unable to read blue prints, nor could they handle such simple hand tools as the file, hammer and chisel. Thus, the few real all-around machinists that can be mustered will have to be depended upon until an army of operators can be trained to perform their new duties. The meanwhile, ships are wanted and wanted badly.

The situation is serious to say the least, and it proves that a mistake was made in neglecting our apprenticeship system of other days—a system that developed the all-around mechanic. Thus the war may serve a useful purpose in pointing out the weakness of any system which does not bring about the thorough training of young men for mechanical pursuits along broad lines of general service.

The Iron Trade Review

EDITORIAL

Steel Corporation's First Year of War

TAXES paid by the United States Steel Corp. for the 15 years elapsing between its organization and the end of 1916, amounted to $130,605,256. Twelve months later in estimating taxes for 1917 alone, the corporation set aside $252,265,695. Of this latter total $233,465,435 is designed to cover 1917 federal income, war income and excess profits taxes. The balance covers other taxes levied against the corporation and its subsidiaries.

The estimated allowance for federal taxes is $9,245,870 greater than the balance left for dividends at the close of the year's business.

These two comparisons reveal with striking clarity the extent to which the government is calling upon the country's industries to help in carrying the war's financial burden.

In general, the sixteenth annual report of the corporation contains few surprises. The financial results of the year's operations reflect, as indicated, the changed conditions produced by the country's transition from a peace to a war basis. The confusion produced by that shift, as reflected particularly in railroad conditions, led also to the drop in output shown by the report. Pig iron production fell off from 17,607,637 tons in 1916—or 45 per cent of the country's total—to 15,652,928 tons in 1917, or 40 per cent. The steel ingot production was 20,910,589 tons in 1916 and 20,285,061 tons in 1917. Output of finished products generally showed slight losses, with the plate tonnage increasing from 1,332,262 to 1,372,625 tons.

As one of the country's greatest industries and one upon which a proportionately heavy share of the country's huge war program necessarily falls, the annual report of the Steel corporation is an admirable cross section of the industrial life of the country in the first war year.

Putting Strength to the Task

WAR activities of the United States in its industrial centers are not fully appreciated by the general public, and for obvious reasons it would be foolhardy to divulge all the facts. Enough is known, however, to awaken the realization that undertakings and accomplishments are amazing. It is interesting to observe how the work is constantly branching out and progresses toward the complete systemization of a huge war machine.

In the Pittsburgh district, a production division of the ordnance department has been located; the signal corps has established offices and is building up a large organization of inspectors, chemists, machinists, etc., in connection with the work of building up the air fleet, and at one plant 1500 girls from all parts of the country are to be added to the force now engaged in making Liberty motors. These are only random manifestations of a great movement that grows daily. The vast production along essential lines of a widely varied character in that district emphasizes what the iron and steel industry is doing quietly to win the war. Indeed, the efforts that are being put forth, prompted a Canadian officer, recently returned from the trenches, to say that the war is being "won along the Allegheny river".

The industry is capable of meeting the enormous demands that being made upon it and has shown that it is determined that, if necessary, it will produce every pound possible to make this world a fit place to live in. The road looks to be a long and hard one, but it can be and will be traveled.

War Creates Home Industry

WHAT this country can do under stress of necessity along lines not attempted under normal conditions, is illustrated well by the dye situation. Three years ago the press was filled with warnings that cutting off the dyes from Germany would result in everybody wearing white clothing, and that colors would not be available to meet ordinary demands. Yet advertising in a commercial newspaper now contains the following announcements: "Blank Brand Dyes for Export. Full Line of Colors". "Full Line of Aniline Colors 'Made in America'." "Malachite Green Crystals Equal to Best Imported".

Not only has the dye industry in this country met the famine of three years ago, but it has turned it into a surplus for exporting. Under the spur of necessity, with protection from competition by the war, a highly technical industry has been built up in the United States on which depends the prosperity of a large number of persons in the textile, leather and paper manufacturing world.

Had conditions prior to July, 1914, continued without the war factor entering, this home industry would not have been created. There are many lines where development of like kind is possible. In the proportion that the nation takes advantage of these possibilities, will its future commercial position be strengthened.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 828

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, delivered.	$250.00
Spiegel, 20 per cent fur.	70.00 to 72.50
Spiegel, contracts, furnace.	70.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh.	180.00 to 190.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products March 27, average for February, 1918, average for December, 1917, and average for March, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices March 27, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$37.45
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	32.85
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	36.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	35.70
Lake Superior charcoal, Chicago	37.50	37.50	37.50	37.55
Malleable, Chicago	33.50	33.50	33.50	35.70
**Southern, No. 2, Birmingham	33.50	33.50	33.50	28.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	36.00
Basic, eastern Pa.....	33.00	33.00	33.00	34.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	34.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	37.25
Ferromanganese, delivered.....	250.00	250.00	247.50	275.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	67.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	67.00
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	67.00
Open-hearth billets, Pitts.....	47.50	47.50	47.50	67.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.20
Steel bars, Chicago.....	2.90	2.90	2.90	3.40
Iron bars, Philadelphia.....	3.50	3.50	3.685	3.509
Iron bars, Cleveland.....	3.64	3.64	3.64	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices March 27, 1918	Average prices Feb., 1918	Dec., 1917	Mar., 1917
Iron bars, Chicago mill.....	$3.50	$3.50	$3.50	$3.00
Beams, Chicago	3.00	3.00	3.00	3.65
Beams, Pittsburgh	3.00	3.00	3.00	3.45
Beams, Philadelphia	3.185	3.185	3.185	3.759
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.20
Tank plates, Chicago.....	3.25	3.25	3.25	4.60
Tank plates, Philadelphia.....	3.435	3.435	3.435	5.659
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	5.05
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	4.70
Sheets, galv., No. 28, Pitts.....	6.25	6.25	6.25	6.70
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.15
Connellsville furnace coke.....	6.00	6.00	6.00	7.60
Connellsville foundry coke.....	7.00	7.00	7.00	6.90
Heavy melting steel, Pitts.....	30.00	30.00	30.00	23.40
Heavy melting steel, eastern Pa.	30.00	30.00	28.75	23.75
Heavy melting steel, Chicago..	30.00	30.00	28.90	23.00
No. 1 wrought, eastern Pa.....	35.00	35.00	35.00	30.50
No. 1 wrought, Chicago.....	35.00	35.00	34.75	28.85
Rerolling rails, Chicago.....	35.00	35.00	35.65	27.25
Car wheels, Chicago.....	30.00	30.00	30.75	20.30

(For Additional Prices See Page 828)

Steelmaking Iron Contracts Revised

Heavy Booked Tonnage of Basic Will Get Benefit of $1 Reduction in Official Price—Bessemer Readjustment Not So Large—Tremendous Amount of Inquiry Still Goes Begging—Chicago Maker Declines 150,000 Tons

Pittsburgh, March 26.—Large tonnages of basic iron sold during the first quarter will be delivered by makers in this district during the second quarter at $32, furnace, in view of the reduction of $1 made in the official prices effective April 1. Shipments of bessemer iron at the reduced figure of $35.20, furnace, will involve heavy tonnages also, but will not be as great as in basic. Producers who took business in the first quarter carried a provision in their contracts that the prices would be those prevailing at the time shipment was made, and this was in accordance with the government price-fixing program. Makers of basic and bessemer iron generally have accepted the proposed reductions without complaint. Extremely large inquiries are out for iron, especially basic, and a condition of famine exists. No sizable tonnages of any kind are available. There is considerable interest manifested as to whether furnaces which are not entirely sold up now will open their books for second quarter business. Such offerings relatively would not be large. Inquiries for basic iron in this district for last half shipment involve not less than 250,000 tons, and those for foundry and bessemer not less than 100,000 tons. The N. & G. Taylor Co., Cumberland, Md., is inquiring for 1000 tons monthly of basic for last half delivery. The Pressed Steel Car Co. has been able to obtain about 1000 tons of car-wheel pig iron from a nearby furnace to apply on its requirements of 10,000 tons. The Pennsylvania railroad has been unable to get tonnages from furnaces in this district against its last half inquiry for 13,000 tons of foundry grades. The Andrews Steel Co. inquiry for 20,000 tons of last half basic and that of the American Rolling Mill Co. for 10,000 tons of this grade for the same delivery also are reported to be still unsatisfied. Furnace production has improved as the result of better supplies of fuel. The Carnegie Steel Co. continues to operate 46 of its 59 furnaces, the same as for the past two weeks.

Inquiries are Plentiful

Boston, March 25.—There are plenty of inquiries for iron in this market but actual business is at a low ebb for it is almost impossible to unearth any nearby supplies. Pending the announcement of the new prices, effective April 1, there are few makers who are inclined to accept business. Reservations for a considerable tonnage have been placed in local offices subject to the new prices, but these cannot be counted as business until the furnaces have been consulted. Inquiries on the market for nearby iron run anywhere from carload lots of more than 1000 tons. The New Hampshire melter in the market a week ago for 1500 tons of malleable is reported to have secured about one-third of the amount needed for second half. Deliveries of iron from the Buffalo district are reported to be good and there is little complaint about shipments from Alabama, but there is little iron moving here from any of the producing sections except on special or government permits. Virginia deliveries are slow, because of the railroad congestion. Southern roads are handicapped by the recent government order to send all box cars west for moving grain;

this leaves gondolas as the only available equipment for moving iron. Shipments of Connellsville coke into this territory still are very limited, for while the car situation has improved any good that has resulted from this development has been more than offset by the maintenance of the Pennsylvania railroad embargoes.

Many Inquiries Are Out

New York, March 26.—The pig iron committee of the American Iron and Steel institute is endeavoring to place 2000 tons of bessemer for May and June shipment to Italy. Efforts are being made to place this iron in the east, but indications are that none of the eastern furnaces will be in a position to make it, so it is considered likely this iron will be placed in the middle west. Practically no pig iron business has been transacted in this district during the past week. Many new inquiries calling for lots of 1000 tons or less of foundry iron both for second quarter and second half are out, but none of the furnaces are quoting on them. Several makers, however, have quoted on 10,000 to 15,000 tons of foundry for second half, for which the Pennsylvania railroad now is in the market, and it is considered likely this business will be placed during the coming week.

Sales at Minimum

Buffalo, March 26.—The iron market is in a state of practical stagnation as far as orders are concerned. The inquiry keeps up in volume but there is no iron to be had. The development of the week in this district is that a furnace which had been disposing of tonnage rather consistently for some time back, and the only one to so do, has virtually retired from the market. This makes the "old customer" transactions the sole enlivening feature of the market. If an old customer must be appeased, producers are allowing a carload of iron or thereabouts to be sold but beyond that the coke situation has rendered business prohibitive. The coke situation is improving so slowly that the latter can hardly be said to be perceptible. Three furnace interests report a very slight improvement. With one stack out, one interest reported that it had barely enough fuel to run. Interest centers on the pending announcement of a new price schedule. The new No. 9 furnace of the Lackawanna Steel Co. should be ready in three months. There has been some improvement in the empty car situation.

Steelmaking Iron Sold

Philadelphia, March 25.—Sales of steelmaking iron again featured the pig iron market in this district during the past week. A large central Pennsylvania steel castings producer placed 12,000 tons of copper-bearing low phosphorus for second half. This interest during the preceding week placed about 12,000 tons for second, third and fourth quarters, making a total purchase of 24,000 tons. The same melter also bought 6000 tons of basic for second half. Numerous additional inquiries for steelmaking iron are out, including 6000 tons of last half and 1500 tons of second quarter basic for the N. & G. Taylor Co. Eastern makers of basic are inclined to view philosophically the reductions in the official prices of basic and bessemer. In view of the lower cost of producing basic, as compared with foundry, it is felt that the projected spread in prices is justified. It is thought it would prove a wiser policy, however, to advance foundry than to reduce basic, particularly since some of the eastern furnaces now are producing foundry at a loss. A Virginia furnace came into the market with a limited tonnage of foundry for second quarter last week and withdrew after selling all its offering. A southern furnace sold some second half foundry here. A limited tonnage of charcoal iron for second half has been sold to regular users in this district. Indications are that conditions in standard low phosphorus iron are reaching a stage where production soon will be sufficient to meet all urgent requirements.

Much Tonnage Seeks Takers

Cleveland, O., March 26.—Many inquiries but few sales still represent the pig iron market situation in this district. Makers continue to receive weekly a round tonnage of miscellaneous inquiry against which they have practically nothing to offer up to Jan. 1, 1919. Most of this proffered tonnage is in foundry with some malleable, and the lots usually are of the 500 to 1000-ton variety. The Pressed Steel Car Co. has asked for 5000 tons of foundry, half of which would be taken high in sulphur. Some of the larger malleable interests in the territory still are reported in need of considerable iron. The heavy unfilled basic requirement remains before the furnaces. Makers say they could dispose of 200,000 tons in a day's time, if they had the iron. A shortage of steelmaking iron exists in the valleys. Some of the larger interests there have attempted to buy basic from nearby furnaces without success. Even small tonnages are unobtainable. Some of the steel companies which have been short on basic but long on coke have made trades of fuel for metal with merchant furnaces. In cases the iron has been of off-basic quality. A Norwalk buyer has been figuring on 1000 tons of basic. A new government allotment is 2000 tons of foundry for a Rochester gearmaker which an eastern furnace practically has agreed to accept. A 300-ton foundry lot for a Davenport, Iowa, user has been placed. The specifications of 1000 tons of foundry for the Italian government has been changed to embrace the usual southern analysis and is expected to be filled by makers in that district. The inquiry for 2000 tons of bessemer for Italy is unplaced.

Proposed Cut Disappoints

Cincinnati, March 25.—Disappointment is displayed by producers in any proposed reduction of basic and bessemer prices by the government. While it is conceded that basic is cheaper to make than foundry iron, as far as coke costs are concerned, some well-informed iron merchants believe that the best policy should have been to encourage the production of steelmaking irons at the present time. Additional orders for foundry iron have been placed, but only the southern furnaces are able to take on business for last half shipment. Melters are now willing to buy No. 3 foundry iron, and the high sulphur iron unsold in the Birmingham district is fairly well cleaned up. The furnaces are holding considerable iron on their yards because the railroads are not able to deliver the metal. The shortage of cars and motive power is probably as serious as it was 30 days ago. However, this condition does not seem to be so acute in southern Ohio and shipments from Ironton furnaces are moving fairly well.

Chicago Turns Down Inquiry

Chicago, March 26.—Although local producers of pig iron have sold their entire production for 1918 and have not been able to take additional contracts during the past fortnight, inquiry continues strong. One interest has turned away over 150,000 tons, of which much is basic and malleable. Every effort has been made to cover requirements of regular customers who have bought here in the past. Much of the inquiry now comes from melters who have bought from southern producers previously. Under present circumstances southern iron costs a northern melter $3 to $4 per ton more than northern iron. In cases of regular customers of northern makers who require additional iron beyond their contracts, the leading interest simply is entering the order without contract and promises to do as much

as possible to ship the iron as needed, without interfering with its obligations to others. The present pig iron situation is described as the tightest condition ever known in the northern market. Some important southern makers who have been out of the market recently are expected to resume selling for second half now that a price announcement has been made. It is believed that a string may be attached to contracts, requiring melters to take an equal tonnage of iron containing 1.75 silicon or less with every purchase of regular No. 2 foundry analysis. High silicon iron is practically unobtainable. Present fuel conditions render production of high silicon iron difficult. Furnaces find it almost impossible to produce sufficient tonnage to cover their present obligations.

Consumers Are Borrowing

St. Louis, March 23.—In point of actual sales, the past week has been about the slowest this year. Both buyers and sellers are disposed to hold off, awaiting price developments at Washington. A tremendous volume of inquiries came out during the week. One user inquired for 2000 tons of high manganese iron, who never before was known to purchase that grade. The necessity of accepting pig with a high percentage of sulphur, rather than go empty-handed, has increased the need of other qualities for mixtures. Absolutely no improvement in the coke situation has developed, and at the moment it is the darkest spot on the horizon. Representatives of southern producers here are being pressed for even small quantities. The shortage of basic is the most pronounced.

Not Anxious to Sell

Birmingham, Ala., March 26.—Southern makers, with one eye on Washington in view of the revision of prices effective April 1, are giving their main attention to the production and delivery of pig iron. While there is still some selling, this is in small lots largely for last half and to regular customers. Reports to the effect that basic iron prices may be reduced did not disturb southern producers. With one exception practically all basic produced in this section is for use at home. That company with a large tonnage of basic sold ahead will not be greatly disturbed for the revision will not be retroactive in its case. Southern makers recently were requested to produce more basic but their demands for foundry were such that the request was not granted. Furnaces in southern territory continue to show increased output and there is hope now that one of the three stacks ready for blowing in will receive the torch in the next week or two.

Coke Traffic Much Better

Car Supply More Nearly Normal and Labor Situation Improves—Eastern Consumers Get More Fuel—Pennsy Embargo Lifted

Pittsburgh, March 26.—Decided improvement in the car supply in the Connellsville coke region was made during the past week. The average on the Monongahela railroad, ovens on which serve most of the independent blast furnaces, was 60 per cent, while that on the Pennsylvania railroad showed an increase of 15 per cent over the preceding week. The average supply in the entire region was larger than it has been at any time since last fall, and one of the most important features is marked improvement being shown in the placement by the Pennsylvania railroad on the Monongahela line. The supply of cars on the Monongahela again fell off today, however, and was only 30 per cent and that is the average promised for tomorrow. It is believed that this slump is only temporary and that the better showing that has been made will continue to develop. Eastern furnaces have not been benefited by the increased supply owing to embargoes which had been in effect on the Pennsylvania railroad but which were lifted last Saturday. These furnaces likely will begin to feel the beneficial effects by the end of the present week. Shipments to the Pittsburgh district and west were increased proportionately. Producers of both foundry and furnace coke insist that they are not taking any contract tonnages despite reports to the contrary. There are also only limited tonnages of spot offerings being made and most of these involve foundry grades whose shipments have been restricted to points on the Pittsburgh & Lake Erie railroad. The labor situation in the Connellsville region is more satisfactory than it has been for a long while. Coke production for the week ending March 16 totaled 335,122 tons as compared with 314,409 tons during the preceding week, according to *the Connellsville Courier.*

Deliveries Greatly Improve

Philadelphia, March 25.—Deliveries of coke have shown much improvement at consuming points all through the east. One blast furnace interest for which coke recently was requisitioned by the fuel administrator has reported that its receipts have been in excess of its requirements with the result that some of the coke now being shipped to this furnace will be diverted to other points. Fair tonnages of foundry coke have been sold here for forward delivery. No spot foundry, or spot or forward furnace coke, however, is offered.

Foundry Contracts Renewed

Cincinnati, March 25.—Some renewals of foundry contracts have been made. No new contracts are reported. Producers are trying to take care of their old customers and even now this is a difficult proposition. Shipments from the Connellsville district showed some improvement last week, but the movement of coke from others was somewhat restricted. The same old trouble involving the scarcity of cars and the inability of the railroads to move the fuel when loaded is said to be the reason for these complaints. Pocahontas furnace and foundry coke is held at $8, but there is some confusion as to whether furnace coke should be sold at the same figure as the foundry grade. No sales of furnace coke have been made from that district recently. The foundries in this territory have been able to operate without trouble lately, but they have a very short supply of coke on hand.

Accept Any Consignment

St. Louis, March 23.—The market for coke here continued as restricted as ever, the demand far outstripping available supplies. A feature has been the astonishingly poor quality of some metallurgical coke coming from the east. There are no end of complaints but the consumers none the less are accepting every car. Deliveries on contract from Connellsville and other eastern producing points are about on a parity with the preceding week, when an average of about 60 per cent of normal was reported. Dealers here have nothing to offer for near delivery, and contracts for foundry coke for any delivery are exceedingly hard to make.

Has Difficulties in South

Birmingham, Ala., March 26.—While the coal production in the south and in Alabama in particular, is noticeably larger, the coke output is not on an equal plane. Every effort is being made to produce an ample supply but the difficulties hold down the total. Furnace coke in particular is not in sufficient a supply. Chief State Mine Inspector C. H. Nesbitt announces the coal production of Alabama for 1917 to have been around 20,250,000 tons, an increase of more than 1,500,000 tons.

Scrap Prices Grow Easier

Discounting of Reduction in Official Schedule Produces General Softness—Commission Status Causes Dissatisfaction Among Sellers

FOR COMPLETE SCRAP PRICES SEE PAGE 828

Chicago, March 26.—Advance reports that $1 per ton reduction in the maximum price on iron and steel scrap will be announced for deliveries after March 31 have caused weakness in the market. This probably results from efforts of those holding some tonnage to dispose of it before the reduction goes into effect. However, general shortage of scrap is sufficient to prevent this downward change having full effect. Some consumers believe that considerable tonnages of scrap are available in many grades which have not come onto the market recently and that perhaps this situation may bring it out and ease conditions materially. The Rock Island has offered 4500 tons, including 1200 tons of rerolling rails and 500 tons of short steel rails. The Chicago, Milwaukee & St. Paul offers 900 tons and the Monon 632 tons.

Demand Shows Increase

Boston, March 25.—More open weather has resulted in quite a material increase in business between collectors and wholesale dealers in scrap. There also has been a good demand from consumers and a fairly liberal movement, thanks to better transportation facilities, of stock held up during the period of railroad paralysis. Prices are firm. Wholesale dealers' paying prices f.o.b. cars, shipping points follow: Wrought No. 1 yard long, $31; horse shoes, $31; cotton ties, $24; stove plate, $22; No. 1 machinery, $32; No. 2 machinery, $29; car axles, iron, $43; car axles, steel, $43; rerolling rails, $32; bundled barrel hoops, $21; iron boiler plate, $35; wrought iron pipe new special, $30; steel rails, $26.50; No. 1 railroad steel, $26.50; heavy melting steel, $26.50; axle turnings, $22; machine shop turnings, $16; cast borings, $16.50; drop forge trimmings, $24; cast iron car wheels, whole, $28; cast iron car wheels, broken, $32.

Prices Generally Soft

New York, March 26.—With the exception of cast scrap old materials here reflect a general weakness. This is due to the continued freedom with which supplies now are coming out. In cast scrap, the market is very firm as the heavy demand by foundries is keeping accumulations at a minimum. The foundries are paying the maximum of $35, and in some instances the 3½ per cent commission. Considerable interest prevails as to the effect the government's new price schedule will have on scrap. It is believed that one of the changes to be made will be the establishment of a lower price on heavy melting steel in the east, or a reduction, which will be equivalent to the difference in freight rates between eastern points and the Pittsburgh district. Under the present schedule, the Pittsburgh district has great difficulty in getting heavy melting steel, as dealers in the east find it more profitable to ship to the nearest consuming points. During the past few days prices on several descriptions have declined.

Heavy Steel Sold

Philadelphia, March 25.—Considerable tonnages of heavy melting steel have been bought recently by eastern steel plants direct from the producers. Just what tonnage figured is not known. With the exception of this business, the market is quiet. All the dealers have plenty of scrap to offer but in general the consumers are not keen to buy. Cast scrap and heavy melting steel are easier. Wrought continues strong. Price changes during the past week include reductions of $1 in wrought pipe and heavy axle and forge turnings, and of $2 in unguaranteed low phosphorus, No. 1 cupola malleable and cast iron borings for chemical use.

Market is Inactive

Pittsburgh, March 26.—Inactivity characterizes the market for iron and steel scrap. Dealers and brokers report that their attention is being devoted almost exclusively to making shipments on contracts. They express disappointment at the recommendation made by the war industries board and the price fixing committee that prices on regulated grades be reduced $1 a ton. They are also anxious to have announcement made as to whether or not they are to be allowed a commission on sales. A claim is made that with prices reduced and a commission denied, it will be impossible to do business. Middlemen say that they have been compelled to pay prices equal to government levels in order to obtain supplies. In the absence of a commission they say, no profit can be made and incentive for selling is entirely lacking. Assertions have been made that those who have scrap on hand have refused to sell to dealers at less than the government prices. By reason of the refusal of dealers to buy except in limited lots, heavy stocks are said to have accumulated. It is reported but not verified that there may be further classification of the different grades of scrap.

Heavy Steel is Wanted

Buffalo, March 26.—The demand for heavy melting steel continues heavy with a particular call for it from the Pittsburgh and valley districts. This demand is far from being satisfied as local producers are unable to obtain all the material they could use. There are no surplus stocks available and it is a case of its being used as fast as it is produced. Little improvement is likely in the heavy melting steel situation for some time, dealers feel. Sales of scrap now being made are subject to any increase the government makes in the price April 1 and are subject also to the increased freight rates which are to go into effect shortly. The last railroad offerings in this section were sold to consumers direct. There is no change in the regular price schedule.

Commissions Main Factor

Cleveland, March 26.—Now that it seems to be assured that the government reductions in scrap iron and steel will be uniform, jobbers here are paying less attention to the matter of actual prices than to the matter of commissions. A combination of lower prices minus a commission would be ruinous, they insist. Leaving aside all other considerations, scrap iron and steel dealers here do not view the reported $1 cut in all maximums with much apprehension. One trader here has a contract which called for the delivery of a certain tonnage prior to April 1. Though the dealer was ready to ship it and the consumer anxious for it, a railroad permit could not be obtained. On this material the dealer declares he will demand the price in effect prior to April 1 regardless of whatever reduction is commanded. Trading has been at rock bottom in the past week because of the general uncertainty. No inquiries or extensive railroad lists have been put out. Melting steel still is scarce, though not so much so as a few weeks ago.

Dealers Are Upset

Cincinnati, March 25.—Scrap dealers are in an unsettled state. The new price recommendations have proved somewhat disappointing, and the commission question is yet unsettled. It is also thought that a general reduction further will complicate the situation and tend to curtail offerings of scrap. No. 1 machine cast has been bought more freely by nearby melters. Wrought scrap would also be in much better demand if shipping facilities were better. Should

lower prices be adopted there is even some question as to whether buyers would be disposed to contract freely. Most of them would probably only buy enough to carry them until June 30, instead of through the entire year.

Prices Grow Easier

St. Louis, March 23.—There has been a softening tendency in scrap iron and steel prices here this week. The railroads have been functioning better, and receipts on contracts have picked up materially. Consumers are buying little, most of them being well supplied for immediate wants. Another bearish factor has been the uncertainty as to price fixing. Many dealers and brokers here are much discouraged at the outlook for their business. Heavy melting steel, of which there was a dearth here earlier in the month, has become more plentiful. There is a fair demand for low phosphorus scrap and some inquiries have been received for miscellaneous material. There were no railroad offerings before the market this week.

Dealers Want to Sell

Birmingham, Ala., March 26.—Dealers in iron and steel scrap in the south began seeking contracts at prevailing prices the latter part of the past week and still are anxious to sell as reports received here indicate the possibility of a downward revision of government prices. Stocks are not large but are substantial and all demands can be met. The railroad car service is improved. Steel plants in home territory are requiring large quantities of certain grades while cast iron pipe plants are not taking their usual allotment.

Domestic Trade Dwindles

Boston, March 25.—Local jobbers report a good movement of materials to plants directly or indirectly engaged on government work, but a dwindling in domestic business. This is much the same condition that has existed here for several weeks and about the only new feature is that, as a result of the more open weather, shipments are coming through in practically ante-winter fashion. One concern reported the arrival on one day recently of 12 cars of stock, some of which had been on the way east as long as 90 days. The freer arrival of material is resulting in a freer movement to users and the warehouse people are beginning to catch up with their orders. These orders, however, are sufficient to absorb most of the stock coming in and consequently warehouse stocks, outside of purely domestic lines, are still much depleted.

Plate Mills Are Filled

Fleet Corporation Allotments Reach New High Mark—Government Insists on Receiving 75 Per Cent of Full Output

Philadelphia, March 25.—The tonnage of plates placed by the Emergency Fleet corporation recently forms a larger total than any business of this character which yet has come out. It is known that as a result of this business every mill in the country capable of rolling ship plates has all the tonnage on its books that it can roll by July 1, and in many cases by the end of the third quarter. This fact was brought by efforts which vainly were made during the past week to place an additional 40,000 to 50,000 tons of ship plates which are urgently needed for second quarter. In addition to this direct government business there are all kinds of inquiries out from regular consumers. The Pennsylvania railroad wants 6000 tons of various specifications for repair purposes. Many inquiries are coming out from car and locomotive builders. Demands of fabricators who need plates for structural work for the government also are large. None of this business can be booked by the mills.

Plates Run High

CLEVELAND, March 26.—A reflection of the extraordinarily high prices for plates which prevailed before government regulation, was given by invoices covering only five plates and totaling more than $10,000 which passed through a local steel office last week. Each plate weighed about 7 tons. These shipments embraced a consignment of marine boiler steel ordered by a Canadian consumer some months ago. The billing price with extras was from 15.25c to 15.75c, mill, per pound. In connection with the shipment it was necessary to specify a fair value for the steel in the domestic market at the present time. This was shown to be 5.00c, mill.

Allies Want Big Tonnage

Pittsburgh, March 26.—Extremely heavy requirements are to be called for from platemakers for the last half of the year by the government, both for itself and its allies. England, according to reliable information, will take a surprisingly large tonnage. Platemakers continue to follow with interest the development of the government program for the purchase of large orders of cars and locomotives.

Canadian Inquiries Heavy

Buffalo, March 26.—The plate demand is fair but the fact that mills working on government orders cannot guarantee deliveries is militating against any extensive placement of commercial tonnage. One mill here which is willing to take on commitment states that on this account it is unable to say whether or not its slack will be taken up. A Canadian inquiry includes a very large tonnage of plates and bars in connection with recent government orders for railway cars. One inquiry directly by the Canadian government embraces 10,000 tons of plates. There were other inquiries sent out directly by car manufacturing companies. Emergency fleet tonnage has been allotted to Buffalo mills from time to time.

Want Production Speeded Up

Youngstown, O., March 27.—Mills in this district which are rolling ship plates for the government have been asked to speed up production by Washington authorities. If unable to attain a greater output, mill managers are requested to limit the shipments of plates to domestic buyers to 25 per cent and thus allow the government 75 per cent of production. It is estimated that 70 per cent of the output of the valley plate mills now is going into government work. One mill alone is distributing 5500 tons monthly to the various shipyards which are under government contracts. The government in order to further increase its tonnage has taken over a large tonnage of plates which the British ordered some time ago from one of the local mills. One mill in this territory is at present shut down on account of repairs.

Government Demand Grows

Chicago, March 26.—Allotments of ship material for war purposes, most of which is plates, continue to be received by all steel mills almost to the exclusion of other tonnage. The past week has not been unusual, but it is believed approximately 100,000 tons have been placed with western mills by the government during that period. This is divided as previously between fabricating shops preparing parts of ships and shipyards on salt water which do their own fabricating.

Bar Shipments Are Heavier

Western Mills Now Back to Normal Operations—Makers Well Filled Up on Bookings to Third Quarter

Pittsburgh, March 26.—Makers of both iron and steel bars are receiving an increased supply of cars and are able to make greater shipments. Producers of steel bars have been suffering considerably owing to a shortage of cars and only recently have been able to operate at better capacity. Their output now, however, continues greatly below normal. They have moved considerable tonnage that has been piled but report that they have not made much progress in the way of cleaning up live and pre-war tonnages for buyers who took bars with the understanding that makers would make shipments as rapidly as tonnages and cars became available. With the increased supply of cars makers soon will be in a position to take more new business. As it is now most of them are well filled up to the third quarter and this also represents the condition of the books of makers of bar iron. Some private business is being taken by producers of bar iron for shipment in three to four weeks. Large government orders are being received for iron bars. It is understood that the government is about ready to place its initial orders for cars in connection with its new building program and it will require a considerable tonnage of steel bars.

Inquiries More Numerous

Cleveland, March 26.—Inquiries for steel bars from the general trade, both for war and non-war requirements are more numerous. One local consumer has been seeking 600 to 800 tons for a war contract. The policy of the leading mills, however, is to accept little new business at present, both because of the steel shortage and the prospect for heavy government requirements. Makers of reinforcing bars are quoting cautiously because of the difficulty in getting rerolling rails.

Western Mills Normal

Chicago, March 26.—For the first time in its history, the Gary works of the Illinois Steel Co. is operating 12 blast furnaces, and all the 42 open-hearth furnaces are turning out steel. Other steelmakers in this territory are also operating their pig iron capacity in full and conditions are generally regarded as normal. Bar mill production consequently is heavier. Specifications on contracts are being filed in large tonnage. At the same time, other demand is decreasing. This results from the fact that most manufacturers are busy on government contracts and business of a nonwar character is comparatively small. With building operation at a minimum and railroads out of the market, a large slice of the usual demand is removed. Agricultural implement makers have been taken care of and will receive their supplies as they need them. Bar iron continues to be sold in small tonnages for prompt shipment and mills are running with sufficient business for several weeks, but nothing is being done on long-time contracts.

Prices Are Steadier

Chicago, March 26.—After a period marked by some shading of quotations on attractive orders for nuts and bolts, mostly on the part of eastern manufacturers, prices have become steadier at the prevailing level. The government is the principal customer and large numbers of bolts have been placed for war use. A western mill recently was forced to decline an inquiry for 3,500,000 bolts in one size and two lengths for fear of putting its operating schedule askew.

Moving Delayed Shipments

Pittsburgh, March 26.—Makers of nuts, bolts and rivets report that they are receiving better supplies of cars and in consequence are able to move shipments that have been delayed owing to the scarcity of rolling stock. They are operating fully and are receiving numerous orders, most of them for the government.

Shafting Orders Are Awaited

Pittsburgh, March 26.—The condition of the market for cold rolled shafting remains unchanged. The government is the chief buyer and it is understood it is about to come into the market for 20,000 tons. The 7000 tons it wants for a consumer in Ohio has been allocated but the order itself has not yet been placed.

May Consolidate Extras

Steps are being taken by the committee on iron and steel products of the American Iron and Steel institute to correct inequalities in prices on strips, hoops and bands by consolidation of the various extras into one list and the adoption of a single base price to cover all these products with proper differentials for the different qualities of steel for special purposes. Makers have ever since prices were fixed maintained that prices on these products should be made according to their own classification and that they should be removed from the steel bar card. At present bands take the same price as steel bars, 2.90c, Pittsburgh. It is asserted that hand-made products in view of higher cost of production should be given a price over that asked for steel bars.

New Standards

Proposed in Ferromanganese and Spiegel to Save Vessels

New York, March 26.—Government officials at Washington last week requested that steps be taken to secure an immediate reduction in the number of manganese units in standard ferromanganese and spiegeleisen. As a result, it is expected that the American Iron and Steel institute shortly will take steps to have both producers and consumers of these alloys recognize 70 per cent ferromanganese and 16 per cent spiegeleisen as standards for the remainder of the war. This action is to increase the use of domestic manganese ore and reduce vessel requirements for bringing in foreign manganese ore. It is understood the new standards will not affect old contracts.

Active selling characterized the spiegeleisen market during the past week and fully 8000 tons of 16 per cent metal was sold, mostly for last half, with some for second quarter. The market on 16 per cent spiegeleisen now is quoted at $70, furnace.

Several sales of ferromanganese for forward delivery have been made during the week. These included 1500 tons to a Chicago consumer. The market for 80 per cent is firm at $250, delivered, for any shipment this year. On some second quarter inquiries $275 was quoted.

On 50 per cent ferrosilicon the market continues at $155, delivered, for contracts, and at $180 to $190 for spot shipment.

Heavy selling of ferrotungsten for spot delivery developed during the past week. This business went at $2.20 to $2.30 at the furnace for 70 per cent metal.

The furnace at Graham, Va., operated by John B. Guernsey & Co., was blown in on ferromanganese March 20. The output will be disposed of by Edward E. Marshall.

Talk of Fixing Prices

Pittsburgh, March 26.—Active inquiry exists for ferromanganese. A seller in

Pittsburgh sold 1000 tons to a nearby consumer for second quarter shipment at $250, delivered. The market for 50 per cent ferrosilicon is irregular. Quotations for prompt delivery vary from $175 to $190, delivered. One maker is quoting $150, furnace, for last half. A number of sales of small lots of 20 per cent spiegeleisen have been made at $70, furnace, both for prompt and second quarter. In the event prices on the alloys named are fixed the levels at which sales have been made during the first quarter it is expected, will have to be revised to meet those established by the government for second quarter delivery. Active inquiry exists for the lower grades of ferrosilicon, 10 per cent being in especially heavy demand.

Heavy Inquiry at Chicago

Chicago, March 26.—Although there is heavy inquiry for standard ferromanganese from the local stack, not much is being sold as the ore situation continues serious. It is understood the government is considering a plan to reduce the standard grade of 80 per cent ferromanganese by several points. It is probable that even with a reduction of the manganese content the price will remain the same or be higher. The present quotation appears to be $250, furnace.

Full Price

Quoted by Wire Nail Makers to Government in Competitive Bids

Pittsburgh, March 26.—Makers in this district in bids opened last Friday by the bureau of engineering, war department, to furnish 30,000 kegs of nails for shipment to France, quoted the level of $3.50 per 100 pounds, Pittsburgh, the price recommended by the committee on iron and steel products of the American Iron and Steel institute. The fact that the war department had asked that competitive bids be submitted on these requirements apparently left makers free to name quotations above or below the price of $3.50 but manufacturers felt that they were obliged to adhere to the price recommended by the institute. Distribution on this order is to be made within 15 days from the date of the opening of bids. If all makers quoted the same price, it is likely that awards will be made to those who are in a position to put their nails in kegs that require the least cargo space. Bids were opened today by the bureau of supplies and accounts, navy department, for approximately 40,000 kegs of nails and a delivered price on the basis of $3.50, Pittsburgh, was again named in these specifications by Pittsburgh makers. Makers of wire and wire products are receiving more cars.

Huge Shell Tonnage Near

Understood Government About to Act on 3,500,000 Tons—Allies to Get 500,000 Tons—Allotments Are Settled

New York, March 27.—Orders for 3,500,000 tons of shell steel for the second half will come up for action some time in April, according to reliable information. This will include 500,000 tons of shell bars and billets for the allies for shipment over the second half. The allotments to each mill for this latter tonnage are understood already to have been decided upon. Domestic requirements of shell steel for the second half also are under consideration at Washington. No definite allotments have been decided upon but it is expected that shellmakers will obtain their second half steel requirements from the mills which now are supplying them.

Strip Buying Expected

Pittsburgh, March 26.—Manufacturers of cold rolled strip steel think that buyers will come into the market soon for second quarter. Recommendations have been made to the President to continue the price of 6.50c, Pittsburgh, for the second quarter. Stocks of consumers are almost exhausted. This appears to be especially true of automobile makers. Operations of mills are irregular but at present those in this district are producing almost at capacity. Unless they are able to secure more cars, they will be compelled to curtail output.

Supply Shortage is Acute

Pittsburgh, March 26.—Shortage of tonnages of billets and sheet bars continues to be acute without any prospect of any marked change in the situation in the near future. Inquiries for tonnages are numerous but makers have no offerings, and some of them would like to obtain sheet bars from outside sources if that were possible. Producers of sheets and tin plate especially are anxious to get larger tonnages.

Receives Big Allotment

Philadelphia, March 25.—A leading eastern Pennsylvania steelmaker has been allotted an order by the authorities at Washington for 10,000 to 15,000 tons of rerolling billets which are to be exported to one of the allies. With the exception of urgent government tonnages, the semifinished market here is at a standstill. Due to their reduced operations during the last three or four months, steelmakers have fallen far behind on deliveries so that eastern consumers of semifinished steel have suffered accordingly. The situation as to supply has not eased any and the only sales reported are small ones from middle western mills. Operations at eastern steel plants have improved so that some of them are running at 90 to 100 per cent of capacity. A leading eastern steel foundry is offering 10,000 tons of large forging ingots for April delivery.

War Buying

In Cast Iron Pipe is Growing—Domestic Demand Poor

New York, March 26.—Cast iron pipe remains in fairly good demand in the east, due to the various activities of the government. Inquiries ranging in size up to 2000 tons are before the market. Much of this material is for explosive plants, while some of it is for purposes unknown. For government work in Pennsylvania 1000 tons are wanted. Another lot of 300 tons, involving 4, 6 and 8-inch pipe is for work at Governor's island. A fair-sized tonnage is pending for shipment to Mechanicsville, N. Y., this also for the government. A lot of 150 tons has been purchased by the government for delivery at Newark, N. J. Municipal demand is dull.

Operations Are Heavier

Pittsburgh, March 26.—Operations of pipe mills in this district are heavier. The A. M. Byers Co. is running its mills in Pittsburgh at capacity but is not operating its pipe mill at Columbia, Pa., which produces sizes from 2 to 4 inches, owing to railroad embargoes in the east. This maker is about two months behind in deliveries of small sizes of lap weld iron pipe. Active buying of lap weld iron and steel pipe is being made by oil country interests and there is a considerable increase in specifications for butt weld grades, jobbers being more interested in getting supplies for builders.

West Buying Little

Chicago, March 26.—Absence of inquiry for cast iron pipe continues and small tonnages which are asked for are much below usual size. Battle Creek, Mich., will open bids March 26 on 100 to 300 tons and Niagara, Wis., the same day on 142 tons. This letting was postponed from March 14. J. B. Clow & Sons, Chicago, has been awarded 250 tons for the city of Ft. Wayne, Ind.

Some Prices Cut for Next Quarter

Basic Quotations Reduced $1, Bringing Bessemer Down $1.10—Prices on Scrap Lowered $1—New Schedule for Second Quarter Only—Hearings Will be Held

Washington, March 26. (By wire.)—President Wilson has approved the new schedule of iron and steel prices for the quarter beginning April 1. After that date the maximum price on basic iron will be $32 instead of $33, the present price; bessemer pig iron will be $35.26 instead of $36.30; with a reduction of $1 on the four base grades of scrap. Other prices as fixed previously for the first quarter of this year are reaffirmed. The cut in basic resulted from the impression that the spread between this quotation and prices on semi-finished materials did not permit producers of the latter product a sufficient margin.

The official price announcement follows: The President today approved the recommendations of the price fixing committee of the war industries board that maximum prices heretofore fixed by the President upon recommendation of the board upon ore, coke, steel and steel products subject to revision on April 1, 1918, be continued in effect until July 1, 1918. From April 1 to Julv 1, however, the maximum price of basic pig iron is to be reduced from $33 to $32 per gross ton and the maximum price of scrap steel is to be reduced from $30 to $29 per gross ton. No new contracts calling for delivery of any of said commodities of articles on or after July 1, 1918, are to specify price unless coupled with clause making price subject to revision by any authorized United States government agency so that all deliveries after that date shall not exceed maximum price then in force although ordered or contracted for in meantime. It is expected that all manufacturers and producers will observe maximum prices now fixed.

The President's announcement disposes of the efforts made by the steel manufacturers to have prices set for a longer period than three months. The new schedule specifically applies to the second quarter only and will be reconsidered late in June. At that time cost figures now being compared by the federal trade commission are expected to play a prominent part in the deliberations.

The President's action followed the recommendations of the price-fixing committee of the war industries board. The schedule approved by this committee had been widely discussed before the President's official announcement and had provoked little surprise. The impression had been general that certain reductions were coming.

To Hold Continuous Hearings

The almost simultaneous announcement by Robert S. Brookings, chariman of the industries board's price committee, that hearings would be held to receive requests, suggestions and complaints growing out of the government's approval of maximum iron and steel prices, has aroused great interest. The committee's action may result in disturbing the harmonious arrangement under which the government and the steel industry have been co-operating during the recent months.

Want Hearings on Prices

New York, March 27. (By wire.)—Price fixing committee of war industries board has decided to conduct hearings to receive all requests, suggestions and complaints with reference to iron and steel maximum prices. Present plans are to continue these hearings as long as government prices prevail.

Leaders in steel industry feel that this method of procedure will lead ultimately to much confusion and will jeopardize continuation of orderly and harmonious arrangement by which iron and steel industry is now co-operating with government.

Favors 90-Day Plan

Efforts to get the war industries board's new price committee to recommend that the prices be continued for two quarters or longer failed, members of the committee using some of the arguments advanced by the steel men for that concession. The steel manufacturers had argued that higher costs, still mounting, should assure present prices at least for the next three months. When the request for a longer contract period was made, the committee said that prices longer than three months might work a hardship on the industry, possibly having to sell at less than cost.

Treatment Pleases

It is understood that the majority of the steel men who attended the conference last week left Washington satisfied with the decision of the price committee. It is reported many of them were pleased with the treatment given them by the government. Some of the smaller manufacturers are said to have been disappointed that the pig iron and scrap prices were not cut deeper, but on the other hand, the pig iron and scrap men were, in some instances, displeased with the small cuts that were made. The committee, however, is said to feel that it made a good showing, especially as regards the cut in scrap. It is known that some members of the committee favored even sharper declines.

Much of the time of the conference was spent in a full discussion of the steel industry, which included a general survey of costs, labor, materials, transportation, priorities, production, demands, etc. The government was again given assurance that the steel production of the country would meet requirements provided the industry is given all the co-operation possible in obtaining raw materials and cars.

Government Officials Who Attended

Robert S. Brookings, chairman of the committee, presided. Chairman Baruch of the war board, member *ex officio* of the committee, attended, as did John Hancock, paymaster, the navy's bureau of supplies and accounts; Brig. Gen. P. E. Pierce, representing the army; F. W. Taussig, chairman, the federal tariff commission; and Hugh Frayne, labor's representative on the war industries board. Dr. H. A. Garfield, fuel administrator, was unable to attend, but he was represented by Warren S. Blauvelt, coke director, and William B. Colver, member, attended for William J. Harris, chairman of the federal trade commission. The other civilian member, succeeding Judge R. S. Lovett, has not yet been appointed.

J. Leonard Replogle, director of steel supply, and H. H. Barbour, chairman of the priorities' rating committee, also attended. S. R. Fuller, in charge of steel matters for the bureau of supplies and accounts, attended with Paymaster Hancock and Francis Walker and M. W. Wooster, investigators for the federal trade commission, attended with Commissioner Colver. Jay C. MacLauchlan, handling pig iron

questions for Director Replogle, also was present at the conference.

Manufacturers Who Attended

The steel manufacturers who attended included: Judge E. H. Gary, chairman of the United States Steel Corp.; James A. Farrell, president of the United States Steel Corp.; A. C. Dinkey, president of the Midvale Steel & Ordnance Co.; E. G. Grace, president of the Bethlehem Steel Corp.; H. G. Dalton, Pickands, Mather & Co.; J. A. Burden, president of the Burden Iron Co.; E. A. S. Clarke, president of the Lackawanna Steel Co.; John A. Topping, chairman of the Republic Iron & Steel Co.; W. L. King, vice president of the Jones & Laughlin Steel Co.; L. E. Block, president of the Inland Steel Co.; James A. Campbell, president of the Youngstown Sheet & Tube Co.; James B. Bonner, vice chairman of the American Iron and Steel institute's subcommittee on steel distribution; F. J. Hall, vice president of the Central Iron & Steel Co.; J. S. Reynders, president of the American Tube & Stamping Co.; J. M. Reeves, president of the Phoenix Iron Co.; B. L. Sommers, secretary-treasurer of the Keystone Steel & Wire Co.; J. G. Deericks, general manager of sales, the Pittsburgh Steel Co.; and D. P. Bennett, vice president, the Pittsburgh Steel Co.

At a meeting with the ferroalloys committee which immediately followed the steel price conference, at which ferroalloy production was discussed, Messrs. Farrell, Clarke, Grace, A. A. Fowler, E. J. Lavino, A. D. Ledoux, Frank Samuel, E. M. Price and F. W. White, were present.

Pittsburgh Finds Changes About as Expected

Pittsburgh, March 27.—Disappointment has been expressed by some of the merchant furnace interests that the government has reduced the price of bessemer and basic iron while others say they are satisfied with the change. The recommendations have caused no surprise and they are so limited that they therefore do not call for a sweeping realignment in the industry is a source of relief to the trade. It is understood that the chief reason for the reduction in basic iron was the insistent complaints made by certain producers of plates, that the price of 3.25c, Pittsburgh, was too low and that it would either have to be increased or basic reduced. The price of bessemer iron was reduced in order to maintain the previously established differential of 10 per cent. The price of $33 on No. 2 foundry was allowed to stand apparently because it more nearly represents the differential that has existed in the past under trade custom. It now becomes $1 higher than the price of basic. It is pointed out that foundry iron cannot be produced in as large quantities in given furnaces as can basic. Moreover, foundry iron is sold in relatively small lots, whereas basic is marketed in heavy tonnages which calls for much less handling and distribution costs. Large tonnages of both bessemer and basic have been sold during the first quarter, but will not be delivered until after April 1. The price on these undelivered tonnages automatically will be reduced to the new levels.

There is a difference of opinion as to the market effect of the new price declaration. Some authorities believe it will bring out new inquiries for both iron and steel. So far as pig iron itself is concerned, the market here is well cleaned up, although some furnaces which have not committed themselves for the entire last half, it is claimed, now may be willing to do so. Some lines of steel are open to new business, including cold-rolled strip steel, steel bars, standard railroad spikes and barbed wire and nails, although buyers have been assured right along that they would be given tonnages at government prices existing at the time of shipment.

Iron Shortage

Being Felt by Valley Steelmakers—Operations Slightly Improved

Youngstown, O., March 27.—Operating conditions in this and the Greater Pittsburgh districts is slightly improved, although far below the normal output. Reports show that coke ovens are operating at 93 per cent capacity, blast furnaces at 92 per cent, open-hearths at 88 per cent, and bessemer plants at 85 per cent. Some blast-furnace managers state the reason for not making a better showing in operation is that they have not as yet been successful in getting their furnaces to take the usual volume of wind; others report either a shortage of coking coal due to the car situation or retarded coke shipments. Operators of bessemer plants say that a shortage of pig iron has greatly hampered their output. Various steel commodities piled in the yards of the steel companies in this district totals 38,000 tons. Half of this tonnage is stocked on account of the existing embargoes, and half on account of the shortage of cars. A large per cent of the steel is war material.

More Difficulty

Is Experienced by Consumers in Obtaining Sheet Tonnages

Youngstown, O., March 27.—Nearly all sheet mills are operating in this district and the output is estimated at 85 per cent. Box cars are still scarce and mill managers are experiencing trouble in making shipments. Consumers are still clamoring for all grades of sheets but find them hard to get under two months' delivery. One producer states his books are already closed for second quarter. The mills are heavy burdened with government business, the nature of which is mostly galvanized. However, light tonnages of cold-rolled black sheets have been bought by the government and will be used for powder containers. One producer has a tonnage of this material going through his mills now. One mill took on 75 tons of galvanized business for the government this past week; while tonnages ranging from 100 to 400 were booked by another mill.

Operations Are Poor

Pittsburgh, March 26.—Operations of sheet mills in this district are proceeding at a low and somewhat irregular rate. Makers are suffering from a shortage of sheet bars and cars. Great piles of stocks have been stored and are awaiting shipment, some of the tonnage being for the government. There does not appear to be any sign of any marked improvement in the car and steel supply in the near future. Sheet mills have been compelled to suffer in order that other lines may be supplied as freely as possible with cars and steel. Makers of sheets have heavy government bookings and it is understood that just at this time their output is devoted largely to this business. No new business is being taken from domestic consumers. Allotments for this trade were made early in the year for first half business on black and blue annealed sheets and for first quarter business on galvanized sheets.

Dormant Demand Heavy

Chicago, March 26.—Although comparatively little inquiry from domestic users of steel sheets is being received by western mills, indications are that a strong need for further supply exists in many lines which would come out if consumers were not satisfied of their inability to place it on mill books. The situation appears to be quiet and demand small except on the part of exporters though consumers really are in need of further supply.

Wants Much Ship Tonnage

Submarine Boat Corp. to Ask for 100,000 Tons of Fabricated Steel—Bethlehem Seeks Tonnage—Boston Development Large

Philadelphia, March 25.—The Submarine Boat Corp. is about to request bids on approximately 100,000 tons of fabricated ship steel in addition to the tonnage it placed a couple of months ago. The Bethlehem Steel Co. also requires some 10,000 to 15,000 tons of ship shapes to be used in vessel construction. The structural market again is exceedingly quiet here. The only award of any consequence is 600 tons for a boat shop at the League Island navy yard. Some railroad bridge tonnage has been placed but it was of insignificant total. Fair sized orders for plain shapes are being placed by fabricators in connection with government work. The Belmont Iron Works has taken an order for an additional 20 hangars for erection in France, making a total of 40 to this fabricator. Orders for additional hangars are in contemplation, but at the present rate of action it will require many months before the entire 2500, originally contemplated, are placed. The government contemplates building a pier and warehouses on the water front here similar to the development at Boston, but plans have not yet assumed definite form.

Terminal Tonnage Large

New York, March 26.—Much speculation prevails in the eastern structural market at this time as to the steel requirements of the proposed government terminal to be erected in Boston. Recently new plans have been considered regarding the main warehouse, which call for all-steel instead of reinforced concrete construction. As a result, about 35,000 tons of additional steel may be required. There still is a belief among some fabricators, however, that the original plan will be carried out, inasmuch as developments along that line have reached such an advanced stage. It appears to be an established fact, though, that the pier sheds will require 8300 tons, although inquiries as yet have not been issued. Other auxiliary buildings, it is believed, will be constructed of reinforced concrete. The Boston terminal, which will cost approximately $20,000,000, will be the first of several to be erected along the Atlantic coast. It is understood that while this terminal still may be erected of concrete, the others will be of all-steel construction. Current structural demand is relatively small, the bulk of buying being for government account.

Government Orders Are Heavy

Pittsburgh, March 26.—Heavy government orders of various kinds are being placed with fabricators whose operations are devoted almost entirely to this kind of business. Better supplies of cars are being received by structural mills and this has allowed them to increase operations and to make larger shipments. The domestic market is extremely dull.

Attractive Orders Declined

Cleveland, March 26.—Various inquiries of good size for plain structural shapes have been current in this district during the past week. These mainly have been for stock or manufacturing purposes, as few new building projects are coming out. One lot called for 2700 tons, another for 800 tons and the third for about 500 tons. Though the specifications were very attractive and the deliveries were made subject to mill convenience, few of the producers have shown any interest in this business. Some of the more important interests decline to quote because their supply of steel is engaged far ahead and they are anticipating heavy additional government orders. Some government contracts involving a large tonnage will probably be closed within the next two weeks.

West Builds Little

Chicago, March 26.—Demand for steel structural material is much below par and, except for shipbuilding purposes comparatively little is being required. The largest tonnage placed in the west recently involves 835 tons for an agricultural pavilion for the state of California at Sacramento, which will be fabricated by the Central Iron Works.

CONTRACTS AWARDED

Agricultural pavilion for state of California at Sacramento, Cal., 835 tons, to Central Iron Works.

Addition to Mills building for the Mills Estate, Inc., at San Francisco, Cal., 295 tons, to California Steel Co.

Additional material for power house for Kansas City Light & Power Co., Kansas City, Mo., 119 tons, to independent shop.

Government explosive plant at Nashville, Tenn., 6000 tons, to American Bridge Co.

Government chemical plant at Sautville, Va., 800 tons, to McClintic-Marshall Co.

Government explosive plant at Charleston, W. Va., 1000 tons, to Nashville Bridge Co.

Addition to the plant of the Singer Mfg. Co., Elizabeth, N. J., 500 tons, to the Ferguson Iron & Steel Co., through the Austin Co., Cleveland, general contractors.

Boat shop at Philadelphia navy yard, 600 tons, to McClintic-Marshall Co.

Twenty airplane hangars to be erected in France, 750 tons to Belmont Iron Works.

Building for quartermaster general's department at San Antonio, Tex., 2500 tons to independent fabricators.

Warehouses for use of American expeditionary forces in France to Lackawanna Bridge Company.

CONTRACTS PENDING

Power house, Pier 18, for Central Railroad of New Jersey, 200 tons, bids being taken.

Addition to plant of Cleveland Brass & Copper Co., 200 tons, bids being received by Westinghouse, Church, Kerr & Co.

Marine railways at Boston and Charleston, 700 tons still pending.

Assay office at New York, 400 tons, inquiry before market.

Addition to the plant of the Linde Air Products Co., Buffalo, 200 tons, bids being taken.

Substation 13, for government, at Washington, 100 tons. Bids being taken.

Lift bridge for Boston and Albany railroad, 600 tons, bids being taken.

Building for quartermaster general's department at Baltimore, 900 tons, bids being taken.

Power house for Central Railroad of New Jersey, at Jersey City, N. J., 300 tons, bids being taken.

Office building and crane runway for Wm. Cramp & Sons Ship & Engine Building Co., 600 tons to 700 tons and 1500 to 1600 tons respectively, bids being taken.

Alterations to Hotel Imperial, New York, 1500 to 1600 tons, bids being taken.

Lake Ore Trade

To be Discussed at Meeting in Cleveland Next Week

Cleveland, March 26.—Active steps are being taken to insure the movement of a sufficient supply of iron ore on the lakes this year with a minimum tax upon the transportation facilities. General supervision over the trade will be in the hands of a central committee. To secure a clearer insight into all phases of the problem, a meeting will be held at the Hollenden hotel, Cleveland, at 10 o'clock Tuesday morning, April 2. The meeting is designed to secure a full attendance of representatives of all interests involved in the ore trade.

A. H. Smith, regional director of railroads for the eastern district, requested the institute committee on pig iron, iron ore and lake transportation to estimate the tonnage of ore which the railroads will be expected to handle during the 1918 navigation season.

The committee immediately issued the call for a general meeting of representatives of the railroads, vessels, coal shippers and ore shippers and consumers. At the meeting a free discussion will be sought in order to determine the best methods for handling the ore so that consumers will be amply supplied with the lightest

strain upon the railroads. Ore consumers, whether handling ore over their own docks or over railroad terminals, are specifically requested to attend the meeting.

Ore prices for 1918 will be the same as the 1917 figures, according to the impression generally held by the ore trade. The result of the meeting at Washington last week at which prices for the second quarter of this year were discussed, is believed to have led to the reaffirming of last year's quotations. This action was not surprising to the ore trade. Failure, however, to set ore prices for a longer period than the next quarter is disappointing as the ore trade always has been operated on a 12-month basis. The bulk of the ore tonnage for this year has either been contracted for or placed under reservation with the price subject to change in line with the action of an authorized federal agency.

Chrome Ore at Record

New York, March 26.—Prices on chrome ore have ascended to record breaking height. Several thousand tons of new Caledonian chrome ore of highest quality have sold at $2 per unit, c.i.f. seaboard. This ore, which contains around 55 per cent chromite, was sold only a few months ago at around $1.25 per unit. Considerable tonnage of new Caledonian chrome ore now is being offered c.i.f. Pacific coast at a price equivalent to about $2 per unit, delivered in the east. It is expected that additional offerings of foreign chrome ore will involve very little tonnage for some time to come, since efforts to make arrangements for ships to bring in the ore have not met with encouragement.

Many Locomotives

Virtually Arranged for by Government —The Expected Distribution

New York, March 25.—Present plans of the government are to place orders for 3000 locomotives to be delivered in time to aid in preventing traffic congestion in this country next winter. It is expected 1200 will be made by the Baldwin Locomotive Works, 1200 by the American Locomotive Co. and the remaining 600 by the Lima Locomotive Co. and other builders.

The Baltimore & Ohio has placed an order with the Jones & Laughlin Steel Co. for 1400 kegs of spikes.

Await Government Orders

New York, March 26.—Although the railroad bill has been signed by President Wilson, an allotment of orders for railroad equipment has not as yet been made by the administration. Action in this direction, however, is being expected almost daily. Simultaneously with the signing of the bill by the President, General Director McAdoo issued an order that the construction of new lines, or the extension of present facilities during the rest of the war may be undertaken only with the approval of the administration. Buying at the present time continues exceedingly dull. Included in the few orders to be placed recently is that of the Guantanamo & Western railroad involving 25 steel frame box cars. This business was placed with the American Car & Foundry Co. It is reported that the Birmingham Southern railroad is in the market for 20 freight cars.

May Fix Rail Price

Pittsburgh, March 26.—Fair demand for light rails is coming to makers in this district and good deliveries are being made on this business. The market for standard rails is dull and makers are not yet quoting for 1919 delivery. It is understood that when the government comes into the market, as it is expected soon in connection with its railroad building program, it will take large tonnages of standard rails and fix a price on them. Mills are holding themselves in readiness to take care of this business promptly. The market for standard spikes is more active and orders involving small lots are rather numerous. Makers have been giving prompt delivery on standard spikes but now are compelled to defer shipments from six to eight weeks. Pressing demand is being made for small spikes and comes chiefly from jobbers. Some makers are entirely out of the market on these sizes, while others are taking small orders for delivery at their convenience.

The Pressed Steel Car Co. has taken 50 tank cars for the Canadian government and 100 car bodies for the American Steel & Wire Co.

Mill Deliveries Slow

Chicago, March 26.—On account of heavy pressure for finished steel material for war purposes, mills are not getting out rails and track fastenings at a rate sufficient to meet the actual needs of railroads and the situation begins to assume a serious aspect. With large orders for 1918 delivery, rail makers are unable to divert sufficient steel from plates and shell rounds to keep their mills busy and meet obligations on these contracts. No inquiry for railroad cars is now current and nothing definite is heard relative to the government's proposed order for 45,000 freight cars.

Will Commandeer

Tin Plate Output, in Near Future, Makers Believe

Youngstown, O., March 27.—Reports are current that the government may commandeer the production of all tin mills in the near future. This means there will be no tin plate available for nonessentials and that the entire output of the mills will be used for food containers until an ample supply is available to care for this year's needs. Tin plate makers here are expecting such an order to be issued at any time. Mills are still handicapped in making tin plate shipments on account of the box car shortage. One valley producer which had 18 box cars in his yard waiting to be loaded, received a governmental order requesting him to free the cars so they could be forwarded to a nearby state and loaded with foodstuffs bound for France. The mills have a fair supply of pig tin on hand and report that they have not had any mills idle on account of any tin shortage. Shipments of pig tin from New York continue to arrive at intervals but in slightly decreased amounts. The production of tin plate in this district will be increased about 600,000 base boxes annually by the eight mills of the Liberty Steel Co. These, it is stated, are expected to be placed in operation by about the tenth of April.

Cut Warehouse Supplies

Pittsburgh, March 26.—A better supply of cars is available to makers of tin plate, and during the past week some plants received their entire allotments and others were able to secure their entire requirements. Allotment of cars is based on capacity, but has not been meeting the entire requirements of producers to take care of their output and at the same time make inroads on stocks they have piled. Operations are well over 90 per cent of capacity. During the past week, however, some makers have received a sufficient supply of cars to take care of both situations, and as a result there are some plants which have almost entirely cleaned up stocks they had piled in warehouses. Improvement in shipments was made throughout the industry and prospects are for a continuation of this betterment. Operations are devoted almost wholly to requirements in connection with the food conservation program. Some inquiries are coming from South America, but this business is not being taken owing to the pressing character of domestic demand.

High Wages

In Shipyards for Experienced Men Justified by Manager Piez

Indianapolis, March 26.—A defense of the attitude of the Emergency Fleet corporation toward labor was made by Charles Piez, vice president and general manager of the corporation, in an address before the Indianapolis branch of the National Metal Trades association last night. He declared that the decision of the corporation to pay wages that were so generous as to attract inexperienced workers into the shipyards not only is justified, but is wise, in view of the prime need for tonnage to meet the demands of war.

"Now 300,000 skilled men actuated by a loyal purpose will turn out between 6,000,000 and 7,000,000 deadweight tons of shipping per annum," he said; "but that number of half-skilled laborers will turn out barely half that production, necessitating either a corresponding reducing of our expected output or a vast extension of shipyard facilities. The statement that high wages reduce rather than increase output, in my opinion, cannot be substantiated. The present administration stands firmly committed to a basic day of eight hours. The application of the 8-hour day is being very widely extended and my suggestion is to those employers who are still working on a 10-hour day basis, that they had better begin an immediate reduction of hours on straight time and to adjust themselves promptly to the inevitable.

"Concerning the charge that we are playing into the hands of the unions, let me say that wage adjustment agreement under which the shipyard workers are operating has been, on the whole, a most effective instrument in adjusting labor disputes and in preventing walkouts and strikes. That the unions are extending their membership cannot be denied, but they are doing this much as a manufacturer extends his business during periods of extreme business activity. The Fleet corporation stands firmly by the principle that an equal opportunity should be extended to all.

"That the wage policy adopted by the Fleet corporation should prove embarrassing to industry is regrettable, but if industry will look on this wage increase as a war measure intended to attract workers to the most essential part of the war program, and will bear it in the same philosophic spirit in which it bore the draft, it will find that the burden will be only temporary."

Mr. Piez said that he did not want to be understood to be in opposition to wage increases in general. He declared industry has enjoyed prosperity for two years, and he asked if employers have given employes a fair share of the prosperity. He said labor is going to insist on a fairer distribution of the fruits of industry.

Enters Engineering Field

Organized by three former members of the Wellman-Seaver-Morgan Co.'s organization in Cleveland, the Hulett-Boyd Co., with offices at 301-303 Union building, Cleveland, has been incorporated under the Ohio state laws with a capitalization of $50,000. The new concern is paying particular attention to the engineering and contracting field and among other projects it already is busily engaged on work in connection with crane and pier equipment for the Submarine Boat Corp., which is building the government shipyard at Newark Bay, N. J. The company will specialize in dock equipment work, in ore and coal storage yard machinery and other heavy machinery. G. H. Hulett, inventor of the Hulett ore unloader and car dumper, and formerly vice president of the Wellman-Seaver-Morgan Co., is chairman of the board and vice president. His son, Frank E. Hulett, affiliated with the Wellman company for about 20 years, most recently as engineer in charge of coal-handling equipment, is president. C. A. Boyd, connected with the same company for the last 12 years and who for some time prior to his resignation, was works manager, is likewise vice president.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, March 26.—The New York metal trade has felt the influence of the big German drive. Whereas, on previous big pushes statisticians were wont to figure out the amount of metal being consumed in the heavy bombardments, the appalling loss of life and the issues weighing in the balance in this crisis have repressed activity even to a narrower scale than in recent dull weeks. Inquiries have been noticeably scarce this week, even for tin, which has been in lively demand heretofore. Speculation has largely been eliminated from the metal markets and brokers and dealers are figuring only to a very limited extent in the distribution of metals, as compared with previous years. The government controls distribution of copper, tin and aluminum, among the major non-ferrous metals. The lead producers are selling the bulk of their output to the government and are disposing of exceedingly little metal through second hands. Demand for spelter is so light that there is little activity on the part either of producers or second hands. Consumption of antimony continues apparently light, while stocks are large. All in all, the New York metal trade is passing through the hardest time in years. Several smaller brokers have shut up shops and some of the larger have cut down their office forces.

Spelter prices were driven downward last week from the level at 7.50c, St. Louis, at which they had been pegged for some time, when one large producer pressed sales heavily. In the course of a few days they dropped to 7.25c, St. Louis, for prompt, March, April and May shipment, and metal might have been obtained at even as low as 7.12½c. This is the lowest level the spelter market has reached in three years. The government continues to take good sized tonnages of high grade spelter at the fixed price of 12c, St. Louis, and producers are sold up about a month ahead.

The lead smelter of the St. Joseph Lead Co. at Herculaneum, Mo., has been closed for more than a week because of labor troubles. This smelter produces about 20 per cent of the country's lead output and undoubtedly if its closing is prolonged the market will reflect the diminished output. At present the market is quiet, with producers supplying a large part of their output to the government, while sellers are not pushing sales to the general trade. Production generally has been improved with better traffic conditions and arrivals of cars at New York from the West have eased the spot situation in the East. Independent producers are shading the leading interest's quotation, asking as low as 7.12½c, New York, for prompt, March, April and May shipment. Spot is quoted 7.50c to 7.60c, New York.

The tin market has been extremely excited, with heavy demand to scarcity of supplies. Practically no offerings of spot Straits are reported. On occasional lots of Banca from 87c to 90c, New York, is being done. Chinese No. 1 and other grades of 99 per cent tin are quoted 87c. No quotations on Straits for future shipment from Singapore are reported. Chinese for March shipment from China is quoted 78.50c to 79c, c. i. f., New York; April shipment, 77c. Banca for March shipment from Batavia is quoted about 81c.

The aluminum market has become generally adjusted to the government fixed maximums and there have been few reports of violations. The maximum price for 98 to 99 per cent aluminum in 50 ton lots is 32c.

Some of the larger copper producers have sold up their output until June 1, but one or two continue to accept business. On June 1 the present price agreement of 23.50c for carload lots expires and the trade generally feels that if there is any revision it will be upward. Consequently many consumers have been led to cover their requirements until that date. However, no scarcity of copper is apparent.

Antimony in a 25-ton lot sold today at 12.-67½c, New York. Some sales were made in 50-ton lots at 12.50c, New York, recently. Holders generally have been asking about 13c, duty paid, New York.

Velocity Measured by Impact Tube

Discussion of Fundamental Principles and Proper Arrangements for Actual Tests—This Apparatus is Applicable for Measuring Pipe Pressure or Flow of Fluids—Venturi Meter Computations Needless

BY SANFORD A. MOSS

VELOCITY of gases or liquids in pipes or tubes is determined, mathematically, from the static and total pressures of the substance under consideration. These pressures are obtained by means of the well-known pitot tube which consists of a central portion called an "impact tube" pointed downstream, surrounded by a chamber in which are openings for obtaining static pressure. Properly calibrated static openings in a properly smooth jet give exactly the same readings as are given by a static pressure hole in the pipe wall where fluid flow is being measured. There are a number of positive advantages gained by discarding the common pitot tube, and using instead an impact tube and a static hole in the pipe wall.

The impact tube is valuable for many other purposes, both for incompressible fluids and for compressible fluids at high velocities. An impact tube can be used instead of a static pressure hole, in the pipe preceding a venturi meter or in an orifice discharging into atmosphere, in order to automatically take account of the initial velocity head; or it can be used to traverse the jet issuing from an orifice and so give absolute calibration and velocity coefficient, without actual measurement of volume by means of tanks, weirs, gas holders, etc.

The impact-tube law which covers all cases is that "the impact tube perfectly converts velocity into pressure," so that the pressure shown by the impact tube is exactly the pressure which will produce, with theoretical adiabatic flow, the actual velocity of the stream in which the impact tube is inserted.

The impact tube as a part of the pitot tube is well known as a means for measuring flow of fluids. When used as a separate instrument, it is a much more valuable apparatus, and has not received the attention it deserves.

Accuracy of Pitot Tube

The common form of pitot tube is a double-walled tube consisting of an impact tube pointed downstream surrounded by a chamber with openings for determining the static pressure. It is asserted that the impact portion of this tube gives reliable results, regardless of its shape. The static holes give very indefinite results and the shapes and sizes of all of the parts have influence on the static readings.

Static pressure is determined by a hole in the wall of a surface parallel to the fluid flow. Reliance cannot be placed upon readings with an impact tube, or any of the common forms of pitot tube, unless the instrument is inserted at a point where the stream is uniform. Ten to 20 diameters of straight pipe should precede the tube and about five diameters should succeed it. Hence, if we have a pitot tube which measures true static pressure, and a uniform jet, the static readings at every point across the pipe section are the same as would be given by a static hole in the pipe wall. Any measurements made by a plain impact tube in conjunction with a static hole in the pipe wall will give results identical with those given by an accurate form of pitot tube.

That an accurate form of pitot tube takes account of any slight variation there may be in static pressure from one side of a pipe to another when a traverse is made across the pipe, is not a fact. If there is any difference in the static pressure across the pipe section, the streams will not flow parallel to the pipe walls, but at various angles. Parallel flow in a pipe is only possible when the static pressure is absolutely the same at all parts of a section perpendicular to the stream. Therefore, if there is variation in the static pressure the stream angles will be such that even an accurate form of pitot tube will give erroneous results. The pitot tube offers no advantage over the combination of an impact tube and a static

From a paper presented before the American Society of Mechanical Engineers. The author, Sanford A. Moss, is engineer, turbine research department, General Electric Co., West Lynn, Mass.

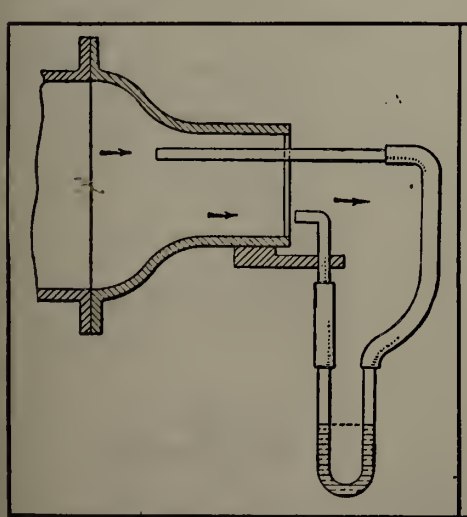


FIG. 1—CONSTANCY OF IMPACT PRESSURE OF AN ORIFICE

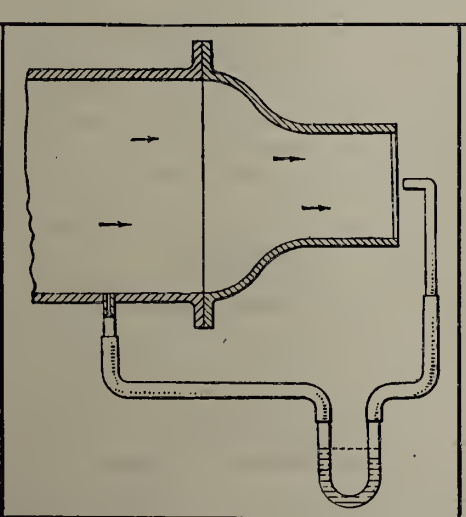


FIG. 2—EQUALITY OF IMPACT PRESSURE IN PIPE AND JET

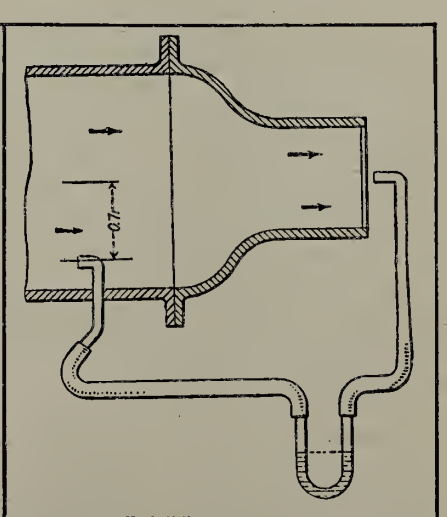


FIG. 3—VELOCITY HEAD SHOWN BY DIFFERENCE BETWEEN PIPE STATIC AND JET IMPACT PRESSURES

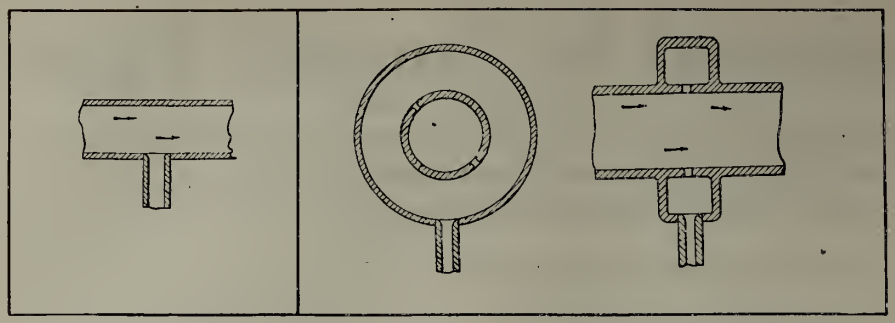


FIG. 4—SINGLE STATIC HOLE IN PIPE WALL

FIG. 5—RING OF STATIC HOLES IN PIPE WALL

hole in the pipe wall. It is much easier to make a reliable static hole in the pipe wall than it is to make a reliable static hole in the pipe wall than it is to make a reliable static hole in the pitot tube. The usual trouble with pitot-tube static openings is that they give too low a reading for static pressure. This increases the small differential reading between impact and static sides and indicates a quantity larger than actually exists.

All of the foregoing refers to the common form of pitot tube, consisting of an impact opening and one or more static openings in the side walls immediately adjacent. Such a tube is used to determine the flow in a pipe by means of a traverse across the stream, readings being taken at each of a number of different points. There are several forms of nozzle plugs, special pitot tubes, etc., which provide a number of holes completely across a jet. Some of these are said to average the velocities and static pressures in an irregular jet, automatically determining the flow at a single reading. The writer has had no experience in the use of such instruments for accurate work and this paper does not discuss them.

Law of Impact Tube

The law of the relation between velocity and the differential pressure (difference between the readings of an impact opening and a true static opening) is well known for the case of incompressible fluids or cases where the compressibility effect is negligible, such as air and steam at comparatively low velocities. This law is usually given in the form $V = \sqrt{2gh}$, where V is the velocity in feet per second, and h is the height, in feet, of a column of the fluid in question having a pressure equal to the differential pressure.

The use of the impact tube is by no means restricted to cases where the foregoing formula applies. High velocities with compressible fluids can be measured accurately if the complete law is used. This law is that the impact tube perfectly converts velocity into pressure. That is to say, the velocity of the fluid in front of the impact tube is exactly that which would be produced by theoretical adiabatic flow from a region where the absolute pressure is that shown by the impact tube, to a region where the absolute pressure is the static pressure. We may use the theoretical thermodynamic formulae for adiabatic flow through orifices deduced with the assumption that the initial velocity in the pipe preceding the orifice is practically zero. This law holds for steam, air, all gases, and liquids.

The flow of a gas thus computed by the thermodynamic laws for adiabatic flow is somewhat different than if computed by the incompressible fluid law, as heretofore stated. This difference is negligible if the differential pressure is a small fraction of the absolute static pressure. The error is noticeable in the case of air with a pressure of 1 pound per square inch above atmosphere and a velocity of about 50 feet per second. This error becomes more serious as the velocity increases.

The law that the impact tube converts velocity into pressure follows directly from the general law that impact pressure is constant at all points as we proceed up the stream along an orifice fed by a very large pipe. It has been known for some time that this law holds for the case of liquids, and it may be extended to the case of high velocities and compressible fluids. Demonstration of this law is readily made by means of apparatus shown in Fig. 1. A stationary impact tube is clamped at a convenient point in the jet from a convergent orifice preceded by a large pipe. An impact tube is pushed up inside the orifice. Differential pressure between the two tubes is shown by a water U-tube. It will be found that the differential pressure is zero. The law is accurate within one-quarter of 1 per cent of the orifice impact pressure.

The apparatus shows, when the pipe preceding the orifice is more than three times the orifice diameter that the jet issuing into the atmosphere has a constant impact pressure and a constant velocity at all points over its area except close to the edges.

The velocity in a long straight pipe preceding an orifice is not at all constant, but is proportional to the ordinates of an ellipse. The velocity is a maximum in the center and gradually decreases toward the sides of the pipe. When this pipe velocity, compared with the spouting velocity, is insignificant. Fig. 1 shows that static pressure in the pipe preceding the orifice plus the average velocity head at this point is equal to the jet—impact pressure issuing from the orifice. The sum of the initial static pressure and the average velocity head in the pipe preceding the orifice is given by an impact tube placed at such a radius as to give the average velocity head. If this pipe is quite large, the velocity head has the average value at a point of a periphery, the radius of which is about 0.7 of the radius of the pipe. A water U-tube, arranged as in Fig. 2, reads zero, while the water U-tube, shown in Fig. 3, reads the average velocity head in the pipe preceding the orifice.

Importance of Orifices

Where the final pressure of a compressible fluid is greater than half the initial pressure, an orifice must be wholly convergent as in the case of an incompressible fluid. The velocity of the jet issuing from the orifice is less than the velocity of sound and the impact-tube laws, as

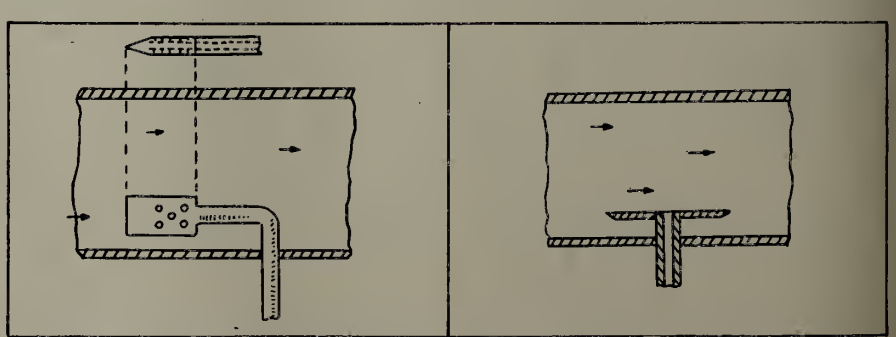


FIG. 6—STATIC PRESSURE BOAT

FIG. 7—STATIC PRESSURE BY SIDE GAGE

well as the work with impact tubes here discussed, apply only to such cases. When the final pressure of a gas is less than half the initial pressure, the orifice of a pipe must be first convergent and then divergent. The writer has not carefully investigated impact tubes in such cases. There is an indication that the impact tube does not convert velocity into pressure with an efficiency of 100 per cent. It is asserted that with a final pressure less than half the initial pressure, and with a wholly convergent nozzle (a shape which does not give full theoretical velocity), the impact pressure in the jet close to the end of the orifice is equal to the initial pressure. It is known in this case that the static pressure of the jet is about 52 per cent of the initial pressure for air, and 58 per cent for steam, notwithstanding the pressure of the region into which the jet discharges, and that the jet velocity is the velocity of sound. The jet forms stream lines. This creates an extension of the orifice and represents a divergent portion where pressure decreases to the pressure of the surrounding region and where velocity increases from velocity of sound to a somewhat greater value. This value is less than one obtained with a properly-shaped orifice.

A gas in a closed envelope consists of a number of molecules oscillating at high velocities. A gas flowing in a pipe consists of molecules with velocities such that the average velocity down stream has a definite value, the velocities across the stream cancelling so that the average is zero. When gas is flowing from a large vessel through a properly-shaped orifice into a region of lower pressure, the molecules in the jet issuing from that orifice are really in the same condition as those in the vessel, except that there is a general net velocity which we call the velocity of the jet. The net velocity is at once destroyed if anything is inserted in the jet. The molecules immediately in front of the impact tube in a discharge jet are in exactly the same condition as those in the large vessel from which the gas issues. Hence, the impact tube in the jet must measure the same pressure as would a static hole in the pipe wall of the large vessel.

Impact Temperature

A similar situation occurs if a thermometer is placed in a high-velocity jet in an attempt to measure its temperature. The molecules surrounding the thermometer are immediately restored to the same condition as those in the large vessel from which they originally proceeded. A thermometer inserted in a high-velocity jet issuing from an orifice will give nearly the same reading as a thermometer in the large vessel from which the jet discharged. An interesting experiment can be performed with an orifice discharging steam with an initial pressure of about 25 pounds per square inch absolute into the atmosphere and with the initial steam slightly wet. The laws of adiabatic expansion show that the steam in the jet issuing from the orifice will also be wet. Hence, the jet will actually be at the temperature of wet steam at atmospheric pressure, which is 212 degrees Fahr. A thermometer inserted into the jet will indicate a temperature which is considerably higher than 212 degrees Fahr.

A gas discharged from an orifice has a very low temperature resulting from adiabatic expansion. This temperature is only relative to a thermometer moving with the velocity of

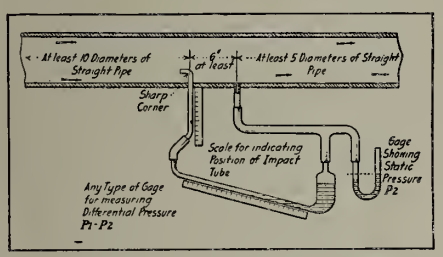


FIG. 8—IMPACT TUBE AND HOLE IN PIPE WALL FOR MEASURING PIPE FLOW

the jet. The individual molecules have the same average kinetic energy and the same temperature as they originally had.

Temperature measurements have been made which show temperatures in a high velocity jet of air much above the theoretical adiabatic temperature of the jet. It was alleged these experiments showed that the velocity of such a jet was not the theoretical velocity due to adiabatic expansion, and that it was not possible to expand a gas in a nozzle so as to obtain such a velocity. This conclusion is incorrect and with a properly-shaped orifice or nozzle nearly the theoretical velocity due to adiabatic expansion can be obtained with air or any gas, just as with steam in a steam turbine. If the energy is extracted from the jet by means of a turbine wheel or the like, the exhaust steam will show low temperature. Nearly initial temperature will be shown if the thermometer is inserted directly in the high-velocity jet.

The temperature of the walls at the orifice end of the pipe in which a high-velocity jet is flowing, is another interesting matter. There is reason to believe, if the tube is perfectly smooth from a molecular point of view, that the temperature of the wall will be the theoretical adiabatic temperature. A temperature intermediate between the initial and the adiabatic temperature will be read if the wall is rough.

A similar situation arises when a thermometer is inserted in the jet. This thermometer will probably read initial temperature provided the perfectly square end is exposed to the jet. If the thermometer has a rounded end and some side walls exposed to the steam, a lower value will be read. If the tip of the thermometer be shielded so that only the thermometer walls, parallel to the jet, are exposed, a value nearer the adiabatic temperature will be read. Intermediate arrangements will give temperatures between the adiabatic and initial values.

The temperature shown by a thermometer which had only a square end exposed to the jet would probably be initial temperature rather than the temperature which would result from destruction of the initial velocity at the lower pressure. This latter temperature is that obtained in a porous-plug experiment or any other case of expansion with constant total heat, and is cooler than the initial temperature. Experimental measurements of this have baffled physicists for years. Possibly such experiments may be made by using a thermocouple in a high-velocity jet, one side exposed to the impact temperature, and the other shielded from the impact temperature and exposed only to gas whose velocity has been destroyed.

Velocity an Important Factor

Experiments on temperature of air after great expansion show thermometers directly in high-velocity jet have a lower temperature than those a little further away where the velocity had been destroyed. This is due to the fact that the orifice which was demanded by the pressure ratios involved should have been first converging and then diverging. The actual orifice was a straight passage succeeded by a sudden enlargement to a chamber where the thermometer was inserted. This formed an orifice mouth with area greater than necessary and gave expansion to a pressure lower than atmosphere. The adiabatic temperature with such an excessive expansion would be lower than with expansion to atmospheric pressure. It could easily be lower than the temperature of the jet after it had gone up to atmospheric pres-

sure and had had its velocity destroyed.

The exact shape of the impact tube is not important. It is necessary that there be a pipe or tube facing squarely up stream in a jet undisturbed except by the impact-tube end. The impact-tube end before it bends away from the jet should have a straight portion parallel to the jet about 10 times the length of the impact-tube opening. The open end of the tube should be slightly rounded on both inner and outer edges and should be smooth For ordinary work, the tube is ¼ inch to 1 inch in diameter. For work with small pipes, and for special exploration work, the tube may be of any size. The writer has obtained satisfactory results with tubes as small as 1/32-inch outside diameter.

The impact tube must face squarely downstream. There is no necessity for exact measurement in this connection, and estimation by eye is accurate enough. Readings in a constant jet with impact tube rotated, show that angles of several degrees on either side of the exact downstream position, give no effect on the readings. As the tube is rotated further, the readings fall off rapidly. While the tube is facing up stream at an angle and before it becomes perpendicular to the stream, the differential pressure becomes zero and the impact tube reads the static pressure. When the tube is perpendicular to the stream the differential reading becomes negative. If the outer end of the tube is bent in the same plane as the inner end, as shown in Fig. 8, the tube inside the pipe will face downstream properly.

Location of Static Holes

Figs. 4, 5, 6 and 7 show different methods for obtaining static pressure. Fig. 4 shows how actual pressure is obtained by means of a hole in the pipe wall. The inner surface of the pipe, adjacent to the hole, must be smooth. The hole must be at right angles to the surface and there must be no burrs. The inner corners should be rounded with a radius 1/10 to 1/50 of the diameter of the hole. Fig. 2 shows a number of static holes. This form is in common use and any variation in static pressure is averaged. It is questionable whether any advantage is obtained from the multiplication of holes. Possibly the pressure reading is the average reading of the two holes on either side of the connection to the gage. This is because any difference in the static pressure will create a flow in the outer ring with different pressure at various places. There will not be a constant pressure at all points of the chamber at the average of the different static pressures. When there is a proper length of straight pipe preceding the point of measurement, such arrangement as Fig. 5 is not necessary. When there is not a proper length it is questionable whether the arrangement of Fig. 5 will give good readings.

Static holes such as Fig. 4 are often made with burrs on the inner surface or with the pipe leading to the measuring instrument projecting into the stream. These practices cause serious errors and must be avoided. If it is not possible when work is done in the field to make proper holes of the type shown in Fig. 4, the arrangement of Figs. 6 or 7 must be used.

The pressure holes for any of these types must be of good size. They should be at least ¼ inch to 1 inch in diameter in order to avoid a drop of pressure which might occur with a small hole and a minute leak. One of the disadvantages of the common

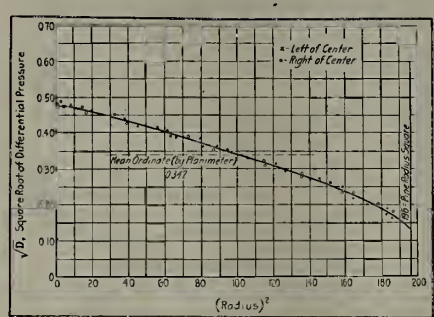


FIG. 9—CURVE OF PIPE-FLOW TEST

The Mean Ordinate of a Smooth Curve Through the Points, as Found By a Planimeter, Gives the Square Root of the Impact Pressure Difference *D*, which is to be Inserted in the Formulas

form of pilot tube is that the static holes are often so minute that the pipes to the pressure-measuring instrument must be of extraordinary tightness to secure accuracy. If a large hole is used in the pipe wall, or the equivalent, as in Figs. 4, 5, 6 and 7, and if the impact tube is made of good size with the opening ¼ to 1 inch in diameter, a slight leak will not have very serious effect. Nevertheless, precautions should be taken to keep the pressure piping tight.

It is desirable to use large pipes for connecting the static and impact tubes with the measuring instrument. Standard ¼ or ⅛-inch piping should never be used for such purposes unless the connecting lines are very short. When the piping is of any great length, ½-inch or even 1-inch pipe should be used, because it is much easier to make the larger-size pipe tight, and because even a small leak will not cause much of a pressure drop. The differential pressure measured is usually quite small; a slight error in either pressure will cause an appreciable error in the differential.

The following methods of test for tightness of piping apply to pilot and impact tubes, flow-meter work, venturi-meter work, etc.:

1.—A leak will always be shown by a drop in pressure if the connecting pipe is filled with water. Such leaks tend to rust tight, so the drop will soon disappear.

2.—While the pipe is filled with gas under pressure, the entire outer surface, including all fittings and joints, must be painted. If there is steam or hot gas in the pipe, this coating should consist of cylinder oil. If there is air or cold gas in the pipe, it should consist of a thick lather of soap suds. Every part of the surface must be thickly coated. Leaks will be shown by bubbles.

3.—If there is a sensitive differential gage attached to piping of considerable length, valves should be inserted on both the static and impact sides immediately adjacent to the pipe in which the flow is to be measured. A by-pass valve connecting the two pressure pipes should also be installed immediately adjacent to the measuring instrument. Such valves can be used for testing leakage as follows: The by-pass valve should be opened and the valves on the pressure pipes closed as rapidly as possible in the following order: First, approximately close the valve on the pipe giving the lowest pressure, then the valve giving the highest pressure. Now completely close the valve giving the lowest pressure, and then the valve giving the highest pressue. Lastly, close the by-pass valve. Fluid under pressure will be trapped in each of the pressure pipes. The measuring instrument will indicate a definite pressure difference which will remain unchanged if there is no leak on either side. The instrument will remain unchanged if there are equal leaks in the two sides, but this condition is almost inconceivable. If the instrument varies, even though the pipe be tight, the valves may leak. Under such conditions the test gives no information.

Measuring Pipe Flow

The apparatus for measuring pipe flow should be arranged as shown in Fig. 8. Instead of the single static hole, as shown, other means of securing static pressure can be used, such as shown in Figs. 5, 6 or 7. When methods of Figs. 6 or 7 are used, the impact tube must be placed at such a distance that it will not disturb the flow recorded by the static tube.

If the test gives flows which show a differential pressure of 1 inch (water column) or more, it is best to connect a vertical water U-tube parallel to a differential gage. A steel scale with graduations on both sides should then be provided. These graduations on one side should be 1/64, 1/50 or 1/100 of an inch. The two legs of the U-tube should be separated accurately. The two legs of the glass must be of exactly the same diameter.

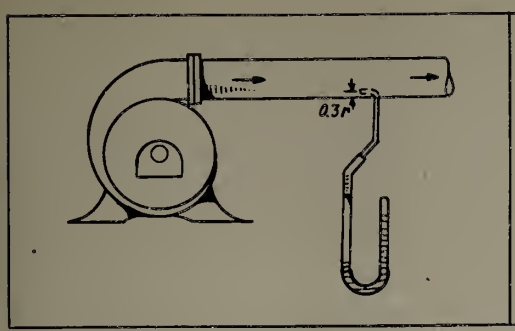


FIG. 10—IMPACT TUBE GIVING TOTAL PRESSURE RISE WITH ATMOSPHERIC INLET PRESSURE

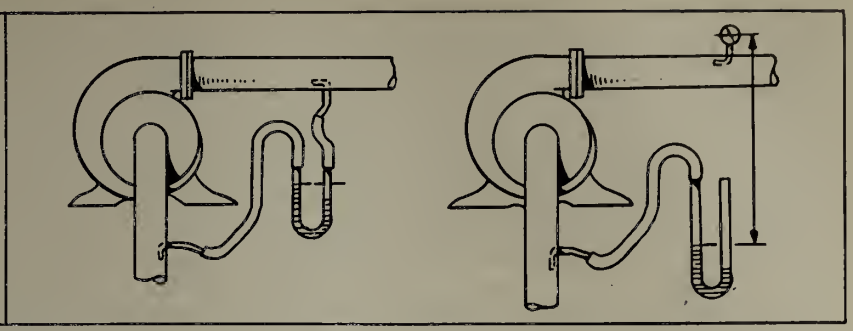


FIG. 11—IMPACT TUBES GIVING TOTAL PRESSURE DIFFERENCE BETWEEN INLET AND DISCHARGE PIPES

Satisfactory readings can be obtained by using a magnifying glass and a good light. If a number of readings are made with a differential pressure of 1 inch of water, the average of the ratios of such readings to the readings of the differential gage gives a satisfactory constant for calibration or checking of the differential gage.

Readings should be taken with the impact tube placed at points in various concentric circles within the pipe. One method is to space the positions at distances proportional to the square of the radius. The arithmetic mean gives a number properly weighted for the various areas involved.

The writer has found it satisfactory to measure the actual radius with each setting, spaced more closely at the edges than at the center. The various readings are then plotted, as shown in Fig. 9, readings on both sides of the center being plotted together. The square of the radius is plotted against the square root of the differential pressure. The mean ordinate of such a curve gives the mean square root of the differential, properly averaged. The static pressure is measured independently. The computation work is simpler if this is taken rather than impact pressure.

When a fluid is flowing in a pipe, it is frequently desirable to use the impact pressure rather than the static pressure. An example of this is pressure in a pipe preceding a venturi meter or other form of orifice in a pipe line. This pressure as well as the pressure at the throat or orifice end involves the ordinary formulas and includes a troublesome corrective term for the initial velocity at the point where the initial static pressure is measured. If this initial pressure is measured with an impact tube, the velocity head at this point is automatically added to the static pressure. The net pressure obtained is equal to the pressure which would have been obtained if the pipe preceding the orifice had been large enough to render the velocity head negligible. The formulas for this case are very much simpler than those in which the initial velocity has to be taken into account. If there is any foreign matter in the stream, it is likely to clog the impact tube. In such a case, initial pressure must be measured by means of a hole in the pipe wall and the ordinary formulas which take account of initial velocity must be used.

Another case in which it is convenient to measure the impact pressure is in finding the total pressure rise produced by a centrifugal pump or centrifugal compressor. If the discharge pipe of such a machine is very large, the velocity head in it is negligible, and pressure produced is static. If the pipe is small and gives an appreciable velocity head, as is often the case with fan blowers and centrifugal compressors producing a pressure of 2 or 3 pounds per square inch, the energy actually put into the air by the machine is completely shown by the impact pressure. It is correct to compute the efficiency of the machine on the basis of impact pressure. The arrangement is shown in Fig. 10. A similar arrangement can be used in the case of centrifugal pumps. If the inlet and discharge pipes are of the same size, impact tubes give the same difference as static holes. Should the inlet pipe be larger than the discharge pipe, impact tubes in both pipes automatically take account of the difference in velocity heads. The difference in the pipe

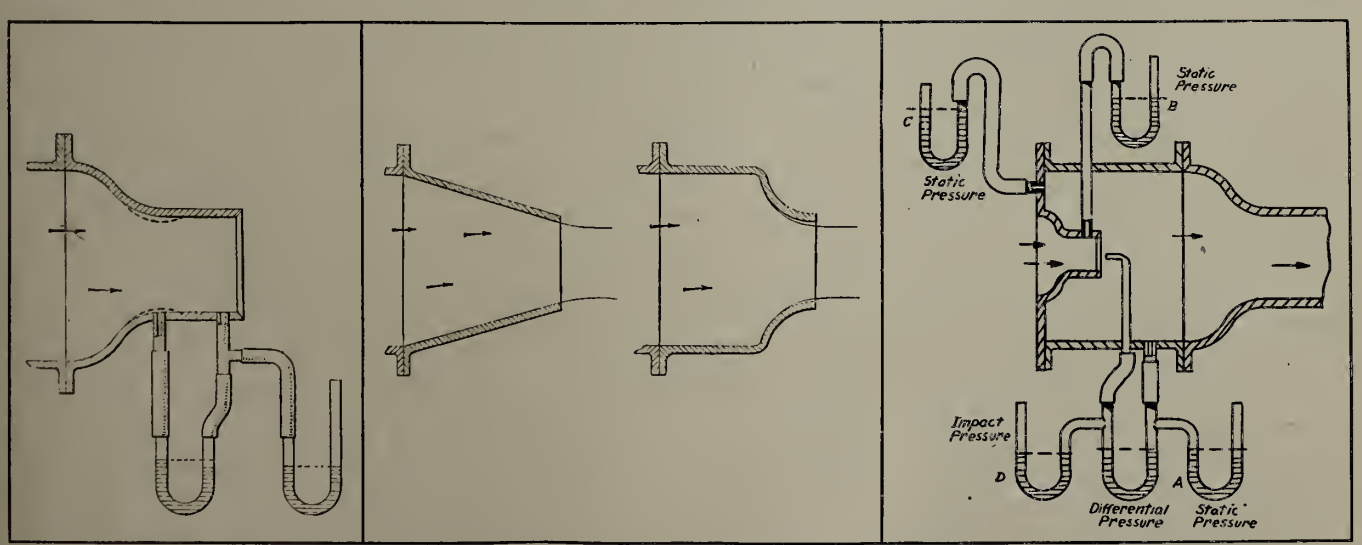


FIG. 12—APPARATUS SHOWING CONTRACTION AT END OF CONVERGING PORTION OF AN ORIFICE FIG. 13—POORLY SHAPED ORIFICES CAUSING JET CONTRACTION AND EFFECTING JET DIAMETER LESS THAN ORIFICE END DIAMETER FIG. 14—ORIFICE DISCHARGING INTO AN ENCLOSED REGION

The static pressure of regions, such as *A*, *B* and *C* in Fig. 14, in which several jet discharges must be taken are shown to be exactly the same. If the orifice is supplied directly from the atmosphere, the impact pressure *D* will be zero

pressure, as shown by the impact tubes, plus the head equal to the vertical height difference, gives the total work done by the pump. The arrangement is shown in Fig. 11. The foregoing remarks do not apply to the case of pulsating flows, as with a reciprocating machine. In all cases, the impact-tube center should be about 0.3 of the pipe radius from the pipe wall.

As an additional advantage in the use of the impact rather than the static pressure, it should be noted that the pressure is obtained more accurately. The tapping of a pressure hole in the pipe wall is very uncertain and it is often easier, particularly in the case of field tests, to insert an impact tube than it is to take the necessary precautions to make sure that a hole in the pipe wall is free from burrs and projection.

convergent portion, of sufficient length to size the jet. At the end of the convergent portion there may be a contraction of the jet, due to the fact that the orifice is not shaped to avoid contraction. The existence of such an effect can never be known except by an actual experiment. The figure illustrated in Fig. 12, represents a case where a comparison was actually made between pressure in a parallel portion of the orifice with atmospheric pressure on one side, and with pressure at the end of the convergent portion on the other. It was found that pressure in the parallel portion was equal to atmospheric pressure, while pressure at the end of the convergent portion was below atmosphere. The contraction in the jet is shown in Fig. 12. In other words, there was a venturi-meter effect, and the jet at this point did not quite

and round. This is quite important.

The general arrangement of a venturi meter with impact tube is shown in Fig. 16. The use of an impact tube avoids the computation necessary in determining the initial velocity head and the necessity for care in drilling a static hole. From the discussion already given it is obvious that the impact tube, theoretically, could be placed in the throat of the meter adjacent to the static tube. In the case of a large meter where the impact tube can be made so small that it will not affect the area nor the readings of the static tube, this arrangement is perfectly practical. However, in many cases an impact tube of reasonble size would disturb the jet at the throat.

Fig. 16 also shows some additional readings which have been found convenient in the case of venturi meters

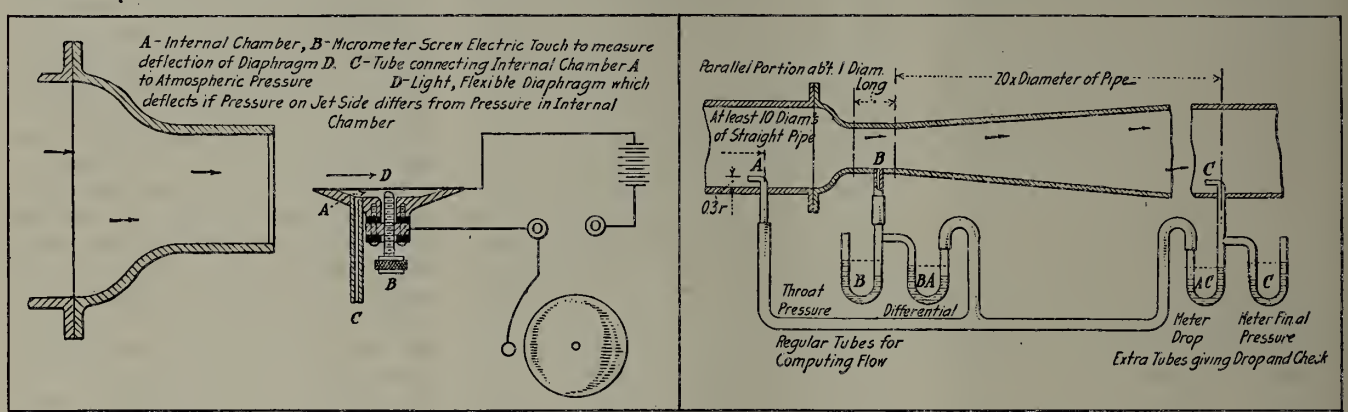


FIG. 15—APPARATUS TO SHOW EQUALITY OF STATIC PRESSURE IN JET AND ATMOSPHERE FIG. 16—VENTURI METER WITH IMPACT TUBE AND EXTRA TUBES FOR EXPERIMENTAL PURPOSES

In Fig. 15: *A*, Internal Chamber; *B*, Micrometer Screw Electric Touch to Measure Deflection of Diaphram *D*; *C*, Tube Connecting Internal Chamber *A* to Atmospheric Pressure; *D*, Light, Flexible Diaphram which Deflects if Pressure on Jet Side Differs from Pressure in Internal Chamber

The "orifice" frequently discussed in this article is a smoothly formed, convergent passage. Such an orifice is used at the entrance of a venturi meter, or for measurement of fluid discharged into the atmosphere, as discussed later. The exact shape by means of which the convergent portion is secured is not very important. A cone with straight sides, however, is probably equally satisfactory, if the angle is gentle and if there is a smooth circular arc connecting with a straight portion at the end of the orifice. It seems probable that any shape will be satisfactory which will obviously have a gentle action on the stream, without interference and eddies due to corners or sudden variations of section. When the orifice is being machined, it is not particularly important that the shape be made to fit a templet. The orifice wall should be smooth, as any lumps or ridges will cause irregularities in the fluid flow.

It is essential to have a parallel section of pipe at the end of the

fill the orifice. Hence, if the orifice had ended at the end of the convergent portion giving an orifice of the shape of Fig. 13, the jet escaping into the atmosphere would be of smaller diameter than the orifice end. The quantity would have appeared to be larger than it actually was. A similar situation is given by the other orifice of Fig. 13. If we have a venturi meter with the shape of Fig. 16, the parallel portion insures that the jet whose measurement is sought has the exact diameter of this parallel portion. The length of such a parallel portion should be from one-half to the whole of the diameter of the parallel portion. Greater length might introduce appreciable friction drop.

Chamfering is of Importance

The chamfering of the outer end of an orifice is important. This prevents the edge from being burred or dented while handling and preserves the diameter of the parallel portion. The parallel portion must be carefully machined so as to be exactly parallel

used for experimental testing. For permanently installed venturi meters, these extras are of no particular advantage. The extra apparatus consists of an impact tube, *C*, in the pipe beyond the meter, and shows the pressure drop resulting from the use of the meter. It is quite necessary that the tube, *C*, be placed at a considerable distance from the meter in order that the jet may have wholly recovered from the divergence due to the meter. The streams, and the static pressure particularly, are not normal at points near the end of the divergent part of the meter. The impact tube, *C*, is connected so as to show the final pressure directly, and also, the difference between this pressure and the initial impact pressure. This gives the meter drop or pressure difference caused by the insertion of the meter. The meter drop, *AC*, is usually from ¼ to ⅛ of the meter differential pressure, *BA*. The system shown involves four U-tubes, one of which is superfluous. However, the use of this extra U-tube gives a very valuable means for checking the readings. The

readings will check as follows, if all pipes are tight and the apparatus properly set up:

If *B* and *C* are above atmosphere, the difference between *B* and *AC* will equal the difference between *C* and *BA*.

If *B* is below atmosphere and *C* above, the sum of *B* and *AC* will equal the difference between *C* and *BA*.

If *B* and *C* are below atmosphere, the sum of *B* and *AC* will equal the sum of *C* and *BA*.

The writer's custom has been to have the readings inserted in this equation as soon as they have been taken. If the equation is not satisfied there is a leak, or something else is out of order in the apparatus.

The only case where the pressure of a jet discharging from an orifice into the atmosphere is discussed in this paper is that in which the final pressure is greater than half the initial pressure. However, the theoretical orifice was wholly convergent. In such a case, the static pressure of the jet discharged from an orifice is equal to the pressure of the region into which it discharges. This law applies primarily to the discharge of an orifice into the atmosphere. It also applies to discharge of an orifice into an enclosed region, as is shown in Fig. 14, provided there is ample room around the orifice for a free discharge of jet and no restriction that would cause a venturi-meter effect. The static pressure of the region into which a jet discharges must be measured in a number of places, such as *A*, *B* and *C*, Fig. 14. If the orifice is supplied directly from the atmosphere, the impact pressure, *D*, will be zero. The accuracy of the above law is really the basis of all of the impact-tube work here discussed. So far as known, the law has never received any valid criticism. In one case a certain form of pitot tube, when inserted in a jet discharging into the atmosphere, gave readings below atmosphere at the static openings, and it was assumed that the static pressure of the jet was, therefore, below atmosphere. This particular form of pitot tube is now know to have static openings seriously in error. As an actual fact, readings of static pressure below atmosphere, when taken with a pitot tube inserted in a jet discharging into the atmosphere, are proof that the static-pressure holes give erroneous readings.

If the orifice at the end has a parallel portion of appreciable length, the streams of the jet as they discharge into the atmosphere necessarily proceed in straight lines. This can be seen by watching the jet discharging from a water or wet-steam orifice of the proper shape, or by feeling the surface of an air jet. The jet preserves a solid parallel column for quite a distance. If a stream at the edge of the jet and one in the interior of the jet are proceeding in parallel directions, there can be no pressure difference between them. If there were any pressure difference, the flow would be in curved lines. A stream at the edge of the jet, proceeding in a straight line, is obviously at the pressure of the region. Hence, the same pressure exists throughout the cross-section of the jet.

The experiment of Fig. 15 verifies the foregoing statements. A diaphragm pressure gage was placed in a high-velocity jet with the diaphragm exactly parallel to the stream lines. This was accomplished by clamping the gage in a position perpendicular to the plane of the end of the orifice, as shown by an accurate square. The gage comprised a small chamber, one edge of which consisted of a very light, flexible diaphragm. A tube leading well outside the jet made the pressure in this chamber equal to the pressure of the atmosphere. A delicate micrometer screw, with an electric bell and battery attached, indicated the deflection of the diaphragm. When the jet was not flowing, the micrometer was screwed out until the bell just stopped ringing. The jet was then turned on. Adjustment of the micrometer screw showed position of the diaphragm unchanged. This experiment was made with a velocity of about 150 feet per second, and the deflection of the diaphragm was seen to be zero within a few hundred thosandths of an inch. The diaphragm was such that it would be deflected about 0.001 inch by a pressure of 0.005 inch of water. A similar result can be obtained if the side gage shown in Fig. 7 be set up in a jet, parallel to the stream lines and connected to a delicate pressure measuring instrument.

The static pressure of the jet being thus the pressure of the region into which it discharges it follows that the differential between impact and static for a jet discharging into the atmosphere is given by a gage which reads pressure above atmosphere.

Many calibrations of orifices discharging high-velocity jets of air have been made by the writer with the appa-

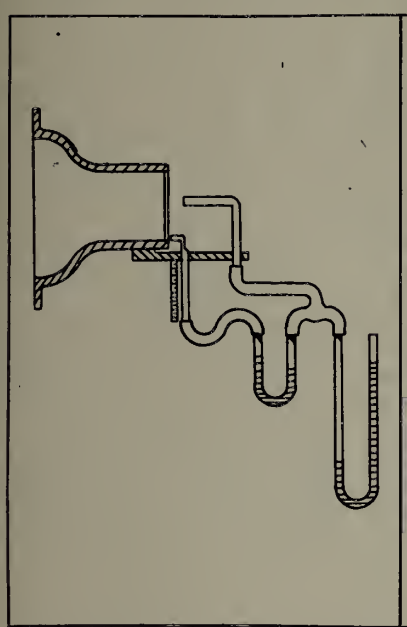


FIG. 17 — ORIFICE CALIBRATION BY TRAVERSE OF AN EXPLORING IMPACT TUBE

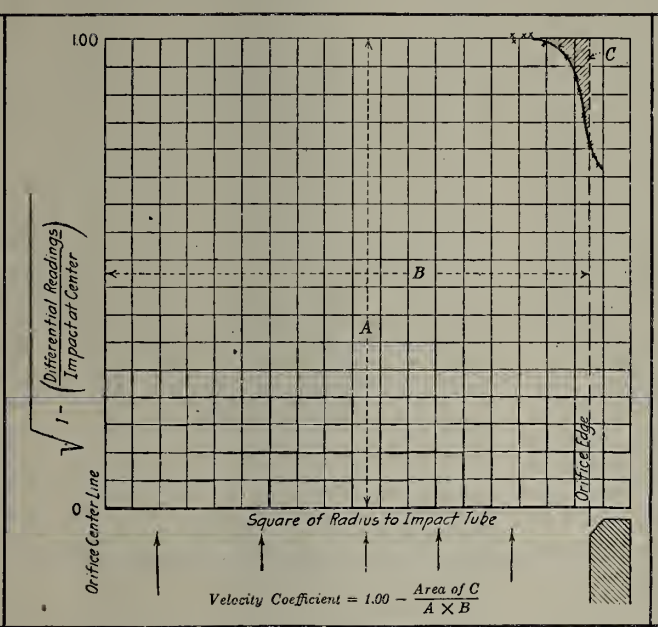


FIG. 18—CURVE OF ORIFICE CALIBRATION BY IMPACT-TUBE TRAVERSE

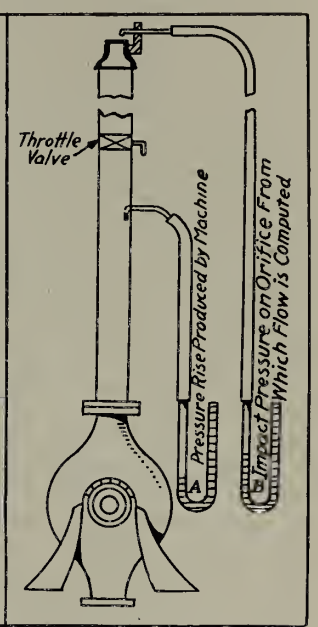


FIG. 19—MEASUREMENT OF FLOW BY MEANS OF ORIFICE AND IMPACT TUBE

ratus shown in Fig. 17. This consists of a stationary impact tube placed in the center of the jet, slightly beyond the plane of the orifice end, and a very small movable impact tube which can traverse the edge of the jet covering a space of ¼ to ½ inch. The differential pressure is read by means of a vertical water U-tube, or a more delicate instrument, as circumstances warrant. The method gives an accurate calibration of any orifice without measuring the flow by means of tanks, wiers, gas-holders, etc. The impact pressure is constant everywhere in the jet, except in a narrow ring around the edge which is traversed by the small impact tube. An impact tube with an outside diameter of 1/32-inch has been used with a 4-inch orifice, traversing a space of about ¼ inch and proportionately with larger orifices. The results are plotted in Fig. 18. The ratio of the area of the small corner, *C*, to the area, *AB*, of the large rectangle, gives the velocity loss. By subtracting this from unity, the velocity coefficient of the orifice is obtained. Many such tests indicate a velocity coefficient of about 0.99. These experiments have been accurate to within 0.5 per cent, so that the coefficient may be somewhere between 0.985 and 0.995. It seems probable that the larger the orifice the greater the coefficient.

The same general methods have been used by the writer to find velocities of various types of jets, such as those from the nozzles and stationary buckets of steam turbines. Small impact tubes were used which could be rotated and moved in two directions. At each position the tube was rotated until the maximum reading was found, and the angle noted. In this way, the stream lines were completely mapped out, both as to velocity and direction. In all cases the work was done with jets discharging in straight lines into a large chamber which had a definite and uniform static pressure. Static pressure variation and curvilinear motion cannot be investigated easily in this way. The static pressure was found in a dead corner where the jets could not give error. The velocity was computed from the theoretical laws for adiabatic flow and the impact-tube law already given. The jets from a stationary set of turbine buckets were concentrated near the active faces. The faces were clevised. A jet from a moving turbine wheel would be pulsating, and could not be explored by this method.

Measurement of High-Pressure Air

The general arrangement for measuring the discharge of high-pressure air by means of an orifice and impact tube is shown in Fig. 19. The discharge pipe of the machine is connected with a considerable length of straight pipe. The orifice is attached to the end of this pipe. It is desirable to have a throttle valve in the pipe so that various amounts of flow, giving various loads on the machine, can be measured by means of a single orifice. It is necessary that there be at least 10 diameters of straight pipe between the throttle valve and the

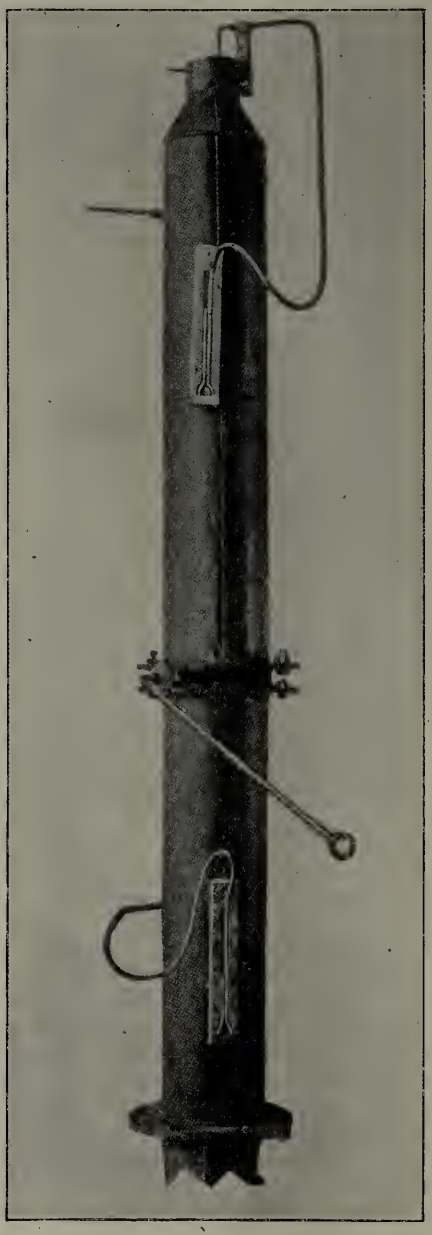


FIG. 20—ORIFICE, IMPACT TUBE AND DISCHARGE PRESSURE ARRANGEMENT

orifice. If it is desired to measure the discharge pressure produced by the machine, it is necessary, in addition, to have about 10 diameters of straight pipe between the machine itself and the throttle valve. An impact tube inserted in this pipe gives the net pressure rise which the machine under test produces; while the impact tube on the orifice gives the quantity passing through. The orifice should be selected so that it will just discharge the greatest quantity which the machine will produce with an orifice-impact pressure equal to the total pressure produced by the machine when this quantity is flowing. Then the highest flow of the test will be obtained with the throttle valve wide open. For this flow, the readings of the impact tube in the pipe preceding the throttle valve, and that in the orifice jet, should be identical, except for slight friction loss in the pipe. This identity gives a check on the validity of the readings and apparatus. Various tests with successively lower amounts of flow are given by closing the throttle valve so as to decrease the orifice pressure.

The impact tube is to be stationary and in the center of the jet. The tube is placed slightly outside the plane of the orifice end. This distance should be about 1/5 of the orifice end diameter. The tube can always be seen to be properly in line and free from obstructions. This is one of the advantages of the method. The general method here described has been used for testing centrifugal pumps. It is just as convenient to use it in conjunction with high-velocity jets of air or other gases.

The parallel portion at the end of the orifice should have a diameter about 1/3 of the diameter of the straight pipe preceding the orifice. The orifice may be smaller than 1/3 of the pipe diameter without any effect. The coefficient does not differ greatly from 0.99, even if the orifice is but 1/2 of the pipe diameter. In all such cases, the effect of the varying velocity at different radii in the pipe is not transmitted through the orifice; but the discharge jet has the same velocity at all points, except at a narrow band close to the edge. Where the orifice diameter is greater than 1/2 the pipe diameter, the variation of pipe velocity may show some effect on the discharge jet.

Limitation of the Impact Tube

The impact tube, as here discussed, can only be used with continuous flow, such as is given by centrifugal machinery. Pulsating flow, as delivered by reciprocating machinery, cannot be integrated by the impact tube.

In order to compute the quantity or flow, it is necessary to know the temperature in the pipe preceding the jet. This must be secured by the insertion of a thermometer through the pipe wall. However, identical and accurate readings are obtained by placing the bare bulb of the thermometer in the jet outside the orifice.

If a machine whose flow is to be measured can be arranged so that its discharge can be wasted, the use of an orifice in the discharge pipe is the

only method of flow measurement which should be considered. The reason is that nearly the entire pressure rise produced by the machine can be utilized in causing discharge through the orifice. This gives a reading of such magnitude that accurate observations can be made. For instance, if the machine being tested gives an air pressure of 15 pounds per square inch, the reading from which the flow is computed will be about 30 inches of mercury. If the machine gives an air pressure of about 1 pound per square inch, the reading will be 27 inches of water. Such magnitudes are easily measured and do not require the use of inclined gages, hook gages, or other means of getting small differentials.

The use of the impact tube has the advantage of simplicity of formula in connection with initial velocity head as well as ease of proper arrangement, over the use of a static hole in the pipe-wall preceding the orifice. Many million cubic feet of air discharged by various types and sizes of fan blowers and centrifugal air compressors have been measured by the arrangement of the impact tube shown in Fig. 20. This tube is made in two sections.

Broader Service For Engineers

BY D. S. KIMBALL

WE HAVE all become accustomed to seeing the engineer called upon to perform new and strange duties, but few of us were prepared to see an engineer called upon to undertake the greatest piece of constructive economics ever attempted. I refer to the work of Mr. Hoover, who by training and practical experience is a mining engineer. Yet this somewhat startling event is in full keeping with the trend of modern industry. The engineer from the first has had a difficult time trying to define just what his field of activity is. This is necessarily so in any civilized community where the life of the people rests upon mechanical contrivances. Engineering, and mechanical engineering in particular, is an integral part of everyday life and necessarily assumes fresh aspects as the complexity of modern life increases.

Technical Schools Alter Scope

The original conception of technical schools was to train men to design, build and operate machines within a narrowly defined field. The closely prescribed curriculum of the early engineering schools succeeded well in sending out men who in time made a place for themselves in the engineering field. But the men who passed through these schools were far from satisfied with the training they thus received. Their complaint has not concerned the technical studies alone, but has embodied a demand for broader training in harmony with changing industrial conditions. Today there is not a first-class technical school in this country that is not recognizing this demand. The technical schools of today are not places where engineers, as defined by this term originally, are educated, but they are schools that prepare men, and women also, for industrial life in a broad manner.

It may be truthfully stated that the engineer has been drawn over into management more because of his peculiar method of attacking problems than because of his technical or commercial knowledge; and that for this reason engineering colleges may well neglect these broader subjects and confine themselves to the time-honored engineering studies. While this may all be true theoretically, the fact remains that the industrial field is demanding men from the engineering schools who are well grounded in engineering and, in addition, know something of management. Hence we find such subjects as economics, psychology, logic, public speaking and similar studies included in engineering curricula, and they appear no more strange there than does an engineer as a food administrator.

What is true of the engineering schools is equally true of the engineering societies. The engineering colleges have lagged behind the industrial field in these matters, and the engineering societies in turn have lagged behind the colleges. In 1880, Dr. Robert H. Thurston, the first president of the American Society of Mechanical Engineers, in his inaugural address states the objects of the society to be "the promotion of the arts and sciences connected with engineering and mechanical construction". And the chairman of the preliminary meeting, A. L. Holley, enumerates in some detail the several branches of engineering contemplated as follows: Metallurgy, railway engineering, machine-shop work, rolling mills, structural work, national defenses, shipbuilding, agricultural machinery and textile machinery, and concerning the latter he states, "The public would deem it quite outside of mechanical engineering". It is on this analysis as a basis that the first list of those eligible to election was made up, namely, mechanical engineers, civil engineers, military engineers, mining and metallurgical engineers and architects. And after reviewing the field, which to us now seems so restricted, Mr. Holley remarks, "I confess that in thinking over the range of mechanical engineering with reference to our proposed society I was astonished at its magnitude."

Dr. Thurston stated a broader view later when he said, "Its province will lie no less in the field of social economy than in that which has reference only to the individual needs of its members." This germ of thought has always remained in the A. S. M. E. and found its most widely known expression in Frederick W. Taylor's classic paper on shop management. But though this remarkable paper was presented to the world through the society, comparatively little has been done by the society to further this important line of thought.

Society Membership Changes

Ten years ago Prof. F. R. Hutton in his presidential address made an exhaustive review of the aims and activities of the American Society of Mechanical Engineers which is well worth reading. He found that about 50 per cent of the membership at that time was classifiable under the headings "manufacturer", "shop executive" and "local manager". Yet the transactions for that year do not contain a single paper on industrial administration, though Taylor's masterpiece had been published three years before. An examination of any page of the year book will show that this relation has not changes and that the society is far from being, strictly speaking, an engineering society, but that it represents industry in a very comprehensive and broad manner.

What is true of the relation of mechanical engineering to management is also true of many other fields. Is the problem of electric welding one for the mechanical engineer, or does it belong to the field of electrical engineering? Where shall we place oxyacetylene welding on the thermit process? Accident prevention is certainly within the range of the society's

activity, so far as the mechanical features are concerned, but how far shall we interest ourselves in our employers' compensation acts and the legislation that lies back of this important movement? Shall we discuss it as a problem in mechanical engineering or shall we also include the humane features of the problem? At the present moment a strong movement is on foot to interest engineers in the important problem of Americanization, and engineering schools are being urged to pay special attention to this matter. The subject is timely and important, and no single class of men can do so much to promote it as the engineers. The problem is closely connected with industrial management; shall it become, therefore, a problem for engineers and engineering societies?

These intricate relations come before the society largely in passing upon papers to be presented. Many of the papers offered are well within the range of the field of engineering as commonly understood, a number are in the field of industrial management or in other fields equally removed from engineering in a strict sense. Then there are a number of papers presented that are so far removed from engineering as to make their presentation questionable, though they are sometimes valuable papers. The tendency, therefore, is rather to discourage papers which treat of matters on the "fringe" of engineering. I sometimes wonder if Taylor's paper on shop management, had it been presented by some one less known and under some other title, would have been accepted. It is fairly certain that if more encouragement were given to papers of this broader character societies probably would, in time, receive papers that would be as great in their field as is Taylor's classic.

I believe the time has come, therefore, when every engineering society should redefine its aims and objects. There will never be a better or more opportune time to consider this subject. Every loyal American is now asking himself what are his duties and responsibilities. Every technical school is facing a reorientation of its purposes and aims. As a nation we are facing a period of self-analysis that may result in changing some of our fundamental policies. I am not so sure, for instance, that we shall continue to be a "refuge for the oppressed of the earth", unless we are quite sure that the aforesaid oppressed are really in pursuit of the liberty and happiness that we all hold so dear. Americanization may indeed be a part of the work of all organized bodies that are interested in the existence of the republic. If we have not at this moment a clear vision of whither we are tending, now is the time of all times to take stock of ourselves and to redirect our course, whether this course is in conformity with time-honored definitions or not. Change is not necessary synonymous with progress, but there is no progress without change.

Wanted---Standardized Mill Motors

BY W. T. SNYDER

IN THE early days of electricity in the iron and steel industries, some of the builders of traveling cranes made the motors for their cranes or had them made to order. This practice is now obsolete by virtue of the growth of specialization. Motors are made by the motor manufacturers; cranes are built by crane builders, as each is an apparatus requiring an individual type of organization and manufacturing equipment.

Crane users in the steel industries select the motors that are to be used on their cranes, and as far as they are able they standardize on one type for the sake of interchangeability and to minimize spare parts. By reason of the fact that there is no uniformity in motors of like operating characteristics made by different manufacturers, it is impossible to interchange different makes. The result is that the initial installation governs the later motors purchased.

Based on the factor 0.0064 horsepower of motor energy required per ton of iron produced, and also on data from plants handling iron from the ore through the mills, there were approximately 800,000 motors in use in 1917. Data from the United States bureau of census indicate that there are nearly 1,000,000 motors in the steel and allied industries. These 1,000,000 motors under a liberal estimate will probably be charged off in 20 years. This time limit is not too low when it is considered that a large portion of direct-current motors now installed could be alternating current. Alternating current is replacing direct-current equipment because of the higher economy of alternating current power generation and transmission.

Cost of Spares is High

With 1,000,000 motors installed, a conservative estimate indicates 500,000 armature changes per year, with 200,000 spares representing an investment of $80,000,000. If these same motors were of standard type, with a maximum of interchangeable parts, the armature changes would be the same, but the spares would be reduced to about 50,000 and would necessitate an investment of only about $20,000,000.

The steel plants at the present time have only two alternatives. They may adopt a certain make of motor and enjoy the benefits of standardization as far as they are able under the existing conditions of many types and models; or they may buy motors in open competition and content themselves with a conglomeration of types with a maximum of confusion and an excessive investment in spares. If within five years from now we could begin to install motors that adhere to standards covering perhaps only speeds and the more general dimensions, we would start to right this condition. The benefits would increase with the development along the standard lines.

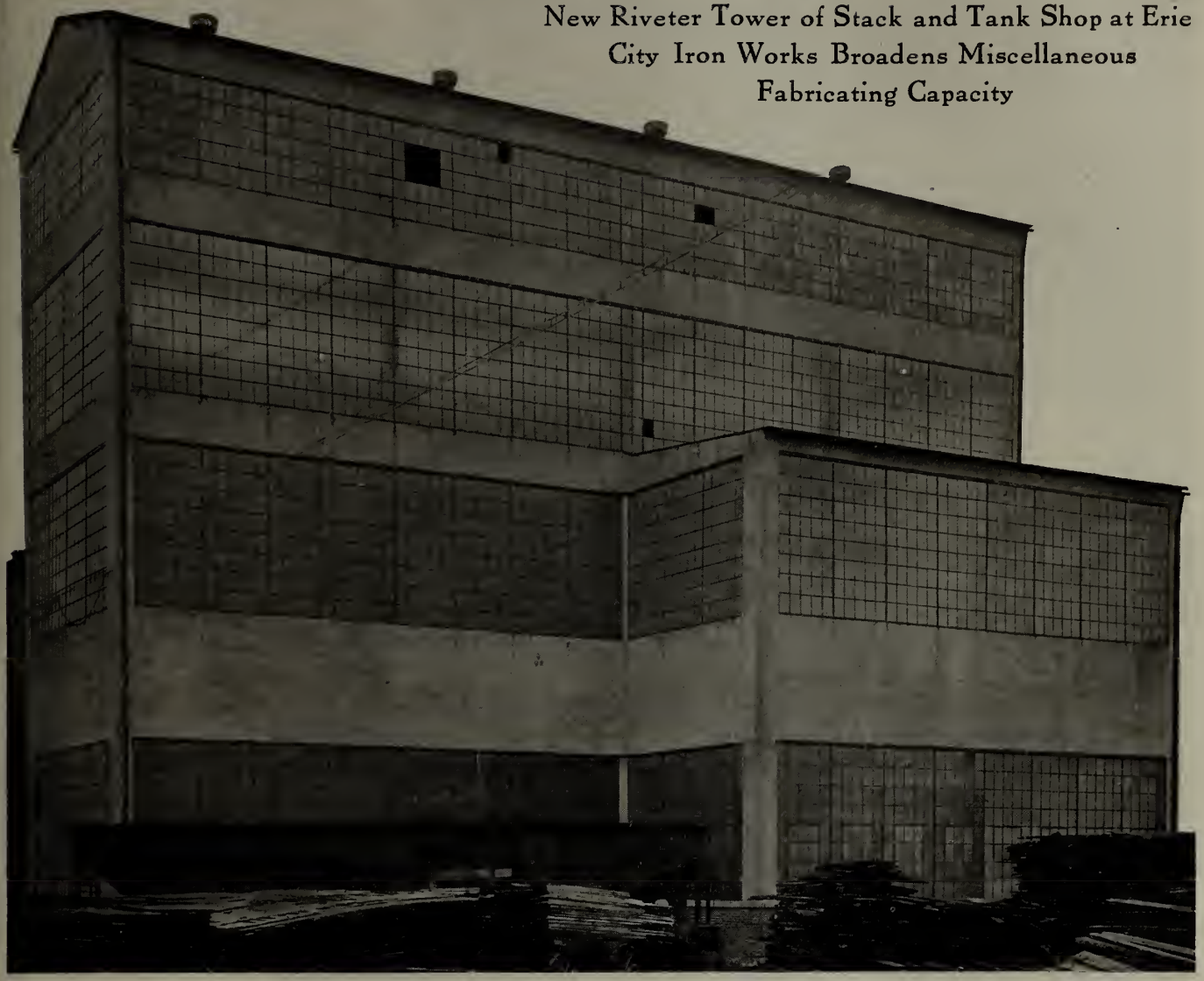
The Association of Iron and Steel Electrical Engineers through its standardization committee has endeavored to formulate plans that will ultimately provide a standardized motor for machine tools and mill auxiliaries. It is a task that cannot be accomplished hurriedly. The committee is studying the possibility of a joint committee of engineers representing makers and users to design a line of standard motors which all manufacturers will be asked to build.

Few appreciate the advantages of standardization as it exists in the production of screws, bolts, lamp bases and receptacles, railway parts, track equipment, etc. The development in these lines has been a parallel factor if not an actual result of standardization. It is reasonable to expect that a concentration of attention on a single line of motors would result in a more rugged and practical motor than if a multiplicity of types demanded divided attention.

Abstract of a paper before a joint meeting of the American Institute of Electrical Engineers and the Association of Iron and Steel Electrical Engineers. Mr. Snyder is electrical engineer for the National Tube Co., McKeesport, Pa.

War Taxes Plate Shop Facilities

New Riveter Tower of Stack and Tank Shop at Erie City Iron Works Broadens Miscellaneous Fabricating Capacity

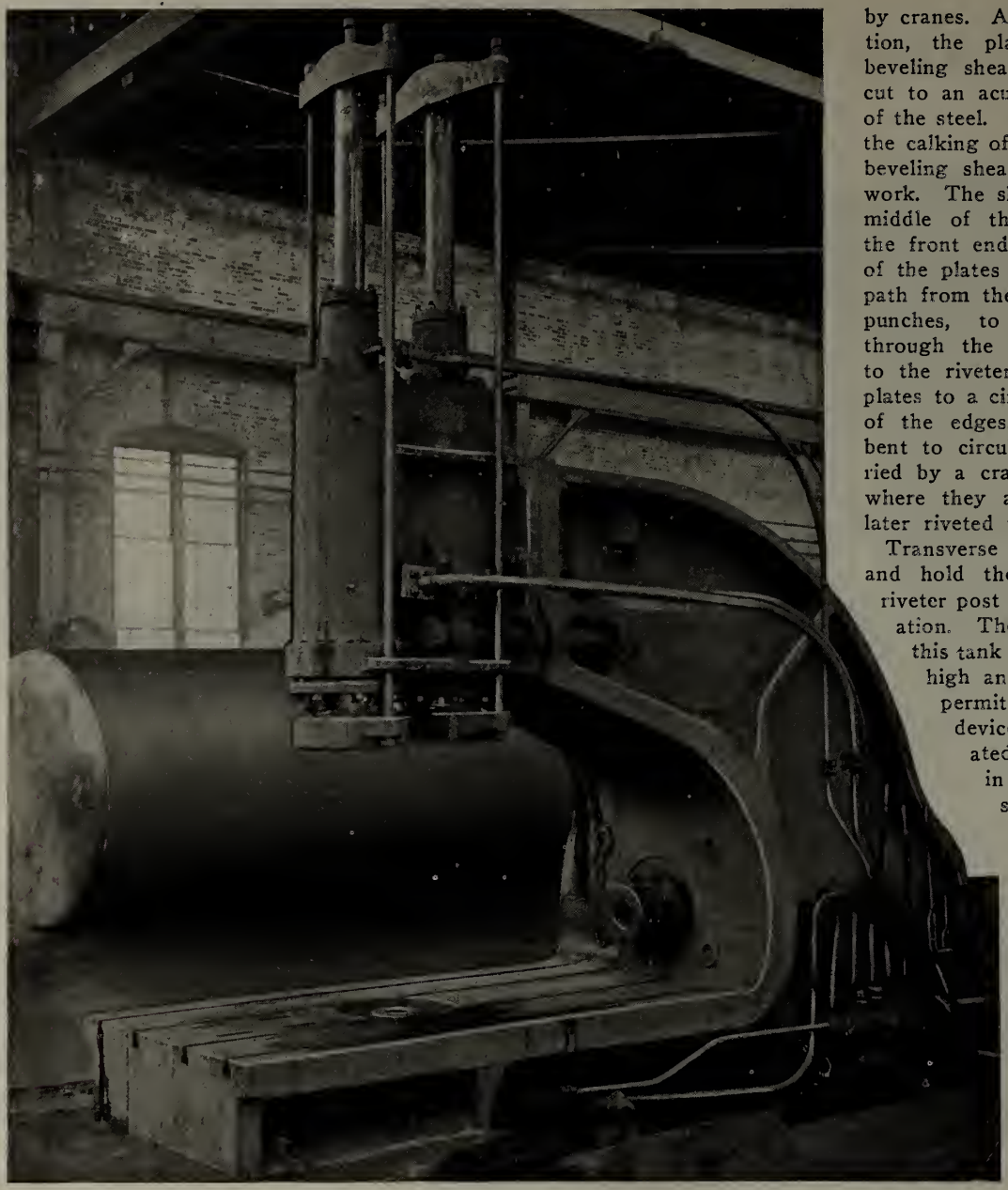


Completed Riveter Tower of New Stack and Tank Shop

MODERN war has made the fabricating shop one of the most important units of the nation's industrial line of defense. Some of the greatest undertakings which are represented in this country's far-reaching program for the upbuilding of a powerful military machine center about the capacity for plate and shape working. From a manufacturing standpoint, the great standardized ship project which now is being pushed so vigorously is a fabricating proposition both as to hull construction and as to equipment. The standardized railroad car program now about to be launched is equally so. The list of war requirements of finished steel both direct and indirect, in the supplying of which the fabricating shop plays a leading part, is a long and variegated one. As a result of these miscellaneous demands, fabricating capacity is becoming more and more taxed and the factor of flexibility of production, of the individual shop has been rendered highly important. The plant of the Erie City Iron Works, Erie, Pa., which has been considerably enlarged to increase its adaptability for war production of an auxiliary character, illustrates in its operations the function of providing a wide variety of essentials, which the plate shops now are being called upon to fill.

Illustrating the wide adaptability of the shop, the work now being carried on consists of tanks for railroad tank cars and for other purposes, smoke stacks, economizers, boiler casings, smoke connections and fabricated plates. An order for 200 tanks for railroad tank cars, each of which is of 12,500 gallons capacity and will be mounted on standard trucks, now is going through. The shop recently completed an unusually large stack for the plant of the General Electric Co., at Buffalo. This stack rises 160 feet above its foundation. It is 19 feet in diameter at the top and 30 feet at the bottom. Included in completed work are several boiler casings for the Emergency Fleet corporation. A number of large smoke connections and air ducts have also been turned out for central station units and other power houses.

The operations involved in fabricating one of the 12,500-gallon tanks is typical of most of the work. In making these tanks, the steel is moved from the stockroom to the laying-out floor by means of small trucks running on narrow-gaged tracks. Here the plates are inspected, marked, and later punched. They are carried from the laying-out floor to the punches



by cranes. After the punching operation, the plates are taken to the beveling shears where the edges are cut to an acute angle with the plane of the steel. This is done to facilitate the calking of joints later. Two large beveling shears are required for this work. The shears are located in the middle of the building and toward the front end, so that the movement of the plates is in an almost straight path from the laying-out floor to the punches, to the beveling shears through the bending rolls and then to the riveters. The bending of the plates to a circle follows the beveling of the edges. After the plates are bent to circular shape, they are carried by a crane to the riveter tower where they are bolted together and later riveted to the tank.

Transverse cranes pick up the plates and hold them in position over a riveter post during the riveting operation. The riveter posts used for this tank work are 18 feet 6 inches high and are sufficiently tall to permit of half a tank. These devices are hydraulically operated. The tank is built up in two sections. The next step in the process then is the fitting of the heads and the joining of the two halves.

Two hundred-ton sectional flanger recently installed in the stack and tank shop. A new shape bender having a capacity of a 20-inch I-beam is illustrated below





THIS NEW PLATE BENDING ROLL IN THE BOILER SHOP HAS A TOP ROLL 24 FEET LONG AND 36 INCHES IN DIAMETER—AN INTERIOR VIEW OF THE NEW RIVETER TOWER SHOWING ONE OF THE NEW 90-TON HYDRAULIC RIVETERS IS GIVEN BELOW

In the latter operation however, air riveters are used. To join the halves an air jack is used in connection with pneumatic hammers. An operator stands in the inside of the tank and holds an air jack against the rivet while a second operator hammers the rivet from the outside. Meanwhile the dome has been marked, punched, rolled and riveted by smaller machines in the shop, and is attached to the tank by pneumatic tools in a manner similar to that just described. Another step in the completion of the tank which follows is the calking of the seams with a round-nosed air hammer. After the calking has been completed, the tanks are thoroughly tested by hydraulic pressure. If no leaks develop, they then are painted and stenciled. To insure the rapid drying of the painted tank, steam is used. The shop building has been improved and enlarged by the addition of a new riveter tower, which is 25 x 100 x 80 feet high.

Considerable attention has been paid to the arrangement of equipment in the shop. Because of the wide variety of work turned out, the placing of machinery has been considered as an important factor. Stock is unloaded by means of cranes at one end of the building and is stored in racks adjacent to a narrow-gage track. This track extends into the main section of the shop. The laying-out floor is next to the stock room. Two 5-ton cranes which run the entire length of the erecting and fabricating shop facilitate the handling of all plates from machine to machine. In the new riveter tower are two 20-ton and one 15-ton cranes. These cranes run crosswise of the building and are used exclusively for handling plates and for holding them in position for hydraulic riveting.

Adjacent to the laying-out floor is a punch table of sufficient size to



punch plates ¾ inch in diameter and of any length up to 236 inches. Next in line are the two shears for beveling the edges of the tank plates. Along this same line is a set of plate bending rolls. This set of rolls is ample for the needs of the entire shop and has a capacity for rolling plates in any length up to 16 feet and to a 60-inch circle. Smaller rolls are provided for lighter work.

In the next bay, in the direction of the riveter tower, is a new shape bender of great capacity. It is driven by a direct-current electric motor through a set of reduction gears and will bend cold shapes up to 20 inches in size. This device is illustrated in an accompanying view. A new sectional flanger has just been put into operation and is in a position close to the shape-bender. The flanger has a rating of 200 tons and consists essentially of two hydraulic cylinders fitted with plungers which are actuated by water supplied under pressure from an accumulator nearby. This powerful press performs many of the drawing operations on plates used in the building of tanks of different types. Two-way valves and conveniently located hand levers centralize the control of the flanger. A view of the machine is given on page 788.

Large Riveters Employed

In the riveter tower, which is at the extreme front end of the shop, there are two large hydraulic riveters of 90 tons capacity. The stakes are 18 feet 6 inches high. Their height facilitates the building of stacks and tanks of great size. Workmen operate these riveters from platforms attached to the stakes. A third riveter, of 75 tons rating, is employed. This unit has an 8-foot stake. Similar supplementary equipment consists of a number of air riveters. These are required mainly for driving rivets in inaccessible places; that is, where the bulky head of the hydraulic device prevents its effective use.

Hydraulic power for operating this equipment is supplied by an accumulator operating in a small section of the riveter tower. The pressure exerted by the accumulator is 150 tons per square inch. Water is pumped into the accumulator cylinder by means of a two-plunger pump. The pump is gear-driven by a 75-horsepower electric motor.

Other equipment includes a battery of drills set along one wall and arranged so as to be within the working radius of nearby wall cranes. Several shears, punches and radial drills complete the list of the major shop equipment. In a balcony in the rear of the building and located over the stock racks is a small shop especially equipped for sheet metal work. One of the features of its equipment is an air riveter, provided with two arms of unusual length, to permit the assembling of small stacks in long sections.

Ample Power is Provided

The new shop is supplied with power from a unit in an adjacent machine shop. In the entire plant there are three main power units and a reserve system consisting of a motor-generator set operating on municipal current. The power capacity and distribution is such that in the event of the failure of any one of the units the two other units may be relied upon to supply sufficient current for the whole plant. The reserve motor-generator set is used only as a last expedient. The establishment of the stack and tank shop in its new location released manufacturing space in the boiler shop. This made possible the installation of considerable new equipment in that shop. The new set of bending rolls has a top roll 24 feet long and 36 inches in diameter and rolls plates 22 feet wide and 1½ inches thick to a 60-inch circle. A combined punch and shear has a capacity of punching a 4-inch hole in a 1-inch plate. Various other punching and shearing machines are included in the list of new equipment.

The main boiler shop is a structure 270x640 feet in size. It consists of six bays each served by traveling cranes. Three standard gage tracks run the entire length of the building. The riveter section is at the far end and transverse cranes operate in a manner similar to that already described in the stack and tank shop. At the extreme end of the building are the forges where boiler heads are straightened and other forge work is done.

Plate stock for boilers enters at the extreme right of the building. They are marked out in a section nearby and after a careful inspection, they are punched on a multiple punching table. This method greatly aids in securing an accurate punching of rivet holes. The ends of the shell plates, where the plates lap, are then squared off and the edges are bevel-planed on a planer. After the planing operation, the plates are passed through the bending rolls and rolled to a circular form. The boiler heads are shaped by shearing plates to size, heating them, and drawing them in an hydraulic press. The manhole flange is turned in the same manner. The tube holes in the boiler heads are reamed and chamfered with a reamer, so that all burrs are removed. After this process, the tubes are set into the heads with a roller expander and the ends are beaded over against the head. The test which is made after the boiler has been calked consists in subjecting it to an hydraulic pressure 50 per cent above its rated working pressure.

The many types of water and fire tube boilers which the company specializes in require considerable equipment. For the plate planing operation there are two plate planers. Several sets of bending rolls are utilized in addition to the large new unit. The plate and angle equipment in general is arranged either in the two middle bays or along the walls. Situated near the left wall of the shop are two hydraulic flanging presses, one of 500 tons and the other of 250 tons capacity. These presses are especially adapted to the drawing of boiler heads, and are fitted with special dies for this purpose. The tube holes in the boiler heads are reamed to size on drill presses. The heads are straightened under an hydraulic press if any irregularities in their contours exist. A third hydraulic press is included in the equipment of the shop but this is seldom used for drawing boiler heads; its chief function being in the punching of mud drums. This press is rated at 100 tons. Several hydraulic riveters are placed at the farther end of the building. Overhead traveling cranes hold the boiler plates to be riveted in position during that operation. These riveters are of different capacities and have stakes of varying heights. The 5-foot riveters are rated at 50 tons; the 10-foot, at 80 tons; the 12-foot, at 108 tons, and the largest at 150 tons. A full complement of punches, shears, drilling machines, radial drills, milling machines and shape benders, together with oxyacetylene equipment complete is also provided.

Testing the Boilers

The assembly floor is located in the main bay. The heavy assembly work is done on the testing floor so that the boilers upon completion may be tested without removal. Tracks run the full length of these bays and the boiler, after testing, may be lifted by crane and placed on a car for shipment. The smaller boilers are tested on an assembly floor near the laying-out section. Facilities are provided for transferring these boilers to cars in the same way. For testing purposes a 3-plunger, 500-pound test pump is used. This hydraulic pump is located near the flanging machines and pumps water to the two testing floors through a high pressure main.

Machine work required for boilers and boiler fittings is performed in a small, well-equipped shop at the extreme front end of the shop. Its location is close to the laying out floor. The equipment consists principally of turret lathes, thread cutting machines and drill presses.

Electric Furnace Reduces Titaniferous Ores

Process for manufacturing tool steel from titaniferous iron ores has been patented by E. H. Rothert, president of the Rothert Process Steel Co., Seattle. The process pertains both to the smelting of the ore and the subsequent refining of the metal. The company owns two mines, one in British Columbia which is 250 miles from the mill, and the other in the state of Washington which is 150 miles distant. About 400 tons of the ore are to be transported at once from the British Columbia mine by boat. The ore from this reserve analyzes 70 per cent iron and from the Washington mine 60 per cent. It is stated that the sulphur and phosphorus contents in both grades of ores are negligible. For smelting the ore a three-phase electric furnace equipped with three electrodes is used. This furnace has a melting capacity of two tons per 24 hours and is shown in the accompanying illustration together with the control board and auxiliaries. The metal is tapped into a ladle which is suspended in a pit directly under the pouring spout of the furnace. The ladle is hoisted, swung around by a jib crane and is set on a truck which operates on an elevated narrow gage track. By this means the metal is conveyed to the ingot molds. It then is passed on to the forging department. In the near future the company contemplates extending the melting building 100 feet and installing an additional electric furnace of 10 tons capacity. An 1100-pound steam hammer, of the latest type and design, and a reheating furnace also will be added to the forging department.



METHOD OF PLACING AND COMPACTING REFRACTORY WHICH IS SUPPORTED UNTIL SET BY THE FIRE

The value of the primary aluminum made in the United States in 1917 was $45,882,000, an increase of $11,982,000 over the value of that made in 1916.

Plastic Baffle Refractory for Boilers

A plastic refractory for boiler baffles, said to be impervious to the hot gases which are constantly passing through the baffles, was recently developed by the Betson Plastic Fire Brick Co., Rome, N. Y.

In forming a cross baffle for a water-tube boiler, the ordinary cast-iron baffle plate is used as one side of the mold. The other side is made by thrusting slats in through the diagonals between the tubes, as shown in the accompanying illustration. The refractory is poked down through the diagonals to fill the space between the cast-iron baffle plate and the slats. The refractory is said to be sufficiently plastic to be found sidewise around the tubes.

When this work has been completed the boiler is fired up slowly, the criss-cross of slats burned out, and the refractory vitrified in place. The operation requires only a few hours, after which the full load may be placed upon the boiler.

The position of the refractory is claimed to regulate itself automatically. Inasmuch as the boiler comes up to full steam capacity before the material is set, the latter is pushed away by the hot metal to the position which it should occupy when the boiler is hot. While the metal will draw away from the refractory in cooling, the baffles it is said will always fit tightly.

In forming a longitudinal baffle, blocks of wood are placed between the tubes, above and below the space which the baffle is designed to occupy, thus confining the plastic material which may be inserted by the most convenient method.



INTERIOR VIEW OF MELTING PLANT, SHOWING THE 2-TON ELECTRIC FURNACE AND CONTROL

Ford is Pushing Tractor Industry

Temporary Plant Now Producing Numerous Machines of Perfected Model for Government Use and Output is to be Increased Swiftly—Great New Works Planned —Materials and Design of Tractor Are Novel

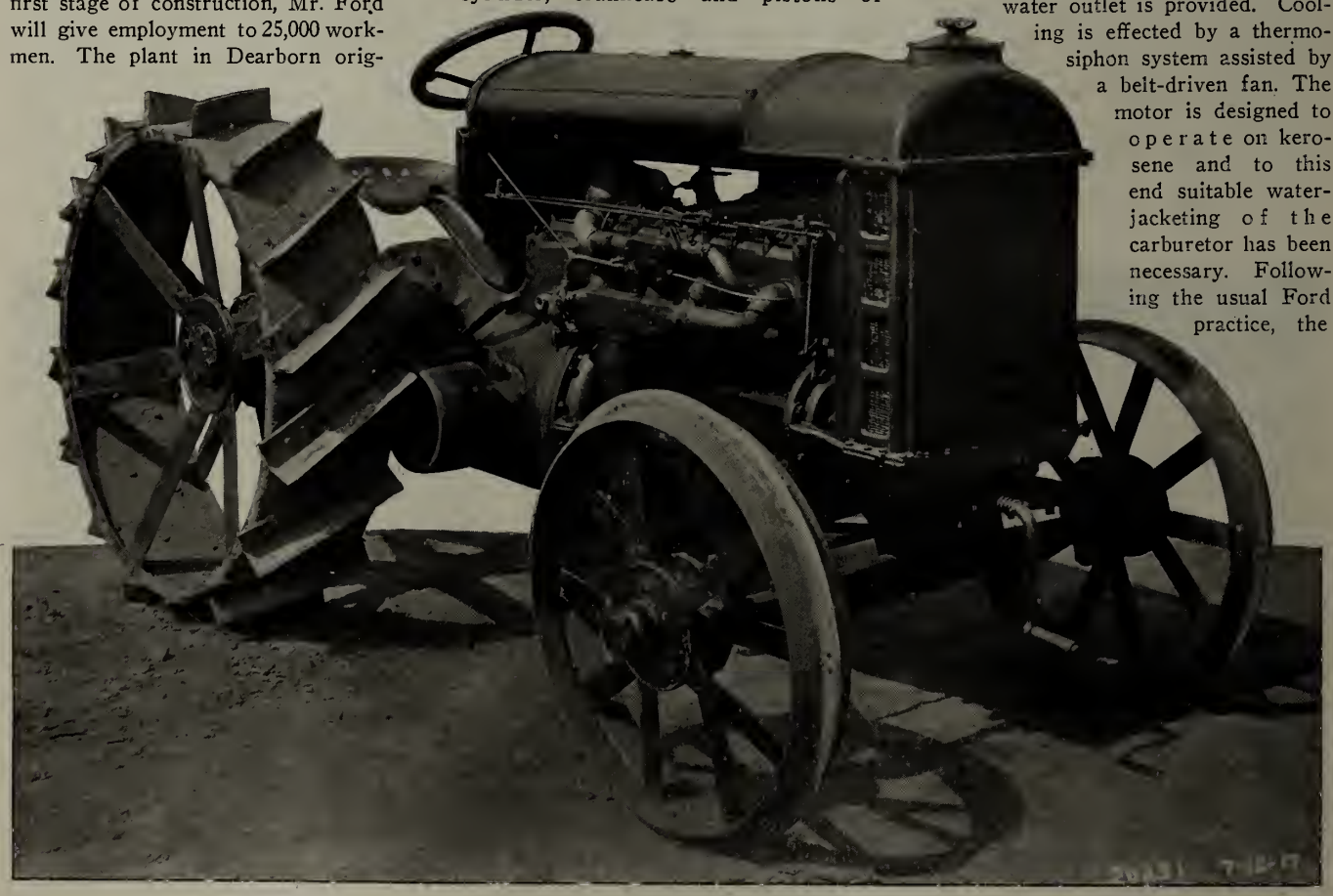
DETROIT, March 26.—Production of Fordson farm tractors at the temporary plant of Henry Ford & Son, in Dearborn, a suburb of Detroit, will be increased from 80 to 150 a day by May 1. The entire production for 1918 is placed at 50,000, most of which will be made available for use in this country. The machine is reported to be in great demand among farmers in spite of the fact that it has not yet been placed on the market in this country. All that have so far been manufactured have been sent to England there to help solve the food problem. Henry Ford believes the tractor is destined to create one of the world's leading industries. He plans to devote most of his time in developing his own tractor business to a point where he eventually will employ 100,000 men in the manufacturing, assembling, service and distribution.

In the proposed tractor plant, covering a town-site on the River Rouge, adjoining his steel mills now in the first stage of construction, Mr. Ford will give employment to 25,000 workmen. The plant in Dearborn originally was built for experimental purposes. It is now employing 2000 men. In all 50 models were produced before the perfected machine was turned out. The plant and equipment represents an investment of $3,500,000 and is complete except for an office building, 192 x 70 x 40 feet, which now is being erected.

The plant includes a foundry, 120 x 225 feet; stock room, 30 x 100 feet; heat treating room, 40 x 145 feet; assembly shop, 44 x 165 feet; pattern shop, 50 x 105 feet; gas producer plant, 54 x 45 feet; power plant, 70 x 45 feet; machine shop, 285 x 75 feet, and another machine shop, 225 x 90 feet.

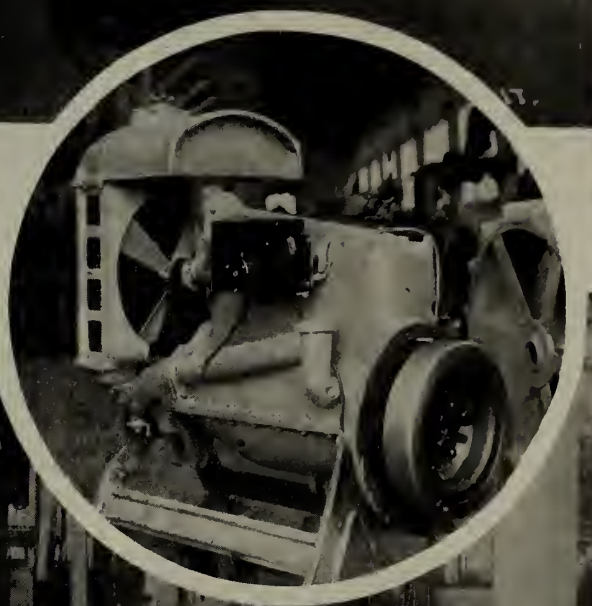
The wheels of the tractor are of hot rolled steel; the front axle of high carbon steel; the bearings and bearing races of chrome steel; the worm wheel of aluminum bronze; the clutch shaft, transmission gears, transmission shafts, axle shafts and worm gears of chrome-vanadium steel; the cylinder, crankcase and pistons of semisteel; the crankshaft, connecting rods and piston pins of chrome-vanadium steel; the main bearings of babbitt cast in steel caps; the valve heads of cast iron; the valve stems of carbon steel; the camshaft and valve tappets of 0.15 carbon steel, and clutch plates of 0.40 carbon steel.

Although the tractor motor is more ruggedly built than the standard engine used in the automobile, many of its characteristics bear out the the essential Ford principles of design. The engine has four cylinders cast integral with the upper half of the crankcase. These cylinders are of the conventional L-head type. The cylinder heads may be taken off easily for removing carbon from the interior walls, as the heads are cast in one block and save for the disconnection of the water outlet, it is only necessary to take out the cap screws that hold the cylinder heads in place. Instead of the conventional flexible connection between the radiator and cylinders, a rigid cast iron water outlet is provided. Cooling is effected by a thermo-siphon system assisted by a belt-driven fan. The motor is designed to operate on kerosene and to this end suitable water-jacketing of the carburetor has been necessary. Following the usual Ford practice, the

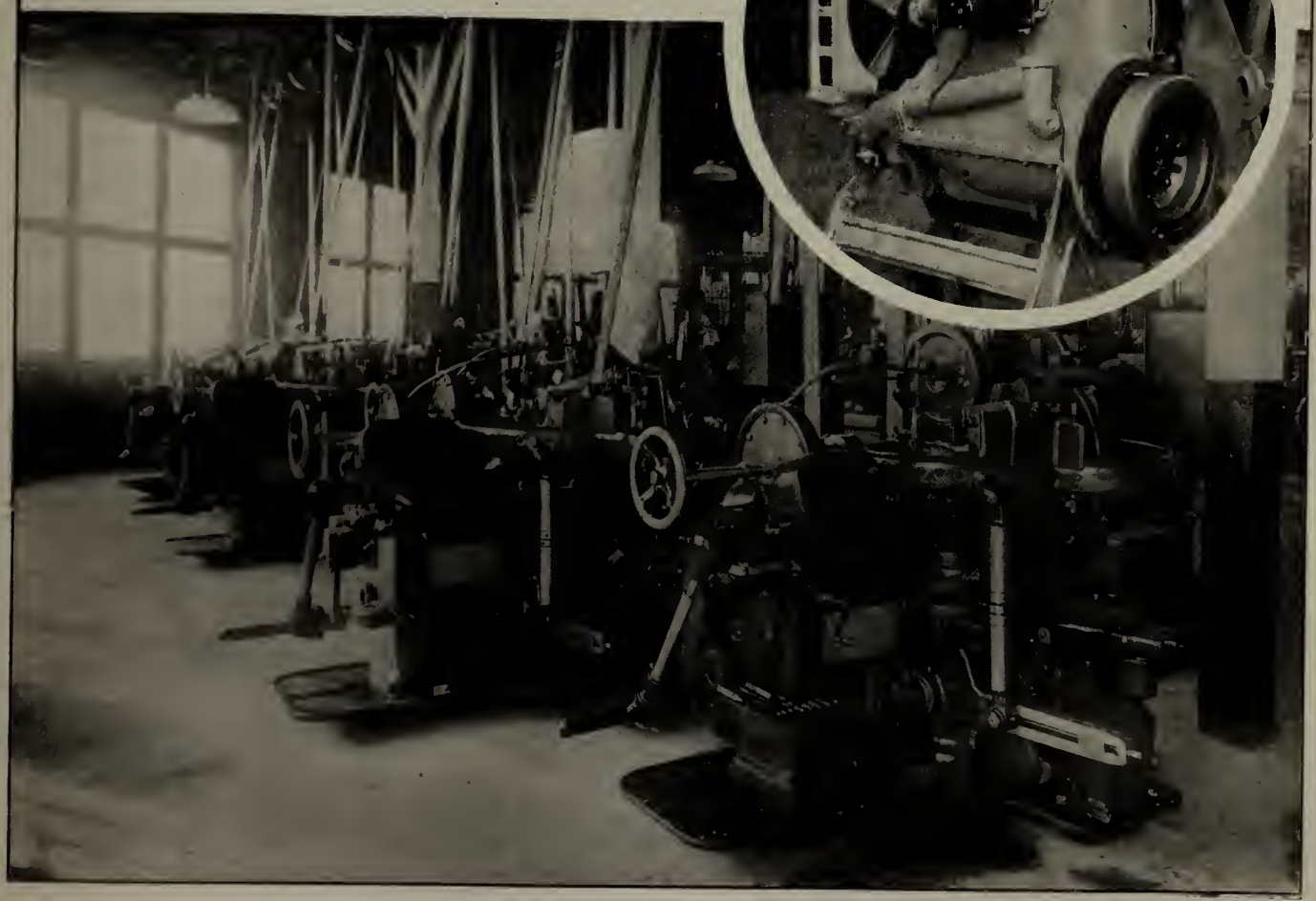


THE FORDSON FARM TRACTOR





Three glimpses in the Fordson plant. The upper illustration shows a special battery of special cylinder boring machines while the lower view was taken in the gear-cutting department. The insert illustrates the assembled tractor motor.



magneto is incorporated in the flywheel, where it is secure from dirt, moisture and damage.

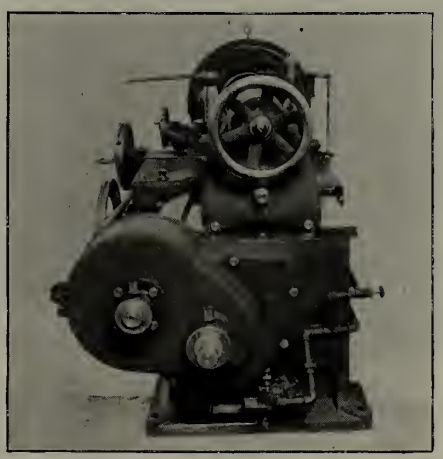
One of the features of the design is the three-point motor suspension and the incorporation of the motor, differential housing and the rear axle in one unit. The advantage of this system is that a straight line drive from the motor to axle without the interposition of universal joints is obtained. Through one side of the differential housing a pulley shaft fitted with a pulley projects. This arrangement enables the tractor owner to use it for miscellaneous farm duties. The motor develops 22 horsepower at 1000 revolutions per minute.

Designs Axle Lathe for Heavy Work

THE lathe shown in the accompanying illustrations was designed by the Niles-Bement-Pond Co., New York, for turning locomotive and railroad car axles, either from rough or semifinished forgings. The work is driven from the center so that wheel seats and journals at both ends of the axle can be finished simultaneously. The lathe was designed for a high production machine and it is of rigid construction throughout.

The bed is reinforced by box-section cross girts 8 inches wide and all sections are of sufficient proportions to insure rigidity. The carriage tracks consist of a flat way at the back and compensating V-shape at the front. The angle of the V-shape track is 15 degrees at the back and 70 degrees at the front. This construction is shown in the end view of the lathe. The 15-degree angle serves a double purpose as it presents a thrust surface at right angles to the combined forces of the turning tools and at the same time it compensates for wear on the carriages and the bed. This construction is designed to eliminate the tendency of the carriages to climb under heavy cuts.

The center-drive head is of heavy construction. It encloses the main driving gear entirely and also forms an oil reservoir for lubricating the gear. The head is fastened to the bed by six bolts and it has a longitudinal adjustment along the bed. The drive is operated through a steel herringbone-type gear and pinion. These



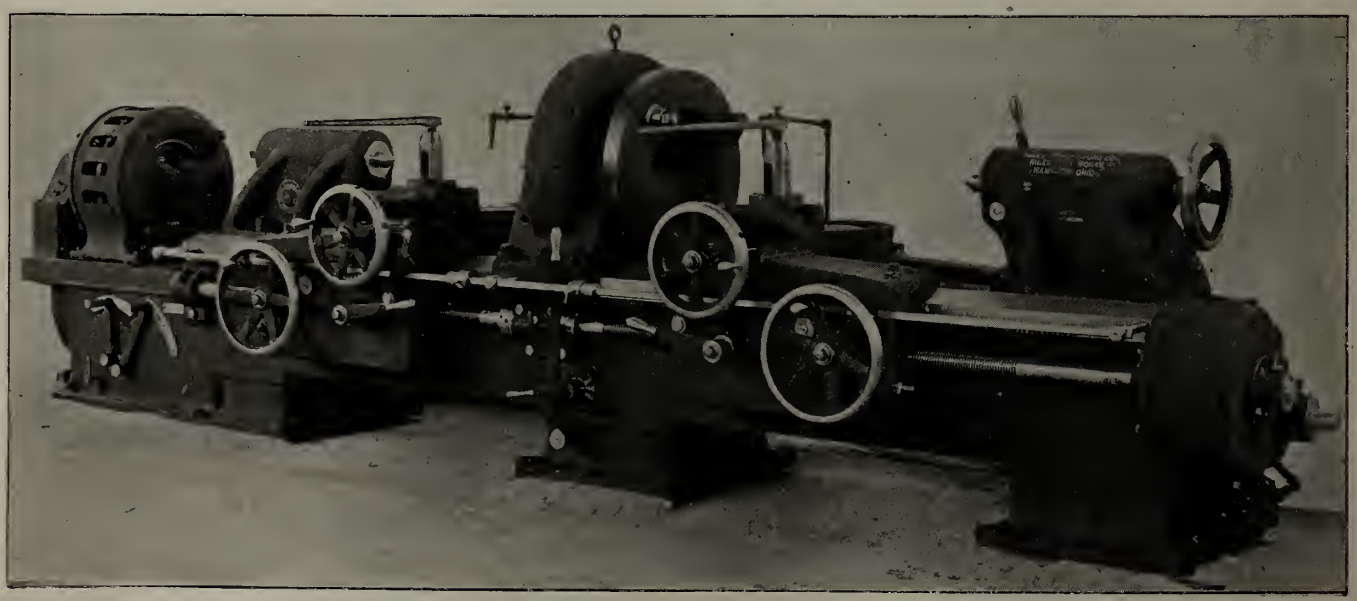
CROSS-SECTION OF V-TRACK

are carried between bearings in the head. These bearings are large, thus insuring long life, and provision has been made for a sufficient supply of oil. The drive is said to be smooth, owing to the spiral action of the herringbone gearing. The axle to be turned is rotated by a steel equalizing driving plate which has lugs cast integral. These engage both ends of a double driving dog. By means of this type of driving plate, crooked or irregular axles can be machined readily without setting up bending strains.

The lathe is provided with two carriages. These have longitudinal feeds by positive gear-driven, right and left-hand screws. The carriages are equipped with automatic stopping devices which are adjustable. When the carriages come in contact with the stops, which consist of set collars, the split nuts that encircle the feed screws are thrown open, thus arresting the travel of the carriages.

The carriages are held down by full-length clamping strips and the front and back vertical surfaces are adjustable by means of taper gibs. At the front of the carriages, two clamps are provided. One of these is utilized for clamping the carriage to the bed when turning up to shoulders and facing ends of axles. The other clamp is under the bridge and decreases the tendency of the carriage to lift during burnishing operations.

The carriages are equipped with wipers, the object of which is to remove chips from the ways that otherwise might work back under the carriage and score the working surface. These wipers have felt pads which provide the sliding surfaces with



AXLE LATHE DESIGNED FOR TURNING BOTH ENDS OF THE WORK SIMULTANEOUSLY

lubricant at all times. The lubricating system for the tools consists of a pump, jet pipes, reservoir and collecting channels. The tool slides are provided with a trough which is connected with channels in the carriage bridge for carrying off the lubricant. The carriage aprons are of double-wall construction and all the mechanism with the exception of the operating levers is enclosed. All shafts are supported by journals at both ends.

The feed gears are located at the right-hand end of the bed and they are entirely enclosed. The feed-change lever is placed at the center of the lathe within easy reach of the operator. Three feeds are provided for the carriage, 1/16, 3/32 and 3/16 inch per one revolution of the work. The carriages have hand traverse on the bed and the tool slides are equipped with hand cross feeds.

Lathe Has Two Tailstocks

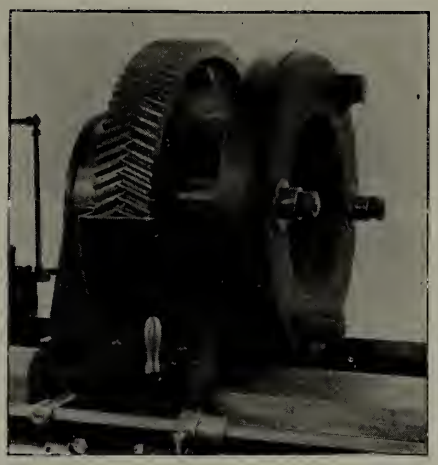
The axles are carried on dead centers mounted in two heavy tailstocks. The tailstocks are adjustable longitudinally along the bed to accommodate axles of different lengths and are clamped in place, as occasion requires, through the medium of four large anchor bolts. A pawl, which engages a cast rack in the bed, is provided to prevent slipping under heavy loads. The tailstocks have taper gibs at the front and back of the bed which permit alignment of the spindles. The spindle of the right-hand tailstock is provided with a hand wheel for purposes of adjustment.

The lathe can be equipped with any one of four different drives: Cone-pulley drive, single-pulley drive, constant-speed motor drive and adjustable-speed motor drive. With the cone-pulley drive, the lathe is driven by a 3-step cone which has a maximum diameter of 32 inches and takes a 7-inch belt. A 2-speed countershaft is provided which gives six speeds to the driving head. These range from 16 to 48 revolutions a minute. A break is also provided which is operated by a foot pedal.

With the single-pulley drive, the driving pulley is 26 inches in diameter for an 8-inch belt. The drive is through a speed box mounted at the left-hand end of the bed. The speed box transmits four speeds which range from 16 to 48 revolutions a minute. The gears are steel and run in oil and all the bearings are lubricated automatically.

For starting and stopping the lathe, a friction clutch is provided. This clutch is mounted inside the driving pulley and is operated by a lever located at the center of the machine. When the clutch is disengaged, a brake is automatically applied which brings the lathe to a quick stop.

For use with alternating current, a constant-speed motor drive is employed. The motor is mounted on the speed box at the left-hand end of the bed as shown in the large illustration. Power is transmitted by gearing from the speed box to the driving shaft. There are four speed changes which range from 16 to 48 revolutions a minute. The speed box gears are steel and run in oil and all bearings are lubricated automatically. Starting and stopping is controlled by means of a friction clutch similar to the one used with the single pulley drive. In this case, however, the clutch is mounted inside of the speed box driving gear.



HERRINGBONE DRIVING GEAR

The adjustable-speed motor, used with direct current, is mounted on a base plate attached to the left-hand end of the bed. This motor is geared directly to the driving shaft and gives speeds to the driving head ranging approximately from 16 to 48 revolutions a minute.

Large Orders

For Railroad Cars Are Placed By The Canadian Government

Toronto, March 23.—The Canadian government has awarded contracts for rolling stock for the government railways including the Canadian Northern, amounting in all to about $22,500,000. The orders are allotted as follows: Canadian Car & Foundry Co., 5000 40-ton steel frame box cars, 450 40-ton wood ballast cars and 300 30-ton stock cars, making a total of about $16,000,000. Eastern Car Co., Trenton, N. S., 750 40-ton steel flat cars and 650 50-ton steel coal cars, making a total of $3,750,000. National Steel Car Co., Hamilton, 1000 40-ton steel frame box cars, amounting to about $2,750,000.

Contracts for the 150 locomotives required and for refrigerator, tank and passenger cars have not yet been awarded.

Details of the Canadian government's plan for assisting in meeting the need of the allies for merchant ships were given by Sir Robert Borden, prime minister, in the course of a speech in the house of commons on March 19. Already much has been done in Canada by the imperial government, through the imperial munitions board. Orders have been placed by the board for 43 steel ships with a total tonnage of 211,300 tons and for 46 wooden vessels aggregating 128,400 tons. The total value of these vessels is $64,500,000. Twelve shipyards are now working on orders for the imperial munitions board and their capacity is being brought up to approximately 250,000 tons a year. Berths vacated by the completion of ships ordered by the board will be utilized at once by the dominion government. Four cargo steamers with a total of 23,500 tons are to be completed and placed in commission this year. Next year, however, 50 steel ships are to be constructed. During his speech the prime minister expressed his thanks to the United States government for providing that the Canadian government might obtain 80,000 tons of ship plates and angles to meet shipbuilding requirements this year. These materials are to be supplied at the same price as to the United States government.

At the recent organization meeting of the Manitoba Steel & Iron Co., Ltd., Winnipeg, T. R. Deacon was made president, H. B. Lyall, vice president, and Walter Stuart, secretary. The company which recently took out a Dominion charter, with $500,000 capital stock, will take over the merchant end of the business of the Manitoba Bridge & Iron Works, to carry on a general merchant business in heavy steel goods, such as structural steel, plates, and sheets, railway supplies, mining equipment, heavy forging billets and shipbuilding material. A block of land has been secured with a suitable warehouse, and under the charter, authority has been given to build and operate rolling mills, blast furnaces, etc. The Manitoba Bridge & Iron Works proposes to confine its operations more to the manufacturing end and is applying for incorporation under the Dominion government with $1,000,000 capital stock.

The Bird Coal & Iron Co. is planning to blow in its furnace at Talladega, Ala., about May 1.

Railway Show Best Despite War



That widely varied industries are allied through the railway use of their products may be noted from the firm names over some of the exhibits at the Railway Appliance show held in the Coliseum at Chicago during last week.

The exhibit spaces were prepared with close attention to the importance of artistic effects. The utilitarian character of the equipment shown was submerged in an effort to increase the pleasing and artistic appearance of the entire display enclosure.





Traffic considerations and the imperative need for continuous railway operation gave added interest to those exhibits showing track fastenings and appliances which increase the factor of safety in track and roadway work.





DESPITE the fact that American railroads are now under federal control, the exhibition of the National Railway Appliances association, held in conjunction with the meeting of the National Railway Engineering association, was fully as complete and instructive as those of former years. The show was held last week at the Coliseum in Chicago and over 150 of America's large industries displayed their products. Adopting a rough classification, the exhibits were divided in two general classes—safety and signaling appliances, made up of compressed air and electrical devices used in operating trains and in protecting crossings; and rails and track appliances. The exhibit of the Associated Manufacturers of Malleable Iron—part of which is shown in the upper left hand corner of this page—was one of the most interesting of the entire show. This association presented a diversified line of malleable castings adapted for railroad work and demonstrated their strength on wedge-testing machines, miniature pile drivers and other testing devices. The Coliseum was handsomely dressed for the occasion in the national colors. Pictures of the national leaders were displayed in many prominent positions.



Pig Iron Production in United States, 1917

(Compiled by the American Iron and Steel Institute)

PRODUCTION OF PIG IRON BY GRADES, 1900-1917.

Years	Basic.	Bessemer.	Foundry.	Malleable.	Forge.	All other.	Total. Gross tons.
1900.	1,072,376	7,979,327	3,376,445	173,413	793,092	394,589	13,789,242
1901.	1,448,850	9,596,793	3,548,718	256,532	639,454	388,007	15,878,354
1902.	2,038,590	10,393,168	3,851,276	311,458	833,093	393,722	17,821,307
1903.	2,040,726	9,989,908	4,409,023	473,781	783,016	312,798	18,009,252
1904.	2,483,104	9,098,659	3,827,229	263,529	550,836	273,676	16,497,033
1905.	4,105,179	12,407,116	4,758,038	635,236	727,817	358,994	22,992,380
1906.	5,018,674	13,840,518	4,773,011	699,701	597,420	377,867	25,307,191
1907.	5,375,219	13,231,620	5,151,209	920,290	683,167	419,856	25,781,361
1908.	4,010,144	7,216,976	3,637,622	414,957	457,164	199,155	15,936,018
1909.	8,250,225	10,557,370	5,322,415	658,048	725,624	281,789	25,795,471
1910.	9,084,608	11,245,642	5,260,447	843,123	564,157	305,590	27,303,567
1911.	8,520,020	9,409,303	4,468,940	612,533	408,841	229,910	23,649,547
1912.	11,417,886	11,664,015	5,073,873	825,643	469,183	276,337	29,726,937
1913.	12,536,693	11,590,113	5,220,343	993,736	324,407	300,860	30,966,152
1914.	9,670,687	7,859,127	4,533,254	671,771	361,651	235,754	23,332,244
1915.	13,093,214	10,523,306	4,843,899	829,921	316,214	309,659	29,916,213
1916.	17,684,087	14,422,457	5,553,644	921,486	348,344	504,779	39,434,797
1917.	17,671,662	13,714,732	5,328,258	1,015,579	345,707	571,459	38,647,397

PRODUCTION OF PIG IRON BY STATES, 1913-1917.

States.	1913.	1914.	1915.	1916.	1917.
Mass., Conn.	12,810	6,594	7,802	5,719	10,527
New York, New Jersey	2,187,620	1,559,864	2,104,780	2,352,535	2,417,527
Pennsylvania	12,954,936	9,733,369	12,790,668	16,506,284	15,539,728
Maryland	289,959	195,594	251,548	501,452	422,212
Virginia	341,815	271,228	251,346	399,885	520,311
Alabama	2,057,911	1,826,929	2,049,453	2,762,885	2,953,705
West Virginia, Kentucky, Georgia, Mississippi	315,731	236,393	291,040	554,590	561,951
Tennessee	280,541	216,738	177,729	355,374	369,951
Ohio	7,129,525	5,283,426	6,912,962	8,602,895	8,518,603
Illinois	2,927,832	1,847,451	2,447,220	3,922,512	3,483,096
Indiana, Michigan	1,775,883	1,557,355	1,986,778	2,221,708	2,657,503
Wisconsin, Minn.	367,326	329,526	372,966	811,325	738,541
Mo., Ia., Col., Wash., Cal.	324,263	267,777	271,921	437,633	453,742
Total	30,966,152	23,332,244	29,916,213	39,434,797	38,647,397

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	335	307	95	402	18,874,680	19,015,144	37,889,824
Anthracite†	13	15	5	20	203,320	177,728	381,048
Charcoal‡	19	18	17	35	180,235	196,290	376,525
Total	367	340	117	457	19,258,235	19,389,162	38,647,397

*Includes ferro-alloys made with electricity.
†Includes mixed anthracite and coke pig iron.
‡Includes small tonnage made with charcoal and coke.

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN 1917.

Grades.	For sale.	For maker's use.	Total. Gross tons.
Basic	2,614,875	15,056,787	17,671,662
Bessemer and low-phosphorus	2,406,742	11,307,990	13,714,732
Foundry, including ferro-silicon	5,186,498	141,760	5,328,258
Malleable	1,014,025	1,554	1,015,579
Forge or mill	128,061	217,646	345,707
Ferro-manganese	132,068	153,932	286,000
Spiegeleisen	144,036	49,255	193,291
All other grades	50,208	41,960	92,168
Total ..... Gross tons.	11,676,513	26,970,884	38,647,397

PRODUCTION OF COLD AND HOT AND WARM BLAST CHARCOAL PIG IRON, 1913-1917.

Kinds of iron.	1913.	1914.	1915.	1916.	1917.
Cold blast	10,222	9,294	5,302	5,323	5,219
Hot and warm blast*	329,759	254,630	290,850	367,088	371,306
Total	339,981	263,924	296,152	372,411	†376,525

* Includes iron made with charcoal and electricity from 1913 to 1915, inclusive.
† Includes small tonnage of pig iron made with charcoal and coke mixed in 1917.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1917.	Second half of 1917.	Total 1917.
New York, New Jersey	535,286	627,367	1,162,653
Pennsylvania—Allegheny County	1,797,309	1,901,228	3,698,537
" —Other counties	2,330,237	2,320,621	4,650,858
Virginia, Alabama, Kentucky	770,667	748,795	1,519,462
Ohio	1,412,324	1,575,056	2,987,380
Indiana, Illinois	1,466,677	1,610,138	3,076,815
Michigan, Minn., Missouri, Col., Wash.	308,104	267,853	575,957
Total	8,620,604	9,051,058	17,671,662

PRODUCTION OF PIG IRON BY GRADES, 1916-1917, SHOWING INCREASE OR DECREASE BY GRADES.

Grades.	1917.	Per cent.	1916.	Per cent.	Increase.	Per cent.
Basic	17,671,662	45.72	17,684,087	44.85	*12,425	*0.07
Bessemer and low phosphorus	13,714,732	35.49	14,422,457	36.57	*707,725	*4.91
Foundry and ferro-silicon	5,328,258	13.79	5,553,644	14.08	*225,386	*4.06
Malleable	1,015,579	2.63	921,486	2.34	94,093	10.21
Forge	345,707	.89	348,344	.88	*2,637	*.76
Spiegeleisen	193,291	.50	194,002	.49	*711	*.37
Ferro-manganese	286,000	.74	221,532	.56	64,468	29.10
All other	92,168	.24	89,245	.23	2,923	3.28
Total	38,647,397	100.00	39,434,797	100.00	*787,400	*2.00

*Decrease.

PIG IRON MADE FOR SALE BY GRADES IN 1917.

States.	Bessemer.	Basic.	Forge.	Foundry.	Malleable.	All other.	Total. Gross tons.
Mass., Conn.	.....	.....	.....	10,007	.....	.....	10,007
N.Y., N.J., Md.	334,577	162,483	6,429	579,569	149,375	29,025	1,261,458
Pennsylvania	1,328,821	739,666	48,410	912,426	75,227	189,253	3,293,803
Va., W. Va., Ala.	9	439,610	61,381	1,800,871	.....	33,391	2,335,262
Ky., Tenn., Ga.	116,554	.....	3,223	398,022	.....	6,020	523,819
Ohio	308,470	1,050,677	8,618	647,192	430,416	588	2,445,961
Ind., Ill.	237,732	133,781	.....	90,973	220,011	52,976	735,473
Mich., Wis., Minn., Mo., Iowa, Col., Wash., Cal.	80,579	88,658	.....	747,438	138,996	15,059	1,070,730
Total	2,406,742	2,614,875	128,061	5,186,498	1,014,025	326,312	11,676,513

METHODS BY WHICH ALL PIG IRON WAS CAST OR DELIVERED.

States.	Molten condition.	Sand cast.	Machine cast.	Chill cast.	Direct castings.	Total. Gross tons.
Mass., Conn.	.....	10,527	.....	.....	.....	10,527
N. Y., N. J., Md.	1,560,474	569,977	565,544	143,213	531	2,839,739
Pennsylvania	10,434,070	1,293,287	3,101,486	700,982	9,903	15,539,728
Va., W. Va., Ala., Ga., Ky., Tenn.	1,172,356	2,511,003	490,848	220,677	11,034	4,405,918
Ohio	4,797,365	1,230,811	2,214,143	266,372	9,912	8,518,603
Ind., Ill., Mich., Col., Wis., Minn., Mo., Ia., Wash., Cal.	5,229,174	622,962	1,277,663	201,331	1,752	7,332,882
Total	23,193,439	6,238,567	7,649,684	1,532,575	33,132	38,647,397

METHODS BY WHICH BASIC PIG IRON WAS CAST OR DELIVERED IN 1917.

States.	Sand cast, machine cast, chill cast, etc.	Molten condition.	Total. Gross tons.
New York, New Jersey	230,452	932,201	1,162,653
Pennsylvania	1,742,899	6,606,496	8,349,395
Alabama, Virginia, Kentucky	547,878	971,584	1,519,462
Ohio	1,050,264	1,937,116	2,987,380
Indiana, Ill., Mich., Minn., Mo., Col., Wash.	403,569	3,249,203	3,652,772
Total	3,975,062	13,696,600	17,671,662

Bessemer Loss

Greatest in 1917 Iron Output According to Official Data

Pig iron production in the United States during 1917 is placed by t American Iron and Steel institute at 38,647,397 tons. This total, as given in a bulletin just issued, covers all grades of pig iron including charcoal, ferroalloys and the product of electric furnaces. In 1916, the total tonnage amounted to 39,434,797, a loss for last year of 787,400 tons.

A comparison of the production figures according to fuel used indicates this loss was due entirely to the coke furnaces, which produced 37,889,824 tons in 1917, a loss of 954,774 tons compared with the 1916 total of 38,844,598 tons. The anthracite stacks last year showed a gain of 163,260 tons, producing 381,048 tons in 1917, compared with only 217,788 tons in 1916. Charcoal furnaces also registered a gain, with a total production of 376,525 tons, or 4114 tons more than the 1916 total of 372,411 tons.

By grades, the heaviest loss was in bessemer iron. The output of this grade amounted to 13,714,732 tons, compared with 14,422,457 tons in 1916, a loss of 707,725 tons. The basic total last year amounted to 17,671,662 tons, or 12,425 tons less than the 1916 figure of 17,684,087 tons. Both forge and foundry grades show a loss, the foundry figures being 5,553,644 tons and 5,328,258 tons in 1917 and 1916, respectively, a loss of 225,386 tons.

The last half of the year, with a production of 19,389,162 tons, shows a gain of 130,927 tons over the first half total of 19,258,235 tons. Basic production for the second half was 9,051,058 tons, compared with 8,620,-604 tons in the first half, a gain of 430,454 tons. The gain in the production of foundry iron in the last half amounted to 123,362 tons, the total tonnage produced in that period being 2,725,810, while the first six months' total was 2,602,448 tons. In the July to December period, 6,-673,306 tons of bessemer pig iron were produced, a loss of 368,120 tons compared with the January-June total of 7,041,426 tons.

The tables on the opposite page show in detail the pig iron production figures for 1917 as collected by the institute.

Skilled mechanics from Cleveland, Detroit and other industrial centers are being called to care for the great air fleet which the United States has begun to send abroad. More than 2500 airplanes are now ready to take to the air on the other side and with 46 men required on the ground for every man in the air, 115,000 men are required immediately. With 10,000 planes as a minimum for this country's contribution, an army of at least 460,000 mechanics must be recruited.

Labor Problems

During and After War to be Studied at Conference

Labor problems under war conditions will be considered from practically every angle at an important national conference to be held at the Hotel La Salle in Chicago, March 27 to 29, by the Society of Industrial Engineers and the Western Efficiency society. The topics of woman in industry, the substitution of man power by mechanical equipment, the realization of maximum output from the men remaining in nonmilitary pursuits and the readjustments in the industrial field that will take place upon the return of the army to civil life will be studied. In connection with the conference an exhibit will be held of labor-saving factory equipment and modern office devices.

The detailed program of the meeting is as follows:

WEDNESDAY AFTERNOON

Women in Industry—Replacing Men

Purpose of the Conference, I. A. Berndt, secretary Society of Industrial Engineers.

Labor During and After War, Harrington Emerson, president, The Emerson Co.

Some Things Women Have Done and are Doing to Help Win the War, Mrs. J. T. Bowen, chairman women's committee, Illinois council of national defense.

Women as Munition Workers, J. E. Otterson, first vice president, Winchester Repeating Arms Co.

WEDNESDAY EVENING

Conclusions 1000 Questionnaires of Women in Industry, C. E. Knoeppel, counsel on organization, New York City.

Some Things Women Should do to Help Win the War, Miss Florence King, president, Women's Association of Commerce.

Women in Industry—Replacing Men, Barton T. Bean, president, Klink, Bean & Co., San Francisco.

Replacement of Men by Women in Industry, Richard A. Feiss, general manager, Joseph & Feiss Co., Cleveland.

THURSDAY MORNING
THURSDAY

Round Table Conference—Women in Industry, W. S. McArthur, Armour & Co., Chicago.

Mechanical Equipment—Its Function in Replacing Men

Planning, scheduling and Dispatching, W. S. Ford, manager efficiency division, Montgomery, Ward & Co.

Mechanical Aids to Man, A. Russell Bond, managing editor, Scientific American.

Standardization of Machines and Tools, Ellis F. Muther, general sales manager, Gisholt Machine Co.

THURSDAY EVENING

Relation of Coal Conservation Movement to the Engineer, Joseph H. Harrington, fuel conservation committee of Illinois.

Men Remaining—Securing Their Maximum Production

Maximum Production from Undrafted Labor, Irving A. Berndt, manager betterment department, Jos. T. Ryerson & Sons.

Man Power Engineering, Miss Frances A. Kellor, national Americanization committee, New York.

Scientific Management a Necessity of Modern Organization, F. M. Simons Jr., chairman of directors of Western Efficiency society.

Shifting of New Man-Power to Emergency Production, James O. Craig, president, Business Men's Clearing House.

FRIDAY MORNING

Round Table Conference, Capt. Harry F. Porter, Quartermaster's Corps, U. S. R.

FRIDAY AFTERNOON

Industrial Stimulation Through War Finance, James A. Davis, speakers' bureau, war savings committee.

Re-education of Crippled and Disabled Men, Douglas C. McMurtrie, director Red Cross institute, New York.

Business After the War, Willard E. Hotchkiss, director business education, University of Minnesota.

Mending Fragments from France in Canada, Norman A. Hill, general manager, Carriage Factories, Ltd., Toronto.

FRIDAY EVENING

Banquet, Samuel Insull, chairman, chairman Illinois council of defense.

Human Conservation and Reclaiming of the Disabled, Major Harry E. Mock, surgeon general's department.

Demobilization of Our Armies and Their Reassimilation in Civil Life, Col. J. S. Dennis, British-Canadian recruiting mission.

First Steps in Solution of Crippled Soldier Problem, Maj. F. B. Gilbreth, Providence, R. I.

Pennsylvania Plan for Meeting After-War Conditions, Lew R. Palmer, Pennsylvania department labor and industry.

Labor Checks Iron Output

British Furnaces Unable to Produce at Full Capacity Despite Urgent Demand—American Semifinished Steel is Sought

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 7, 1918.

GREAT pressure for all kinds of pig iron continues. Every blast furnace in the Midland district could dispose of hundreds of tons more per week, if the metal were available. But no blast furnace maintains anything like a prewar average. One of the largest makers in South Staffordshire considers that his reduction in output, although the furnace is blowing continually, is about 400 tons per week. This is accounted for in various ways. The fuel is of lower quality, all sorting at the pits having had to be abandoned; the ore also is inferior; but the most serious falling off is in the human element. The workmen who feed the furnaces are above military age and their assistants are very largely nondescripts engaged before the war in any trade but that of iron. A number of women assist on the pig beds, and in general boring. Yet in these circumstances there is a keen scent by the recruiting authorities after all men eligible for the army. The managers are protesting with all the vigor they can against military withdrawals of men and are threatening that if their staffs are further interfered with the furnaces will have to cease operation. The practice of cutting down all new contracts is strictly adhered to. The basic furnaces are now yielding full output, which is rendering some help to the steel section.

In the Cleveland district the monthly allotments have been made, and business is restricted to a few supplementary orders. In foundry the supply is not equal to requirements, though there is rather more forge iron available. The warrant stock is the same and shipments are decidedly small. In the Barrow district a furnace has been blown in at Carnforth, and there are now 34 in blast in the area between Maryport and Carnforth. Of these, two have been recently commenced, and it is hoped the larger output will relieve the stringency, though it is not likely to meet the full demand, especially for low phosphorus qualities. Generally, however, the outlook is brighter than for some time, especially as one, if not two, furnaces will shortly be started. The increased output has been made possible by the bringing into the ore mines of additional labor from Scotland. In the Welsh district supplies of hematite still are below requirements, but the ore supplies are well maintained.

Advance is Unsatisfactory

Demand is well maintained for all kinds of finished iron. Makers of chains and anchors and material for agricultural implements are all placing orders with the iron mills, while black sheets are in good request, largely for hutments in England and France. To the general surprise, the ministry of munitions has announced an advance of 2s 6d (60c) in the selling price of unmarked bars, raising the maximum from £13 15s ($66) to £13 17s 6d ($66.60) net at makers' works. Probably nothing yet done by the ministry of munitions in connection with the iron trade has caused greater dissatisfaction than this advance, which, it is said, is too trifling to make any material difference to the ironmaster's position. Rumors of this concession were prevalent a week ago, but the trade for the most part was incredulous, in view of the obvious inadequacy of the amount. Its insufficiency is self evident in view of the high price of puddled bars now selling at £12 15s ($61.20) to £13 ($62.40). This leaves a margin of less than £1 ($4.80) for heating and rolling of the puddled bars to finished material. At a rough computation this should cost about £3 ($14.40) so that manufacturers report that they are suffering a substantial loss on a large part of their production. One of the results of the peculiarity of the position is that the Staffordshire mills usually turning out common iron, now are using rather better pig, and selling their product at the marked bar price of £16 ($76.80). The normal difference in peace time between marked bar and unmarked bar is about 30s ($7.20) but at present the gap is extended to £2 2s 6d ($10.20). The result of the strain is a very wide range of prices. While some firms manage to continue to sell at the official maximum, there are a number of prices above this, charged on various pretexts, and frequently voluntarily imposed by the buyer who cares far more about getting his material than the price. It is a remarkable circumstance that puddled bars are not yet controlled whereas the finished material made from these bars is subject to a government maximum.

All the steel mills and foundries are turning out material to their full capacity. In the Glasgow district the works are immensely busy. But the output still is below demand. Latterly, the government has utilized large quantities of shell discard steel, formerly available for general purposes. The news received through The Iron Trade Review cablegram that the American government has now absolute control of export, is welcomed here, as suggesting a possibility of better supplies when the requirements of this country are fully realized. Users of billets and wire rods could do with considerable quantities of American material, especially the wiremakers. For some time past, the Birmingham mills producing wire have been wholly dependent on American wire rods, and the stoppage of supplies has hit them severely. The proprietors of these mills are contemplating an early shut down, if better supplies are not forthcoming. The demand for their products is enormous.

The Welsh steelworks again are in full operation. There is a shortage in the supply of tin bars which is affecting the output of tin plates, and the amount produced as well as the quantities in stock compare rather poorly with the figures of last year. The extravagant prices of tin keep the selling figures of tin plate at a very high level.

More Mills Ordered

The Carnegie Steel Co. has placed an order for five additional mills to be built at its McDonald plant near Youngstown. These mills will be built at the company's Ohio works, where the mills previously erected by the McDonald plant were built. When completed, this plant will contain one 12-inch, two 10-inch and two 8-inch hoop mills; one 18-inch land mill, one 8-inch, one 10-inch and one 14-inch bar mills. The Carnegie company has placed an order with the Hyatt Roller Bearing Co., Harrison, N. J., for complete roller bearing equipment for all of the new mills, thus providing the new mills as well as those previously built, with these bearings. The use of roller bearings has enabled the company, as a result of the reduction in friction, to reduce the size of the motors driving the tables and cooling beds by about 50 per cent from the sides which originally would be required.

The Bettendorf Co., Bettendorf, Iowa, has waived its patent rights to truck sides and underframes during the period the government is in control of railroads.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

COLONEL HENRY P. BOPE, vice president and general manager of sales of the Carnegie Steel Co., has resigned effective April 1. He has been associated with the Carnegie company in different positions for more than 38 years, having joined the sales department of the company in November, 1879. Colonel Bope has resigned to devote his time to personal interests which require his immediate attention. He has been succeeded in the sales organization of the Carnegie Steel Co. by William G. Clyde, who has been assistant general manager of sales in charge of the bar, hoop and band division. Mr. Clyde in turn has been succeeded by Charles L. Wood, who has been his assistant in that division of the sales department.

Lorenzo C. Dilks, who has been president of Milliken Bros., Inc., Staten Island, N. Y., and prior to that time was connected with the Eastern Steel Co., Pottstown, Pa., as general manager of sales, has been made president of the Carolina Shipbuilding Corp., Charleston, S. C., where the main offices of the company will hereafter be located, moving from New York.

W. L. Reid was recently elected vice president and general manager of the Lima Locomotive Works, Inc., Lima, O. After serving his apprenticeship with the Rogers Locomotive & Machine Works, Paterson, N. J., where he was born, he held positions of increasing importance with the Brooks Locomotive Works, the American Locomotive Co., the National Brake & Electric Co., Milwaukee, and before his latest election, was superintendent of the Baldwin Locomotive Works, Eddystone, Pa.

James A. Campbell, president Youngstown Sheet & Tube Co., and L. E. Block, vice president and treasurer Inland Steel Co., Chicago, have been appointed members of the committee on steel and steel products of the American Iron and Steel institute.

Frederick Holbrook has been elected president of the American International Shipbuilding Corp., to succeed D. P. Robinson, resigned. Mr. Holbrook has been vice president of the contracting corporation of Holbrook, Cabot & Rollins, Boston.

Charles H. Hodges was promoted at the annual meeting of the American Radiator Co., Detroit, from the position of second vice president to that of first vice president.

John W. Higgins was elected president of the New England Safety council, at its second annual meeting,, held in Boston recently. He is president and treasurer of the Worcester Pressed Steel Co., Worcester, Mass. S. W. Wakeman, general manager of the Fore River and Squantum, Mass., plants of the Bethlehem Shipbuilding Corp., Ltd., was made vice president.

Jeremiah Winn, who for more than 50 years has been manufacturing wheels in Worcester, Mass., has retired from business because of ill health.

C. Oscar Hedstrom has resigned his position as mechanical engineer for the Hendee Mfg. Co., Springfield, Mass.



COL. HENRY P. BOPE
Who Has Resigned as Vice President and General Manager of Sales of the Carnegie Steel Co.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JOHN LITTLE, M. I. M. E., for 10 years general manager of the Grimethorpe, Eng., works operated by Cammell Laird & Co., London, Sheffield and Birkenhead, Eng., steel manufacturers, shipbuilders and engineers, has retired. He commenced to work for the company 42 years ago at the age of 13 as an office boy, at the Cyclops branch, which then had 1500 workmen and which now employs approximately eight times that many. About 15 years ago Mr. Little directed the building of one of the largest armor plate plants in the world and when he became assistant chief engineer, the works method was changed from the Wilson compound process of armor plates, namely a steel face with an iron backing, to the Krupp process, which is all steel with a hardened face and soft back. At present Mr. Little is president of the Sheffield branch of the British Foundrymen's association and is mentioned as a possible president for that organization.

J. J. Green has been appointed assistant in the structural sales department of the Bethlehem Steel Co., at Philadelphia.

H. G. Uphaus upon his resignation from the Cambria Steel Co., Philadelphia, accepted the position of district sales manager in that city for the Donner Steel Co., Buffalo.

Robert E. Frame was recently elected vice president of the Hutchins Car Roofing Co., with offices at Detroit. He formerly was assistant to the president of the Haskell & Barker Car Co., Michigan City, Ind.

John S. Kennedy has become affiliated with John B. Guernsey & Co., Roanoke, Va., who operate furnaces at Graham and Roanoke, Va. He formerly was with the Oriskany Ore & Iron Corp., Oriskany, Va.

George R. Munschauer, formerly secretary and treasurer of the Niagara Machine & Tool Works, Buffalo, was recently elected president to succeed George A. Lautz. He has been connected with the company for about 20 years and is succeeded as secretary by W. F. Schweigert, who has seen 30 years' service, and by F. E. Munschauer as treasurer, affiliated with the company for the past 10 years.

A. F. Ausman has been made Chicago district manager for the Nagle Corliss Engine Works, Erie, Pa., manufacturer of air compressors, vacuum pumps, engines, etc. His headquarters will be in the Monadnock block. He formerly was vice president of the McMasters-Carr Supply Co., Chicago.

Benjamin S. Rosenberg, who for many years was connected with the Eagle Smelting & Refining Works, Nassau Smelting & Refining Works and Post van der Burg & Co., has been made manager of the New York office of the United Smelting & Aluminum Co., Inc., to succeed C. J. Wolfe.

James Forbes, formerly with the Manitowoc Shipbuilding Co., has been made manager of the Interlake Engineering Co., Cleveland, to succeed Thomas Deegan, who resigned to accept a position with the Ohio Shipbuilding Co. Mr. Forbes will assume his new duties April 1, and until that time Assistant Manager Captain Joseph Wood will be in charge.

William J. Matheson was recently elected president of the National Aniline & Chemical Co., New York, to succeed J. L. Schoellkopf, who declined re-election. Dr. L. C. Jones, a prominent chemist, was chosen third vice president to succeed C. P. Hugo Schoellkopf, retired. The Schoellkopf brothers will continue as directors.

I. E. Edwards has accepted the position of works manager of the Marshall Foundry Co., Blairsville, Pa. He has been chief engineer of the Valley Mound & Iron Co., Sharpsville, Pa., for the past 12 years and officials and fellow-workers of the latter company tendered a reception to him recently upon his resignation. At one time Mr. Edwards was connected with the Carnegie Steel and National Tube companies.

J. V. S. Bishop, Real Estate Trust building, Philadelphia, has been made secretary of the eastern division of the American Board of Scrap Dealers, to succeed C. A. Barnes, Widener building, Philadelphia, who resigned recently. Mr. Barnes will continue as secretary of the national organization and will devote most of his time to the duties of secretary of the new subcommittee on iron and steel scrap of the American Iron and Steel institute.

Richard K. Papin, who formerly was St. Louis and southwestern representative of the Davenport Locomotive Works, Davenport, Iowa, but who for the past 10 years has been manager of the equipment department of the Walter A. Zelnicker Supply Co., St. Louis, dealer in railway equipment, has been transferred to Minneapolis, Minn., to take charge of the recently opened offices of his company in the Plymouth building there.

Victor W. Page, has been promoted to the rank of captain in the signal reserve corps, aviation section, at Hazelhurst field, Mineola, L. I., from the position of engineering officer in full charge of the mechanical and technical departments in the Mineola school for aviation and care and operation of military trucks. Mr. Page was formerly in the engineering department of the New Departure Mfg. Co., Bristol, Conn.

D. P. Thompson, who in 1912 became assistant general superintendent of the Inland Steel Co., Indiana Harbor, Ind., of which his father is president, has been promoted to the position of assistant vice president. He was born in Newcastle, Pa., in 1880, and ever since he was graduated from Yale University. he has followed iron and steel and mining, four years in Alabama and four years in Cleveland.

John B. Emerson, for 10 years in charge of work in the southwest for Robert W. Hunt & Co.'s bureau of inspection and tests, has entered the employ of the La Salle Engineering Co., Old Colony building, Chicago, designing and consulting engineers. The La Salle organization has expanded rapidly in the past few months on account of its new commissions in marine engineering, and it is now occupying the entire fourth floor of the Old Colony building.

P. C. Gunion, who early this year was made advertising manager of the industrial bearings division at Newark, N. J., of the Hyatt Roller Bearing Co.,

Harrison, N. J., has been promoted to the position of advertising manager with headquarters in the Metropolitan building, New York. He succeeded R. A. Holme, who recently resigned to accept a similar position with the Machinery Utilities Co., New York. Mr. Gunion was formerly manager of the Pittsburgh office of the Hyatt company.

Iron and Steel Men in War Machine

J. Leonard Replogle, Steel Director for Government

J. LEONARD REPLOGLE as steel director for the government, probably possesses a greater knowledge of the intimate affairs of the iron and steel industry than any other individual. Weekly there come to his desk complete confidential reports from the country's pig iron producers and steelmakers, which set forth the exact position of these concerns as to orders on hand, deliveries, etc. These reports, coupled with his personal knowledge of the steel business, enable him to keep his finger upon the pulse of the industry, to the end that orders for steel from the United States or allied governments are most expeditiously allocated and handled. From the position of office boy at 13, in the period of 29 years, he has risen through positions of increasing importance and scope, until now at 42, he has been called upon to serve the country in one of the most responsible posts of the war behind the lines. After a service which in point of time extended over more than a quarter century with the Cambria Steel Co., Johnstown, Pa., marked with many promotions, beginning as office boy and ending as vice president and general manager of sales, he resigned in January, 1915, to become vice president and general manager of sales of the American Vanadium Co. In this capacity, he brought about a material enlargement of the market for vanadium steel. He was elected to the presidency early in 1917 and in March of that year organized and became director and board chairman of the Wharton Steel Co., Wharton, N. J. His resignation from those connections, because of the character of his present Washington duties took place recently. In August, 1917, he was made steel advisor to the government to direct the purchase of steel for war purposes, with headquarters in the Munsey building, Washington. Three months later, he was chosen by the war industries board as steel director under responsibility to that body for the proper allocation among producers of orders from the United States and allied governments. His executive training and complete familiarity with the ramifications of the industry qualify him peculiarly for his duties.



J. LEONARD REPLOGLE

Enlarge Transport Line to Europe

Taking Over of Dutch Merchant Fleet and Further Restriction of Imports Will Provide More Than 1,000,000 Tons of Additional Shipping—Must Rely on Domestic Sources of Metals and Ores

WASHINGTON, March 26.—Almost simultantously with the commencement last week of the long-expected spring drive of the Germans came action by the United States and the allies which is to provide for speedier transport of munitions, food and men from the industrial constructive line in America to the military destructive line in Europe. This action was really double, the combination adding more than 1,000,000 estimated tons of available ocean shipping to the steady stream essential to supplying the allied fighting forces in France.

One part of the double action was a concerted move by the United States and Great Britain in commandeering more than 800,000 tons of vessels flying the flag of Holland but lying idle in American and British ports. The other was the blow struck at import shipments through the promulgation of the war trade board's first list of restricted imports. This latter action is expected to place more than 300,000 tons of ships in actual war service, curtailing an aggregate of over 1,000,000 tons of imports normally received by the United States. Fully three-fifths of this aggregate is represented in metal shipments.

To Clear Up Accumulations

The addition of the Dutch tonnage, approximately 70 ships, now being overhauled under supervision of the navy and the shipping board, is expected to shortly expedite shipments of steel projectiles, cannon, machinery and other munitions which have been filling tidewater terminals and waiting ocean tonnage. The removal of these supplies, as well as the large quantities of foodstuffs, is seen here as one of the means of increasing production, providing the railroads will be able to haul the manufactured products to seaboard as fast as ports are cleared.

Manufacturers who have been depending upon foreign metals and ores, particularly nickel, pyrites and zinc, for their raw materials, now will have to look to domestic production to supply their requirements. Nickel and zinc are absolutely cut off through the embargo, but 125,000 gross tons of pyrites may be imported before Oct. 1. From this limited quantity and after that date domestic fields will have to supply the manufacturers with the sulphur and sulphuric acid now produced from imported pyrites. For some time past the department of the interior has been campaigning for exploitation of this work here in the United States.

Imports Further Restricted

The action of the war trade board in declaring a list of restricted imports was not made to allow free importation of commodities not on the list. In fact, it was stated by the board, the same rigid licensing system is to be maintained, more rigid than ever, if there is to be any change at all. This is precluded by the fact that the list announced was called "No. 1", indicating at least another is to come, possibly more. To what extent shipping still could be conserved by further lists has not been attempted in a public estimate, but the war trade board, spurred on by the shipping board, is ready to go as far as compatible with expanding the embargo list. It is altogether likely the list will not be shortened until the ships now being built begin to make the ocean splash with a great many more launchings.

The curtailment of imports is regarded as the logical completion of the argument that it is absurd to gear American industries to top speed for production of war supplies which only pile up in warehouses and terminals and cannot be put to use because there isn't sufficient ships to move even those requirements actually needed. Stopping of shipments of imported raw materials is expected to curtail some less essential production. That will tend to lead those manufacturers to enter more essential fields which again would lead to overproduction. But, government officials feel, curtailing really essential imports such as zinc, nickel and pyrites will even things up a bit.

List Covers Wide Range

The list promulgated by the war trade board includes the following which are associated with the iron, steel and allied industries:

Agricultural implements; asbestos; cars, carriages and other vehicles; all acids; muriate of ammonia; all coal tar distillates except synthetic indigo; clocks, watches and parts thereof; electric lamps; explosives, except fulminates and gunpowder; fish hooks, rods and reels, artificial bait; fluorspar; gold and silver manufactures, including jewelry; musical instruments and parts thereof; nickel; penholders and pens; phonographs, gramophones, graphophones and parts thereof; plates, electrotype, stereotype and lithographic, engraved; plumbago or graphite (until July 1, 1918; thereafter not exceeding 5000 long tons for remainder of 1918); pyrites (except not exceeding 125,000 long tons to Oct. 1, 1918); tar and pitch of wood; umbrellas, parasols, sunshades and sticks for; and zinc.

McAdoo Must Ratify All Railroad Buying

WASHINGTON, March 26.—Practically every bit of steel required for future railroad construction, whether it be for road repair or extension or for new equipment, will have to wait upon Director General McAdoo's approval of the sum to be expended. This is in accordance with an order Director McAdoo issued almost before the ink had dried in the President's signature to the railroad bill last week. This move is regarded as one of the many the director general in his senior capacity as secretary of the treasury has made to subserve all new financing to the government's war requirements.

The new order says no new locomotives or cars shall be ordered or constructed without Mr. McAdoo's approval, and that no new construction of lines or extension of present lines are to be undertaken without his sanction. Work contracted for and ordered before Jan. 1, 1918, may continue, Mr. McAdoo says, but even

then he asks that the railroads make sure the work is essential. He asks that all work conform to these conditions:

From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. From the standpoint of the available supply of labor and material, it is likewise highly important that this supply shall not be absorbed except for the necessary purposes mentioned.

"Please also bear in mind that it may frequently happen that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular company, may not be equally meritorious or necessary under existing conditions, when the government has possession and control of the railroads generally, and therefore when the facilities heretofore subject to the exclusive control of the separate companies are now available for common use, whenever such common use will promote the movement of traffic."

The railroad administration will not stand in the way of any other work which does not involve expenditure of more than $25,000, providing the proposal conforms to the policy of the administration relative to finances, labor, materials and its importance to railroads in the war; also providing it conforms to a policy of the railroad in effect in 1916 and 1917; and still further providing full reports are made to the administration within 10 days of the commencement of work or the placing of contract. If the expenditure is to be greater than $25,000, it still must conform to the administration's policy and have Mr. McAdoo's approval.

Judge Robert S. Lovett, who had been made director of the division of betterments and additions, has been made director of the division of capital expenditures in charge of this particular phase of railroad financing. Reports and applications must be made to Director Lovett, who will confer with the director general for his approval, if it is required, and then refer the question to John Skelton Williams, director of the division of finance and purchases, for execution.

Plants to Get Coal from Nearest Mines

WASHINGTON, March 26.—The national fuel administration's coal zoning plan becomes effective next Monday by which mills and furnaces of the iron and steel industry will obtain their supply of bituminous coal from the nearest mines. This is the theoretical object of the plan which affects more than 300,000,000 tons of soft coal annually for an estimated saving of more than 160,000,000 car miles, enabling the car equivalents thus saved to tend to increase coal production fully 5 per cent. The resultant elimination of cross hauls will also have the benefit, it is expected, of reducing the possibility of coal car congestion.

The new plan will not apply to anthracite coal, coke or bituminous coal intended for by-product ovens, gas, metallurgical, smithing or other specific uses where special grades of fuel are required. To obtain the benefits of these exemptions, for bituminous coal, manufacturers and consumers of this special coal must obtain from the fuel administration special permits. Applications should be sent to the United States Fuel Administration, Coal Zone License Bureau, Room 6209, New Interior building, Washington, D. C., with complete information in order that the licensing may be expedited.

How Zones Are Fixed

Pennsylvania, Maryland and northern West Virginia will ship to West Virginia, Maryland, District of Columbia, Delaware, Pennsylvania, New Jersey, New York, New England and Lake Erie ports, for transshipment only, except that Pennsylvania may ship as far west as Wellington and Lorain, O.

Ohio will ship to Ohio, Indiana and Michigan.

West Virginia high volatile fields will ship to West Virginia, Ohio, Indiana, the lower peninsula of Michigan, Kentucky and Virginia.

West Virginia low volatile fields will ship to District of Columbia, North Carolina, Virginia, Kentucky, Ohio, West Virginia, South Carolina and Lake Erie reports for transshipment only.

Alabama will supply Louisiana, Mississippi, Alabama, Georgia, Florida, eastern Texas, Arkansas and western Tennessee.

Tennessee, Georgia, Kentucky and Virginia will ship to North and South Carolina, Georgia, Tennessee, Alabama, Virginia and Florida.

Virginia, southeastern Kentucky and Tennessee will supply Kentucky, Indiana, Ohio and the lower peninsula of Michigan.

Western Kentucky will ship to Kentucky, Tennessee, Mississippi, Arkansas, Louisiana, Texas, Illinois, Wisconsin and Indiana.

Indiana will ship to Illinois, Kentucky, Wisconsin and Michigan.

Illinois will supply, from April 1 to Sept. 30, Illinois, Wisconsin, Minnesota, South Dakota, Iowa, Missouri, Arkansas, Louisiana, Tennessee, Kentucky, Indiana and Michigan, and from Oct. 1 to March 31, Wisconsin, Missouri, Arkansas, Louisiana, Tennessee, Kentucky, Illinois, Indiana and Michigan.

Missouri, Arkansas, Kansas, Oklahoma and Iowa will ship to western Louisiana, eastern Texas, Missouri, Kansas, Arkansas, Iowa and Oklahoma.

Montana, Wyoming, Colorado, New Mexico, Utah, Washington and Oregon will supply the Rocky Mountain and Pacific Coast states, except that the mines east of the Rockies may ship also to Missouri valley points to supply the summer demand.

Lake Michigan and Lake Superior docks will supply the Dakotas, Minnesota, the upper peninsula of Michigan, northern Iowa and Wisconsin.

Huge Sum Goes to Mobile Artillery Production

Washington, March 26.—The gun division of the army ordnance bureau is spending $40,000,000 in the construction of 16 factories for the manufacture of thousands of mobile artillery pieces and in the course of another year will have paid out $300,000,000 for this particular type of weapon, according to a statement by the war department. The division's program calls for an expenditure of approximately $2,000,000,000.

While this vast sum will be used partly in building and equipping plants for the manufacture of guns, the larger part of the undertaking will be spent for other work falling to the administration of the division. This includes the nitrate fixation, smokeless powder, gas filling, acids and other developments, according to the statement.

The plants and additions contemplated under the program, especially

those devoted to manufacturing the artillery, are all under construction and some have been completed. Department officials decline to discuss details of the artillery factory work, but the statement says "forgings are already being produced and the machining plants are in an excellent state of progress".

The gun division's construction program, in addition, includes two smokeless powder plants, one nitrogen fixation plant, one gas-fillling plant, to cost approximately $1,500,000; five shell-filling plants to cost approximately $25,000,000; and negotiations with cities for erection of by-product plants for extraction of toluol.

Increase Export Check on Sweden and Greece

Washington, March 26.—New and stricter regulations controlling exports from the United States to Sweden and Greece have been issued by the war trade board. Before an exporter may make applications for license he first must obbtain from the prospective importer the number of the Swedish import certificate; use form X; such other supplemental forms as may be necessary; an additional supplemental sheet, form X-104 giving the gross weight of the proposed shipment and any instructions relative to cables to Sweden, which will be sent at his own expense in order to hasten the war trade board's investigation in lieu of mail inquiries abroad; and observe fully the instructions formerly given concerning shippers' export declarations. Shipments should go forward in Swedish bottoms. The import license serial number is not needed on shipments to Greece, nor is it necessary to ship by way of Greek vessels. Supplemental sheet X-101 is to be used in the case of each shipment made.

Capital Odds and Ends

WASHINGTON, March 26.—Denial was made last week by Theodore E. Ferris, who was formerly chief ship designer for the Emergency Fleet corporation that he received compensation of any kind in connection with any contract secured from the corporation and that he was in no way interested in the Sloan Shipbuilding Corp. Mr. Ferris resigned when the senate investigation committee was at the height of its probe and when it was charged that he had received a fee from the Sloan corporation. He told the committee last week that he had an understanding with the corporation before the incumbency of Admiral Bowles, who requested his resignation, that he could continue what private practice he had providing it did not interfere with government work. Mr. Ferris appeared before the committee upon his own request.

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The Great Northern railroad desires an increase from $7 to $7.30 per net ton in carload commodity rate on zinc and concentrates from Butte, Helena and other points in Montana to Keokuk, Iowa.

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Nonapplication of rates is asked on in and terne plate via Chesley Tug & Barge Co., Kingston Transportation Co., Lillico Transportation Co., Mainland Navigation Co. and Star Steamship Co., to various points in Washington and British Columbia.

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The Emergency Fleet corporation has spent $392,000,000 up to March 1 in its shipbuilding program. There remains to be spent the difference between that amount and $2,000,000,000 which the program contemplates and which congress has authorized.

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An increase of $5,000,000 each month has been noted in the post office revenue figures since the new war postal rates went into effect last November. Estimates based on 1917 post office business indicate that the gain for the year under the increased rates will be approximately $75,000,000.

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The amount of tin imported to the United States last year from Singapore and Penang, Straits Settlements, decreased nearly 2,000,000 pounds in volume and more than $2,000,000 in value from the corresponding totals of 1916. The total value of the 1917 import was $23,909,000 as against $26,124,000 in 1916.

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The council of national defense, parent body of the highways transport committee, has passed a resolution approving its efforts to increase the use of motor trucks in solving transportation problems and requesting state organizations to provide for further use of trucks and to eliminate any restrictions which discourage this use.

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The Emergency Fleet corporation is now working on designs for 10 ships of 15,000 tons each, the largest vessels to be used in the American merchant marine. The shipping board has approved the general idea and has put the matter up to the corporation to be worked out. These ships will be of steel, of the nonsinkable type and likely will be awarded to some of the older ship yards of the country.

* * *

The National Steel Rail Co. has complained to the interstate commerce commission for reparation of $1542 on a shipment of 274 tons of rails and 37 tons of track material from New Madrid, Mo., to the Laclede Steel Co., Madison, Ill. The National company claims the published rate of 31 cents per 100 pounds exceeds a rate of $2 per ton allowed in other tariffs, and is unjust.

* * *

On complaint of the Durham Coal & Iron Co., Durham, Ga., the interstate commerce commission has found a rate of $5.85 applicable on blacksmith coal in carloads from Durham to Denison, Tex., unreasonable as it exceeds the lowest combination of intermediate rates in effect over the route. Reparation of $17.44 has been awarded. Shipment was made over the Central of Georgia and other railroads.

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While the order of Jan. 9 limiting the consumption of fuel by manufacturers of box board, paper board, straw board, etc., is temporarily suspended, the fuel administration, through the federal trade commission, is making a survey of the production and consumption of all paper and pulp products in order that these related industries may be limited in similar capacities when the order is again put into effect.

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An agreement has been made between coal operators of West Virginia and J. D. A. Morrow, manager of distribution for the fuel administration that Pocahontas, or smokeless soft coal, the fuel coal mostly used by manufacturers in Chicago, Detroit, Indianapolis, Dayton and other middle western cities, may be used during the coming summer by steamships passing through the war zones. This plan involves consumption of 5,000,000 tons of the coal.

Lets Refining House

The Cleveland-Cliffs Iron Co. has let a contract to the Arnold Co., Chicago, to erect a new refining house at the North Marquette furnace, Marquette, Mich., to replace that destroyed in the recent explosion and fire. The new building will be fireproof, of steel, concrete and glass. Since the explosion only a small portion of the by-product recovery has been possible. Several months probably will be necessary to restore full operation of the chemical plant. The company also has let a contract for a sawing and splitting mill at its furnace at Kipling, Mich. This is under the same management as the Marquette plant. Due to scarcity of labor in the woods the logs will be shipped direct to the mill and there prepared for the retorts.

Government Furnishes Shipwrights

Eastern Yards Asked to Fill Labor Requirements from Public Service Reserve—Classification of the 200,000 Enrolled Commences—Wage Scale Decided for Delaware River and Baltimore Districts

NOTIFICATION has been sent to all shipyards east of the Rocky mountains that the United States employment service of the department of labor now is prepared to fill all their labor requirements. Since the recent drive for 250,000 shipyard workers resulted in the registering of 200,000 mechanics, all yards are asked to obtain workers exclusively from this public service reserve. Government officials state that if shipyard operators will comply with this request, it will mean the elimination of the confusion to industry resulting from competitive bidding for labor and the attracting of large bodies of labor from one section to another. Directors of the United States public service reserve in each state have been notified to begin the classification of volunteers already enrolled so they may handle expeditiously any orders for workmen that may be placed. They likewise have been requested to continue registering volunteers, since some states have not filled their quotas.

That considerable progress has been made in reducing labor discontent in shipyards to a minimum is the hope of officials of the labor department, with the putting into operation of a wage scale in the Delaware river and Baltimore districts. This scale calls for an 8-hour day from Monday to Friday, with four hours on Saturday; time and a half for overtime; maximum week is 60 hours except in emergency cases in drydocks; night workmen are paid 5 per cent over the scale. This applies to the yards of the American International Shipbuilding Corp., Hog Island, Pa.; New Jersey and Pennsylvania Shipbuilding companies at Gloucester, Pa.; New York Shipbuilding Co., Camden, N. J.; William Cramp & Sons Ship & Engine Building Co., Philadelphia; Bethlehem Shipbuilding Corp., Sparrows Point, Md.; Baltimore Dry Dock & Shipbuilding Co., Baltimore, and others.

The wage scale in cents per hour is as follows:

Acetylene department, burners (first class) 65, (second class) 60; grinders and chippers 50, welders 65, helpers 46.

Anglesmith department, anglesmiths (heavy fires) 87½, helpers 55, (other fires) 72½, helpers 46, furnacemen on shapes and plates (shipwork) 82½, electric welder 65.

Blacksmith shop, hammer and machine forgers (heavy) $1.35, heaters and heavy hammer runners 55, levermen or crane men 70, helpers 50, blacksmiths (heavy fires) 87½, helpers 55, (other fires) 72½, helpers 46, drop forgers 70, helpers 50, bolmakers 72½, helpers 46, laborers 40, liner forgers 55, helpers 46.

Boiler shop, boilermakers 70, drillers 60, holders-on 50, rivet heaters 40, flange burners and slab furnace men 75, helpers 46, planer hands, 55.

Bolting and liner department, bolters 50, linermen 54, helpers 42½.

Cement department, cementers 50, helpers 42½.

Chipping and calking department, tank testers, hand chippers and calkers 70, pneumatic chippers and calkers 65, packers 50.

Cleaning department, leader 55, laborers 40.

Coppersmith department, coppersmiths 70, helpers 46.

Drilling and reaming department, drillers 60, reamers 50.

Electrical department, electricians (first class) 70, (second class) 65, wiremen 55, joiners 70, machinists (first class) 72½, helpers 46.

Erecting department, leading men 85, marine erectors (first class including machinists, plumbers and pipe fitters) 72½, (second class) 62½, specialist or handy man 52, helpers 46.

Fitting-up department, fitters (first class) 72½, (second class) 65, regulators (first class) 60, (second class) 52½, helpers 46.

Foundry department, molders, coremakers, cupola tenders, 72½, helpers 46, hand and machine chippers 50, laborers 40.

Furnace department, leaders 67½, firemen and helpers, strikers 55.

Hull engineering department, marine erectors (first class including machinists, plumbers and pipe fitters) 72½, (second class) 62½, specialists or handy men 52, joiners 70, helpers 46.

Joiner department, joiners, machine men 70, helpers 42½.

Lumber department, machine men 65, helpers 42½.

Machine shop, machinists (first class) 72½, (second class) 62½, specialists or handy men 52, helpers 46.

Material labor department, engineers (locomotive) 65, operators (locomotive, cantilever, gantry and other cranes of over 3 tons) 70, operators (stiff-legged derricks) 68, hoisting and portable firemen, locomotive and road crane conductors 50.

Mold loft, gang leaders 85, loftsmen (first class) 82½, (second class) 72½, joiners 70, helpers 42½.

Paint department, painters and polishers 60, helpers 42½.

Pattern shop, patternmakers 75, laborers 40.

Rigging department, marine and crane leaders 75, marine riggers 62½, crane gang leaders 67½, cranemen and erector leaders 60, erectors 50.

Riveting department, rivet testers, hand riveters 70, stage builders 57½, pneumatic riveters 65, holders-on 50, heater boys 38, passer boys 30, helpers 46.

Ship carpenter department, ship carpenters (first class) 70, (second class) 65, fasteners 60, erectors 50, helpers 42½, wood calkers 70, wood reamers 55.

Ship shed department, punchers, planers, scarfers, countersinkers 55, drillers 60, bending rollers 62½, mangle rollers 57½, pressmen (first class) 62½, (second class) 55, offsetters 55, sawyers 47½, helpers 46.

Ventilation department, layers out and sheet metal workers 70, helpers 46.

The rates for the employes engaged in construction work are as follows: Operators (locomotive cranes) 82½, blacksmiths, molders, plumbers, pipe fitters 72½, sheet metal workers, carpenters 70, electricians (first class) 70, (second class) 65, wiremen 55, engineers 65, painters 60, common laborers 35.

Scales for shipyards in other localities will in all probability be decided upon as soon as sufficient data is secured regarding local conditions.

An interesting compilation of shipyard workers has been made by the Emergency Fleet corporation, which shows that while only 44,962 workmen were employed in shipyards in 1916, 43,582 in steel yards and 1382 in wooden, by Jan. 1, 1918, the total had swelled to 204,710, comprising 181,273 and 23,437 workmen in steel and wooden shipyards respectively. This number with the new shipyard army recently enrolled will mean approximately 450,000 men at work on ships when the yards are in full swing.

Obituaries

SAMUEL LLOYD, who for many years was associated with Lloyds, Foster & Co., Wednesbury, Eng., died at Farm, Sparkbrook, Birmingham, recently at the age of 90. With John Brown, of Sheffield, he was the first to adopt the bessemer and siemens processes in England. He was the founder of the tube manufacturing firm of Lloyd & Lloyd, which amalgamated 15 years ago with the Glasgow firm now trading under the style of Stewarts & Lloyds, Ltd. He was one of the original members of the Iron and Steel institute, joining in 1869.

Daniel J. Carroll, aged 55, office manager for the Henry Vogt Machine Co., Louisville, Ky., died in that city recently, following an illness of several weeks.

Charles H. Stone, prominent merchant and business man of Kenne, N. H,. died there recently at the age of 79. He was an exdirector of the New England Hardware Dealers' association.

Harry E. Eury, after serving the Henry Vogt Machine Co., Louisville, Ky., for over 15 years, latterly as sales manager of the boiler department, died at his home there, aged 47, after an illness of two days.

Willard J. Nixon, secretary and treasurer of the Wright-Martin Aircraft Corp, Elizabeth, N. J., died Feb. 23 at his home in Orange, N. J. of pneumonia. Mr. Nixon was 61 years of age.

Edward T. Burrowes, who retired from the screen manufacturing business six years ago, having been a pioneer in it, died in Portland, Me., recently. He was born in Sherbrooke, Que., in 1852.

Homer Thayer Lovell, aged 76 years, died at his home in Chicago, March 9, following a paralytic stroke. For many years, he was salesman for the Crane Co., and then became connected with the Western Valve Co. He retired from active business life about 10 years ago.

Harry V. Brady, prominent in Framingham, Mass., manufacturing interests and superintendent and treasurer of the International Engineering Works of that city, died in a Boston hospital. recently after a brief illness, aged 42.

George S. Richardson, who for 46 years has been general superintendent of the Fitchburg Machine Works, Fitchburg, Mass., died at his home there after a brief illness of pneumonia, aged 64. He was born in Wheelock, Vt., and located in Fitchburgh 47 years ago.

Captain William Penglase, who for many years was mining captain for the Jackson Iron Co., and since 1905 captain of the Cleveland-Cliffs Iron Co.'s Jackson mines, died recently at his home in Negaunee, Mich. He was a mining expert of the upper peninsula of Michigan.

Joseph Grandidier, who was prominent in the National Amalgamated Association of Iron, Steel and Tin Workers, died recently in New Albany, Ky., at the age of 59. He had held positions at the plant of the Ohio Falls Iron Co., and as foreman of the St. Louis Bolt, Nut & Screw Works.

Frank L. Underwood, president of the British Columbia Copper Co., died in the Post-Graduate hospital, New York City, recently. He was first president of the Arizona Copper Co., and one of the promoters of the American Smelting & Refining Co. He was born in Waldon, Vt., 74 years ago.

Clifford S. Barbour, who was born in Portland, Me., 74 years ago, died recently in Bath, Me., following a minor operation. He was a skilled machinist at the Bath Iron Works in that city and in 1882 took a locomotive across country from Portland, Me., to Portland, Oreg., via San Francisco.

Hezekiah Scritchfield, who was one of the junior partners of the Carnegie Steel Co., having been made head of the heating furnaces at the bloom mills of the Edgar Thompson Steel Works, Braddock, Pa., in 1875, and subsequently superintendent until 1910, died at his home in Hawkins Station, Pa., from heart failure. He was born in Bedford county, Pa., Oct. 10, 1844, and after service in the civil war he was employed by the Cambria Iron Co. He was one of the first beneficiaries of the Carnegie junior partner fund.

Henry Sabin Chase, president of the Chase Companies, Inc., which includes the Chase Rolling Mill Co., the Waterbury Mfg. Co., Waterbury, Conn., and the Chase Metal Works, Waterville, died in that city recently, following an operation for appendicitis. He was born in Waterbury 63 years ago and was graduated with the class of 1877 from Yale university. His life's rule was "to pursue legitimate objects in legitimate ways, hard, patient work, square and truthful dealings, and concentration of mind and purpose." He was identified with many other financial and industrial enterprises.

James Drummond McGregor, vice president of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., and one of its incorporators, died in New Glasgow recently at the age of 80. He was the oldest surviving director of the Nova Scotia Steel & Coal Co., and had extensive mercantile and shipowning interests. He took an active interest in political affairs and after serving a term in the provincial legislature was nominated to the Canadian senate in 1903. In 1910, he was appointed lieutenant-governor of Nova Scotia. He likewise was prominent in religoius and philanthropic work.

Colonel Edwin A. Stevens, born March 14, 1858, in Philadelphia, died recently in Providence hospital, Washington, where he was serving as shipyard inspector. He was graduated from Princeton University in 1879 with an A. B. degree and took a course in Stevens Institute of Technology, founded by his father, graduating as an engineer. He designed the first screw propeller ferryboat, the BERGEN, which still operates between Hoboken and New York. As a marine engineer he was vice president of the American Society of Mechanical Engineers and held that office in the Society of Naval Architects and Marine Engineers.

Harry B. Barren, blast furnace superintendent for the Inland Steel Co., Indiana Harbor, Ill., died recently at his home there following a sudden attack of pneumonia. He was graduated from Case School of Applied Science, Cleveland, in 1910, and became gas chemist and efficiency engineer with the National Tube Co., Lorain, O. Later he was appointed assistant superintendent of blast furnaces for the Inland Steel Co., and subsequently was promoted. Mr. Barren was the son of Henry A. Barren, general superintendent of the Pittsburgh, Donora and Cleveland districts for the American Steel & Wire Co.

Price Regulation

Is Not Expected by the Producers of Refractories

Producers of refractories did not from the outset believe that the government proposed to fix prices for their products and they now understand that it will not be done. They say present prices are now under levels that are justified in view of the high costs of raw materials they use with prospects of additional expenses of production. It also is pointed out that prices have not been increased since the United States went to war. Conditions of the industry have caused loss of production and therefore heavy overhead costs have resulted. This is due to a shortage of cars and railroad embargoes. Extreme difficulty is being experienced in obtaining shipments of lime and sand and of making shipments from their plants.

Makers are considerably behind in deliveries and can take but little new business. Demand continues to be active. At the annual meeting in Chicago on March 7-8 of the Refractories Manufacturers' association, all the officers were re-elected as follows: President Porter S. Kier, the Kier Fire Brick Co., Pittsburgh; Vice President E. M. Allen, American Refractories Co., Chicago; Treasurer J. H. Cavender, Chicago Retort & Fire Brick Co.; Secretary Frederic W. Donahoe. The association will continue its association with the Mellon institute.

Demand for refractories in northern Ohio meets with only partial satisfaction, as the car situation still continues acute, even for those plants working on government orders. During the early part of the month it was reported that some plants were receiving only 10 per cent of their required number of cars. At the present time it is reported that about 30 per cent of the cars asked for are set. This is an improvement, but small in view of the fact that orders for refractories have been accumulating during the entire car shortage. Those concerns having a stated consumption have ordered repeatedly, but have been obliged to draw continuously on their reserves. The price consideration does not enter into the question of refractories at the present time.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.	
(First Quality)	
Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00
FIRE CLAY BRICK	
(Second Quality)	
Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00
SILICA BRICK.	
Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00
MAGNESIA BRICK	
(Per Net Ton)	
9 x 4½ x 2½	$135.00 to 160.00
CHROME BRICK	
(Per Net Ton)	
9 x 4½ x 2½	$135.00 to 140.00
BAUXITE BRICK	
(Per Net Ton)	
55 per cent	$40.00 base
76 per cent	100.00 base

Opens Branch Office

To continue its policy of expanding and increasing the field of its activity when necessary to meet demands, the Latshaw Steel & Metal Products Corp., New York City, recently opened a branch office in Chicago in the Railway Exchange building. Marvin White Singer, who was graduated from Lehigh University as a mechanical engineer and who has been affiliated with the Bethlehem Steel Co., the Pennsylvania Railroad Co., and the Pullman Co., has been placed in charge. The Latshaw company contemplates opening other branch offices at Pittsburgh, Philadelphia, etc., in the near future.

Building New Plant

The Peerless Foundry Co., of which C. Howard Hook is president, has begun the erection of a plant at Latrobe, Pa. The first building will cover 80 x 375 feet and will be equipped to produce a full line of low pressure gas and coal cast iron boilers. The company is expected to begin operation shortly after July 15. All of the machinery for the plant has been purchased and after it has been completed the company will have a first class equipped foundry and machine shop. The general office of the company is located at Pittsburgh.

Start Coke Plant

Approximately 500 tons of coal are being coked each day, producing 3,000,000 cubic feet of gas along with the usual by-products at the plant of the Chattanooga Coke & Gas Co., Chattanooga, Tenn., since 24 new Semet-Solvay ovens have been placed in operation. About 5000 gallons of coal tar are produced daily and 150 tons of ammonium sulphate monthly.

Strong Demand

Suddenly Develops in Solvent Naphtha—Toluol Supply More Adequate

New York, March 23.—The work of the committee of the war industries board in co-ordinating the toluol requirements has reached a stage where it is regarded as assured that supplies may be set aside soon for ordinary commercial uses. Producers figure that by July there will be enough toluol to go around. These optimistic views are due largely to the increasing output resulting from improved traffic conditions. Demand for benzol generally has broadened. Pure benzol is quoted at 35 to 40 cents per gallon. This level may be shaded on large orders.

The most surprising development in the coal tar products market is the greatly improved demand for solvent naphtha. Up to a couple of months ago purchasers were few and prices sagged. Large sales now have been made and demand is further increasing while stocks have been reduced to a minimum. The largest producers are not quoting. The market continues largely nominal, at 18 to 22 cents per gallon.

Business in phenol comprises occasional spot lots at 53 to 55 cents per pound. Producers continue to refuse to quote on contract requirements. Both the United States and French governments would place orders for 500,000 to 750,000 pounds per month, were additional quantities to be had.

Consumers of sulphate of ammonia are showing considerable interest in their requirements over the coming year. They would like to place contracts which will assure them of their pro rata share of the surplus after the government's needs are supplied.

Coke Oven By-Products

Spot	
Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	(nominal)
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Naphthalin	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia (nominal)	$5.40 to 5.50
Contract	
Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Dividing Steel in Great Britain

Country is Split Up Into Six Producing and Consuming Districts in Charge of Superintendents Who Arrange Rollings of Mills in That Territory—Light Plates Are Standardized

OWING to the confusion and the lack of exact knowledge which has seemed to surround the British method of distributing steel supplies, the ministry of munitions has published recently a detailed explanation of the form and operations of the system. Because the demand for steel is far in excess of the possible supply, and in order to insure the delivery of available material as early as possible, it has been made necessary the ministry points out, to organize a system of control over mill rollings.

The country has been divided into six areas, each of which has been placed in charge of a steel superintendent who represents the admiralty and the ministry of munitions. One of his chief functions is to advise and assist industries located in his area to obtain the steel needed by them for authorized purposes. The industries requiring supplies must consult with him and follow his directions. The six areas with their steel superintendents follow: Scotch, G. P. West; North-East Coast, H. J. Eastcott; Sheffield, H. A. Clift; Manchester, W. H. Jago; Birmingham, C. Wallis; South Wales, T. J. Rogers. The accompanying map illustrates the boundaries of these areas.



MAP SHOWING LOCATION AND AREA OF GREAT BRITAIN'S SIX DISTRICTS FOR REGULATING STEEL REQUIREMENTS

The rolling schedules at the principal works are arranged by the steel superintendent in consultation with committees selected from the district, and composed of representatives of the principal mills. It follows that the steel superintendent, who is in constant communication with his colleagues in the other districts, is in a position to give authoritative information as to the prospects of obtaining material. To facilitate a rapid and systematic schedule of rolling, a list of standarized sections has been drawn up and published for information. If industries confine their requirements for sections to the list in question, the ministry states there should rarely be any delay in obtaining supplies necessary to enable work to proceed with promptitude. The needs of the various services and the country generally have been carefully estimated, and the available supplies have been allocated pro rata thereto. In order to insure supplies reaching their allotted destination, statistical returns are regularly received from all manufacturers. These give particulars of deliveries to the various customers, and, in order to enable these returns to be utilized, a system known as "prefix lettering" for orders has been instituted. These letters indicate the service for which the steel is to be used, and it has been ruled that no order be entered or executed unless it bears the lettering followed by the admiralty or ministry of munitions priority or permit reference. All material destined for admiralty purposes, including every type of floating craft, is dealt with under admiralty prefix lettering and contract or permit number. All remaining services are dealt with under ministry of munitions prefix lettering and contract or permit numbers or references.

Where a main contractor receives a contract which it is necessary to sublet,

(*Concluded on page* 813)

Taxes Cut Corporation's Earnings

Allowance of Approximately Quarter Billion, Set Aside for Federal Taxes, Exceeds Balance Remaining for Dividends—Output Decreases Despite Additions to Capacity—Two New Shipyards Under Construction

CHANGED conditions under which the steel industry operated during 1917 are clearly reflected in the sixteenth annual report of the United States Steel Corp., covering the year ending Dec. 31, 1917. The report has just been made public. Gross earnings for the year were $1,683,962,552, compared with $1,231,473,779 in 1916, an increase of $452,488,773. The amount available for dividends was $224,219,565, compared with $271,531,730 in 1916. The regular dividends of 7 per cent on the preferred stock and 5 per cent on the common were paid in 1917, but an extra of 13 per cent was paid in the common, compared with an extra of 3¾ per cent in 1916. An estimated allowance of $233,465,435 was made to cover federal income, war income and excess profits taxes for the year.

Production of the wide variety of products turned out by the corporation generally showed slight declines. The total production of ingots dropped from 20,910,589 tons in 1916, to 20,285,061 tons in 1917. Blast furnace output fell off from 17,607,637 tons in 1916, to 15,652,928 tons in 1917. The output of cement increased from 10,425,600 barrels in 1916, to 10,917,000 barrels in 1917.

Chairman E. H. Gary, in the annual report, says:

"The large demand for iron and steel products which existed during 1916 continued during the year 1917. This was increased after the entrance of the United States into the European war, especially for certain lines of products required for the war program. These demands largely exceeded the producing capacity of the manufacturers and, because of the largely increased cost of labor, raw material and supplies, the prices for steel products advanced materially.

"Two general advances in wage rates of employes of 10 per cent were made on May 1 and Oct. 1, respectively. These followed three increases in 1916, each of substantially the same percentages, and resulted in making the wage rates in effect at close of the year 65 per cent above the rates prevailing at the close of 1915 in the case of unskilled labor and an average of 58 per cent higher in respect of all employes. In December, 1917, the average earnings per employe per day of all the employes, exclusive of the administrative and selling force, was $4.60; and of the total, including the administrative and selling staff, $4.65.

"The smallest number of employes in the service of the corporation and its subsidiary companies during the year in any month was 250,836, and the higest number 277,526. The average number employed during the entire year and the total payroll in comparison with results for 1916 were as follows:

Average number of employes during the entire year: 1917, 268,058; 1916, 252,668; increase, 15,390; per cent, 6.1. Total amount of payrolls: 1917, $347,370,400; 1916, $263,385,502; increase, $83,984,898; per cent, 31.9.

"During the year 11,486 employes of the United States Steel Corp. and its subsidiary companies entered the regular war service of the United States.

"At Dec. 31, 1917, the tonnage of unfilled orders of the subsidiary companies was 9,381,718 tons of rolled steel products, a decrease in comparison with Dec. 31, 1916, of 2,165,568 tons. The conditions prevailing in respect of governmental regulation of prices, priority orders on production and the demand for war purposes directly and indirectly of a large percentage of the output of the mills,

PRODUCTION OF RAW, SEMIFINISHED AND FINISHED PRODUCTS BY SUBSIDIARIES OF THE UNITED STATES STEEL CORP. IN 1917 AND 1916

Products	1917 Tons	1916 Tons
IRON ORE MINED:		
In the Lake Superior Region		
Mesabi Range	23,806,268	24,928,039
Vermillion Range	1,039,807	1,314,002
Gogebic Range	2,197,554	2,369,460
Menominee Range	1,120,382	996,983
Marquette Range	491,760	647,132
In the Southern Region		
Tennessee Coal, Iron & R. R. Co.'s Mines	3,125,998	3,099,553
Total	31,781,769	33,355,169
LIMESTONE QUARRIED	6,494,917	7,023,474
COAL MINED:		
For use in the manufacture of coke	24,554,525	26,606,041
For steam, gas and all other purposes	6,942,298	6,162,340
Total	31,496,823	32,768,381
COKE MANUFACTURED:		
In Beehive Ovens	11,177,247	12,479,160
In By-Product Ovens	6,284,428	6,422,802
Total	17,461,675	18,901,962
BLAST FURNACE PRODUCTION:		
Pig iron	15,460,638	17,412,049
Spiegel, ferromanganese and ferrosilicon	192,290	195,588
Total	15,652,928	17,607,637
STEEL INGOT PRODUCTION:		
Bessemer ingots	6,405,390	7,273,766
Open-Hearth ingots	13,879,671	13,636,823
Total	20,285,061	20,910,589
ROLLED AND OTHER FINISHED STEEL PRODUCTS FOR SALE:		
Steel rails (heavy and light tee and girder)	1,594,196	1,533,681
Blooms, billets, slabs, sheet and tinplate bars	1,692,348	1,881,526
Plates	1,473,625	1,332,262
Heavy structural shapes	1,004,537	1,029,682
Merchant bars, hoops, skelp, light shapes, etc	2,650,970	2,715,277
Tubing and pipe	1,234,129	1,338,892
Wire rods	267,071	278,197
Wire and wire products	1,821,985	2,004,494
Sheets (black and galvanized) and tinplates	1,740,949	1,786,642
Finished structural work	550,744	557,953
Angle splice bars and all other rail joints	207,846	277,271
Spikes, bolts, nuts and rivets	91,980	95,096
Axles	220,291	173,530
Steel car wheels	110,014	107,167
Sundry steel and iron products	282,226	349,122
Total	14,942,911	15,460,792
Spelter	67,418	55,898
Sulphate of iron	43,942	46,263
Universal Portland cement, bbls	10,917,000	10,425,600

naturally interferes with forward buying by customers.

"The output of the properties and plants of the subsidiary companies in 1917 did not quite reach the record figures of the previous year, notwithstanding additions and extensions completed and placed in operation increased somewhat the capacity. The decrease in production and output in 1917, compared with 1916, is attributable principally to inability to secure sufficient employes to fully man the plants and to the lack of ample transportation service to furnish the plants with necessary raw materials and supplies."

Expenditures in 1917 by all subsidiary companies for maintenance, renewals, including blast furnace relining, amounted to $92,624,329, compared with $69,392,627 iu 1916. Aggregated charges from gross earnings to cover exhaustion of minerals and deterioration amounted to $136,057,605, compared with $104,576,379 in 1916, an increase of 30.1 per cent. Taxes levied against the Corporation and subsidiaries, exclusive of federal income and excess profits taxes, amounted to $18,800,260, in comparison with $16,907,712 for 1916. The estimated allowances of $233,465,435 for federal income, war income and excess profits taxes compares with $9,692,009 allowed for federal income tax in 1916.

Inventory valuations as of Dec. 31, 1917, showed a general increase compared with valuations at the close of the preceding year as follows:

	Dec. 31, 1917	Dec. 31, 1916
Ores—iron, manganese and zinc	$66,536,015	$50,021,287
Pig iron, scrap, ferro and spiegel	16,563,857	18,581,072
Coal, coke and other fuel	6,768,898	4,168,595
Pig tin, lead spelter, copper, nickel, aluminum and dross and skimmings	15,318,114	10,415,759
Limestone, fluxes and refractories	5,646,067	3,904,814
Rolls, molds, stools, annealing boxes, etc.	12,456,223	7,814,775
Manufacturing supplies, stores and sundry items not otherwise classified	36,019,562	23,908,526
Ingots—steel	2,947,003	1,930,101
Blooms, billets, slabs, sheet and tin plate bars, etc.	13,683,437	11,659,281
Wire rods	1,223,347	893,491
Skelp	1,685,362	1,566,349
Finished products	33,545,964	30,612,642
Mining supplies and stores (for ore and coal properties)	7,768,634	4,083,029
Railroad supplies and stores	9,651,450	5,941,113
Merchandise of supply companies	1,333,388	962,945
Material labor and expense locked up in bridge and structural contracts	$47,357,922	
Less, bills rendered on account	41,614,031	
	5,743,891	4,265,981
Stocks abroad and on consignment	8,376,794	9,738,287
Material in transit	8,670,750	4,957,751
Total	$253,938,756	$195,425,798
Less, reserve for account of actual cost or market value of stocks in excess of normal prices therefor	30,270,670	13,524,794
Balance	$223,668,086	$181,901,004

The expenditures for 1916 for acquisition of additional properties, new plants and for extensions and construction, including mine develop- aggregated $117,977,118.

The average number of employes during 1917 was 268,058, compared with 262,668 in 1916. Employes were distributed as follows:

Employes of	1917 Number	1916 Number
Manufacturing properties	198,711	187,289
Total salaries and wages		
Coal and coke properties	26,189	25,143
Iron ore properties	13,198	12,624
Transportation properties	26,210	24,189
Miscellaneous properties	3,750	3,423
Total	268,058	252,668
Total salaries and wages paid	$347,370,00	$263,385,502
Average salary or wage per employe per day:		
All employes, exclusive of general administrative and selling force	$4.10	$3.29
Total employes, including general administrative and selling force	4.16	3.36

Domestic shipments in 1916 showed a loss of 0.4 per cent, not including cement, which decreased 4.3 per cent. Export shipments decreased 12.3 per cent.

The new construction program in 1917, in addition to the work carried out at the various steel plants, was marked by the entrance of the Corporation into the shipbuilding field. Two yards are under construction, one on the Hackensack river, near Newark, N. J., and one on the Chickasaw river, near Mobile, Ala. Both yards will have 10 shipways. The New Jersey plant will complete 10 ships this year. Extensive improvements are being made at the Fairfield works in the Birmingham, Ala., district, to permit the fabrication of the steel required at the new Mobile ship plant.

CORPORATION ACCOUNT, UNITED STATES STEEL CORP., FOR FISCAL YEARS ENDING DEC. 31, 1917 AND 1916

COMPARATIVE INCOME ACCOUNT
For the Fiscal Years Ending Dec. 31, 1917 and 1916

	1917	1916	+Increase —Decrease
EARNINGS:—Before charging interest on bonds and mort. of subsid. comps.:			
First quarter	$78,994,371.04	$63,110,720.27	+$15,883,650.77
Second quarter	90,592,701.88	83,501,065.24	+ 7,091,636.64
Third quarter	73,007,297.57	88,159,733.30	— 15,152,435.73
Fourth quarter	61,567,101.04	108,225,573.63	— 46,658,472.59
Total for year	*$304,161,471.53	$342,997,092.44	—$38,835,620.91
Less, interest on outstanding bonds and mortgages of the subsid. companies.	8,869,291.50	9,422,914.94	— 553,623.44
Balance of earnings	$295,292,180.03	$333,574,177.50	—$38,281,997.47
Less, charges and allowances for depreciation applied as follows, viz.:			
To deprec. and extraord. replacem't funds and sink'g f'ds on bonds of sub. cos.	43,296,038.26	32,762,072.38	+ 10,533,965.88
To sink. funds on U. S. Steel Corp. bds.	7,257,233.41	6,785,540.27	+ 471,693.14
Net income in the year	$244,738,908.36	$294,026,564.85	—$49,287,656.49
Deduct:			
Int. on U. S. Steel Corp. bonds outstdg.	21,256,303.17	21,602,852.90	— 346,549.73
Premium paid on bonds redeemed, viz.:			
On subsid. cos. bonds	117,914.50	146,277.11	— 28,362.61
On U. S. Steel Corp. bonds	745,933.69	870,673.57	— 124,739.88
Balance	$222,618,757.00	$271,406,761.27	—$48,788,004.27
Add: Net bal. of sundry charges and cred., incld. adjust. of various acccounts	1,600,807 54	124,969.11	+ 1,475,838.43
Balance	$224,219,564.54	$271,531,730.38	—$47,312,165.84
Dividends on U. S. Steel Corp. stocks, viz.:			
Preferred, 7 per cent	25,219,677.00	25,219,677.00	.....
Common, (1917, regular 5 per cent, extra 13 per cent; 1916, regular 5 per cent, extra 3¾ per cent)	91,494,450.00	44,476,468.75	+ 47,017,981.25
Net income	$107,505,437.54	$201,835,584.63	—$94,330,147.09
Less, appropriated from net inc., on acct. of expend. made and to be made on authorized approp. for add. prop., new plans and construction	55,000,000.00	.....	+ 55,000,000.00
Balance carried to undivided surplus	$52,505,437.54	$201,835,584.63	—$149,330,147.09

*Balance of earnings after making allowances for estimated amount of Federal income and war excess profits taxes.

Henry Potts & Co., 650 Real Estate Trust building, Philadelphia, have recently purchased the entire electrical equipment of the power house of the Reading Transit & Light Co., Collegeville, Pa. It is their intention to begin dismantling at an early date.

The Lutz Co., Inc., Philadelphia, has taken over the Joseph Pedrick Foundry Co., Camden, N. J., which operates a gray iron foundry.

War Center

Being Established at Pittsburgh to Speed Up Production

Pittsburgh is being made into one of the important war centers of the country and the necessary organization to that end now is being carried out. To study problems of individual plants and possibly to work out scientific systems of operation, a corps of industrial experts numbering approximately 400 instead of the 100 originally proposed is being assembled by the government. This corps will assist Ralph M. Dravo, of the Dravo Contracting Co., who recently was appointed head of the Pittsburgh office, production division of the munition district established by the war department.

The ordnance work has been divided into three departments and the following commissioned heads have been named: Maj. Edgar A. Custer, chief of inspection section; Maj. H. H. Scovil, chief assistant to Mr. Dravo, head of production section, and Lieut. Samuel Goodacre, chief of finance section. Others are being added daily. Capt. Harold Bope, son of Col. H. P. Bope, first vice president and general manager of sales of the Carnegie Steel Co., is Major Custer's chief aide, and Capt. H. C. Armstrong, formerly of the navy department, also is on the inspection division. The main purpose of this organization is to expedite production. The finance division is authorized to proceed promptly with payments on certain war contracts and Lieutenant Goodacre's checks on the United States treasurer will be the first issued through divisional headquarters. In this way delayed payments will be reduced to a minimum.

Pittsburgh likewise has been made a controlling center of airplane metal and other materials. The equipment division of the signal corps in charge of Capt. G. L. Norris and William Frew Long in the Keenan building, has sent out calls for 200 experienced inspectors, chemists, testing engineers, metallurgists, metallographists, machisists, etc. Captain Norris is district manager of equipment and chief metallurgist of the equipment division of the United States signal corps. The Pittsburgh testing laboratory has been leased for the duration of war and will be in charge of Captain Norris, with Dr. H. T. Beans as chief chemist and Prof. J. S. Macgregor chief of physical tests.

Additions to its facilities for hot tinning of gray and malleable iron, steel and brass stampings, etc., have been made by the New Standard Hardware Works, Mount Joy, Pa., much new equipment being installed. M. A. Rollman is president of the concern; C. J. Schiemer, vice president, and E. E. Roller is secretary and treasurer.

Has Large War Orders

The J. G. Brill Co., Philadelphia, in its report for 1917 shows total income of $7,706,199, an increase of $1,525,204 over 1916. The balance available for dividends was $904,189, equal to $19.74 a share earned on the $4,580,000 preferred stock, compared with $2 in 1916. President Samuel M. Curwen, in his remarks to stockholders, says the company has large orders from the government for army field equipment, including car and truck orders. In order to assist in the airplane program, the Wason plant of the company at Springfield, Mass., has been devoted to airplane manufacture since the latter part of 1917. Work on hand Feb. 6, including airplane orders, amounted to more than $20,000,000.

Sold Up For 1918

Chairman J. Frater Taylor, of the Lake Superior Corp., in a letter to stockholders, says: "Practically the entire steel output for 1918 is now sold. The unfilled orders on hand Dec. 31 represent 437,951 tons. Adequate supplies of raw materials are now on hand. Enough coal has been secured to carry through until navigation opens. Blast furnace operations were interfered with during December. We believe, however, that in respect of these conditions we fared better than many other similar plants and we are pleased to report the situation now is improving."

Providing Steel in Great Britain

(*Concluded from page* 810)

it is imperative that his sub-orders, and those of all sub-contractors, etc., should bear the prefix lettering and reference allotted for the main contract. The intention is that as far as practicable every area should be self-supporting, that is, firms within an area should obtain their supplies of steel from manufacturers in their area. It is particularly necessary says the ministry that firms outside Scotland should not obtain materials from that area and vice versa.

In view of the vital importance of shipbuilding it is necessary that rolling mills producing large size plates should be employed for that industry alone. It is considered necessary that the capacity of what are known as "re-rollers," that is, mills which purchase semi-finished material for rolling, should have their capacities utilized to the utmost possible extent. Such firms produce plates and sheets limited in size and area, and it has been found necessary to adopt, as far as practicable, standard sizes of light plates to meet their technical difficulties. Such standard sizes are—plates, 8, 10 and 12 feet long by either 3, 3.6 or 4 feet wide, in thicknesses of ⅛, 3/16 and ¼ inches. Consumers are recommended to employ these plates wherever practicable in their designs even although a certain amount of increased cost and workmanship is involved in so doing. Much of the difficulty and delay which has been experienced in obtaining supplies of thin and light plates the admiralty believes will be removed by the methods it has adopted.

Install Reduction Unit

A demonstrating plant for the reduction of ores by the Lockwood electrolytic process will be installed at Spokane, Wash. It will have the rating of 10 tons and is expected to be in operation within 60 days. M. C. Knowles, of London, is in charge of the enterprise. A 2-ton plant also for demonstrating purposes has been in operation in New Jersey. Mitsui & Co. are reported to have contracted to use this process of reduction in their properties in Japan and China.

Acquires Mill Site

The United Steel Co., which contemplates the erection of a rolling mill at Everett, Wash., is making preparations for active construction. A four-acre site has been secured for the plant with options on unlimited area. Head offices have been established at 2829 Rockefeller avenue. J. Johnson, general superintendent, has left for the east to secure machinery and equipment.

Converts Blooming Mill

The Penn Seaboard Steel Corp. recently purchased a 34-inch, 2-high blooming mill, originally made for the Chattanooga Steel Co., but never installed. It has converted this into a 2-high, 84-inch plate mill, which it is installing at its Baldt Works, New Castle, Del.

The Bethlehem Steel Co. is relining its Lebanon "A" stack, which was blown out on Feb. 14.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

War Frames Policies of All Industries

THE pamphlet report of the year 1917 shows graphically the Bethlehem Steel Corp. for the extent to which Bethlehem and its subsidiaries are contributing to the preparation of the United States for war. At the close of the year the company had unfilled orders of $453,800,000, of which total its shipbuilding subsidiary held $273,000,000. On Jan. 1, 1914, the company had on its books orders amounting to only 5 per cent of total on hand Jan. 1, 1918, making it apparent that the plants of the corporation now are taxed to capacity.

Chairman Charles M. Schwab and President Eugene G. Grace, in a jointly signed statement, told stockholders that plant extensions not considered vital to the production of material for the government had been postponed or cancelled. This statement said in part:

"The entry of the United States into the war has caused a profound change in the policies and business methods of all industrial concerns. The demands of the government for materials and products necessary for the prosecution of the war, the adoption of the policy of government control of prices, and the operation of war revenue measures have compelled radical changes in plans for extensions and financing. Such plant extensions as have not been considered vital to the production of materials for government use, have been cancelled or postponed, and every effort has been made to concentrate upon the absolute essentials needed for the prosecution of the war. The maintenance of earnings before deducting federal taxes at approximately the figures of the previous year, notwithstanding regulated selling prices of prices and unregulated higher costs of wages and of many raw materials which have resulted in decreased percentage of profit, have been in large measure due to the increased volume of business. In common with all other large interests we have gladly subscribed to the price-fixing policy adopted by the government; and while many inequalities exist in the application of the details of the policy, we are hopeful that they will eventually be adjusted. The adoption by the government of the 'cost plus' and 'cost fee' methods of determining the contract price has presented difficulties in application and interpretation, but they have not been permitted to delay the progress of the work in hand.

"The government has recognized the inability of corporations to command, in competition with it, the capital necessary for executing its war orders, and both the army department and the navy department have assisted to a large extent in financing such orders. Except for this assistance, it would have been impossible for your corporation to have undertaken all the work required from it by the government."

The company paid bonuses to officers and heads of departments in 1917 amounting to $3,913,833.50, the percentage of this sum to the total net earnings of the corporation being 7.96 per cent. The number of men employed during the year was 64,782, compared with 47,013 in 1916, while the payroll was $83,978,312, against $51,499,773. The balance sheet showed assets and liabilities of $381,541,940, current assets amounting to $153,919,965, of which raw materials and contracts in progress comprised about $71,051,937. The company's comparative income accounts for the year 1917 and 1916 is shown below.

	——1917——		——1916——		
	Amount	Per cent	Amount	Per cent	Increase
Gross sales and earnings	$298,929,530	100.00	$216,284,555	100.00	$82,644,975
Mfg. cost, oper. expense, etc.	234,437,464	78.43	151,278,301	69.94	83,159,163
Taxes	13,489,293	4.51	4,913,702	2.27	8,575,591
	$247,926,758	82.94	$156,192,004	72.21	$91,734,754
Manufacturing profit	51,002,772	17.06	60,092,551	27.78	*9,089,779
Interest, divs. and other income	2,976,587	1.00	1,624,758	0.75	1,351,829
Total net earnings	$53,979,360	18.06	$61,717,309	28.53	*$7,737,949
Interest and discount on bonds, mortgages, etc.	8,746,982	2.93	3,772,555	1.74	4,974,426
Balance	$45,232,377	15.13	$57,944,753	26.79	*$12,712,376
Depreciation and depletion	17,911,640	5.99	14,350,785	6.63	3,560,854
Net income	$27,320,736	9.14	$43,593,968	20.16	*$16,273,231

*Decrease.

The net earnings from operations, after deducting expenditures for ordinary and extraordinary supplies and maintenance, for the years 1905 to 1917, inclusive, follow:

1905	$3,622,475.50
1906	2,011,368.34
1907	2,642,178.07
1908	2,196,172.04
1909	2,993,536.31
1910	4,524,141.30
1911	4,792,713.53
1912	5,114,439.98
1913	8,752,671.44
1914	9,649,667.71
1915	24,821,408.25
1916	61,717,309.58
1917	53,979,360.08
	$186,817,442.13

Virginia Company Clears Yards of Pig Iron

In his statement to stockholders, accompanying the fifteenth annual report of the Virginia Iron, Coal & Coke Co., Roanoke, Va., President John B. Newton says: "We feel that the results obtained in the pig iron department deserve especial mention by reason of the fact that on July 1, 1916, there were stocked on your furnace yards 19,254 tons of pig iron and that at the close of this year, Dec. 31, 1917, your furnaces had produced more pig iron than ever before in the history of the company for a like period, and in spite of labor and car shortages, embargoes, etc., every ton of iron made had been shipped and the stock on hand reduced to 1691 tons."

With a change in the fiscal year to Dec. 31, no statement was issued as of June 30, 1917, and the report gives the net profit from operations

for the year ended on that date as $1,024,364, with net profits for the six months period ended Dec. 31, 1917, as $873,179, a total gain for the 18 months of $1,897,543. In the 18 months the debit to profit and loss was reduced $1,736,992, bills payable $1,187,225 and bonded indebtedness $594,000.

In the 18 months 2,686,723 tons of coal were mined and 597,232 tons of coke and 345,508 tons of pig iron were manufactured. The tonnages of coal and pig iron shipped were 1,690,653 and 372,738 respectively. Coal used in manufacturing coke totaled 996,070 tons while the coke consumed in the manufacture of pig iron was 598,823 tons.

Total receipts from operations were $13,129,239, while operating expenses were $10,138,045 in the 18 months, leaving gross profit of $2,991,194 from which overhead charges, interest on bonds, taxes, etc., of $1,093,650 were deducted, leaving $1,897,543 as the net profit. The income account follows:

	6 mo. end. Dec. 31, '17	Year end. June 30, '17
Inc. from oper., etc...	$5,314,324	$7,675,856
Operating expenses....	4,030,504	6,107,542
Net receipts	$1,283,820	$1,568,314
Other income	53,429	85,630
Total income	$1,337,249	$1,653.944
Tax., int.. all oth. chg.	464,070	629,580
Net profit	$873,179	$1,024,364

Bliss Earnings Drop

In the annual report of the E. W. Bliss Co., New York, the net earnings, after deduction for federal taxes and depreciation, are given as $2,339,295. In 1916, they were $10,565,321. After preferred dividends, the balance of earnings for the $1,250,000 common stock ($50 par value) was equal to $89.57 a share, as against $418.61 a share in 1916, and $217.28 in 1915. The comparative income account of the company follows:

	1917	1916
Net earnings	†$2,339,295	$10,565,321
Preferred dividends....	100,000	100,000
Balance for common..	2,239,295	10,465,321
Common dividends.....	625,000	4,093,750
Surplus	1,614,295	6,371,571
Prem. on bonds retired	.....	74,880
Surplus for year.....	1,614,295	6,296,691
Previous surplus	13,721,839	7,425,148
Total surplus	15,536,134	13,721,839

†After provision for depreciation and federal taxes.

Allis-Chalmers' Gain Big

For the year ended Dec. 31, 1917, the Allis-Chalmers Mfg. Co., Milwaukee, gives its total sales as $26,129,317, as against $19,440,509. After all deductions, including $1,298,300 for federal taxes, the net earnings were $4,010,490, equal to $24.74 a share on $16,206,700 preferred outstanding stock, as against $3,165,020, or $19.18 per share. Surplus for the year amounted to $2,392,115 as compared with $1,738,565 in 1916. A comparative income account follows:

	1917	1916
Sales billed	$26,129,317	$19,440,509
Costs, etc.	19,144,107	14,699,744
Manufacturing profits..	5,078,946	2,902,312
Net profit	5,308,790	3,165,020
Federal taxes	1,298,300	.....
Balance	†4,010,490	3,165,020
Preferred dividends....	*1,618,375	1,426,455
Surplus for year.....	2,392,115	1,738,565
Profit and loss surplus	5,463,604	3,071,488

*Consists of 7 per cent regular preferred dividends and 3 per cent on account of dividends in arrears.

†Equal to $24.74 a share on $16,206,700 preferred outstanding, compared with $19.18 a share earned in 1916.

A copy of this report has been filed with the New York stock exchange in connection with the company's application for listing additional preferred and common stock.

Cambria Steel Co. Profits Exceed Par Stock

The Cambria Steel Co. in 1917 reports profits for 1917 in excess of its outstanding capital stock, before deduction for depreciation and federal taxes. The total net income was $47,121,669, which is more than $2,000,000 over the par of the stock and an increase of $19,610,000 over 1916. The balance of $25,721,853 after allowance for taxes and other charges equaled 57 per cent on the stock, about the same as in 1916. There was $3,996,700 reserved for depreciation, or about twice the amount of this item in 1916 and the $17,264,396 estimated war income and excess profits taxes represented 35 per cent of the net. The Midvale Steel & Ordnance Co. owns about $43,753,400 worth of the $45,000,000 stock outstanding and dividends from Cambria amounting to about $5,400,000 went into the Midvale treasury, excepting about $160,000. These dividends were equal to about 11 per cent on the stock. The surplus of $20,321,853 stood out powerfully in contrast with the deficit of $289,010 in 1914. In 1916, the net earnings were $27,511,794, dividends of $3,037,500 were paid and a surplus of $22,056,853 remained.

Explains Hog Island

The annual report of the American International Corp. for 1917 was largely given over to a detailed explanation of the Hog Island shipyard undertaking by President Charles A. Stone. The report recites the history of the company from the time it was organized to promote America's foreign trade, until the present, when the corporation has under way the most gigantic shipbuilding project of modern times. During the year the company paid $1,574,175 in dividends against $375,000 in 1916. The sum of $375,000 was reserved for taxes, as compared with a similar reserve of $521,810 in 1916. The Hog Island operation is reflected in the balance sheet with an item of $1,732,582 representing real estate investment in the shipyard site. The comparative income account follows:

	1917	1916
Interest, dividends & earnings	$6,830,394.46	$3,839,876
Interest	102,776.00	.....
Taxes	403,761.00	447,655
Other expenses	2,577,733.00	908,277
	3,084,272.29	1,355,933
Net earnings	$3,746,122.17	2,483,943
Surp. Dec. 31, 1916..	1,923,539.43	19,023
Gross surplus	$5,669,661.60	$2,464,919
Dividends	1,574,175.00	375,000
Chgs. and adjustm'ts	587,973.26	166,379
	2,162,148.26	541,379
Surplus Dec. 31, 1917	$3,507,513.34	$1,923,539

Surplus is Raised

Net earnings of the New York Shipbuilding Corp., subsidiary of the American International Corp., for the year 1917, amounted to $1,753,099, of which $963,914 represents profits on the company's shipbuilding operations, and the balance from various external operations. The whole amount was added to the company's previous surplus of $38,390, bringing the total surplus as of Dec. 31 to $1,791,449. The present company was incorporated Nov. 29, 1916, to take over the entire assets of the old New York Shipbuilding Co., and consequently 1917 was its first full business year. Its plant is engaged in government work, principally large warships and destroyers for the navy.

Wheel Earnings Good

With $250,000 reserved for income and excess profits taxes, the Griffin Wheel Co., Chicago, reports that its net profit for 1917 was approximately $1,100,000. Prices on its product have not been raised between 1884 and January, 1917, except in 1907, when the advance was later reduced to normal. Last year increased costs made a raise obligatory. At the close of business, Dec. 31, 1917, Griffin Wheel had net quick assets of over $6,000,000, of which $1,007,000 was cash and $1,500,000 United States government and state securities. While still following its policy of always paying one year's dividends out of the previous year's earnings, Griffin Wheel Co., in order to clear up its surplus account in preparation for taxes, will on March 1 anticipate its semiannual dividend of 3½ per cent on the 92,820 shares of common stock outstanding, due Sept. 1, and pay a full year's dividend calling for $649,740 out of the past 12 months' operations.

Recently the Westinghouse Electric & Mfg. Co., Pittsburgh, effected the lease of the Baxter Stove Co.'s property at Mansfield, O. Here it will consolidate the manufacture of heating appliances carried on elsewhere.

Small Lot Inquiries Predominate

Steady Demand is Noted in All Centers for Single Machines and Small Lots —Heavy Ordnance Contracts Are Expected to Furnish Large Requirements—Brazil Will Make Munitions

INQUIRIES for small lots of tools continue to come out steadily. Few large requirements are in sight, although increased production of heavy ordnance both for the navy and army is contemplated and the present facilities for this manufacture are to be expanded rapidly. Some provisional inquiries in the central and western districts for heavy tools indicate a preparation for heavy gun and gun mount manufacture. Shell orders continue to be distributed principally among those firms which have shown the ability and have the equipment to handle this class of work. Opinion is expressed that the Chicago district will receive a large share of future war contracts, although a wide distribution of awards is assured from Washington. It is said that waterway transportation will be a factor considered in allotting some of the new undertakings.

An awakening knowledge of our shipping situation renders possible the statement that many more shipyards will be projected in the near future, with an accompanying demand for cranes of various classes. Two yards will probably be started soon. They are the Brunswick, Ga., yard of the Southern Shipbuilding Corp. and a plant at Curtis Bay, Md., proposed by the newly organized Curtis Bay Shipbuilding Co. The Carolina Shipbuilding Corp., with temporary offices in New York has been organized to build a new yard at Charleston, S. C. The crane market is slow at present, but indications point to an early revival of inquiries.

Shipping conditions continue to improve, and deliveries are promised within reasonable limits except on a few classes of equipment. Another source of danger to the industry, however, is apprehended by some dealers. The impending shortage of foundry iron is feared as limiting production. A feeling prevails, however, that the situation will be met without injury to the trade, as the necessity is too apparent to warrant any supposition of the government allowing a curtailing of vital machine tool manufacture.

Steady Buying of Small Lots Still Governs

ATTENTION of machine tool builders in the east is being centered more and more on the government's program for increased production of heavy ordnance. At present, aside from government shops, there are practically only three plants in the country with facilities for handling work of this description. As a result huge expansion is believed necessary. However, so far as can be learned, no definite steps have yet been taken in this direction. In the meantime, the comparative lull which has prevailed in the eastern market during the past few weeks continues.

Trading at this time is made up almost entirely of small orders; in fact, little in the way of large buying has taken place since the Singer Mfg. Co. recently closed on tools needed by its Elizabethport, N. J., plant for the manufacture of carriages for 75-millimeter guns. There are, however, a few large lists pending such as the inquiry of the Wright-Martin Aircraft Corp., which came before the market a couple of weeks ago. Another sizable inquiry, although much smaller than that of the Wright-Martin company, is the list issued recently by the Chester Shipbuilding Co., Chester, Pa., involving approximately 70 tools of miscellaneous types.

Brazil Seeks Munitions Tools

A number of tools are expected to be purchased shortly by the Brazilian commission now in New York, although as yet a list has not been issued. The commission recently arrived in this country and is perfecting plans for the establishment of munition works in Brazil for the manufacture of 3, 4 and 6-inch shells; it is also understood a plant will be erected for the manufacture of rifles. It is reported that the Austin Co. has the contract for the construction work involved in these projects.

The government recently has awarded contracts to five companies, two of which are located in the east, one at Albany, N. Y., and the other at Meriden, Conn., for the manufacture of the new 6-inch Stokes-Newton trench mortar bombs. These companies it is understood are inquiring for milling machines and other equipment. The Neptune Meter Co., Long Island City, N. Y., continues to buy miscellaneous tools. The Remington Arms-Union Metallic Cartridge Co. has recently bought 30 to 40 small milling machines, and still is in the market. The Watervliet arsenal has also just closed on some additional equipment.

Industrial Conditions Improve

Industrial expansion in the east continues in fairly good volume. The Barlow Foundry, Inc., Newark, N. J., is doubling the capacity of its gray iron foundry. The Potdevin Machine Co., Brooklyn, has awarded contracts for the construction of a $20,000 machine shop addition. The Buffalo Nipple & Machine Co. contemplates the erection of an addition to its plant. The L. W. F. Engineering Co., College Point, L. I., N. Y., manufacturer of airplanes, is increasing its plant at a cost of about $25,000. The Wisdom Tool & Machine Co., Naugatuck, Conn., also is enlarging its plant.

The Southern Shipbuilding Corp., 17 Battery place, New York City, which has been figuring on the construction of a yard at Charleston, S. C., is understood to have abandoned this project for the erection of a yard at Brunswick, Ga., costing $1,500,000. The company orig-



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Past and present are linked together by the Greek circle as the triumphs of Ancient Greece are reproduced in the successes of Agathon Alloys.

The Ancient Grecians, in art, in sculpture, in sport, even in living, strove toward a goal—perfection—Agathon. Histories, art galleries and museums are filled with evidences of the result.

It is the same high ideal which is the moving spirit in the Central Steel organization. Agathon Steels themselves—the acme of steel making—have been the result.

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SALES OFFICES:

Detroit Office:—326-27-28 Ford Bldg.
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The Hamill-Hickox Co., District Representatives

Chicago Office:—1370 People's Gas Bldg. 122 So. Michigan Blvd.
C. H. Beach, District Sales Manager

Philadelphia Office:—603 Widener Bldg.
Frank Wallace, District Sales Manager

Syracuse Office:—621 University Block,
T. B. Davies, District Sales Manager

J. E. Dockendorff & Co., 20 Broad Street, New York,
General Export Agents

inally had a government contract for 16 vessels of 7500 tons deadweight capacity, and an option on a similar contract. The proposed yard at Brunswick, Ga., will do government work but under an altered agreement. It is stated that bids on equipment will be asked in about three weeks. Locomotive cranes, it is understood, will be used at the ways, while jib cranes will be installed in the plate and angle shops. Another new shipyard to be established in the east will be that of the Curtis Bay Shipbuilding Co., which recently was incorporated with $2,000,000. The yard will be located along Curtis bay, in Maryland, and will be used for the construction of steel vessels. James H. Preston, mayor of Baltimore, is one of the incorporators.

Crane Business is Slow

Competition in the crane market is becoming more strong, as a result of a continued lull. Sellers, particularly those dealing in electric travelers, report few new inquiries, although a fair amount of business is pending. At present, the General Electric Co., Schenectady, N. Y., is inquiring for a 20-ton electric crane for export. Markt & Hammacher, 193 West street, New York, are asking prices on a foundry crane for shipment to Spain. The New York Air Brake Co. is in the market for a 5-ton electric crane with a 47-foot span. Fox Brothers & Co., 126 La Fayette street, New York, are inquiring for four electric cranes, ranging from 15 to 25 tons capacity. The Merchant Shipbuilding Co., 165 Broadway, New York, has not closed on its inquiry for four electric cranes, but is expected to do so shortly. William Cramp & Sons Ship & Engine Building Co. still is negotiating for four 10-ton cranes of 106-foot span.

Chicago Expects Munitions and Ordnance Contracts

THOUGH buying of machine tool equipment in the Chicago territory still consists for the most part of small lots and lighter tools, some larger business seems likely to come out shortly. The general expectation is that war demand will continue and smaller manufacturers are increasing their equipment to meet the conditions. The demand at present indicates a wider distribution of war business. Agricultural implement manufacturers, especially those building tractors, are adding to their machine shop equipment, some fair orders having been taken recently from this source. Two concerns with munition contracts are seriously considering doubling their facilities. The Chicago Ordnance Co., for which the Arnold Co., Chicago, is making plans, apparently is working out in more definite form. This project is backed by the Chicago Association of Commerce and is a composite undertaking. The Standard Steel Car Co., Hammond, Ind., which is equipping for war work, is placing its equipment after several delays. Much remains to be bought. Deliveries are improving in most lines and recently an order for boring mills obtained shipment in 10 days. Planers are still slow and some makers cannot promise earlier than six months. Gits Bros. Mfg. Co. will build an additional machine shop. The Western Electric Co., Cicero, Chicago, is building a six-story factory, 211 x 675 feet. The Aurora Tool Works, Aurora, Ill., will build an addition. The Muncie Gear Co., Muncie, Ind., will build an addition. The Jenkins Machine Co., Sheboygan, Wis., will build a machine shop addition. The United Steel Co., Everett, Wash., a newly chartered concern, is about to start the erection of a rolling mill.

Heavy Tool Demand is Increasing

AN INCREASING demand is indicated by the diversified inquiries, none of which is large, received in the Cleveland machine tool market during the past week. Light equipment is still wanted by contractors working on parts for airplane and motor construction. The demand for heavy machines is increasing, particularly from Detroit and Toledo, where new ordnance work impends. There has been some shifting of war orders in this district, based probably on results shown in contract work to date. This readjustment may in some measure indicate a clearing of decks for action on contracts to come. Tool buying is limited almost entirely to firms with war work, shipping conditions and prevailing high prices serving to discourage strictly private enterprise except where tools are needed for replacements. Used equipment is in active demand and a large list of inquiries probably will remain unsatisfied due to the scarcity of machines for sale.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

PORTLAND, ME.—The Cumberland Motor Sales Co., Inc., has been incorporated to manufacture motor vehicles, airplanes and engines, with $10,000 capital. E. C. Keith and Thomas A. Sander are interested.

ROCKLAND, ME.—The Francis Cobb Shipbuilding Co. has been incorporated and has taken over the shipyard of the Cobb estate, Atlantic wharf. The shipyard will be enlarged. The incorporators are H. Nelson McDougall, Benjamin C. Perry, Maynard S. Bird, Portland, Me., and others. B. C. Perry is treasurer and general manager.

ATTLEBORO, MASS.—The Frank G. Rowley Co. has received the contract for the $50,000 pattern storage building to be erected for the Howard & Burroughs-American Machine Co. The new building will be two stories, 74 x 100 feet.

BOSTON.—The Arthur C. Harvey Co., importer and dealer in iron, steel and metals, has purchased a tract of 275,000 square feet of land on Everett street, Brighton district, and will erect several large buildings for manufacturing purposes at an estimated cost of $300,000.

CAMBRIDGE, MASS. — The Cambridge Electric Light Co. is taking bids on the erection of a 1-story, 30 x 50-foot addition to its boiler house.

FALL RIVER, MASS.—The Fall River Iron & Metal Co. has been incorporated with $10,000 capital by Joseph Bloomberg, Ignatz Bazar, Providence, R. I., and Samuel Bloomberg.

GARDNER, MASS.—The Peterboro Mfg. Co. will build a brick, 2-story and basement, 28 x 80-foot addition to its factory on West street.

MILLBURY, MASS. — Peter Lynch, Wilkinsonville, Mass., has bought the property of the Charles Buck Tool Co., Grafton street, and will remove his shuttle iron manufacturing business there.

SPRINGFIELD, MASS.—A. A. Shea,

EXPANSION with ROLLING MILL JIM



Say fellows—was out to the Hubbard the other day and the boys showed me the plans of the new steel foundry they're putting up. She sure is a humdinger—electric furnaces and all that. The next time I go over I'll rubber around a lot more and tell you all about it.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

Inc., has been incorporated to manufacture electrical machinery and equipment with $12,000 capital. Augustus A. Shea, L. R. Schechterle and E. J. Roberts are interested.

WORCESTER, MASS.—The Sawyer Lumber Co. will make several additions to its mill, including a power plant.

PAWTUCKET, R. I.—The J. O. Draper Co. will build a brick 4-story, 75 x 100-foot factory on Front street.

PROVIDENCE, R. I.—The United States Rubber Co. has purchased the plant of the American Locomotive Co. and will equip part of it for the manufacture of balloons for the United States government.

WOONSOCKET, R. I.—The Tafe-Pierce Shoe Co. will build a reinforced concrete and brick 4-story, 45 x 132-foot addition to its factory, to cost $60,000.

BRIDGEPORT, CONN. — The Automobile Tractor Co. has been incorporated to manufacture tractors and accessories with $150,000 capital by Charles H. Davis, West Haven, Conn., James R. Booth and Frederic A. Bartlett.

EAST HARTFORD, CONN.—The Gildersleeve Ship Construction Co., Gildersleeve, Conn., has leased the plant of the Hartford & New York Transportation Co., at East Hartford, Conn., to build barges for the United States war department, and plans to build four new shipways. Machinery will be required for the carpenter and machine shops.

NAUGATUCK, CONN.—The Risdon Tool & Machine Co. has awarded to the Fred T. Ley Co., Springfield, Mass., the contract for a factory building, 1-story high and 98 x 104 feet in size, of frame construction. This is the first of two large additions to be built to this plant.

NEW LONDON, CONN.—The New London Chemical Co. has been incorporated with $50,000 capital by Bert W. Flanders, Ira M. Comstock and H. Ernest Harris.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—A charter of incorporation has been granted to the Menten Brass Co., Inc., capitalized at $25,000. The incorporators are A. J. Menten, B. E. Menten, and R. Weller, 1547 Broadway, New York.

BROOKLYN, N. Y.—The Turner Construction Co., 244 Madison avenue, New York, will make alterations to the plant of A. Schrader's Sons, Inc., manufacturer of diving apparatus, 783 Atlantic avenue.

BUFFALO.—The Liberty Aircraft Corp. has been organized with $1,000,000 capital to manufacture airplanes and tractors. The incorporators include H. L. Jauch, D. G. Drew and others.

BUFFALO.—Plans have been prepared and bids taken for a forge shop, 130 x 300 feet, to be built by the Delaney Forge Co. The company plans to build a machine shop 100 x 250 feet.

BUFFALO.—The O'Neil Iron Works has awarded to the Lackawanna Bridge Co. the contract for a plant addition to cost $100,000, for use as an erecting shop.

BUFFALO.—An addition to the plant of the Hard Mfg. Co. will be built at a cost of $40,000. It will be two stories high and 75 x 150 feet in size.

BUFFALO.—The Lackawanna Bridge Co. has been awarded the general contract for the construction of an addition to the plant of the O'Neil Iron Works, 269 Perry street.

BUFFALO.—Architect Lewis Greenstein is receiving bids on a brick and steel factory building, 1-story, 35 x 100 feet, for an owner whose name is withheld.

BUFFALO.—The Stewart Motor Co. is having plans drawn by Lewis & Hill, architects, for a storage and assembling building, 1-story, 92 x 110 feet.

BUFFALO.—A charter of incorporation has been granted to the Aldrich Mfg. Co., capitalized at $400,000, to manufacture copper, brass and other metal products. The incorporators are L. E. Desbecker, W. C. Newcomb, I. L. Fisk, 604 D. S. Morgan building, and others.

BUFFALO.—The Buffalo Contractors Plant Corp., 129 Erie street, has purchased a factory which it will equip for the manufacture of hoisting machinery and building equipment.

DEPEW, N. Y.—The American Car & Foundry Co. will make several alterations and additions to its plant in this city.

DUNKIRK, N. Y.—The Atlas Drawn Steel Corp., manufacturer of steel and wire products, has incorporated its business with a capital of $275,000, to provide for plant expansion.

EAST JAMESTOWN, N. Y.—A $30,000 addition will be erected at the plant of the Jamestown Wood Finishing Co. The new building will be two stories, 35 x 100 feet.

ELMIRA, N. Y.—The Willys Motor Co. will erect an $80,000 addition to its branch plant in this city. The proposed structure, 1-story, 90 x 400 feet, will be erected from plans drawn by Architects Mills, Rhines, Bellman & Nordhoff, Detroit. The Lowman Construction Co., Elmira, will be in charge of the work.

FULTON, N. Y.—The Fulton Steel Corp., Woolworth building, plans to build an addition to its foundry in this city.

JAMESTOWN, N. Y.—The Crescent Tool Co. is having plans drawn for the construction of a power house and coal storage building. F. A. Shoemaker, Buffalo, is engineer in charge.

MEDINA, N. Y.—The A. L. Swett Iron Works has increased its capital from $200,000 to $500,000 to provide for works extensions.

NEW YORK.—A charter has been granted to the Saugerties Foundry & Machine Co., capitalized at $20,000. The incorporators are F. C. Smith, E. North and G. W. Levett, 1 West Seventy-second street.

NEW YORK.—Incorporation papers have been issued to the James R. McMann Co., organized with $30,000 capital to manufacture sanitary fixtures and plumbers' supplies. H. E. Mulliken, Englewood, N. J., may be addressed.

NEW YORK.—The Union Gas & Electric Iron Co. has been incorporated with $5000 capital by S. Daniels, 1278 Webster avenue, and others.

NEW YORK.—A charter has been granted to E. R. Senn & Co., capitalized at $50,000, to manufacture lubricating oils, paints, varnishes, etc. Incorporators are E. R. Senn, 972 St. Johns place, Brooklyn, N. Y.; A. H. Greeley Jr., 87 Woodruff avenue, Brooklyn, and others.

NEW YORK.—Work will start soon on a 1-story, 50 x 200-foot factory for the W. P. Tanner-Gross Co., 25 Beaver street, New York. The building will be of brick and steel. The Austin Co., Cleveland, is in charge of the work. The cost of the new structure will be $35,000.

NIAGARA FALLS, N. Y.—The National Carbon Co. has awarded to the Hunkin-Conkey Construction Co., Cleveland, the general contract for the construction of four additions to its Niagara Falls plant. The largest building will be six stories high, 54 x 103 feet. The dimensions of the other buildings are as follows: Two stories, 20 x 114 feet; one story, 70 x 144 feet; one story, 49 x 70 feet.

OLEAN, N. Y.—The board of water supply, through commissioner Sheehan, is receiving bids for a $75,000 filtration plant, to be 1-story, 30 x 70 feet.

PEEKSKILL, N. Y.—A 250-acre site has been purchased on the east bank of the Hudson river by the Weehawken Dry Dock Co. for the establishment of a shipbuilding plant.

TONAWANDA, N. Y.—The United States Alloys Corp. has awarded to the Ferguson Steel & Iron Co. the general contract for the construction of a furnace building.

TUXEDO PARK, N. Y.—The Air-Go Co. has been chartered with $5000 capital to manufacture ventilators, by W. W. Westall, E. A. Farintosh and others.

SYRACUSE, N. Y. — A 2-story factory building to cost $100,000 will be erected by the Crouse-Hinds Co. Gaggin & Gaggin, architects, are drawing plans.

WHITESTONE, N. Y.—The Federal Tool Co. has leased the plant formerly operated by the New York Watering Co., which it will equip for the manufacture of its product.

YONKERS, N. Y.—The Continental Shipbuilding Co., Selah B. Masten, president, has leased a tract of three acres on which it plans to build a fabricating shop and a plant for building wooden ships.

ALIQUIPPA, PA.—The Russell Shovel Co. plans to rebuild its factory which was damaged by fire recently with a loss of $150,000.

ALLENTOWN, PA.—Harvey Settler, owner of the Adelaide Brass Foundry, 384 Linden street, has bought a site in this city and will build an additional plant.

ALLENTOWN, PA.—The Bethlehem Motors Corp., 40 East Walnut street, is building a 1-story, 80 x 145-foot addition to its plant. The cost of the addition is estimated at $20,000.

BEAVER FALLS, PA.—Carlish & Sharrer, architects, Jenkins arcade, Pittsburgh, have let the contract to P. H. McDanel, New Brighton, Pa., for a $10,000 factory at Beaver Falls, Pa., for the G. H. Hamilton Mfg. Company.

BERWYN, PA. — The American Bronze Corp. is having plans prepared for a 1-story foundry, 83 x 100 feet, to cost $20,000.

BRADFORD, PA. — The Bryant Novelty Co. has been chartered with L. J. Bryant as president and general manager. The company will equip a plant on West Corydon



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Small Steel Castings

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Emergency Service!

"Farrell-Cheek" Service has come to be known among foundrymen as ***never failing emergency service.***

When they want ***Small Steel Castings*** and want them ***quick***—"Farrell-Cheek" Service is always specified.

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SANDUSKY, OHIO

BRANCH OFFICES

New York Philadelphia Chicago

street for the manufacture of metal specialties.

CHAMBERSBURG, PA.—Zebriskia, Gamon & Co., 225 Fourth avenue, are having plans prepared by Arch E. Shields, 141 Lincoln Way, for a factory and dye house to cost $18,000.

COATESVILLE, PA.—The roll-turning and punch shops of the Lukens Steel Co. have been sevcrely damaged by fire, with a loss estimated at $30,000.

CONSHOHOCKEN, PA.—Ford & Kendig, 1428 Callowhill street, Philadelphia, are receiving bids on the erection of a 1-story foundry and machine shop which they propose to build. A. E. Wood is president of the company.

CORNWALL, PA. — The Enterprise Mfg. Co. and the Traylor Shipbuilding Corp. have been granted a permit to revise plans for their proposed yard at this point.

CURWENSVILLE, PA.—The Hyde City Nickel Alloy Co. will build a $250,000 addition to its plant this summer.

EAST DOWNINGTOWN, PA.—The Rowe Motor Mfg. Co., Wallace street, will build a 2-story plant, 120 x 200 feet on Fountain avenue, to cost $35,000.

FARRELL, PA.—The American Sheet & Tin Plate Co., Frick building, Pittsburgh, proposes to spend $75,000 for improvements to the annealing plant at its Farrell works.

GREENCASTLE, PA. — The Landis Tool Co. has awarded a contract to Jacob Shank for a fireproof pattern storage plant, 45 x 125 feet in size.

HONESDALE, PA.—The Wayne Engineering Co., capitalized at $35,000, has been chartered and will build an extension to its plant.

LATROBE, PA. — The Peerless Foundry Co. plans to build a $150,000 foundry with power house and warehouse. Address A. L. Francis, general manager, 41 Conestoga building, Pittsburgh.

LEBANON, PA.—The Bethlehem Steel Co. plans to rebuild its coke ovens at the North Lebanon plant.

LOGAN, PA.—The Guyan Machine Shop will purchase considerable additional equipment.

MILLERSBURG, PA.—W. L. Brubaker & Bros., manufacturers of machine tools, have had plans prepared for a 1-story, 75 x 100-foot machine shop.

MOUNT UNION, PA.—The Aetna Explosives Co. will build an addition to its plant, to cost $500,000.

NEVILLE, PA.—The Pittsburgh-DesMoines Steel Co. has bought a tract of land on which it plans to build additions to its plant.

NEW CASTLE, PA.—The Grasselli Chemical Co., Cleveland, will build a $1,000,000 addition to its power plant.

PHILADELPHIA.—The Keystone Supply & Mfg. Co. has awarded the general contract for a 2-story warehouse addition to the Smith-Hardican Co.

PITTSBURGH. — The Ardary-Burns Co., Liberty and Thirty-first streets, has awarded the contract for a 1-story, 48 x 120-foot machine shop to cost about $5000.

SCRANTON, PA.—The plant formerly occupied by the Scranton Axle & Spring Co. has been sold to the Buchanan Foundry Co., Philadelphia, for about $10,000. The Buchanan company, which has plants at Lebanon, Pa., and Waterbury, Conn., makes gray iron castings, and will equip its newiy acquired plant for their production.

SHARON, PA.—The Savage Arms Corp. will build an addition to its plant.

SUNBURY, PA.—The Sunbury Converting Works will build a gas plant shortly.

WILSONBURG, PA.—The Peerless Carbon Black Mfg. Co., Pittsburgh, which now operates a plant here, has let the contract for a branch factory at Munroe, La.

TITUSVILLE, PA. — The American Radiator Co. has had plans prepared for a $25,000 plant and has let the contract to the J. W. Cowper Co., Fidelity building, Buffalo.

WAYNESBORO, PA. — The Waynesboro Railway Co. will take bids for a power substation here, to cost about $10,000.

WILLIAMSPORT, PA.—The Williamsport Water Co. proposes to issue bonds for $490,000 to provide for building additions to its plant.

WILLIAMSPORT, PA.—Meredith Hannan, 461 Elmira street, has received the contract for a $10,000 foundry to be built by the National Foundry Mfg. & Supply Co.

CAMDEN, N. J.—J. S. Rodgers, Morristown, N. J., has the general contract for covering several of the shipways at the yard of the New York Shipbuilding Corp. The work is estimated to cost $68,000.

ELIZABETH, N. J.—The D. & D. Machinery & Tool Co. has been organized with $50,000 capital by Otto H. Dissman, Walter Decker and others.

ELIZABETH, N. J.—The New York Drydock & Transportation Co., South Front street, has had plans prepared for a 2-story, 30 x 50-foot addition to its machine shop. A. L. Alpers is secretary and treasurer of the company.

JERSEY CITY, N. J.—The Olive Loading Co. has been chartered to manufacture metal goods with a capital of $500,000. T. A. Gillespie, R. Oliver and T. H. Gillespie, New York, are incorporators.

MADISON, N. J.—The Behre Chemical Works has been incorporated with $50,000 capital to manufacture chemicals. The incorporators are James Benny, Burgess A. Cruden and others, Bayonne, N. J.

MORGAN, N. J.—The T. A. Gillespie Co., 50 Church street, New York, plans to build a shell-loading plant here. New equipment required will include cranes, hoists and machine tools.

NEWARK, N. J.—The City Auto Radiator Co. has been incorporated with $10,000 capital by Samuel Zucker and others.

NEWARK, N. J. — The Hartwell-Rademaekers Mfg. Co. has been chartered with $150,000 capital to manufacture dynamos and motors. William A. Rademaekers, A. E. Hartwell and W. H. Rademaekers Jr., New York, are incorporators.

NEWARK, N. J.—The Liberty Machine Tool & Die Co. has been chartered with $80,000 to manufacture tools. Albert W. Wenzel, Charles L. Barrows, Newark, and others are the incorporators.

NEWARK, N. J.—A. J. Hastings & Co. have been chartered with $3000 capital to manufacture saws. The incorporators are Arthur C. Hastings, Newark, and Victor E. H. Hoagland, East Orange, N. J.

NEWARK, N. J.—The Ford Motor Co., it is reported, will erect a shipbuilding plant on the meadows near here for the construction of U-boat destroyers. The plant will be a duplicate of the River Rouge plant, near Detroit, and will employ between 10,000 and 15,000 men.

PATERSON, N. J.—Seven warehouses, costing in all $2,000,000, will be erected here by the army quartermasters department. It is stated that estimates on construction have already been asked, and that the buildings will be completed within 30 days, after work is begun.

PHILADELPHIA.—The Massoth Packer & Machine Co. has been chartered with $50,000 capital to manufacture tools by L. K. Cornelius.

SOUTH ORANGE, N. J.—The Peerless Watchman's Clock Co. has been chartered with $75,000 capital. The incorporators are E. L. Prior, Maplewood, N. J.; W. M. Vinnedge, Brooklyn, N. Y., and H. T. Stetson, Orange, N. J.

TRENTON, N. J.—J. O. Hunt, 114 North Montgomery street, has prepared plans for a new plant to be built by the John E. Thropp's Sons Co. to comprise a foundry, 100 x 360 feet, a new power house, pattern shop, pattern storage building, and railroad sidings, to cost in all about $100,000.

WILMINGTON, DEL.—Bids will be received about April 15 for the construction of the proposed $10,000,000 plant to be erected by the Wilmington Sugar Refining Co.

CURTIS BAY, MD.—The Maryland Bolt Co. will build a $100,000 addition to its plant.

Activities in the Central States

ALGOMA, WIS.—Moses Shaw, consulting engineer, has been engaged to prepare plans for a new reinforced concrete and steel bridge over the Ahnapee river, to consist of four 40-foot deck girder spans.

BERLIN, WIS.—Metzig Bros. have disposed of their blacksmith shop but will continue their machine shop business, adding a complete welding and cutting shop and installing several new machines.

CAMPBELLSPORT, WIS.—Jerry Donohue, consulting engineer, York building, Sheboygan, Wis., is preparing plans for improvements and extensions to the city waterworks and sewage system estimated to cost $50,000. A new 70-foot steel stand pipe of about 100,000 gallons capacity is contemplated.

CLINTONVILLE, WIS.—Work is now under way on the construction of a new concret edam and power house for the new hydroelectric plant which is being built on the Embarrass river by the Topp-Stewart Tractor Co. for the operation of its new farm tractor plant, completed recently. The new power plant will consist of a 210-foot dam, 30 feet high, and a power house. The generator will have a capacity of 750 kilowatts and provision is being made for the addition of a unit of the same size when a greater output is needed.

CUDAHY, WIS. — Another large addition



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Our great West 60 years ago is duplicated in a dozen different countries today. And just as our land developed and grew so will these great stretches of virgin territory. After the war is over railroads will be built to bring out the wealth of these countries to a needy world, but until that time comes freight traffic must be conducted by prairie schooners, veldt kaarts and arcos, just as we did two generations back.

It is vital to the success of the American export trade that our goods be safely delivered to the present buyers in these countries. These lands will be great and populous, and the American products that give satisfaction now will hold a permanent trade in the future. Goods that are improperly packed, that come to the buyer broken, mouldy from dampness, or riddled by weevils won't develop this export trade.

There is a right way to pack for export, and the export merchant knows and specifies these requirements. To the manufacturer it may seem that his demands are excessive, but he knows what each packing case must withstand to reach its destination safely. Our little booklet, "Export Packing," explains these conditions. It will be sent to any manufacturer on request.

FEDERAL EXPORT CORPORATION

115 Broadway New York

to the plant of the Ladish Drop Forge Co. will be erected at once to provide for handling existing contracts. The new shop, designed by Klug & Smith, consulting engineers, Milwaukee, will be 50 x 250 feet, of steel, reinforced concrete and brick, and will cost about $30,000 with equipment.

FRIENDSHIP, WIS.—A. J. Kramp, Berlin, Wis., has been awarded contracts for erecting five concrete and steel highway bridges in Adams county. F. F. Mengel is county highway commissioner.

GREEN BAY, WIS.—Architect C. W. Williams, Parmentier building, is preparing plans for a 2-story concrete, steel and brick machine shop addition for the Hudson & Sharp Machine Co., 1207 Main street. It will be 35 x 110 feet, and will cost about $15,000, exclusive of equipment.

HARTFORD, WIS.—The Kissel Motor Car Co. has awarded the general contract for the erection of two new factory buildings, 40 x 200 and 40 x 100 feet, to Thom Bros., Hartford. The Kissel company will spend about $40,000 in new buildings and equipment to handle a large contract for army trucks for the government.

MILWAUKEE.—The department of public works is taking bids until March 22 for the reconstruction of the Humboldt avenue bridge over the Milwaukee river.

MILWAUKEE.—The Babcock Automobile Spring Co., 192 Milwaukee street, manufacturer of vehicle springs, has broken ground for a new plant on Jefferson street. The building will be three stories, 60 x 127 feet, of reinforced concrete and brick, and will cost about $35,000 when equipped.

MILWAUKEE.—The Res Mfg. Co., 2907-2909 Meinecke avenue, has awarded the general contract for the erection of a 2-story addition, 67 x 75 feet, to J. D. Morrison, West Allis, Wis. The company manufactures hardware specialties. Arthur J. Buckley is president.

MILWAUKEE. — The Milwaukee-Western Fuel Co., 14 Grand avenue, has awarded to the Frank Luenzmann Co., 1912 Prairie street, the general contract for constructing 600 feet of coal hoppers at Fifteenth and Canal streets. Klug & Smith, Mack block, are consulting engineers. The work will cost about $35,000.

MILWAUKEE.—A fire which swept the coal yards of the Kanawha Fuel Co., March 10, damaged the hoisting and screening equipment so that it will have to be replaced.

OSHKOSH, WIS.—The Router Mfg. Co. has been incorporated with a capital of $25,000 to manufacture metal-working tools and hardware specialties. James C. Casey is in charge.

OSHKOSH, WIS.—The Universal Foundry Co., which recently increased its capital from $10,000 to $25,000, plans to install additional equipment. The company manufactures gray iron castings.

PORT WASHINGTON, WIS.—The Turner Mfg. Co., which recently increased its capital stock from $100,000 to $250,000, contemplates the erection of a large factory addition to house its tractor department.

SUPERIOR, WIS. — A permit has been granted to the Superior Iron Works, Third street and Grand avenue, for the erection of a new boiler shop, to be two stories high and 60 x 96 feet in size. Cost is estimated at $5000. Frank Hayes is president of the company.

WATERTOWN, WIS.—The Monarch Tractor Co. is having plans prepared for an addition to the machine shop and assembling about $20,000. W. H. Stiemke is manager. room of its plant. The investment will be

WEST BEND, WIS.—The common council has authorized a bond issue of $10,000 for the construction of a reinforced concrete bridge over the Milwaukee river and the mill-race on Division street. An engineer will be selected at once.

WINTER, WIS.—The Kelsey-Brewer Co., Grand Rapids, Mich., has engaged L. A. DeGuere, consulting engineer, Grand Rapids, Wis., to prepare plans for a new concrete dam, 110 feet long and 40 feet high, containing three steel gates, and for other improvements at its hydro-electric power plant on the Thornapple river.

DETROIT.—The foundry of the Monarch Steel Castings Co., Solvay avenue and the Wabash railway, has been severely damaged by fire, with a loss estimated at $100,000. Phillip H. McMillan is general manager of the company.

GALESBURG, MICH.—A charter of incorporation has been granted to the Galesburg Foundry & Castings Co., capitalized at $5000.

CHICAGO.—A permit has been granted to G. A. Buehl, 3950 West Fillmore street, for the erection of a 1-story brick boiler house to cost $2000.

CHICAGO.—The A. Nelson Mfg. Co. has obtained a permit to build a machine shop on Southport avenue

CHICAGO.—The Security Tool Works has increased its capital from $20,000 to $35,000 to provide for building extensions to its plant.

CHICAGO.—The William Ganschow Co., gear cutter, has purchased a site on Morgan street on which it plans to build an addition to its plant, located nearby.

CHICAGO HEIGHTS, ILL.—The Indiana Car Works, it is reported, has purchased the Hicks Car Works, and will enlarge and build additions to the plant.

DE PUE, ILL.—The east unit of the ore crusher at the plant of the Mineral Point Zinc Co. has been damaged by fire, entailing a loss of $15,000. An elevator, a number of belts and some machinery will have to be replaced.

EAST ST. LOUIS, ILL.—The Lubrite Refining Co. has purchased a tract of 25 acres on which it plans to build a plant for the production of airplane lubricants. W. S. Strickler is president of the company.

OTTAWA, ILL.—The factory of the Ottawa Pianophone Co. has been damaged by fire with a loss estimated at $100,000.

PEORIA, ILL.—The Lawler Tank Heater Co. has been granted a charter of incorporation with a capital of $100,000, and will build a plant. S. B. Adelman, F. E. Mendenhall and L. Adelman are the incorporators.

PEORIA, ILL.—The Maple City Stamping Works, Monmouth, Ill., plans to remove its plant to Peoria.

ROCKFORD, ILL. — The Rockford Tool Co. has increased its capital stock from $10,000 to $150,000 to provide for building extensions to its plant.

AKRON, O.—Preliminary plans have been drawn for a 1-story factory building 60 x 100 feet, to be built by the Akron Standard Mold Co., at a cost of approximately $35,000. C. W. McLaughlin is president of the company.

AKRON, O.—The plant of the Williams Foundry & Machine Co. has been damaged by fire with a loss of $10,000. The plant has been working to capacity on government orders.

ALLIANCE, O. — The Alliance Auto & Tool Co. has been chartered with $20,000 capital. The incorporators are J. A. McCaffery, George W. Fertin, Charles S. Luee and others.

BUCYRUS, O.—The American Clay Machinery Co. is in the market for shell making equipment, including ten 24-inch lathes and 12 grinding machines.

CANTON, O.—The Eclipse Electric Co. has been granted a charter of incorporation with a capital of $10,000. The incorporators are Charles A. Miller and N. W. Wirth.

CARTHAGE, O.—The large addition to the plant of the Pollak Steel Co., to cost $500,000, will be started in a few weeks. The plant will be devoted entirely to the execution of contracts for the navy.

CINCINNATI.—The Willard Press & Tool Co. has been chartered with $10,000 capital by Thomas L. Bratton, George W. Schaefer, Ernst Richter and others.

CINCINNATI. — The Warman Aluminum Casting Co., 1741 Central avenue, contemplates equipping its plant for the production of brass castings. The company has been incorporated recently with $20,000 capital. Roy Warman is president.

CINCINNATI.—The Fening-Stockman Iron Works Co. has been incorporated with $25,000 capital by Henry Fening, Fred Stockman and E. C. Lamb.

COLUMBUS, O.—The Ohio State Stove Co. has increased its capital from $75,000 to $250,000 to provide for expansion of its plant.

COLUMBUS, O.—The Ohio Malleable Iron Co. plans to make extensive alterations to its plant, including the installation of three gantry cranes, and other labor-saving devices. The company manufactures steel buckets, motor truck castings and malleable chain.

COLUMBUS, O.—Richard Dawson, architect, Hartman building, is receiving bids on the construction of a 3-story building, 40 x 63 feet, to be built for the Atlas Brass Foundry Co., 980 South Park street. Cost of the new building is estimated at $15,000. John Whittman is president of the company.

CLEVELAND. — The Standard Pressed Steel Co. has been organized with $25,000 capital by Joseph J. Boehm, Andrew J. Miller and others.

CLEVELAND. — The Flexible Steel Tire Co. has been incorporated with $5000 capital by G. O. Bell and John Keavey.

CLEVELAND.—A charter of incorporation has been granted to the Fisher Chemical Co., capitalized at $50,000. The incorporators are Louis Fisher and H. E. Varga.

CLEVELAND. — The Ferry Cap & Set Screw Co. has increased its capital stock from $500,000 to $1,000,000 to provide for plant extensions.

CLEVELAND.—The General Chemical Co. has awarded to the A. A. Lane Construction



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Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U·S·A

Co., 1836 Euclid avenue, the contract for the erection at Willow station, of two plant additions to cost $20,000.

CLEVELAND.—The Gebauer Chemical Co., 523 Erie building, plans to build a factory at Union avenue and East Ninety-third street, to be of brick and reinforced concrete construction. Plans are being drawn by R. H. Hinsdale, architect, Erie building. The building will cost about $10,000.

CLEVELAND. — Condemnation proceedings will start shortly involving a site, 500 x 600 feet, adjoining the Kirtland street pumping station, on which the city plans to build a waterworks addition.

CLEVELAND.—Bids will be received shortly by David Katz, 2330 East Thirty-seventh street, for a building to be used for light manufacturing. The structure will be two stories high and 40 x 90 feet, and will cost about $25,000.

CLEVELAND.—Contract has been awarded by the D. Connelly Boiler Co. to W. I. Thompson & Son, contractors, for a 1-story boiler shop 80 x 140 feet, which it will erect at Ivanhoe road and the Nickel Plate railroad. The building will cost about $18,000.

CLEVELAND.—The Acme Mill Supply Co. has been incorporated with a capital of $10,000 by A. E. Demilio, Mark L. Fisher, Morris Becker and others.

CLEVELAND.—The Cleveland Tractor Co. has awarded the contract for the first unit of its plant to be built on Euclid avenue. This unit will be 180 x 440 feet in size and will cost about $250,000.

DAYTON, O.—The National Cash Register Co. has had plans prepared for the erection of a 1-story factory building to cost $100,000.

LORAIN, O.—The Detroit Engineering & Foundry Co., Detroit, contemplates building a plant here, and has obtained an option on a tract of 20 acres on the New York Central railroad.

NEWARK, O.—The Blair Motor Truck Co. will build an addition to its plant.

RAVENNA, O.—The John F. Byers Machine Co. has increased its capital stock from $150,000 to $300,000.

SANDUSKY, O.—The Ohio Tread & Tire Co. will start work shortly on the erection of a factory building. F. Haskell Smith is general superintendent of the company.

SPRINGFIELD, O.—The Superior Gas Engine Co. plans to build a 60 x 160-foot addition to its plant, two stories, of reinforced concrete construction. The addition will be equipped for a machine shop.

TIFFIN, O.—The Hanson Clutch & Machinery Co. will start work shortly on the erection of two new factory buildings for the manufacture of friction clutches. M. B. Hanson is in charge.

YOUNGSTOWN, O.—The American Sintering Co., C. B. Kelley, Stambaugh building, manager, will take bids after March 20 on the construction of an addition to its sintering plant which was damaged by fire a few months ago. Cost of the proposed structure will be about $100,000.

COVINGTON, KY.—A charter has been granted to the Tristate Metal Weather Strip Co., organized by John Gaiser, L. B. Simpson and C. Gregory, with a nominal capital of $1000.

GRAND RIVERS, KY.—The Suwanee Iron Co. of Kentucky, has been incorporated recently with a capital of $500,000. The incorporators are J. M. Overton, president of the company, C. Cooper and D. I. Milier.

HARLAN, KY.—The H. C. Frick Coke Co., Pittsburgh, has announced plans for opening up mines with a capacity of 12,000 tons in Harlan field and plans extensive developments.

LOUISVILLE, KY.—The Louisville Machine Mfg. Co. has been incorporated with $150,000 capital; by Arthur L. Keim, Paul F. Loichot, Archibald Rogers and others.

MADISONVILLE, KY.—The St. Bernard Mining Co. will rebuild its power plant at Shamrock mine, which was recently dynamited. Loss was about $40,000.

OWENSBORO, KY.—The Anglo-American Mill Co., operator of a foundry and manufacturer of milling machinery, has increased its capital from $1,000,000 to $1,250,000 to provide for plant expansion.

WINDSOR, W. VA.—The American Gas & Electric Co. will build a large addition to its plant this spring.

New Business in Eastern Canada

BROCKVILLE, ONT.—The Canada Carriage Factories, Ltd., will build an addition to its factory to cost $40,000.

OTTAWA, ONT.—The Colonial Hide Co. will build a tannery on Hurdman's road, to cost about $40,000.

OTTAWA, ONT.—McDougal Bros., Messerer street, are in the market for two locomotives, fifteen 4-yard dump cars, one traveling derrick and 75 tons of relaying rails.

TILSONBURG, ONT.—The Huntley Mfg. Co. whose plant was severely damaged by fire recently, with a loss of $100,000, will rebuild immediately and will require machinery and equipment.

TORONTO, ONT. — The Nipigon Reserve Iron Co., Ltd., has been incorporated to carry on a general mining business and to manufacture and treat iron, steel, ores and minerals, with $375,000 capital stock. John W. Newcombe, Fort William, Ont.; Frank E. Abbott, 169 College street, Toronto; James R. L. Starr and others are incorporators.

TORONTO, ONT .— The Commercial Acetylene Supply Co., a New Jersey corporation, has been chartered to manufacture machinery and appliances for railroad lighting systems, with $50,000 capital stock. William H. Wood, 6 Stonehouse Crescent, Toronto, Ont., is the representative of the company.

GRAND MERE, QUE.—The Laurentide Co., McGibbon and Third avenues, will build an addition to its plant, to cost $150,000. Elwood Wilson is chairman.

HULL, QUE.—Bids are being received by Millson & Burgess, Union Bank building, Ottawa, Ont., for the erection of a 1-story machine shop for the Hull Iron & Steel Works.

MONTREAL, QUE.—Williams & Williams tos & Chrome Mines Ltd. are in the market for a lift centrifugal pump. M. A. Sammett, room 504, McGill building, Montreal, is the consulting engineer in charge.

MONTREAL, QUE.—Bids have been received for a 4-story factory, to be erected for the Canada Castings Co., 750 St. Paul street west, and estimated to cost $75,000. Hutchison, Wood & Miller, 2 Place D' Armes, Montreal, are the architects.

MONTREAL, QUE.—The Phillips Steel & Wire Co. Ltd. has been incorporated to manufacture wire and machinery with $100,000 capital stock. Maurice Alexander, Aubrey H. Elder, Felix W. Hackett and others are interested.

MONTREAL, QUE.—Williams & Williams Ltd. have been incorporated to manufacture machinery and hardware supplies with $500,000 capital stock. Michael B. Bronstetter, Walter E. Richardson, Keith C. Notman and others are the incorporators.

MONTREAL, QUE.—The Tollard Mfg. Co. Ltd. has been incorporated to manufacture machinery and tools with $50,000 capital stock. Waldo W. Skinner, William G. Pugsley, Gordon G. Hyde and others are interested.

MONTREAL, QUE.—The American Electro Products Co., Ltd., has been incorporated to manufacture electrical equipment and machinery with $1,500,000 capital. L. Macfarlane, W. B. Scott, J. MacNaughton and others are incorporators.

MONTREAL, QUE.—The Federal Zinc & Lead Co. Ltd. has been incorporated to develop lead, zinc and copper mines with $3,000,000 capital. M. M. A. Plimsoll, R. Brodeur, H. Langevin and others are incorporators.

SHAWINIGAN FALLS, QUE. — The Church-Ross Co., Ltd., 40 Hospital street, Montreal, Que., have been awarded the general contract for the erection of a plant for the American Products Co., to cost $1,800,000.

SHERBROOKE, QUE.—The Auto Piston Ring Co. Ltd. has been incorporated to manufacture automobile piston rings with a capital stock of $149,000. M. Standish, O. B. Somerworth, A. Graham and others are incorporators.

THREE RIVERS, QUE.—The Page Wire Fence Co. of Canada, Walkerville, Ont., will start work shortly on the erection of a manufacturing plant at Three Rivers to cost $150,000, and will require machinery and equipment.

WINNIPEG, MAN.—The Magnet Metal & Foundry Co., Ltd., has been incorporated to carry on a general foundry and machine shop business, and to manufacture iron and steel products, with $150,000 capital stock. J. B. Coyne, S. F. Moffatt, F. K. Hamilton and others are interested.

HANNA



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Foundry, Malleable, Bessemer, Basic.

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

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BUFFALO CLEVELAND PITTSBURG
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HANNA

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
City wrought, short, N. Y.	26.75
Frogs, switches, guards, St. L.	29.50 to 30.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melt'g steel, east. Pa.	28.50 to 29.50
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	25.00 to 26.00
Hydraulic press. sheets, Cleve.	29.50 to 30.00
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Knuckles, couplers, Chgo.	35.00
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	37.50
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	29.50 to 30.00
Springs, Chgo.	35.00
Steel rails, short, Chicago	34.50 to 35.00
Steel rails, short, Cleveland	35.00
Steel rails, short, St. Louis	34.00 to 35.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	22.75
Stove plate, Birmingham	18.00 to 21.50
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	28.50
Stove plate, Pittsburgh	20.00 to 21.00

(Net Tons)

Boiler plate, cut, No. 1, St. L.	24.50 to 25.00
Bundled sheets, Cincinnati	20.00 to 20.50
Knuckles, coup., St. Louis	31.00 to 31.25

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis- St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	75.0 cents
Pacific coast (tin plate)	75.0 cents

IRON MILL USE

(Gross Tons)

Angle bars, iron, Chgo.	40.00
Arch bars, transoms, Chgo.	47.50
Busheling, No. 1, Cleveland.	32.00
Busheling, No. 1, Buffalo	30.00 to 31.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Chgo.	29.50 to 30.00
Busheling, No. 2, Chgo.	20.25 to 21.25
Cast borings, New York	17.00
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	18.50 to 19.00
City wrought, long, N. Y.	31.50
Cut forge, Chicago	32.75 to 33.25
Forge flashings, small, Cleve.	28.00 to 28.50
Forge flashings, large, Cleve.	28.00 to 28.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	22.75
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	33.00 to 33.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	18.25
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chicago	18.50 to 19.00
Pipes and flues, Cleveland	25.50 to 26.50
Pipes and flues, Chicago	26.50 to 27.50
R. R. mch. cast, No. 1, Buff.	35.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	33.50 to 34.50
R. R. wrgt. No. 1, Birming.	27.50 to 29.00
Wrought pipe, Buffalo	28.00 to 29.00
Wrought pipe, eastern Pa.	33.00 to 34.00
Wrought pipe, ungraded, eastern Pa.	30.00

(Net Tons)

Angle bars, steel, St. Louis	34.50 to 35.00
Arch bars & transoms, St. L.	42.00 to 42.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.50 to 27.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, St. Louis	17.00 to 17.50
Iron axles, St. Louis	42.00 to 42.50
Machine turnings, Cinci.	15.50 to 16.00
Machine turnings, St. L.	17.50 to 17.85
Pipes and flues, St. Louis	26.25 to 26.75
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	30.00 to 30.40

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	25.00
Shafting, New York	36.50
Shafting, eastern Pa.	40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	42.00 to 42.50
Steel car axles, St. Louis	42.00 to 42.50

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1 cupola east. Pa.	33.00
Cast, No. 1, Birmingham	25.00 to 26.00
Cast No. 1, Cleveland	33.75
Cast, 1, heavy, N. J. points	33.25 to 33.75
Cast, 1, machy., N. J. points	33.25 to 33.75
Cast No. 1, Chicago	33.00 to 34.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable, Cincinnati	30.00 to 35.00
Malleable, Cleveland	30.00 to 35.00
Malleable, Buffalo	30.00 to 35.00
Malleable, Pittsburgh	30.00 to 35.00
Malleable, east. Pa.	30.00 to 35.00
Malleable railroad, Chgo.	33.00 to 34.00
Malleable, agricultural, Chgo.	33.00 to 34.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	26.50 to 27.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, St. L.	26.50 to 26.75

MISCELLANEOUS USES

(Gross Tons)

Boiler punchings, Chgo.	36.50 to 37.50
Reroll. rails, 5 ft. & ov., Pitts.	35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	44.00 to 45.00

(Net Tons)

Locomotive tires, St. Louis	39.50 to 40.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, April 4, 1918 *No. 14*

Industry Speeds Up War Effort

Greater Co-ordination and Determination Mark Essential Production—Lake Interests Co-operate to Insure Full Ore Movement—Great Government Purchases Continue to be Made for Itself and Allies

GRIMER determination to fill promptly every demand upon it, is the answer of the iron and steel industry to the supreme German onslaught on the battlefields of France. A tightening of effort and more effective co-ordination in speeding up war production is apparent. The government continues to display a more vigorous attitude in following up deliveries of steel and in eliminating delays in the supplying of material which may obstruct essential lines of manufacture.

With the opening of lake navigation in sight, plans have been crystalized to smooth the way for a maximum ore movement during the present season. Co-ordination of the inter-related interests of ore and coal producers, of vessel owners and of the railroads is to be effected through committees and a superior administrative body representing all. A unified working arrangement was established at a general meeting in Cleveland Tuesday.

Car Orders Awarded

Extension of federal price regulation to include railroad supplies is expected in connection with the government's large purchase of this character about to be made. Bids have been taken from the builders on 100,000 freight cars of standardized type and on about 3000 locomotives. These are expected to be distributed in a few days. Buying of steel by the government in behalf of the allies is more in evidence. Large orders for ship plates and shapes have been placed for British delivery. A 60,000-ton inquiry for barb wire for Italy has been put out. Distribution of the several thousand aeroplane hangars for erection in France has been made. A large tonnage of structural steel as well as a huge number of turnbuckles are represented in these orders. Several large new inquiries for nuts and bolts have appeared. Steelmakers are in close touch with Washington pending the award of several million tons of shell steel which is expected within a short time.

Some controversy has arisen between buyers and sellers as to whether basic or foundry iron constitutes the base price under the revised schedule effective April 1. This point is of importance in connection with the differentials applying to other grades which are computed from the base price. The matter has been put up to the general committee of the American Iron and Steel institute for a ruling. Shortages of iron among steelmakers now are causing the government to make requisitions in behalf of these buyers. In the east a considerable tonnage of basic requirements has been provided for in this way. A heavy demand for iron persists in all districts but sellers have little to offer and the situation grows more tense as July 1 approaches. Inability of the furnaces to ship iron because of car shortages is regarded as a minor factor in the present famnie situation. In the Chicago district iron piled on furnace banks during the storm period has been cleared up and the unsatisfied needs are very large. Many producers are behind in deliveries not because of car shortages but because of loss of production.

Iron Output is Increased

While March showed a big gain in pig iron production over January and February, the figures for the completed first quarter strikingly display the slump compared with a similar period last year. The net loss of output for the three months of 1918 compared with the first quarter of 1917 is 1,131,403 tons. March's production of 3.212,715 tons represents an increase of 894,473 tons over February and 809,488 tons over January. The average daily production in March was 103,636 tons against 77,523 tons in January. The number of active stacks was raised from 319 to 340.

Scrap sellers who have held they are not obliged to reduce prices on shipments after April 1 against old orders, to accord with the new government schedule, apparently are on untenable ground. While this matter has not called for an official statement, the opinion has been expressed that scrap sales are not an exception to the rule of revision.

The Iron Trade Review

EDITORIAL

Prudent Lending is Imperative

SENATE and house conferees having finally agreed upon terms of the war finance bill, this measure probably will become a law shortly. The purpose of the bill is to aid the financing of essential war industries, but critics say that in effect it may finance nonessential industries. The bill creates a "capital issues committee" to consist of seven members, appointed by the President, with approval by the senate. This committee will pass judgment on all issues of securities for capital purposes, with a view to confining such issues to undertakings necessary to the conduct of the war. However, the bill distinctly specifies that the committee is not authorized to pass upon borrowing by any firm or individual "in the ordinary course of business". In other words, short-term borrowing through banks by nonessentials, it would seem, not only may proceed as usual, but with the War Finance Corp. taking care of the essentials, the banks would be better able to fill the money needs of the nonessentials.

But there is another way of looking at this situation. The money thus provided the nonessentials with greater facility would be expended in competition with the government and with vital industries, thus diverting labor and materials from war purposes. Also, this competition would hasten the advances in labor and prices, thus introducing inflation. In this connection, Governor Strong of the New York federal reserve bank last week sent a message to bankers which is extremely timely. He urged them voluntarily to curtail wasteful and unnecessary borrowing, to reduce loans for uses pertaining to luxuries and to conserve their surplus credit for the vital industries. In this way, as he points out, "we will be so ordering our affairs that we are not consuming the supplies at home which the armies need at the front". The passing of the war finance bill may relieve the banks of a part of the burden of financing essential industry, but it will not decrease their responsibility to the public in keeping money flowing through proper and useful channels.

Necessity Revives Old Methods

PREVIOUS to the enormous increase of manufacturing due to the European war, 90 per cent of the grinding wheels used in this country were made by what is technically termed the vitrified process. In this process the bonding material is a high grade of kaolin and its object is to hold the grains of abrasive material together. The process involved in making vitrified wheels is comparatively long because it is necessary to vitrify the wheels in a kiln to melt the bond and cause it to set. It takes three days to load a kiln and five days to burn it. Seven days are allowed for cooling and three days for unloading, so that the operation requires 18 days.

To reduce the manufacturing time of grinding wheels to a minimum, a number of grinding wheel manufacturers are filling rush orders in silicate bond. In this process, which was first introduced some thirty years ago, the bonding material is silicate of soda, or water glass as it is commonly called. In making grinding wheels by the silicate process the abrasive and bonding material in correct proportions is first thoroughly mixed and then rammed into molds by hand. A short baking completes the process.

By employing the silicate bond the grinding wheel consumer gets deliveries in the minimum amount of time. Urgent calls for quick deliveries rapidly are reviving this process and it is found that silicate wheels give entire satisfaction on many classes of work where vitrified wheels were heretofore used. By rejuvenating a manufacturing process of other days the war has served a useful purpose.

Teaching Safety to Furnacemen

ACCIDENTS at blast-furnace plants are not as easily prevented as they are at some other line of work. The melting process is intricate and requires a great deal of care. Each man has his duty to perform and when he fails to do it through ignorance or thoughtlessness, he often endangers the lives of other workmen. When you stop to think of the class of workmen that comes from southern Europe and generally seems so unpromising, it is surprising that more accidents do not occur. Some of these men after working about the furnace for a short period are capable of holding a more responsible position which is given to them when the opportunity presents itself. Disastrous accidents directly attributed to the fault of the furnace force are rare, which speaks well for the skill and carefulness of the men who comprise that force, drawn as they are from the "labor gang". It shows that such an organization can insure itself against and familiarize itself with the hazards of blast furnace work. That blast furnace work is dangerous is borne out by the majority of insurance companies. Some life insurance companies will not even consider such a risk.

In a bulletin "Occupational Hazards at Blast-Fur-

The Iron Trade Review

EDITORIAL

nace Plants and Accident Prevention" published by the bureau of mines it is stated that the majority of accidents cause a loss of time of less than 14 days. This means that the burden of financial loss falls chiefly upon the workman.

Practically every accident about a blast furnace is a repetition of a similar one at the same plants or other plants. A large proportion of these accidents can be avoided by the use of common sense, skill and prudence, provided the men are familiar with the causes of the accidents. Only a small per cent of the accidents may be attributed to the fault of the employer.

A Place for Labor Saving

AT THE recent March meeting of the American Society of Mechanical Engineers, the lack of proper equipment for the handling of package freight at the terminals in this country was strongly emphasized. It was pointed out that progress in the development of machinery for this work had been slow and that the use of the two-wheeled truck, as in years gone by, perhaps for the past 60 or 75 years, still was the rule in pier sheds and the warehouses. When freight was on ship or on track, it was asserted, mechanical power was applied liberally, but upon the arrival of the freight at the terminal, there the application ceased; it was the two-wheeled truck, propelled by a muscled unit from southern Europe, and in diminishing quantities, that was left to cope with continually increasing demands.

That the two-wheeled truck has maintained its position of importance all these years indicates its worth. The fact that it not only has served as a conveying unit, but as an ideal loading device, has made it one which engineers had great difficulty in improving upon.

With the situation as it is today and with the bitter experiences in shipping during the past winter, an incentive is presented which may carry for this line of development. Whether or not any marked advance can be made before the termination of the war, that alone time can tell, for the problem has numerous ramifications. It demands that not only attention be given to the development of mechanical equipment, but to the principals of terminal design and, perhaps, to the structure of railroad equipment But now that the subject again is up before the attention of American engineers, it is to be hoped that the work in this direction will be handled vigorously and will be in keeping with best traditions of American progress and ingenuity. The engineers, in this endeavor, may not afford any material aid in the prosecution of the war, yet they will be helping to meet a situation which is likely to develop with the coming of peace. Then embargo on common labor from Europe may go into effect and the present power behind the two-wheeled truck, perhaps for years to come, will be lacking.

A Puzzle for Clear Brains

GIVEN any group of men who handle any commodity necessitating cross-country transportation and it is certain that their conversation quickly will turn to the subject of railroads and freight. An unprecedented winter bringing unparalleled demands served only to accentuate a condition which is cumulative.

A jobber of structural material wished to rush steel 140 miles to complete some urgent government work. A permit was secured to obtain a car, a permit was then forthcoming to load the car and a third permit was procured to ship into embargoed territory. After that a 300-mile routing was necessary to get the car around a point known to be congested past all hope of extricating a shipment.

Refractories are known to be vital to steel production. The requirements of most large steel plants are protected by a reserve which is replenished by standing repeat orders with producers. During the winter months priority orders which were granted to these producers became a mockery, as no cars were forthcoming even at the most urgent calls. During February one maker could secure only 10 per cent of the cars asked to cover immediate crying needs. March saw an increased allotment to 30 per cent of the requested cars, but the depleted reserves of most refractories buyers were hopelessly behind.

These instances might be repeated indefinitely. They represent the general situation now—under favorable conditions for train operation, unhampered by the weather and extra winter traffic. It is true that existing congestion along lines converging at eastern ports is partially to blame. It is also granted that labor conditions and labor shortage at terminals and in railway shops may militate against effective operations in keeping the trains rolling. The whole question seems to display aspects of too much regulation. One good and substantial set of traffic brains seems badly needed.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 890

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$275.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 20 per cent fur.	70.00 to 72.50
Spiegel, contracts, furnace.	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, first quarter, Pittsburgh.	180.00 to 190.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products April 3, average for March, 1918, average for January, 1918, and average for April, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices April 3, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$42.20
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	39.20
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	39.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	39.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	42.25
Malleable, valley	33.50	33.50	33.50	36.00
Malleable, Chicago	33.50	33.50	33.50	39.00
**Southern, No. 2, Birmingham	33.50	33.50	33.50	35.79
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	33.00	33.00	38.25
**No. 2X Virginia, furnace....	33.50	33.50	33.50	38.25
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	41.50
Ferromanganese, 70%, delivered	250.00	250.00	250.00	360.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	72.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	72.50
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	72.50
Open-hearth billets, Pitts.....	47.50	47.50	47.50	72.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.38
Steel bars, Chicago.....	2.90	2.90	2.90	3.54
Iron bars, Philadelphia.....	3.50	3.50	3.648	3.659

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices April 3, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Iron bars, Cleveland.....	3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	$3.50	$3.50	$3.50	$3.19
Beams, Chicago	3.00	3.00	3.00	3.79
Beams, Pittsburgh	3.00	3.00	3.00	3.70
Beams, Philadelphia	3.185	3.185	3.185	4.159
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	4.69
Tank plates. Philadelphia.....	3.435	3.435	3.435	6.909
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	5.75
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	3.75
Sheets, galv., No. 28, Pitts.....	6.25	6.25	6.25	3.75
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.20
Connellsville furnace coke.....	6.00	6.00	6.00	7.25
Connellsville foundry coke.....	7.00	7.00	7.00	7.87
Heavy melting steel, Pitts.....	30.00	30.00	30.00	28.12
Heavy melting steel, eastern Pa.	28.75	29.50	29.80	25.15
Heavy melting steel, Chicago..	29.00	30.00	29.70	26.63
No. 1 wrought, eastern Pa.....	34.00	35.00	35.00	38.50
No. 1 wrought, Chicago.....	34.00	35.00	35.00	33.30
Rerolling rails, Chicago.....	34.00	35.00	35.30	31.90

(For Additional Prices See Page 890)

Question of Price Base in Dispute

Varied Interpretation Whether Basic or No. 2 Foundry Represents Base Figure Under New Reductions, Made by Producers and Consumers—Government Allots Basic Tonnage for Eastern Users—Unfilled Demands Huge

Pittsburgh, April 2.—Differences of opinion exist as to whether or not under the new price program the base level on pig iron has been changed. Prominent trade authorities themselves do not agree on this point and some consumers are contending that purchases they have made for second quarter should carry lower prices on all grades except No. 2 foundry and also on silveries and the lower grades of bessemer ferrosilicon. This contention is made under the assumption that the price on basic iron represented the base and that inasmuch as it has been reduced $1 a ton, a corresponding reduction should be made in the price of all other grades aside from bessemer, the new price of which is definitely fixed at $35.20, furnace and foundry iron, in which the price of No. 2 has been maintained by specific action at $33. The general committee on steel and steel products of the American Iron and Steel institute on Nov. 5 last in officially announcing the "schedule of pig iron differentials, said that "the base price of No. 2 foundry iron and also of basic iron was fixed at $33 per gross ton, f.o.b. cars, furnace." If basic is held to be the base level, then the $1 reduction would have to be made in other grades except No. 2 foundry and bessemer iron or the differentials become $1 greater. On the other hand, if No. 2 foundry is regarded as the base price, the only changes will relate to basic and bessemer. It is understood that the general committee of the institute is going to give an interpretation on this disputed point at once. In the meantime the prevailing opinion of the trade is that the only price changes made are in basic and in bessemer, though this view is hotly combated by some consumers. The matter has been called to the attention of the war industries board. No letup has developed in the demand for steelmaking grades, especially for basic, of which there is an acute shortage. Inquiries for bessemer are not so pressing and those for foundry have fallen off. There has been some trading through middlemen of basic for sheet bars, consumers of the latter paying the difference in the fixed prices. A valley consumer has come into the market for bessemer and is willing to take any amount that can be secured. The Trumbull Steel Co., Warren, O., is asking for 10,000 to 20,000 tons of basic iron for last half, and the Union Steel Casting Co., Pittsburgh, for 5000 to 7000 tons of bessemer. It is understood the Gould Coupler Co., Depew, N. Y., has been unable to cover its basic requirements. Some consumers who are urgently in need of tonnages have appealed to the war industries board. The regular sales averages by W. P. Snyder & Co., for March, show the fixed prices of $36.30 and $33, furnace, respectively, for bessemer and basic.

Strive Hard for Supplies

Boston, April 1.—A strong demand for iron for prompt delivery continues but with almost none available it is a big problem to satisfy demand. The chief effort of local agents and brokers has been to secure supplies for some of their customers who are badly off in the matter of supplies. No time, effort or expense has been spared in this effort and there are numerous cases where personal visits

have been made to the furnaces to get them to release supplies even at the expense of some other customers. There is little evidence, however, that the current inquiries in a majority of cases represent urgent needs; the New Haven road slapped on an embargo on inward freight on March 12 and on March 23, extended it to all its junction points, and the fear of delays in deliveries naturally makes melters rather anxious to be covered. One consumer has been looking for 1000 tons for May and June delivery for instance, which is merely made because there is a danger that 1500 tons contracted for will be held up long enough to create a scarcity. There are numerous such cases. But New England must look farther ahead in its forward bookings than other sections of the country owing to the uncertainties about winter deliveries and with the question of prices out of the way until July 1, it is expected that before long there will be more activity for last half. No Connellsville coke has been coming into New England and current business has gone largely to the local makers of by-product oven coke.

Second Half Foundry Sold

New York, April 1.—Many of the largest eastern consumers, as well as a great number of the smaller melters, have not yet closed for their pig iron requirements for second half, and due to the extent to which the furnaces are sold ahead, it is difficult to gather where their requirements will come from. It is estimated that the entire eastern production now is sold up to the end of the third quarter. Inquiries are coming out right along for good sized tonnages, but the furnaces as a rule, are paying no attention to these. Only in a few cases have second half tonnages been taken on during the past week. An eastern Pennsylvania maker, which previously had sold second half foundry on an extensive scale, has closed further tonnage for this position but since has withdrawn from the market. A Virginia furnace has opened its books and is offering some second half foundry and a western Pennsylvania producer also is selling limited tonnages of foundry for second half. Among the interesting transactions of the week were sales, aggregating a fair-sized total, of foundry iron by a southern furnace for immediate shipment to this district. The iron is to be shipped on special permit to consumers who need it for urgent government purposes. The General Electric Co. wants an indefinite tonnage of foundry for second half. Among numerous inquiries for second half foundry is one from the McNab & Harlan Mfg. Co., Paterson, N. J., for 1800 tons. A New York state melter is inquiring for indefinite tonnages of basic and malleable for second half. Leading Connecticut malleable interests recently have been sounding the market for a round tonnage of this grade.

Government Supplies Basic

Philadelphia, April 2.—Government regulation of pig iron distribution is becoming a market factor here. Numerous consumers on government work will receive tonnage by allocation of the director of steel supply which otherwise would go elsewhere or could not be delivered. To relieve shortage at one eastern mill government requisitioned 1000 tons of basic from a Schuylkill furnace and this was shipped immediately. The Lukens Steel Co., which has been suffering from shortage, has effected arrangement with the government whereby it will receive 5000 to 6000 tons of basic monthly from the south. Negotiations have been started for the requisitioning by the government from a New York state furnace of a large tonnage of standard low phosphorus iron for a large eastern consumer. This will supersede other bookings to large extent. Sales of the week include several thousand tons second half foundry iron for Pennsylvania railroad and several thousand tons copper-bearing low phosphorus iron for the last half. Other business comprised small tonnages of foundry and gray forge for quick delivery.

Shortage More Pronounced

Buffalo, April 2.—The scarcity of pig iron looms up from week to week now as the outstanding feature of the situation and this condition appears to be increasingly evident, rather than diminishingly so. Nothing more than the small lots which have constituted the only market of the past several weeks, is being disposed of. Producers have reached the stage where the taking on of extra commitments becomes hazardous in view of the uncertain coke supplies. One furnace not regarded as a merchant furnace, but which has been selling rather freely up till a month ago, now has retired from the market. It is sold up until the third quarter. Two of this interest's stacks are out. One will be blown in May 1 on basic which will be used by the producer's own steel mills while the other will be put in on the same date on ferromanganese. As events now shape themselves, it would not appear likely that there will be any large contracting by any district furnace for the next couple of months, unless the operating situation is improved. The demand keeps up strongly.

Expect Heavy Allocations

Cleveland, April 2.—Producers are anticipating that the government will be called upon to make heavy allocations of pig iron orders for delivery after July owing to the inability of many consumers to buy for that position in the open market. New allocations the past week have been small. The 1000 tons of foundry and 2000 tons of bessemer for Italy still are open. Consumers appear to be in a fairly comfortable position for the second quarter but there remains a large uncovered requirement for the last half which is the subject of a continuing heavy inquiry. Sellers are accepting practically nothing of this owing to their sold-up condition. The unfilled demand in steelmaking now is very large. A valley sheetmaker who has been seeking 15,000 tons of basic monthly has partially closed with a nearby maker. An Ohio river steelmaker again is inquiring for 30,000 tons for second, third and fourth quarter and another southern Ohio plant for 10,000 tons for third quarter.

Chicago Inquiry Persists

Chicago, April 2.—Though local makers of pig iron have been fully sold for their entire 1918 production for several weeks, inquiry continues to come out, not only from local melters but from a distance as well. The same condition seems to obtain in other producing centers as efforts by Chicago foundrymen to buy elsewhere have met with little success. One possibility remains in the fact that a merchant furnace at Milwaukee which has been out of blast for some time may become active during the last half and furnish some additional iron. This will not take place until July 1, and perhaps later, on account of the fuel situation. The principal producer in Chicago has taken a few contracts beyond its production with the understanding that they will be filled if conditions work out to make this possible. One inquiry just received is from the Andrews Steel Co., Newport, Ky., for 5000 to 10,000 tons of northern basic for second quarter and an equal tonnage for third quarter. An inquiry was received recently from a Buffalo consumer asking 15,000 tons of malleable. A round tonnage recently asked by a St. Louis basic user is not known to have been filled. Southern makers have not yet begun to offer iron freely for last half although indications are that

something will be done along this line. Embargoes preventing shipments to certain points have released some tonnage for spot selling which has relieved the situation somewhat.

Metal Can't be Had

Cincinnati, April 1.—The reduction of $1 a ton on basic will bring out no new business in this territory. Should basic producers in any district announce that they were able to take on more business this year, there would be a scramble on the part of consumers here to get under cover. The scarcity of metal now is of more consequence than the price fixed. The Ironton district has practically been cleaned up of all grades of iron with the exception of some foundry iron that will probably be offered later for last half shipment. As this tonnage will be so limited, the furnaces are hesitating about putting the metal on the market. Then, too, they also have to reckon with the possible contingency of having to shut down for repairs. Southern foundry iron is being sold in small tonnages for last half shipment, and a little off iron is to be had for the second quarter.

Sales at Lowest Ebb

St. Louis, March 30.—The past week has been marked by a continued heavy demand for pig iron from the district proper and from points logically well out of the zone normally supplied from this center. Against this is reported probably the smallest aggregate of actual sales noted since the beginning of the war. Merchant furnaces here are out of the market, being sold to capacity to the end of the year. Representatives of northern makers have received no further allotments for disposal, and the same is true of eastern producers. Customers are being informed the best possible arrangements will be made for them when there is anything to sell, but so far as could be gathered, no contracts to speak of were closed.

Furnace Companies Cautious

Birmingham, Ala., April 2.—While the revision of the pig iron prices by the government has been temporarily settled,southern furnace companies are preceeding cautiously. They are selling only in small lots and mainly to regular customers. There is but little if any iron obtainable from the probable make for the second quarter of the year. The sales being consummated are for last half delivery. Upward of 50 per cent of the probable make for the last half of the year has been sold. However, material increase in the make is looked for at least eight months of the year.

Coke Shipments Unstable

Car Supply Again Drops to Low Mark—By-Product Plants Instructed to Supply Local Foundry Trade

Pittsburgh, April 2.—The car supply in the Connellsville coke region is irregular. On the Monongahela railroad today the average was 70 per cent, yesterday it was 60 per cent and 30 per cent is promised for tomorrow. During the past week the supply fell off greatly and averaged only 30 per cent, the lowest it has been in a long period, comparing with 60 per cent for the preceding week, which was the greatest since last fall. It is the opinion that some loaded cars have been held at furnaces which had accumulated stocks and were unable to find additional space for piling. These supplies have been greatly reduced, however, and unless the improvement in the situation is made at once, it is likely that furnaces will again find themselves running extremely short of fuel. Efforts are being made to have virtually a full supply of cars within the next two weeks. There is practically no free coke being offered, and no new contracts are being made. Occasionally there are offerings of coke for shipment to restricted destinations. This has been especially true for delivery to points served by the Pittsburgh & Lake Erie railroad. Since the reduced level of $32 for basic iron became effective, coke contracts made on a sliding scale basis last fall for delivery during the second quarter will take lower levels. The contracts for the most part were made on bases of 5 to 1 and 4½ to 1 and under these the coke price for April, May and June delivery will be cut 20 to 22 cents per ton. The plan of the fuel administration to issue licenses to coke and coal jobbers which was to be effective April 1 has not been placed in effect. Applications for licenses have been made by jobbers and dealers and it is assumed that the plan will be started soon. Some dealers and jobbers are of the opinion that the licensing system will cause confusion. Production during the week ended March 23 totaled 339,580 tons as compared with 336,122 tons for the preceding week according to *Connellsville Courier.*

Further Sales in East

New York, April 1.—Some additional second half tonnage of foundry coke has been sold in this district during the past week by a western Pennsylvania beehive maker, who previously had closed numerous contracts for this position. This interest since has withdrawn, and no beehive coke now is being offered here. Additional sales of by-product foundry coke have been made by both New England and New Jersey producers.

Local Demand is Served

Cleveland, April 2.—Local consumers of foundry coke, under orders from the fuel administration, are drawing upon the by-product plant of the McKinney Steel Co. to the extent that the latter is able to supply this demand. The local blast furnaces of the American Steel & Wire Co. also are obtaining a portion of their supplies from the McKinney coke plants. The blast furnaces of the McKinney Steel Co. in western Pennsylvania are being served from the ovens of the H. C. Frick Coke Co. This arrangement is in keeping with the plan of the fuel administration to pool coke shipments in order to avoid long hauls and thereby effect a saving of cars.

Shipments Are Slow

Cincinnati, April 1.—Mild weather has brought out only spasmodic improvement in the coke situation. Shipments are being moved too slowly to destination according to the general complaint. No furnace coke is sold and very few foundry sales are on the books of different agencies.

Deliveries Move Up

St. Louis, March 30.—Consumers of coke in this district are complaining less on the score of deliveries from eastern ovens. An average of 50 per cent early in the month has been raised to close to 70 per cent. The favorable weather is loosening up congestion, and cars are more plentiful. Here, however, the betterment ends abruptly. It has been impossible to buy anything more than a few scattering cars for early shipment, and spot fuel is out of the question. Inquiries continue to deluge local dealers Southern producers are offering absolutely nothing. Smelters in the Missouri lead and zinc districts are hard pressed for supplies, and conditions in the southwestern states is hopeless. Fuel administration officials in the southwest have been exerting pressure here to obtain relief, but thus far have had but scant success. Production by by-product plants in this general region has picked up to some extent.

Pushing Commission Fight

Scrap Interests Circulate Petitions to Gain Support of Consumers—Shipment Prices Expected to be Reduced—Market Weakens

FOR COMPLETE SCRAP PRICES SEE PAGE 890

Philadelphia, April 2.—Scrap dealers and brokers are adopting more vigorous tactics in pushing their claims for a 3½ per cent commission on sales. They are circulating petitions for consumers' signatures which are to be presented to the price-fixing committee of the war industries board. Certain sellers who have taken the position that they were not obliged to revise prices downward on present shipments against sales which were made prior to April 1 are being advised that their position is contrary to the President's announcement of Dec. 28 last. This provided that all contracts entered after that date should contain a revision clause so that the price should be in accord with the official figure ruling at the time of delivery. The local market is weaker and new business is of moderate extent. Prices generally have been adjusted to the general reduction of $1 a ton in all grades.

Melting Attracts Attention

Buffalo, April 2.—Demand for iron and steel scrap is strong with offerings slightly heavier than they have been during the past week or 10 days. Several large railroad lists are now before the market and will be closed this week. They will, it is understood, go directly to the consumer. A picking up of sales was noticed especially for delivery within the district. The automatic effect of the reductions in steel scrap on the price schedule is to reduce the current prices on each grade. Considerable interest attaches to the meeting in Cleveland in the near future of the central division of the Association of Scrap Dealers with the western and eastern divisions. Local dealers believe that the decisions arrived at will touch matters of vital interest to the dealers. The existing price schedule will probably come in for a large share of attention.

Market is Softer

Pittsburgh, April 2.—Several grades of scrap show a softening and are being quoted below recent maximums. Sales of heavy melting steel have been made by producers in eastern Ohio to consumers at $28 and $28.50 f.o.b. consuming point as compared with the new government price of $29 on this grade. It is not believed, however, that dealers and brokers have shaded this quotation. Producers also have sold No. 1 cupola cast scrap, the maximum price for which now is $34, at between $32 and $34. The price of stove plate, which is not regulated, is easier, and this grade is quotable at $22. Transactions between dealers and consumers are almost entirely lacking. Supplies are reported to be somewhat more abundant, but not sufficient to meet the demands of this district, which consumes 44 per cent of the output of scrap in the country, but produces only 24 per cent. This situation gives a firmer tone to this market than is applicable to other consuming districts. The fact that prices are fixed on a delivered basis acts to the disadvantage of Pittsburgh consumers, it is claimed, because the natural tendency is for scrap to move to the nearest point of consumption. Suggestions are said to have been made to the price-fixing committee of the war industries board to change the price bases so it will be less difficult for Pittsburgh consumers to get supplies. It is also reported that the committee on iron and steel products of the American Iron and Steel institute is considering the idea of changing the classification of No. 1 cast and malleable scrap for cupola use and that the prices may be reduced slightly, perhaps 50 cents a ton. Dealers and brokers are anxiously waiting for an announcement on commissions.

Prices Generally Decline

New York, April 2.—The general reduction of $1 in all prices of scrap was the outstanding development in the old material market here during the past week. This, in conjunction with the general weakness of the market has resulted in a further decline in virtually all going prices. Dealers report trading as a whole as being dull and in addition are holding material until the market again shows some signs of strength. In fact, cast scrap appears to be the only description for which there is any particular demand. Prices in this instance are firm. Another grade which is holding up well is city wrought, but this is not due to demand but to the scarcity of this material. The other extreme is found in turnings.

Market is Weakened

Cincinnati, April 1.—Little confusion has resulted from the recent price changes that take effect today, but the action has tended to weaken the market. Dealers are not willing to accumulate any large amount of scrap, especially when the commission question still is unsolved. A great deal of scrap is being received at the yards that has to be sorted, which is only one item of expense that the dealers are put to in handling the material and for which no provision is made in the government prices. An improvement in shipments to Pittsburgh is reported one day and denied the next, because the railroad situation is one that the average shipper cannot understand. Freight embargoes are raised today and put on again tomorrow.

Conditions Are Stagnant

Cleveland, April 2.—Scrap iron and steel trading in this district is more inactive than last week, if that be possible. Announcement of the new prices without any enlightenment on the matter of commission has only served to make the market more stagnant. The country is reported well cleaned of scrap, while dealers have been out of the running so far as railroad material is concerned. Consequently, some of the most fruitful sources of supply have been eliminated. Yards of dealers here are pretty clean, too, and consumers have fairly good stocks on hand. Cleveland dealers are sanguine over the prospects of being granted a commission, and report consumers showing no hesitancy in signing petitions asking that this allowance be restored. Outside of the official $1 reduction, no price changes are reported inasmuch as trading has been nil. The only sale of importance in the past few days was one of $39 in low phosphorus scrap.

Adjust to New Prices

Boston, April 1.—The local scrap market has been somewhat upset by the announcement of the new government prices, but once the changes became clear to the trade, business went forward again in the usual channels. Practically all grades are affected by the new price schedules. Railroad embargoes are restricting the movement of scrap to consuming points outside of New England, and there was a report this morning that all eastern roads soon would establish a two-weeks' embargo. Cast scrap is not selling with much snap, but sellers are not inclined to sacrifice profits for the sake of business. Wholesale dealers' paying prices per gross ton, f.o.b. cars, shipping points, follow: Wrought No. 1 yard, $29 to $29.50; horseshoes, $29 to $29.50; cotton ties, $24; stove plate, $22; No. 1

machinery, $31; No. 2 machinery, $29; car axles, steel, $43; iron, $43 re-rolling rails, $30; bundled barrel hoops, $21; iron boiler plate, $34; wrought iron pipe, new specifications, $29; steel rails, $25.50; No. 1 railroad steel, $25.50 heavy melting steel, $25.50; axle turnings, $22; machine shop turnings, $15 to $15.50; cast borings, $15.50; drop forge trimmings, $24; cast iron car wheels, whole, $27, broken, $31.

Supplies Are Limited

St. Louis, March 30.—Despite the announcement of new official prices, there has been very little change in the market locally for scrap iron and steel. About the only reductions noted in dealers' lists are on grades which were selling at the maximum prior to the $1 cut. Dealers here think the threatened great scarcity of pig iron is the main argument in favor of firm scrap prices. A majority of the important consumers of melting steel are working on government contracts and have intimated they are not over-generously supplied with raw material. Dealers have been pushing the carriers on deliveries, and while some improvement is noted in this respect, there is still much left to be desired. Country receipts have been relatively light. While many consumers are willing to pay top prices for prompt delivery, dealers are unable to promise anything inside of 60 days. Considerable anxiety is expressed among dealers and brokers relative to commissions and other features of the new regulations. Railroad offerings this week were nil.

Chicago Market Quiet

Chicago, April 2.—Conditions in the scrap iron and steel market in Chicago continue quiet, the recent reduction on maximums of $1 having unsettled the market to some extent and buyers and sellers still are awaiting developments. No particular objection has been raised to the changes, and the market probably will resume its regular swing in a short time. Demand is not heavy on the part of most buyers and there seems to be an inclination on the part of holders of scrap not to offer too freely at present. The greatest point of scarcity seems to be in rerolling rails, which are almost absent from the market, and users of this form of scrap have difficulty in obtaining anything like their requirements. Railroads are offering comparatively little, the Chicago & Northwestern having just issued a list containing 4100 tons, of which 750 tons are steel rails and 500 tons No. 1 wrought.

Divert Steel to the East

Congestion of Certain Finishing Mills Lead to Increased Sales
Sheet Makers in Desperate Straits to Get Bars

Philadelphia, April 2.—Congestion at some finishing mills has enabled certain middle western producers to sell some semifinished steel in the east. One such sale involved 9000 tons of slabs; another 500 tons of slabs; a third several thousand tons of billets; and also a considerable tonnage of high carbon billets and slabs. The shortage of raw steel continues acute, however, due to the inability to get sheet bars despite the fact it is covered by contracts. The Bethlehem Steel Co. is rolling sheet bars both at Bethlehem and Sparrows Point. The N. & G. Taylor Co. is inquiring for several thousand tons of sheet bars. A Philadelphia district mill wants 2000 tons of billets for rerolling into large rounds. Numerous other inquiries are current.

Heavy Inquiries Continue

Pittsburgh, April 2.—Pressing and numerous inquiries are coming to makers and sellers of sheet bars in which there is an acute shortage. One small lot was sold in this district to a nearby consumer during the past week. Production now is estimated at about 90 per cent of capacity and it is possible that some light offerings may be made within a week or so, but they will fall greatly below the demand. Inquiries for slabs have fallen off. A platemaker in the east is understood to have bought 2000 tons in this market during the past week. Inquiries for forging billets and for discard steel are more numerous. The former are extremely scarce and the government price of $60, Pittsburgh, represents the minimum at which tonnages could be bought. The market for discard billets is firmer. While it recently was possible to buy 4 x 4-inch discards at $5 or $6 under the government price of $47.50, Pittsburgh, for regular billets, the level now appears to have moved up to about the price on soft billets. Some brokers are understood to have been able to get lots at $1 a ton under this figure. Small discard billets including sizes under 4 x 4 inches for rerolling also command the government price of $51, Pittsburgh, for soft steel, in most cases where quotations are being made.

Market is Quiet

Pittsburgh, April 2.—Activity that was expected by this time has not developed in the market for cold rolled strip steel. Makers of automobiles still have stocks on hand despite the fact that they have not taken any sizeable tonnages for several months. Their supplies, however, are reported to be almost depleted and it is believed they will come into the market soon. Makers have piled some stock and are able to make early delivery on requirements. The car supply has improved.

Consumers are Desperate

Cleveland, April 3.—Consumers of sheet bars in the northern Ohio district are well nigh desperate over the failure of their sources of supply to fill even old contracts. Some sheet mills cannot get shipments of first quarter delivery material, and producers declare there is no use to sell for second quarter when they are unable to complete first quarter contracts. Some Ohio sheet mills are operating at about 40 per cent of capacity, and managers are trying to wring bars from mills under every sort of pressure, but without avail. More attention is being given to the possibilities of using shell steel discard steel as a substitute for certain grades of sheets, but this change would entail such changes in mill practice and equipment as to cause mills to shrink from it at present. However, before the end of the year shell discard steel may become more of a market factor, say conservative sheet mill managers.

Full Operations

Shown by Open-Hearth Plants, But Bessemer Works Less Active

Youngstown, O., April 3.—Reports for the week ending March 30 show that in this and the Greater Pittsburgh districts, by-product coke ovens were operating at 93 per cent, a decrease of 1 per cent over the previous week; blast furnaces were operating at 92 per cent, the same as the week before; open-hearth at 98 per cent compared with 88 per cent one week earlier; and bessemer plants at 83 per cent, a decrease of 3 per cent over the previous week.

With all but one steel company reporting, there are 26,000 tons of steel piled in this city on account of embargoes and a shortage of cars. This company reported the previous week that 10,000 tons of steel were stocked. This would bring the aggregate to 36,000 tons as against 38,000 tons reported last week.

Bars Difficult to Place

Only Smaller Sizes Usually Offered in Open Market—Implement Trade Now is Well Covered for Future

Chicago, April 2.—Soft steel bars now under contract with western mills are sufficient to fill their schedules far in the future. Aside from recent contracting by agricultural implement makers to cover their necessities for the present year, practically nothing is being taken outside of government allotments. The agricultural implement business has gone principally to the leading interest, which has had most of this business in the past and all users are understood to have covered for their 1918 needs. Government allotments are fairly heavy, although not as much for bars as for plates and shapes. Railroads are not inquiring, awaiting action from Washington. Bar iron mills find conditions somewhat quieter, war requirements not now being so much in evidence, and most buying is moderate tonnages with specifications accompanying the order. In fact, almost all contracts now on books are for spot delivery, although a few contracts for wagon material have been taken covering first half requirements. When the government's order for railroad cars is placed, it is expected to call for considerable tonnages of bar iron. Mills rerolling hard steel bars from rails find more business presenting itself than can be accommodated. There is great scarcity of rails, railroads putting much less tonnage of this material on the market than usual. Mills are able to contract for only as much hard steel bars as they are able to cover by their rail purchases. Reinforced concrete users are not inquiring and most of the present demand is from manufacturers.

Small Sizes Only Obtainable

Philadelphia, April 2.—Steel bars continue hard to get except in the smaller sizes. The Donner Steel Co. has disposed of an additional tonnage in sizes up to 2 inches. Iron bars remain quiet. Large orders for bolts, spikes and rivets are being placed for shipyards. The American International Ship Corp. has distributed a good-sized bolt tonnage.

Fair Demand Shown

Pittsburgh, April 2.—Fair demand exists for steel bars and some of the independent mills are able to book considerable tonnages for delivery to implement manufacturers and other users, mostly for second and third quarter shipment. It is understood that some makers are actively soliciting business. Others are able to take care of their regular trade only owing to the sharp reduction in output which they had suffered up to recently and also on account of heavy government orders. The market for iron bars is active and a great deal of the tonnage is being made for the government.

Selling is Cut Down

Buffalo, April 2.—Instructions to discontinue further bar contracting, owing to the heavy government requirements have been issued to some steel mill representatives here. A local mill which is sold two months ahead on bars, still is contracting, but cautiously in order to be able to take care of any forthcoming government requirements.

Big Inquiries are Current

Chicago, April 2.—Inquiry for nuts and bolts has been much stimulated recently and during the past week one inquiry for 6,000,000 bolts and nuts was received in this district and yesterday another inquiry for 10,000,000 for the use of the government in France was received. Demand for turnbuckles is also on the increase, large numbers being used in the construction of airplane hangars, an inquiry within the last few days, involving 100,000 of these. In addition to this heavy government inquiry, there is a demand for the same material from other directions.

Operations are Improved

Pittsburgh, March 2.—Makers of nuts, bolts and rivets report that the car supply has improved greatly and operations are estimated at 75 per cent of capacity. Fair-sized orders are being received, most of them for the government, either directly or indirectly. Shipments on regular commercial requirements are being given in from 30 to 60 days, while on special business they are deferred from 90 to 120 days.

Wait for New Classification

Pittsburgh, April 2. — Makers of steel strip and hoop steel and bands are awaiting an announcement by the committee on iron and steel of the American Iron and Steel institute regarding the reclassification of those products so that they will take a single base proper differential. The price of 2.90c, Pittsburgh, for bands is not at all attractive and it is desired to remove them from the steel bar card. Fairly active demand exists for hoop steel, which is going to miscellaneous interests, but chiefly to makers of oil barrels.

Fair Demand is Made

Pittsburgh, April 2.—Demand for cold rolled shafting is fairly active. A considerable portion of the tonnages is being taken for the government, either directly or indirectly. The smaller sizes, such as 2-inch, are not being inquired for as freely as the larger diameters which are needed for the manufacture of munitions. Delivery on the former is being made in 60 days by some producers, while shipments on larger sizes are deferred from three to four months. Machinery interests are buying fair-sized lots, while demand from the screw stock trade is quiet.

Stronger Prices

Shown in Ferromanganese—Spiegel and Ferrocarbon Titanium

New York, April 1.—The subcommittee on ferroalloys of the American Iron and Steel institute held another meeting today to consider the proposal to reduce the number of units in standard ferromanganese and spiegeleisen, respectively, from 80 and 20 to 70 and 16. It is expected that an announcement on this matter will be made to the trade shortly by the subcommittee.

Inquiry for spiegeleisen is active, and it is estimated that some 4000 to 5000 tons now are wanted, mainly for second half. The market is strong at $70 for 16 per cent for any shipment.

Prices on ferromanganese have advanced. Asking prices now are no lower than $275, delivered, for 80 per cent metal, and $250 for 70 per cent. Sales of the week include 500 tons of English ferromanganese for delivery over April to August, inclusive.

Fifty per cent ferrosilicon for prompt shipment is being sold at somewhat lower prices than those prevailing of late, by interests who only recently began to produce this metal. Carloads for shipment within the next four to eight weeks are being sold at $170 to $180 per ton, delivered. On absolutely spot requirements it is believed that $190 could not be shaded. Contracts are going at all the way from $155 to $175, delivered, depending upon the buyer and seller. De-

mand, while rather quiet, is sufficient to prevent any accumulation of stocks.

Demand for ferrotungsten is somewhat quieter. The largest prospective transaction involves 300 tons for Italy, for which government officials at Washington, are negotiating. The market on 70 per cent ferrotungsten continues to be quoted at $2.25 to $2.30 per pound at the furnace.

Round advances were put into effect on ferrocarbon-titanium on April 1. The former price of $160 per net ton at makers' plant for carloads has been raised to $200, makers' plant. For lots between 1 ton and a carload, the new price is $220 per net ton, and for less than ton lots, $250 per net ton.

Sales Made on New Bases

Pittsburgh, April 2.—Sales of ferromanganese and spiegeleisen have been made in this district on the newly adopted bases. The standard for the former was reduced from 80 per cent to 70 per cent and that for the latter from 20 to 22 per cent to 16 to 18 per cent. The base prices on the old standards have been maintained on the new ones and 70 per cent ferromanganese is quoted at $250, delivered for spot and first half and 16 to 18 per cent spiegeleisen is at $70, furnace, both for spot and contract. Good sized inquiries are pending for ferromanganese. It is understood that the price per unit above 70 per cent has not been definitely decided upon, but that probably it will be $3.50 to $4, depending on the delivery, and that for spiegeleisen will be about the same. The Pittsburgh Crucible Steel Co. has taken 400 tons of 16 to 18 per cent spiegeleisen for April-May-June delivery at $70, furnace.

Snap Up Old Quotations

Cleveland, April 2.—Buyers of ferromanganese in this district who have had open recently quotations of $250, delivered, have been taking advantage of these in view of the market's advance. Probably 1000 tons for last half were closed in the week. The market is quoted at $275, delivered.

Ferro in Demand

Chicago, April 2.—Strong demand for ferromanganese has been experienced recently and considerable selling has been done. The local producer is said to be sold to about 75 per cent of last half production. The price has been $250 at the furnace but some selling has been done elsewhere at $275, delivered. With ore conditions uncertain, sellers are extremely careful in obligating themselves.

Await Great Car Award

Government Takes Bids on 100,000 Cars of Standardized Type and Many Locomotives—Rails Are Placed

New York, April 2.—Distribution of large orders for cars and locomotives in connection with the government's large program of railroad rebuilding is expected to take place this week. The railroad purchasing committee now is conferring in New York with supply men regarding the specialties for standardized rolling stock. Announcements of the car and locomotive orders are expected to follow this conference. According to the present outlook, 100,000 cars including 55-ton steel hopper, 70-ton high side steel gondola, 70-ton low side steel gondola, 40 and 50-ton box and 50-ton composite gondola cars will be ordered. This is in accordance with the standard specifications and plans which have been prepared and have been issued to the car builders during the past week. These specifications are reported to be of a broad character. Parts which are possible of interchange have been standardized.

The Chicago, Milwaukee & St. Paul has authorized the building of 5000 freight cars in its own shops. Since the Canadian government awarded 8000 cars, approximately 6000 of which went to the Canadian Car & Foundry Co., little business has been placed. Of the order the Eastern Car Co. received 750 flats and 650 coal cars, and the National Steel Co. 1000 box cars. The American Railway Corp. has awarded 40 hoppers to the Pressed Steel Car Co. New inquiries include 200 boxes and 200 flats for the Manila railway; 50 are for the Chile Exportation Co. and 100 tak cars for the Roxna Petroleum Co., Tusca, Okla.

The government has distributed orders for 5000 to 10,000 tons of rails. Many railway inquiries are current from street railway and industrial companies. These are being booked at from $60 to $80 per ton. The Philadelphia Rapid Transit Co. is seeking 1000 tons of rails and 300 kegs of spikes.

Withdraw from Market

Pittsburgh, April 2.—Jobbers still are seeking small spikes, but a number of makers in this district have committed themselves fully and have withdrawn from the market. Deliveries are deferred from four to five months on business which was last taken. Numerous small lots of standard railroad spikes are being sold and the time of shipments promised ranges from four to eight weeks. No inquiries of importance are being made for standard rails and probably will not be until the government comes into the market for a large tonnage, as it is expected to do soon, in connection with its railroad upbuilding program. Most makers are fully committed for the remainder of the current year and are unwilling to quote on 1919 business, but are holding themselves in readiness to take care of government requirements.

Await Car Buying

Chicago, April 2.—Railroad cars are not being inquired for nor bought, all railroads waiting the result of the government's proposed buying, which at first was figured at 150,000 cars, later reported at 45,000 cars and now is said to involve 60,000 cars. It has been rumored that this order may be placed during the present week, and probably will be distributed among various builders throughout the country.

Standard steel rails are being sold only in small tonnages to piece out the requirements of various roads which already had covered their principal requirements for 1918. Delivery of rails on existing contracts is slow as mills find need for their raw steel for other purposes. Light rails are active and are being sold in considerable tonnage, about 25 per cent of present contracts being for export purposes.

Car Shortage

Greatly Felt in Tin Plate and Some Plants Suspend

Pittsburgh, April 2.—Shortage of cars caused a reduction in operations of tin plate mills during the past week, some of them having had to suspend entirely. Production continues, however, at a good rate of capacity and it is believed that a better car supply will be available at once. Shipments are moving without interruption and considerable has been accomplished in the way of reducing large stocks which had been piled in warehouses. It is understood that the food administration is exerting every effort possible to improve operations and shipments so as to assure a sufficient supply of tin plate for containers of perishable foods.

Many Hangars Awarded

Large Orders for France Finally Distributed by Government —England is Important Buyer of Ship Shapes

New York, April 1.—Negotiations are being conducted by government authorities at Washington for the purchase of a large tonnage of plain structural shapes for the British government, for early shipment. Many other export inquiries for shapes are out, but are receiving no attention due to the export embargo. Ordinary domestic demand for plain shapes has fallen off considerably. However, to such an extent have government requirements grown of late that the mills which recently were offering shapes for delivery in two or three months now can take practically no tonnage for shipment in less than four to five months. An interesting project which has been revised is the extension to the Culver Rapid Transit line, Brooklyn, which originally came up several months ago. Bids on 3600 tons for this work are requested. Considerable progress has been made in letting the contracts for airplane hangars, of which it originally was expected to build 2500, for the use of the American expeditionary forces in France. It is understood that 900 to 1000 of these buildings, each involving 35 to 40 tons, have been let.

A Hangar Steel is Awarded

Pittsburgh, April 2.—The government is reported to have distributed steel for 2500 airplane hangars for France, involving approximately 100,000 tons. These awards had been held up because of a change made in designs. Fabricators in this district are reported to have received a considerable portion of the business. One local fabricator has put out an inquiry for 20,000 turnbuckles for hangars. It is said that this number of turnbuckles is required for 500 shelters which will require 1000 tons of angles. An inquiry is out by a nearby mill for 2,500,000 1¾ x 1¾ x 3/16-inch angles for supports for barbed wire entanglements for France. About 2750 tons of steel are involved. Structural awards being made by the government involve large tonnages and it is estimated that 85 per cent of the operations of mills in this district is devoted to government requirements. The domestic market is extremely dull.

Western Building Slack

Chicago, April 2.—Were it not for the constant requirements of shipbuilders, for whom material is placed by the government, the market for steel shapes would be extremely slack. Aside from the allotments by the government for shipping, comparatively little is coming into the market as building operations are at a minimum.

CONTRACTS AWARDED

Shaft sets, bearers, and stuttles, for Norrie Aurora mine, Oliver Mining Co., Ironwood, Mich., 223 tons, to American Bridge Co.

Deck plate and through plate girder spans for the Minneapolis, St. Paul and Sault Ste. Marie Railway Co., Palisade, Minn., and Waukesha, Wis., 112 tons to independent shop.

Structural steel for conveyor supports, for crushing plant, Utah Copper Co., Magna, Utah, 100 tons, to Kansas City Structural Steel Co.

Ninety-five buildings to be erected for Atlantic Loading Co. in New Jersey, 1500 tons to independent fabricators.

Crating shop for quartermaster general's department, 900 tons to Bethlehem Steel Bridge Corp.

Crane runway for Henry R. Worthington, Inc., Harrison, N. J., 450 tons to Austin Co.

Airplane hangars for American Expeditionary forces in France, 35 to 40 tons each, contracts let for 900 to 1000, including 120 to McClintic-Marshall Co., 120 to L. F. Shoemaker & Co., and 120 to Belmont Iron Works; 1500 to 1600 still pending.

Power house at Thamesville, Conn., 300 tons, to Berlin Construction Co.

Trestle for the Upson Nut Co., Cleveland, 220 tons to independent fabricator.

CONTRACTS PENDING

Breaker for Delaware, Lackawanna & Western railroad, 900 tons, bids being taken.

Culver Rapid Transit Line, section 3, Route 49, Brooklyn, 3600 tons. Bids to be opened April 15.

Viaduct for Southern Railroad, 350 tons, bids being taken.

United States Assay Office, New York, plans being drawn for new building.

Colored Men's Y. M. C. A. building, 179 East 135th street, New York, 300 to 400 tons, bids being taken.

Bascule bridge for the Boston & Albany railroad, 1000 tons, bids being taken.

Output Loss Due to Cars

Shortage of Box Cars Seriously Affects Sheet Mill Operations —Close Tonnages for Portable Camp Stoves

Youngstown, O., April 3.—All sheet mills in this territory are operating at reduced output owing to the shortage of box cars. The leading producer states only one box car was delivered to his sheet mills in one week and that last month the scarcity of cars was so pronounced, the mills were idle 190 eight-hour turns. As a result large tonnages of sheets are being piled in the mill warehouses and when this space is exhausted the plants will be shut down. Sales-managers say that incoming eastern shipments of material loaded in box cars show a decided improvement but unless these cars are loaded with westbound or government material they cannot be used. Sheet makers do not expect any improvement in eastern shipments until the war is ended on account of the heavy government traffic in this direction. Most mills are already heavily stocked with eastern export sheets upon which shipping permits have been refused. Inquiry continues heavy but sales are few since in addition to being sold up for several months, makers are behind on deliveries.

Want Steel for Stoves

Cleveland, April 2.—Manufacturers who received orders for large numbers of portable stoves for cantonments are covering for their sheet requirements which run to considerable tonnage. One northern Ohio stove maker who received a portion of this order has closed for his black sheet needs involving 18,000 to 20,000 sheets but still was in the market this week for approximately 35,000 blue annealed of No. 14 gage and for 13,000 galvanized sheets. Buyers find it difficult to obtain quotations from sheet makers for any reasonably nearby delivery.

Tonnage is Allocated

Pittsburgh, April 2.—Most of the tonnage of No. 22 corrugated sheets required for hangars for the American army in France has been allocated. The amount of tonnage for this purpose is extremely heavy and is said to exceed 50,000 tons. Operations of sheet mills in this district are proceeding at a low rate and are not greater than 60 per cent of capacity.

Taking Tentative Orders

Philadelphia, April 2.—An eastern maker of sheets now is taking blue annealed business for June delivery with the understanding that the government requirements come first. Government orders recently distributed represent a large tonnage in the aggregate.

Place Plates for British

Government Orders Ship Steel From Eastern Mills for Ally—More Stringent Control Exercised Over Distribution

Philadelphia, April 2.—Large tonnages of ship plates have been placed by the government with mills in the east and elsewhere for shipment to England. These take precedence over all other business. The government during the week placed still further restrictions on the business plate mills may book. They may now accept orders only when accompanied by priority certificates. The Pennsylvania railroad has placed 6000 tons of plates with several mills. All eastern plate mills now have enough urgent business to take them well into the fourth quarter.

Heavy Bookings Made

Pittsburgh, April 2.—Platemakers in this district have taken heavy bookings during the past week, a good portion of the tonnage being for the Emergency Fleet corporation. There are no offerings of sizes in the open market such as are used by the government, although it is understood there has been limited lots of other sizes sold to commercial buyers. Mills are understood to be well committed for the first half and after that period large tonnages again will be placed by the United States government both for itself and the allies. England is in need of an unusually large quantity of plates for that delivery. Car builders are holding a conference in Washington with government authorities regarding the plans for the production of a large number of cars, details of which have been announced heretofore The Pressed Steel Car Co. has taken 95 coke cars for the Semet-Solvay Co.

Follow Orders Closely

Youngstown, O., April 3.—A platemaker in this district whose mill has been idle for about 10 days was notified by government officials to ship all emergency fleet plates to the various shipyards specified and to transfer the remaining unrolled tonnage to another maker. This is illustrative of the close way in which the government is following up plate orders. About a year ago this mill was closed down for over a week on account of the shearmen striking for higher wages which were eventually granted. In order to prevent the reoccurrence of this, the officials ordered a spare shear. This was stored in the mill yard. Recently the shearmen again struck for higher wages. The mill was then shut down and preparations made for the installation of the shear.

War Tonnage is Heavy

Cleveland, April 2.—Local plate makers continue to devote a large proportion of their capacity to war work, principally plates for shipbuilding. The entire output of one plant is being drawn in that direction and from 85 to 90 per cent of the production of another. A new war order received in the local district the past week calls for 2500 tons of light plates for the manufacture of depth bombs. These are to be shipped to a western point and were allocated on a Chicago base price. Some universal plates still may be had from eastern mills at 3.33c, mill, for shipment at mill convenience.

Heavy Tonnage is Offered

Chicago, April 2.—Government allotments of ship material, principally plates, containue to come to western mills, but nothing of an important nature has been allotted here recently. Most of the material is in small tonnages, both for fabricating shops and for shipyard use, but these are in such numbers that the aggregate is large. One lot of 70,000 tons of plates on which prompt delivery was required was offered here recently, but it was not possible for local mills to handle it and it went elsewhere.

Lap Weld Demand

Shows Continuing Increase—War Buying of Cast Pipe Delayed

Pitsburgh, April 2.—Demand for iron and steel lap weld pipe which has been consistently active for some time in increasing and comes principally from oil country interests. The leading interest is not taking any new business, while some of the independent mills have fallen behind in deliveries and cannot make shipments on sizeable lots under three months. They also have reached the point where they are confining sales to their regular trade. Improved demand comes from jobbers for iron and steel butt weld sizes and where it was the practice to make prompt delivery up to recently, the best shipment now afforded is one month except where assorted shipments are wanted these can be made promptly.

Buying is Held Up

New York, April 2.—Considerable new business is being held up in the eastern cast iron pipe market, pending action by congress on appropriations for certain projects the government expects to get under way shortly. At present, demand generally is dull, there not even being the inquiry from private consumers, which has prevailed of late. Little is being done in the way of export buying and municipal inquiry continues at a standstill.

Western Cities Slow

Chicago, April 2.—Demand for cast iron pipe is slow to come out, although the season is becoming advanced, and all tonnages are small. The only inquiry of any importance at present is Springfield, Ill., where figures were to be opened April 1 on 1700 tons. The Central Foundry Co. has taken 90 tons at Manitowoc, Wis., at $54.55 per ton for universal pipe. The United States Cast Iron Pipe & Foundry Co. has been awarded 142 tons at Niagara, Wis.

Largest Inquiry

For Barb Wire Issued for Italy—Nail Bids Accepted

Pittsburgh, April 2.—The Jones & Laughlin Steel Co. and the Pittsburgh Steel Co. each has been awarded 10,000 kegs of nails by the war department and it is reported that the remaining 10,000 of the 30,000-keg lot on which bids were opened last Tuesday went to the United States Steel Products Co. All three of these companies together with the Youngstown Sheet & Tube Co., put in a bid of $3.50 per 100 pounds, the price recommended by the committee on iron and steel products of the American Iron and Steel institute. These nails are to be shipped to France. Nails are in active demand and makers who have been soliciting business have become so heavily booked that they no longer are doing so. Bids for 40,000 kegs of nails were opened today by the bureau of supplies and accounts, navy department. The government is putting out an inquiry for 60,000 tons of barbed wire for Italy to be delivered within six months. This is said to be the largest single inquiry for barbed wire that has come before makers of the United States since the war began. Considerable inquiry also is being made for barbed wire for agricultural interests in the northwest and tonnages taken for this purpose involve sizable lots.

Ore to Move Under Central Control

Consumers and Shippers of Lake Superior Ore Approve Plan for Unified Direction of Trade This Year—Coal and Ore Interests Will Co-operate With Vessel and Railroad Men

LAKE Superior iron ore in its progress from the northern mines to consuming points along the lower lakes and in the east, is to be handled this year under a plan of centralized control. The ore trade will be directed as one element in a general plan which provides for the unified direction of the iron ore, coal, vessel and railroad interests involved in Great Lakes trade.

Unanimous approval was voiced at a meeting in Cleveland April 2 attended by representatives of a majority of the iron ore consumers. On April 3 the vessel operators of the Great Lakes pledged their support to the mobilization plan which is a part of the general scheme of complete co-ordination. The railroad and coal interests are heartily in support of the plan.

What the Plan Is

As worked out at the present time, the plan provides for an administration committee of four members which will include one representative each of the iron ore and coal trades and of the vessels and railroads. These interests in turn will be represented by their own individual committees. The iron ore committee, for instance, will be the subcommittee of the American Iron and Steel institute which has been handling iron ore, pig iron and lake transportation. The vessels will be represented by a vessel committee representative of the shipping board. The coal committee will represent the fuel administration and the railroad committee will represent the regional director of railroads in eastern territory.

The administration committee in turn will function through the newly organized ore and coal exchange. Each of the four trades will be represented by operating committees working in direct co-operation with the ore and coal exchange. The ore operating committee will handle the details of cargo loading, unloading and distribution. The coal operating committee will handle cargo allotment, and loading and unloading problems. The vessel operating committee will look after vessel distribution and supply, and the operating committee of the railroads will supervise the car supply and car movement.

H. G. Dalton, of Pickands, Mather & Co., chairman of the institute committee, presided at the meeting on April 2. He outlined the plan for co-ordinating the four industries and emphasized the vital importance as a war measure of using as sparingly as possible railroad facilities during the next year. "The railroad situation is the weak link," said Mr. Dalton. "The vessel capacity for handling the iron ore is ample and the unloading facilities at lower lake ports and in furnace yards is sufficient."

In directly addressing the ore consumers, Mr. Dalton asked each to place their estimated requirements at the lowest figure consistent with full operation. "Do not ask for more than you need," said Mr. Dalton. "Do not ask for your ore first. We want to close the year with each consumer having a full supply and no more, so that the tax upon the railroads will have been distributed as fairly and as lightly as possible."

Harry Coulby, president of the Pittsburgh Steamship Co. and chairman of the mobilization committee which will direct lake vessels during the year, emphasized the importance of conserving railroad facilities. He pointed out that last year's experience in directing lake trade had resulted temporarily in some inconvenience for individual interests but that the net result had been that at the present time each consumer had on hand a sufficient amount of ore to meet his requirements, that ample coal had been carried to the northwest and that all the grain offered for transportation had been moved before the close of the season.

Matthew Andrews of M. A. Hanna & Co. urged that estimated requirements be placed at the lowest figure and pointed out that the cutting off of 100,000 tons from the estimates of each of 10 different firms would release 1,000,000 tons in transportation capacity. This would decrease the burden upon the railroads so that they could carry more coal.

What Ore Committee Wants to Know

Ore in furnace yard, April 1, 1918.

Ore on Lake Erie docks, April 1, 1918.

Estimated amount wanted direct during season 1918.

Estimated amount wanted docked at Lake Erie ports during season 1918.

Total amount to be brought down by vessel in 1918, *including any deferred purchases.*

First, second and third choice routes over which you prefer to have ore shipped.

Average unloading capacity per day, of 24 *hours, number of cars.*

Kind of unloading equipment.

How Ore Committee Will Work

E. C. Collins of the Pittsburgh Steamship Co., chairman of the ore operating committee, outlined briefly the plan under which this committee will work. Regular daily meeting will be held at which the problems of properly handling the ore movement will be considered. He urged each consumer to have a representative in Cleveland who would be thoroughly cognizant of conditions at his plant so that the committee could work at all times with an exact knowledge of the situation at each consuming point.

The administration committee will be made up of Harry Coulby, president of the Pittsburgh Steamship Co., representing the vessels; Matthew Andrews of M. A. Hanna & Co., representing the ore interests; A. A. Augustus of the Cambridge Collieries Co., representing the coal interests; and George L. Peck, representing the railroads. The vessel committee includes Harry Coulby; C. L. Hutchinson of Hutchinson & Co.; J. S. Ashley of M. A. Hanna & Co.; C. D. Dyer of the Shenango Steamship Co.; and H. S. Wilkinson of the Great Lakes Steamship Co. The coal committee includes A. A. Augustus; Horace Robbins of the Youghioghenv & Ohio Coal Co.; George Cameron of Pickands, Mather & Co.; and H. E. Booth of M. A. Hanna & Co.

The ore committee includes the members of the American Iron and Steel institute's subcommittee on pig iron, iron ore and lake transportation. The ore operating committee is headed by E. C. Collins, vice president of the Pittsburgh Steamship Co., chairman; George H. Warner of M. A. Hanna & Co.; and A. E. R. Schneider of the Cleveland-Cliffs Iron Co.

Pig Iron Production Jumps Upward

Output in March Was Highest Since Last November But First Quarter Production Slumps 12.5 Per Cent From Last Year's Record —More Stacks Now Active

PRODUCTION of pig iron in March approached normal. The output was the highest of any month since November, the daily average production going over the 100,000-ton mark for the first time this year.

Complete first quarter production figures reveal clearly, however, the extent of the decrease this year, when compared with the first three months of 1917. The tonnage made in the past quarter was 7,934,184 tons, against 9,065,587 tons in the same period last year. The loss of 1,131,403 tons amounts to 12.5 per cent.

The actual output of coke and anthracite pig iron last month was 3,212,715 tons, compared with 2,318,242 tons in February, a gain of 894,473 tons. The average daily production showed an increase from 82,794 tons in February to 103,636 tons in March. The increase of 20,842 tons amounts to more than 25 per cent. The biggest gains were made in the northern states, which were hit hardest in the recent slump. Pennsylvania's output jumped 360,000 tons, Ohio's increased 209,000 tons, while Illinois, which produced only 158,000 tons in February, showed a gain alone of 133,000 tons last month.

MONTHLY PRODUCTION

	1918	1917	1916
January ...	2,403,227	3,159,839	3,171,878
February ...	2,318,242	2,649,935	3,078,548
March	3,212,715	3,255,813	3,327,630
Total 3 mos.	7,934,184	9,065,587	9,578,056
April	.....	3,328,061	3,225,496
May	.....	3,413,677	3,364,584
June	.....	3,260,234	3,213,818
Total 1st half.	.....	19,067,559	19,381,954
July	.....	3,337,442	3,221,127
August	.....	3,238,970	3,197,838
September .	.....	3,140,742	3,208,041
October	.....	3,296,286	3,508,180
November ..	.....	3,198,597	3,317,805
December ..	.....	2,885,380	3,184,178
Total 2d half	.....	19,097,417	19,637,169
Grand total	7,934,184	38,164,976	39,019,123

AVERAGE DAILY PRODUCTION

	1918	1917	1916	1915	1914
Jan.	77,523	101,930	102,319	51,323	60,624
Feb.	82,794	94,641	106,157	59,521	67,450
Mar.	103,636	105,026	107,343	66,009	75,534
Apr.	.....	110,936	107,517	70,484	75,383
May	.....	110,119	108,535	72,747	67,646
June	.....	108,675	107,127	78,998	63,486
July	.....	107,659	103,907	82,687	63,075
Aug.	.....	104,483	103,156	89,510	64,403
Sept.	.....	104,691	106,935	94,478	62,757
Oct.	.....	106,332	113,167	100,656	57,007
Nov.	.....	106,620	110,593	101,174	50,042
Dec.	.....	93,077	102,715	103,278	48,236
Av'ge	88,158	104,562	106,610	81,022	62,934

Steel works or nonmerchant furnaces produced 2,337,859 tons in March against 1,640,278 tons in February, a gain of 697,581 tons. The output of merchant iron in March was 826,777 tons compared with 649,159 tons in February, an increase of 177,618 tons. The average daily production of the steel works furnaces increased 16,834 tons or from 58,581 tons in February to 75,415 tons in March. The average daily production of the merchant furnaces in March was 26,670 tons against 23,184 tons in February, a gain of 3486 tons.

More furnaces are now active, 339 stacks being in blast on March 31, compared with 320 on the last day of February. Three new furnaces were lighted during the month, one by the Lackawanna Steel Co., at Buffalo, one by the Indiana Steel Co., at Gary, Ind., and one by the Iroquois Iron Co., at Chicago.

Speigel production in March was 13,965 tons compared with 10,649 tons in February, a gain of 3316 tons. The ferro output last month was 34,114 tons against 18,156 tons in February, a gain of 15,958 tons.

MARCH PIG IRON

States	No. of stacks.	No. in blast last day of month. Mar.	Feb.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— Mar.	Feb.
Pennsylvania	160	128	117	222,800	1,023,929	1,246,729	886,893
Ohio	79	69	64	168,013	548,924	716,937	507,158
Alabama	47	31	32	129,506	96,425	225,931	207,575
Virginia	21	14	14	46,795	.....	46,795	40,914
New York	28	20	19	68,789	107,372	176,161	153,184
New Jersey	6	3	4	15,489	.....	15,489	15,033
Illinois	25	23	20	63,427	226,965	290,392	157,844
Colorado	6	4	4				
Indiana	15	15	13	22,901	284,495	307,396	204,313
Maryland	4	3	3				
Wisconsin	6	3	3				
Kentucky	7	4	4				
West Virginia	4	3	3	52,868	24,971	77,839	68,318
Tennessee	17	11	11				
Washington	1	1	1				
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	3	3	3	36,189	24,778	60,967	54,205
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						13,965	10,649
Ferro—All states....						34,114	18,156
Total	438	339	319	826,777	2,337,859	3,212,715	2,318,242

Fuse Makers Co-ordinate Their War Efforts

The first formal meeting of the American Fuse Manufacturers' association was held in Cleveland, April 2 and 3, when problems of design and construction were discussed. The purpose of the association is to co-ordinate the efforts of the manufacturers of shell-firing mechanism. Committees on design and on loading work out difficulties which arise and present them to meetings which represent over 90 per cent of the fuse manufacturers of the country. Technical discussion in open meeting results in the solution of the greater part of the difficulties which arise and the small remaining differences are submitted to the production division of the war department. The result is a great saving of time and effort both to the government and to the manufacturers. It is the intention to hold these technical meetings frequently in different munition centers. G. T. Trundle, chief engineer of the American Multigraph Co., is president of the association, and R. K. Blanchard, chief engineer of the Neptune Meter Co., New York, is treasurer.

Resigns as Manager

Charles B. Bohn, who for approximately four years has been Detroit works manager of the Aluminum Castings Co., Cleveland, has presented his resignation to take effect about April 15. It is reported that Mr. Bohn will organize a company to operate his own plant.

The Colonial Iron Co., about the end of April, will blow out its furnace at Riddlesburg, Pa., for relining.

One of the seven furnaces of the Lackawanna Steel Co., Buffalo, will be put on ferromanganese.

Business in War

To be Discussed at United States Chamber of Commerce Meeting

What business can do in the second year of the war will be the theme of the addresses to be made by the many speakers of national prominence at the sixth annual meeting of the United States chamber of commerce, at the Auditorium in Chicago, April 10, 11 and 12. Representatives of more than 1000 commercial organizations whose combined membership exceeds 500,000 business executives will be in attendance. On Wednesday representatives of the government having practical knowledge of the subjects will discuss the government's attitude toward railroads, shipping, finance and general control of business. Thursday the same subjects will be discussed by business men, who will present their side of the case. Friday will be devoted to formulating and passing resolutions resulting from previous consideration. Tuesday will be devoted to committee reports. Wednesday morning the meeting will formally commence with an address of welcome by Lucius Teter, president of the Chicago association of commerce. R. G. Rhett, president of the United States chamber of commerce, will sound the convention's keynote.

In the afternoon, government officials will outline the government's position in connection with war matters. Edward N. Hurley, chairman of the United States shipping board, will give the facts about shipping. The national chamber's activities in relation to the foregoing will be presented in 10-minute addresses by Waddill Catchings, chairman of the national chamber's war service committee; E. A. Filene, chairman of the national chamber's war shipping committee; Harry A. Wheeler, chairman of the committee on railroads; Wallace D. Simmons, chairman of the committee on war finance.

Group sessions for discussion of matters suggested on Wednesday will be held Thursday. Mr. Catchings will preside when the first group discusses government organization in relation to business in war. His address will be followed by one by George N. Peek, industrial representative of the war industries board on "How Shall We Keep Industry Going and Carry on the War", and by others. Charles A. Hinsch, president of the American Bankers' association, will lead the group discussion on finance, which will be divided between trade acceptances and the effect of government financing on industry. Among those to discuss trade acceptances will be Wallace D. Simmons, president of the Simmons Hardware Co.

All Prices of Scrap Are Affected Says Gary

To clear up confusion with regard to iron and steel scrap prices to prevail over the second quarter, Chairman E. H. Gary of the committee of steel and steel products of the American Iron and Steel institute, issued the following statement on March 28:

Referring to the statement authorized by the council of national defense, under date of March 26, that "the President today approved the recommendation of the price fixing committee of the war industries board, that the maximum prices heretofore fixed by the President upon the recommendation of the board, upon ore, coke, steel and steel products, subject to revision on April 1, 1918, be continued in effect until July 1, 1918; from April 1 to July 1, however, the maximum price of basic pig iron be reduced from $33 to $32 per gross ton, and that the maximum price of scrap steel be reduced from $30 to $29 per gross ton"; it should be explained that it is the understanding of this committee that the reduction of $1 per gross ton is made on all prices of scrap, both base grades and differentials; the effect being to reduce by $1 per gross ton all prices shown in the differentials recommended by this committee under date of February 21, 1918.

Chairman Gary, in commenting individually on the new price schedule for the second quarter, said:

"The prices approved and announced by the President were those which were recommended by the general committee of the American Iron and Steel institute after consultation with representatives of the different lines. For some of the manufacturers they are very low in view of the increased and increasing cost of production. However, all are disposed to devote their capacity to the interest of the government. A majority of the producers will realize a fair profit on the average.

"Prices on steelmaking pig iron were reduced $1 per ton because it was believed these products could reasonably afford a reduction but more particularly because the reductions would be of considerable benefit to the makers of finished products who are compelled to buy their melting materials.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, April 2.—With the big German drive still in progress, incentive has been lacking on the part of many large consumers to buy heavily of metals. Trading in the metal markets was duller last week than at any other time this year, although this year has been thus far unusually dull. Also, the Easter holidays caused a partial suspension of business, with many brokers and dealers absent for a few days' vacation.

The downward drive in spelter seemed to have been checked at the level of 7c, but was weaker again today at the lowest price in three years. This movement is believed to have been due largely to the activities of various small smelting interests, who have given up hopes of a revival in the market and are preparing to close; consequently they are offering their stocks at almost any price to dispose of them. The trouble with the prime western spelter market is that the metal is not being consumed. The galvanizing trade normally takes above 65 per cent of the output of prime western, yet now it is only taking about 30 per cent of its normal requirements. The brass trade, which takes a large part of the remaining production in normal years, is also operating at a low rate so far as general business goes, most of the brass business now going being for direct and indirect government work. The government is furnishing brass mills high grade spelter at the fixed price of 12c, St. Louis. Prime western spelter may be quoted 6.95c to 7c, St. Louis, for prompt, April, May and June shipment.

The lead market also has eased off slightly, business being generally quiet. Outside sellers are shading the American Smelting & Refining Co. price of 7.25c, New York, for shipment from the west, as low as 7c, New York, being heard. The market may be quoted 7c, New York, for prompt, April, and May shipment.

The tin situation is unchanged. Considerable interest is being shown in the efforts of the food administration and the war industries board to solve the problem of supplying essential industries with tin. There are practically no spot supplies available of any grade. Such odd lots of 99 per cent tin as appear are quoted about 85c to 86c, New York. There has been some buying of Chinese No. 1 for April shipment from China at about 78.50c, c. i. f. New York.

Distribution of copper proceeds smoothly at 23.50c for carloads and 24.67½c for less than carloads. The supply of copper appears ample to meet requirements.

Practically the entire output of virgin aluminum is going to the government at the fixed price of 32c for 98 to 99 per cent. Remelters of scrap are not satisfied with scrap prices and say some arrangement must be made whereby they can obtain supplies of old aluminum at a lower price in order to sell at the government price.

No business in antimony has been reported transacted the past week. The market for Chinese and Japanese brands, for spot delivery is about 12.75c to 13c, duty paid, New York.

The Salvaging of High-Speed Steel

A Few Practical Methods for Conserving This Valuable Material

THE superintendent glanced at the order the purchasing agent placed before him. Then he reread it carefully. It called for several thousand transmission gears of a new type.

He telephoned for Roberts the toolroom foreman, who appeared a few moments later.

"Roberts," the superintendent began in his usual brusque manner, "here is a good-sized rush order we'll have to get out in a hurry. Look it over and tell me what you think of it."

Roberts read the order carefully. "We can get these gears out all right," he replied. "We'll have to make up some box tools."

"All right," the superintendent rejoined; "here's your specifications, so it's up to you to get busy."

"How about getting me some high-speed steel?" Roberts asked.

"Can't get any for love or money," the superintendent replied. "Hunt around and see what you can find—ought to be some odds and ends kicking around somewhere. Dig 'em up."

As Roberts left the office he did a little thinking. He recalled that in the cellar under the toolroom were about 50 tons of scrap steel of all kinds—odds and ends that had been accumulating for the last 15 years.

Superintendent is Surprised

He went into the cellar where he stayed until 4 o'clock that afternoon. He was so occupied with his investigation that he forgot to eat lunch. The result of his search he had transferred to the toolroom. Then he stepped into the superintendent's office.

"Well, Roberts, what's on your mind?"

"You know we wanted some high-speed steel. Well, I wish you'd come to the toolroom a moment. I've got a surprise for you."

A moment later both men entered the toolroom. The first thing that attracted the superintendent's eye was a neat pile of high-speed steel, mostly squares one inch and smaller.

"You don't mean to tell me," he exclaimed, "that all the steel in that pile is high-speed. How much is there?"

"Over a ton," Roberts replied. "I went down cellar with a portable electric grinder and spark-tested all the short ends—that's the result."

"Well, well," the superintendent rejoined, as he rubbed his hands enthusiastically, "who would have believed it? These seem to be worn-out lathe and screw-machine tools that found their way into the scrap heap some years ago when the price of high-speed steel didn't bother us as it does now. Roberts, you've done well. That pile stands us in quite a neat little sum.

"By the way, Roberts, there's another point I want to caution you about. Be careful that even the little pieces of high-speed steel scrap do not find their way into the tool-steel scrap."

"Are those little pieces like worn-out bitts out of tool holders any good?" Roberts asked.

"They certainly are," the superintendent replied. "A process has recently been developed whereby these small pieces can be remelted and cast into ingots of any convenient size."

"In other words," Roberts volunteered, "we can send in a few hundred pounds of scrap we can't use, such as short bitts, worn-out reamers, drill stubs, etc., and get a specific number of pieces of any size we want."

"That's it exactly. You've got the idea. It's an excellent method of conserving our high-speed steel supply and its merits should not be undervalued."

* * *

Roberts' experience suggests only one way of conserving high-speed steel. There are several other ways to cut down the consumption of this semiprecious metal. For instance, solid forged high-speed steel tools may be supplanted by combination tools with ordinary steel shanks. These may be turned out either by brazing or by oxy-acetylene or electric welding.



FIG. 1—A FORMED CUTTER GRINDER

The demand for the solid tool of other days is still in evidence. To meet this demand numerous experiments have been tried for the purpose of perfecting a built-up tool that, for all practical purposes, is as efficient as a solid one. Briefly described, tools of this type consist of a shank made of low carbon steel to which is fastened a bit of high-speed steel.

Must be Fitted Carefully

In Fig. 9 is shown inserted bitt tools in which the metal is cut away at one end for inserting a high-speed cutting bitt. The bitt can be held in position through the employment of either brazing or oxy-acetylene welding. If the bitt is to be brazed in place, it is first fitted carefully, and then wired, as shown in Fig. 10, and sent to the blacksmith shop for brazing.

Only bitts made of air-hardening steel can be brazed in place. Otherwise the excessive heat necessary to harden some brands of high-speed steel would cause the spelter to become molten and run out of the joint. After the tool is brazed and air-hardened it is ground to the desired shape.

To fasten the bitts in place by the oxy-acetylene welding process requires a somewhat longer procedure than the one just described, but it is produc-

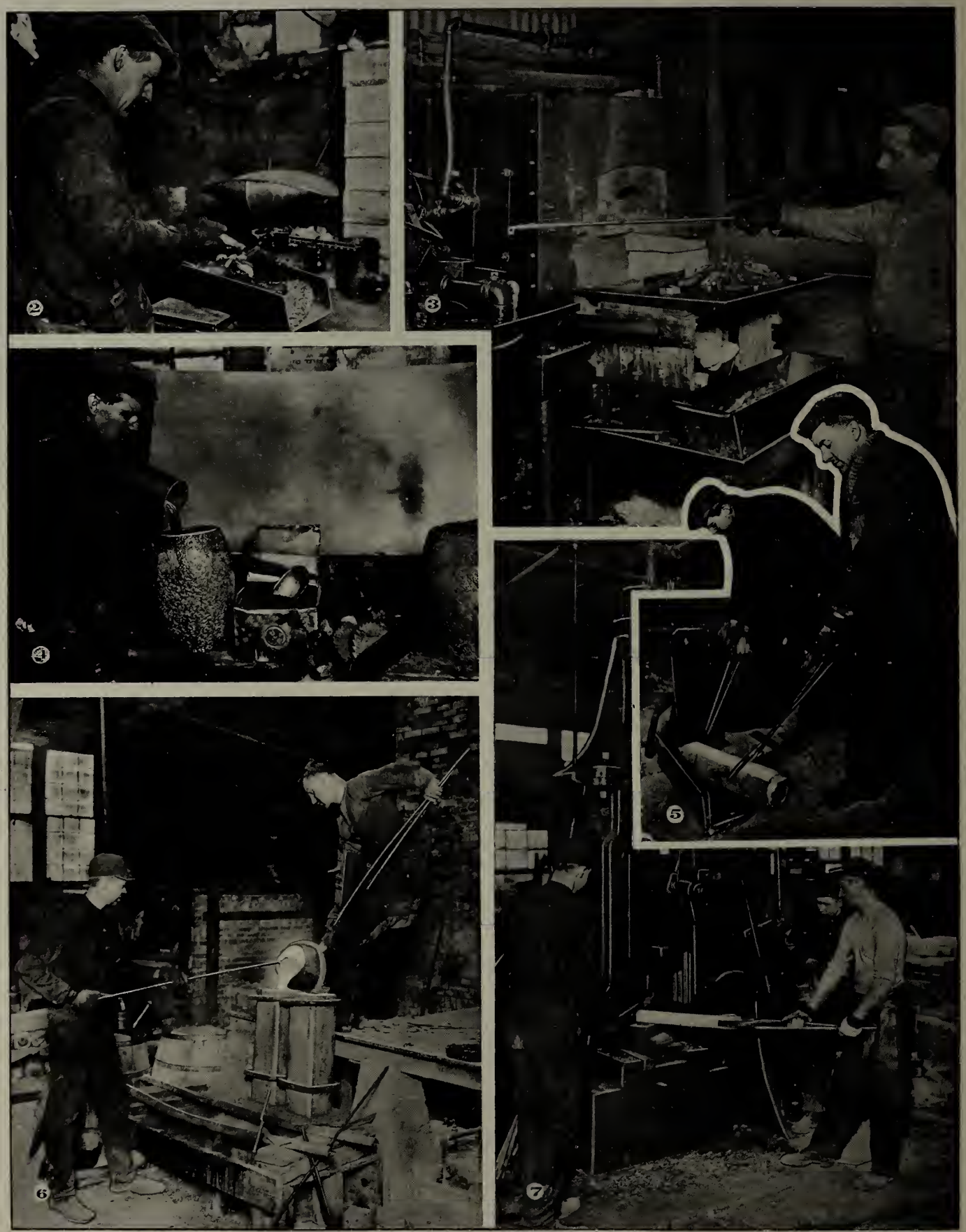


FIG. 2—WEIGHING SCRAP STEEL. FIG. 3—VIEW IN THE HARDENING ROOM. FIG. 4—ADDING TUNGSTEN TO THE CRUCIBLE CHARGE. FIG. 5—REMOVING AN INGOT FROM A MOLD. FIG. 6—CASTING INGOTS. FIG. 7—ROUGH FORGING INGOTS

tive of good results. The first step is to rough-machine the shank as shown in Fig. 15. After the bitt is placed in position, as shown in Fig. 12, a trough or channel is formed all around it. This is filled with the molten metal used in the welding operation. In welding the bitt in place, the two pieces should be firmly clamped together by means of an ordinary C-clamp. It is not practicable to wire the bitt in position since the excessive heat necessary to melt the welding material would also fuse the wire. After welding, the tool can be ground to any shape desired.

Electrically Welded Tools

Another good method of making two-piece tools is to electric butt-weld them. With an electric welding machine the operation is very simple. All that is necessary is to fasten the stock for the shank and the piece for the bitt in the clamps of the welder and proceed as in any other butt-welding operation. The finished welded piece shown in Fig. 11 is ready for grinding and hardening.

In selecting material for the shanks of the tools, a variety of opinion is found as to what material is the most efficient. Cold-rolled steel is cheap, but owing to its softness is soon forced out of shape by the action of the tool-post screw. Ordinary 0.30 per cent carbon steel is harder but where tools for severe service are desired, a low grade of tool steel is preferred as this material will withstand hard usage.

High-speed steel may also be reclaimed by recutting milling cutters. Take as an example the ordinary milling cutters used so plentifully in any machine shop. After these have been ground and reground, they should not be consigned to the scrap heap as it is an easy matter for any toolmaker to recut them without annealing.

The process is comparatively new, but has been widely adopted. The first technical articles explaining the recutting of milling cutters without annealing were published about six years ago. The worn-out cutter, as shown at *A*, Fig. 13, is first gashed all around by means of a thin abrasive wheel, the work being held in an ordinary cutter grinder. The next step is to grind away the superfluous metal between the gashes with another wheel, the face of which has been trued to the correct angle. This is shown in Fig. 14. Upon first trial, the operator will burn a few cutters, but a little practice will make him proficient. In Fig. 16 two cutters are shown. Cutter *A* has been gashed out only, while *B* shows the finished cutter ready to be put into service again. The side teeth can be recut in the same way. However, since the side teeth of milling cutters are seldom ground, they do not require recutting.

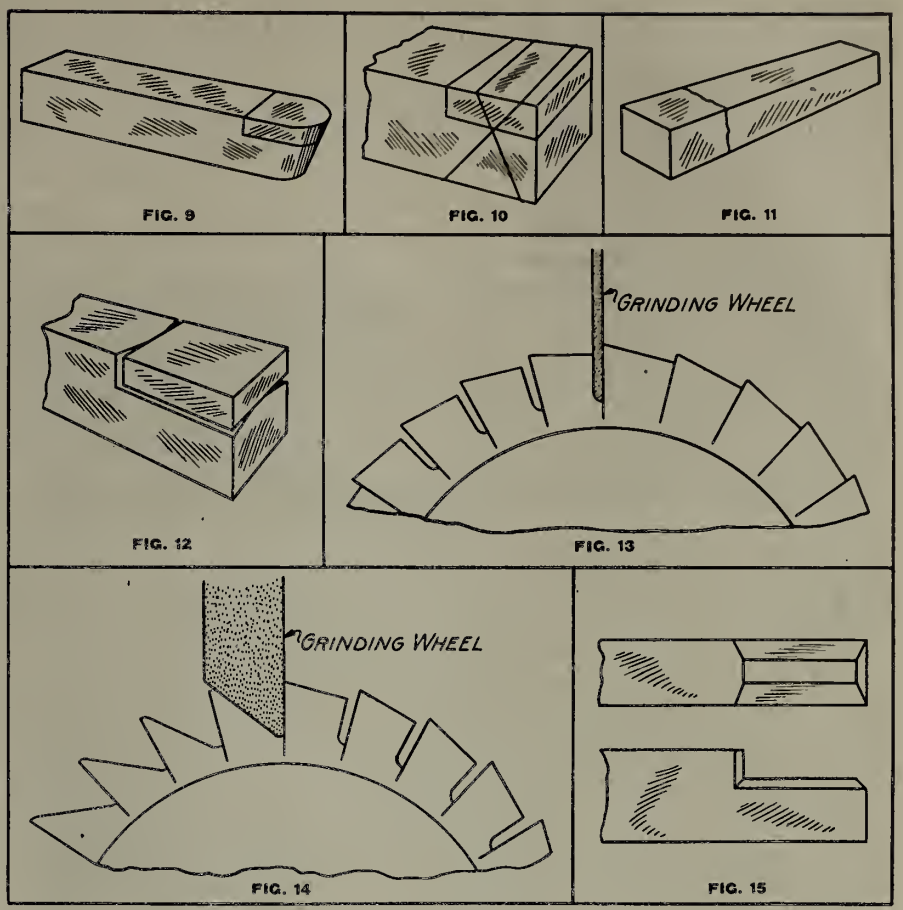


FIG. 9—A BUILT-UP TOOL. FIG. 10—BITT WIRED IN PLACE FOR BRAZING. FIG. 11—ELECTRIC BUTT-WELDED TOOL. FIG. 12—BITT IN POSITION FOR WELDING. FIGS. 13 AND 14—PROCESS USED IN RECUTTING A MILLING CUTTER. FIG. 15—TOOL SHANK MACHINED FOR BITT

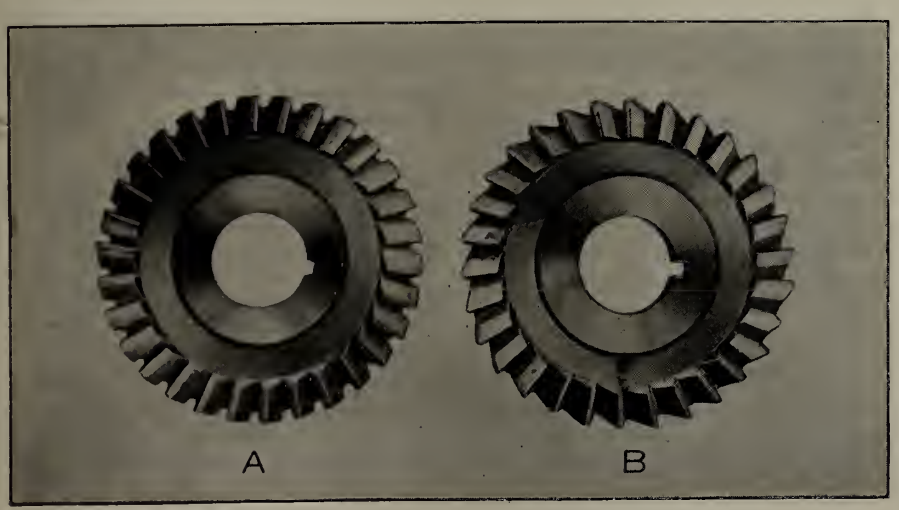


FIG. 16—STEPS TAKEN IN RECUTTING A MILLING CUTTER

The Field for Formed Cutters

Formed cutters are expensive tools, especially when made of high-speed steel. Therefore to use them as economically as possible they should be properly sharpened with the teeth pointing exactly to the center. One of the best ways to accomplish this is to sharpen them on a machine especially adapted for the purpose. Formed cutters are often sharpened by hand in order to save the small amount of time necessary to set up the cutter-grinding machine. This is an unnecessary waste of high-speed steel, as such cutters usually do not work properly and eventually have to be reground correctly.

A typical formed cutter grinding

machine is illustrated in Fig. 1. The work is held on an arbor between centers and the cutter is indexed by means of a worm gear. The operator sets the face of the grinding wheel central with the spindle of the index centers before placing the cutter in position, thus assuring accurate work.

When high-speed steel first came into general use, it was subjected to exhaustive experiments which resulted in its being used in many places where today, owing to its high price, it can be replaced with carbon steel. High-speed steel can be used to advantage in all cases where heavy roughing cuts are to be taken either on cast iron or steel, on the lathe, planer, miller, boring mill, etc. Where very light finishing cuts are to be taken, many manufacturers have found it advantageous to use carbon steel. Again, on such materials as brass, aluminum, die-cast metal, etc., it is now considered good practice to use carbon steel altogether, both for roughing and finishing cuts. Certain kinds of tools that require a keen cutting edge also are preferably made of carbon steel. In this category may be included woodworking tools of all kinds, scrapers for metal work, hand tools such as files, pieces subject to wear such as jig bushings, cutting tools of the nature of punches, dies, etc. Many hand tools such as reamers and taps give efficient results when made of carbon steel. In the case of drills, it is a good plan to use high-speed steel for cast iron and steel, while carbon steel answers for the softer metals. The small drills, known to the trade as number drills, are generally supplied in carbon steel for all purposes in the metal working trades.

Peat Beds Furnish Huge Fuel Reserve

MUCH information and descriptive matter in general has been circulated from a number of sources during the last several years devoted to the peat deposits of the United States.

The United States geological survey in particular has been urging the commercial development of these vast deposits of fuel as one of the practical methods of alleviating the present fuel shortage. Although peat has never been extensively used as fuel in this country because of the abundant supply of coal, which can more readily be prepared for consumption, and in normal times more cheaply brought to the consumer, it has long been used in Europe, where 15,000,000 to 20,000,000 tons are consumed annually in generating heat and power.

The attempts made in this country to manufacture peat fuel on a commercial scale have not been successful, but the failure appears to have been due not to a lack of market for the product but to the lack of sufficient capital, to the inexperience of the operators, and to preventable engineering errors. It is said that air-dried machine peat, which is but little inferior in calorific value to many grades of lignite coal, can be produced at a cost ranging from $0.75 to $2.50 a ton, the exact figure depending on the size and the efficiency of the plant; and it is believed that in some parts of the country it could successfully compete with other fuels for both domestic and industrial use. It burns with little smoke and ash.

Recommend Investigation of Peat

The wide interest felt in the larger use of peat in the United States is expressed in recent messages from the governors of Maine and Massachusetts to the legislatures of those states, recommending an investigation of the local deposits of peat and its possible use to relieve the present shortage of fuel.

The lack of other fuel in many European countries is now being supplied in part by an increased use of peat. According to United States commerce reports, 216 peat machines were in operation in Norway in 1917, compared with 55 in 1916 and 36 in 1914. Among these were two automatic machines, each costing $13,400, having a daily capacity of 30 to 40 tons of fuel, and requiring only two men for operation.

Peat consumed in a properly designed gas producer yields gas of good quality and in abundant quantity in comparison with the yield from coal, as well as many valuable by-products. This is perhaps the most effective utilization of peat fuel for generating heat and power because peat used in this way does not need to be so carefully prepared nor so thoroughly dried as peat designed for consumption under steam boilers.

Specific information with regard to the use of peat in gas-producing plants and for other purposes is given in bulletin 16 of the bureau of mines.

Nature and Distribution of Deposits

Peat is a dark-brown or black residuum produced by the partial decomposition of mosses, sedges, and other vegetable matter in marshes and like wet places. Most of the peat deposits of this country occur in depressions and poorly drained areas in regions where the temperature of the air and the soil is low in summer, and the humidity of the air is high. The most extensive peat beds are found in New England and around the Great Lakes, where the climate and the topography are favorable to the accumulation of partly decomposed vegetable matter. Many deposits are found also in the Atlantic coastal plain, from New Jersey southward to Florida. In regions of heavy rainfall along the Pacific coast peat bogs occur wherever the drainage is so greatly interrupted that the soil becomes permanently saturated with water.

The second annual report of the public utilities commission of Maine contains descriptions of many peat bogs in that state. Detailed information relating to the occurrence of this material in Maine and a map showing the location of workable deposits in that state can also be found in United States geological survey bulletin 376.

It is estimated that more than 11,000 square miles of swamp land in the United States contain peat beds of good quality, and that the total available fuel in these deposits would amount to more than 12,000,000,000 tons, a quantity that could furnish heat and power for the entire country for many years. Much of this material exists in states that have no known deposits of coal and which, on account of their cold climate and manufacturing industries, consume large quantities of fuel, a constantly increasing percentage of which must be conveyed by rail and water from distant mines. According to a recent estimate made by Prof. E. K. Soper in a paper on the peat deposits of Minnesota, published by the Minnesota geological survey, more than 6,000,000,000 tons of air-dried peat fuel can be obtained from deposits in that state alone. The utilization of these deposits would greatly augment the local fuel supply and would incidentally relieve the strain on our transportation facilities by furnishing fuel to an area where coal is now brought by the longest haul.

The American Sheet & Tin Plate Co. has issued a booklet entitled "For Your Own Advertising", which is designed to be of value to metal workers, stamping concerns, shop owners, contractors, roofers, hardware supply concerns and others in the sheet metal field. The booklet is printed on glazed paper and carries illustrations showing the standard brands of products made by the company. The booklet also gives a number of suggestions and hints on the preparation of advertising matter for the trade.

Control of Manipulators

A Description of Side Guards and Lifting Fingers for Handling Blooms—Functions, Mechanical Layout and Operation Are Considered

BY J. D. WRIGHT

USUALLY the first questions which one asks when considering the proper type of motor and control for any steel mill auxiliary machine, are, "What is its function; what is the mechanical layout, and how does the device operate?" Without a thorough knowledge of the answers to these questions it is impossible to make an intelligent recommendation on the application of motors or control.

Discussing standardization of motors and control at a meeting of the Association of Iron and Steel Electrical Engineers in Pittsburgh about a year ago, E. Friedlaender, of the Carnegie Steel Co. said, "What we need is more papers descriptive of installations and operation of our mills. In such a way we would gradually get uniform ideas about general requirements at all our mills and thereby drift toward a stable system of standardization." The *Proceedings* of the American Institute of Electrical Engineers and Association of Iron and Steel Electrical Engineers contain few papers describing installations and operation of steel mill auxiliary apparatus and for this reason the writer heartily agrees with Mr. Friedlaender's remarks regarding the need of such descriptive articles.

Manipulators for Blooming Mills

Manipulators for blooming mills consist of side guards and lifting fingers. The function of the side guards is to guide the bloom into the proper groove in the rolls while the lifting fingers are used for inverting the bloom.

A reversing mill is usually provided with four moving side guards two on each side of the mill. Occasionally a set of lifting fingers is provided on each side of the mill, but as the bloom is usually turned exclusively on the pulpit side, fingers are more commonly provided there alone.

Fig. 1 is a general view of the entering side of a reversing blooming mill equipped with electrically operated manipulators. The two side guards are clearly shown, and, on closer inspection, the tops of the lifting fingers may be detected inside the left hand guard.

Each side guard on the entering side of the mill is connected by suitable mechanical means to the corresponding guard on the delivery side, so that the right hand and left hand guards on opposite sides of the mill move simultaneously and are always in line.

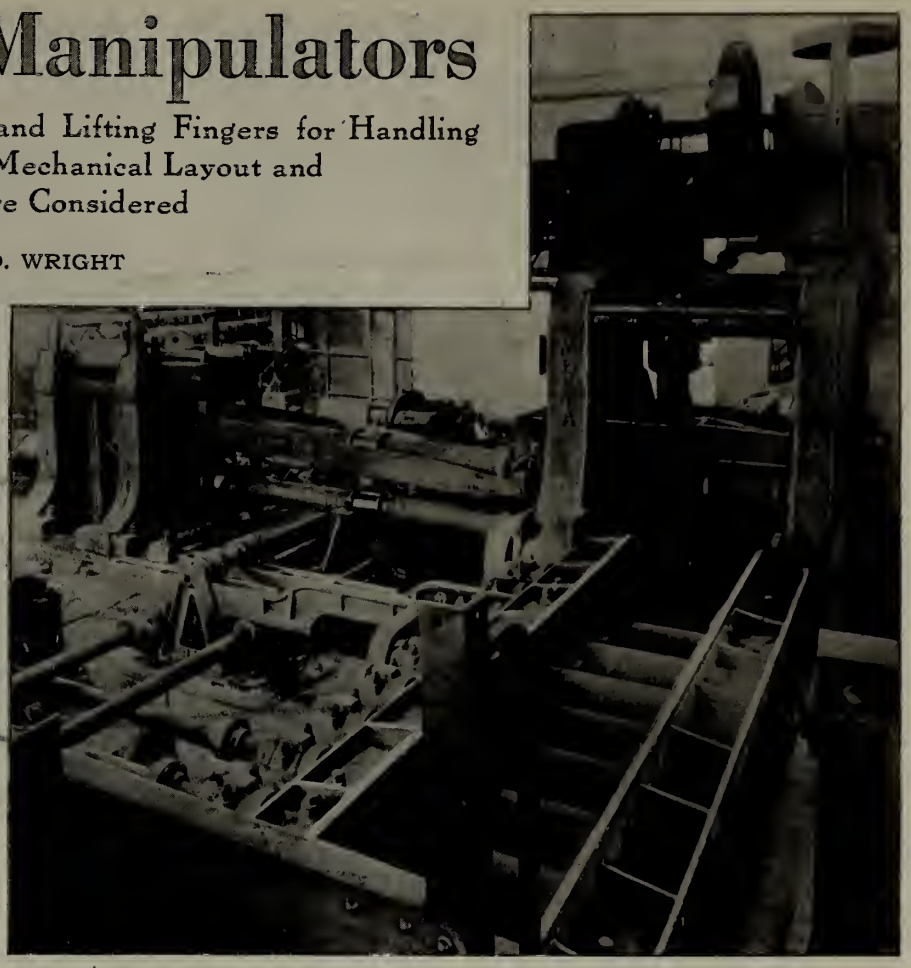


FIG. 1—BLOOMING MILL FROM ENTERING SIDE—LIFTING FINGERS MAY BE SEEN BETWEEN THE ROLLS

Fig. 5 shows one method of mechanical connection between the motors and the side guards. Two motors, one on each side of the mill, are geared through slip clutches to a common shaft on which are mounted four pinions. The pinions engage with an equal number of racks. Two of the racks are attached to the guard on the entering side and the other two to the corresponding guard on the delivery side of the mill. They are supported by rollers and mechanical stops are provided to limit their outward movement.

As previously stated, the function of the side guards is to guide the bloom into the proper groove in the rolls. The operation of the guards during the process of rolling an ingot consists, therefore, of fast, short movements back and forth across the table. Each guard on a side of the mill can move independently of the other and can make a stroke equal to the width of the table. It is possible therefore for the guards when moving inward to come together or against the ingot at full speed. It is the function of the slip clutch to prevent damage as a result of such action, should the operator be careless enough to allow it to occur.

Fig. 2 is a view of the same mill shown in Fig. 1 but presents a more detailed view of the side guard mechanism.

Electrical Equipment

The motor equipment for the side guards, illustrated in Figs. 1 and 2, consists of four 80-horsepower series motors, two connected in series, driving each pair of guards. Satisfactory operation of the guards is best secured through service series motors although some installations use compound wound motors, primarily because dynamic braking for stopping is desired. Furthermore, solenoid brakes are sometimes used to assist the dynamic braking. In the equipment illustrated, neither dynamic braking nor solenoid brakes are used; when a quick stop is desired the motors are plugged.

The control for each pair of motors is of course reversible and is arranged so that a bank of resistance is permanently connected in series with the motor armatures. This acts as a buffer and reduces the shock when the guards jam together or against the ingot. A one-point reversible master controller is

A paper presented before the group meeting of the American Institute of Electrical Engineers, Cleveland. The author, J. D. Wright, is electrical engineer, General Electric Co., Schenectady, N. Y.

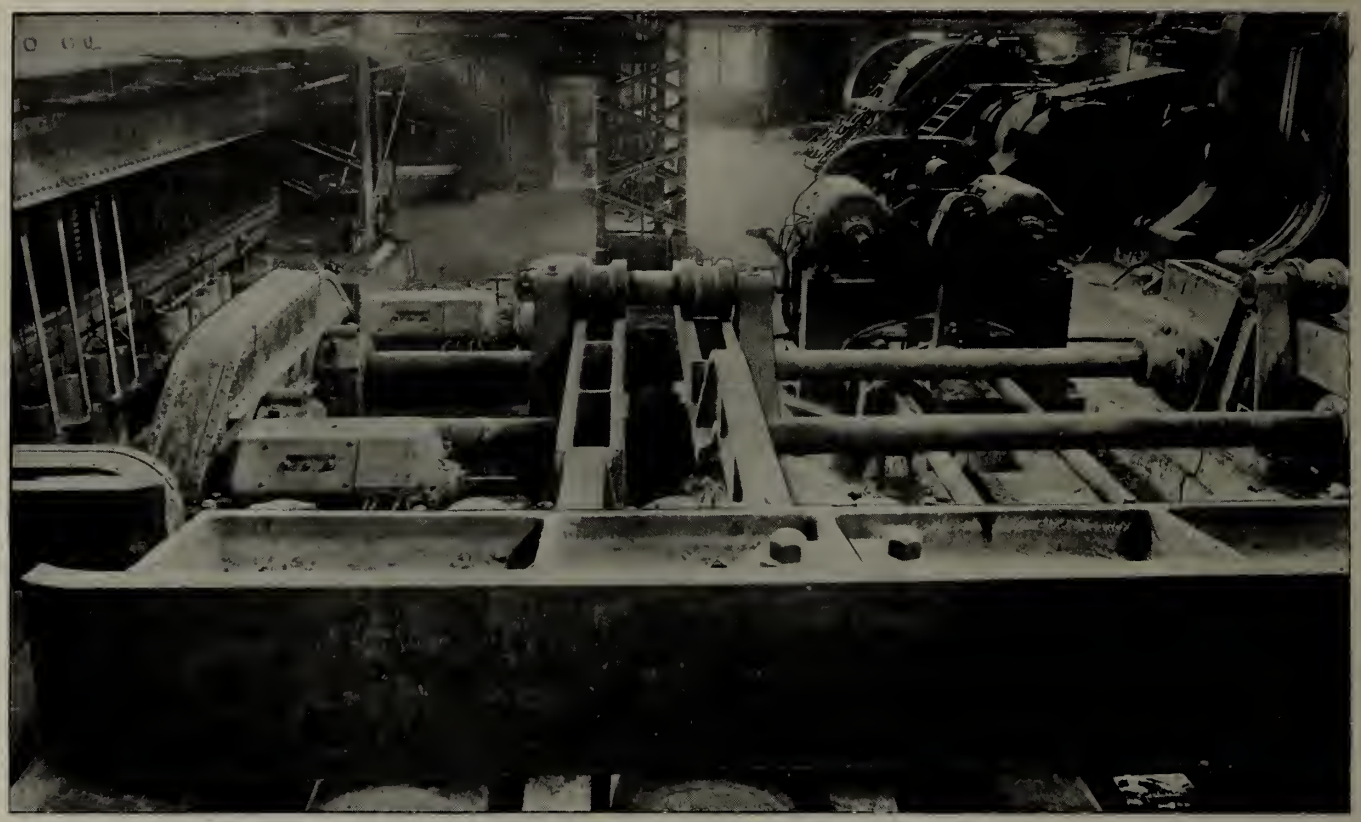


FIG. 2—MANIPULATOR EQUIPMENT LOOKING FROM THE ROLLS

used for each pair of motors. Limit switches are provided for cutting off power when the side guards are moved to the edge of the table. These limit switches are usually of the track type and are operated by movement of the rack. A geared switch might be used but the track type switch is much simpler and more positive in action.

The lifting fingers are carried by a frame attached to the two inside racks connected to one of the side guards, as shown in Fig. 4 and move with the guards. The lower ends of the fingers are pinned to a yoke which is suspended from two horizontal shafts by means of two links and levers. The two horizontal shafts, which are supported by bearings in the finger frame, are connected through cranks to a common driving shaft. On this shaft is mounted a large gear to which the two driving motors are geared. It is evident that one-half revolution of the main driving shaft in either direction from the position shown in Fig. 4 will produce a complete up stroke of the lifting fingers. Another one-half revolution produces a complete down stroke and returns the fingers to their original position.

The motors can, therefore, be either reversible or nonreversible. Successful installations of each have been made.

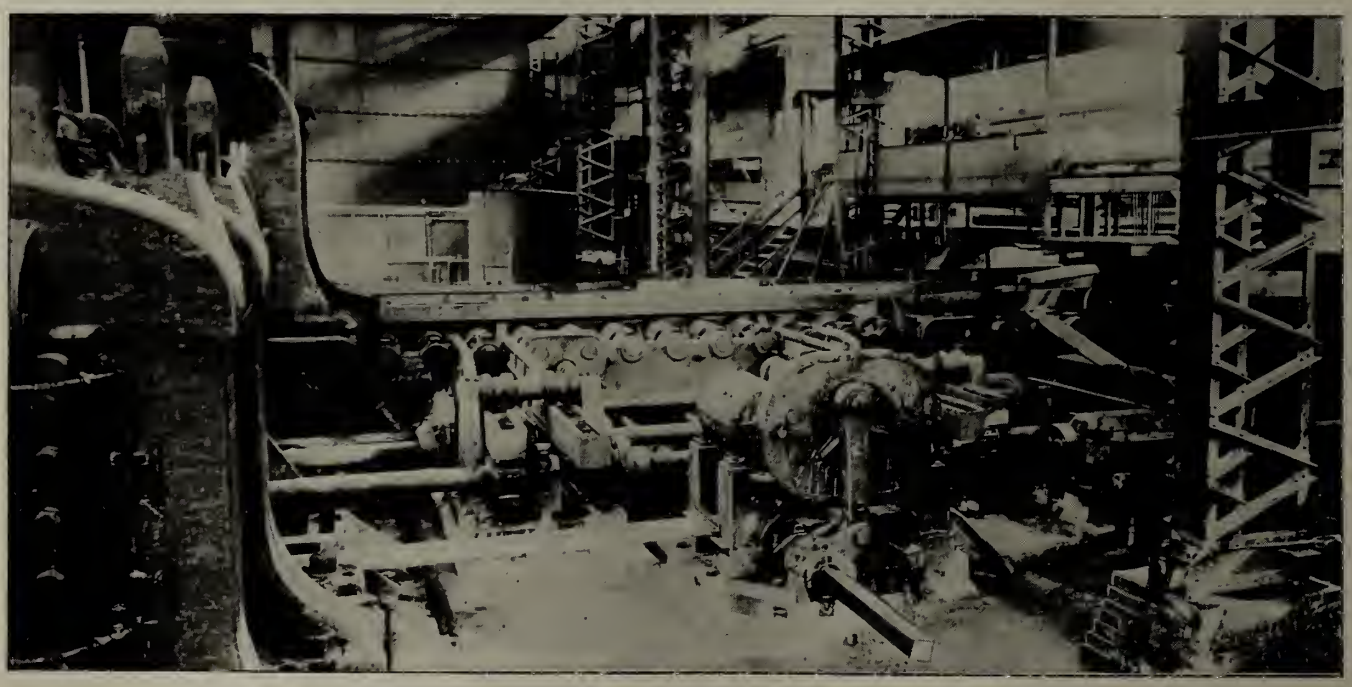


FIG. 3—MANIPULATOR EQUIPMENT LOOKING TOWARD THE ROLLS—THE BARS BENEATH THE MOTOR IN THE FOREGROUND OPERATE THE LIFTING FINGERS

When a nonreversing equipment is used, one complete cycle consists of an up and down stroke of the fingers. When a reversing equipment is used, forward direction of rotation can produce the up stroke and reverse rotation the down stroke.

The motor equipment illustrated in Figs. 2 and 3 consists of two 50-horsepower series motors connected in series, operating nonreversing. For each throw of the operator's master controller a complete up and down stroke of the fingers is produced. The motors are automatically stopped at the end of the down stroke by a limit switch which cuts off power and completes a dynamic braking circuit.

Conditions Governing Design

The dynamic braking connections for a series motor operating nonreversing are comparatively simple. Where reversible control is used, a compound wound motor is preferable if dynamic braking is desired, as the control connections are simplified. Solenoid brakes are required if the equipment is reversible, whereas if nonreversible, no brakes are necessary. It has at times been stated that the operator should be able to control the stroke of the fingers. This of course necessitates the use of reversible control, but the fingers move so rapidly that frequently they make a complete up stroke before the operator throws his master controller to the reverse position to lower them. It has been shown that the equipment for the lifting fingers may be either reversible or nonreversible. The motors may be either series or compound wound. Dynamic braking and solenoid brakes may or may not be used. The operator's master controller may be one-point or multipoint reversible or nonreversible. The limit switch may be arranged to stop the motors when the fingers are at the end of their down stroke if the control is nonreversible, and if reversible the limit switch may be used to stop the motors with the fingers in both up and down positions. Great opportunity exists for standardizing the operation of these devices. To discover the most satisfactory methods of operation, however, steel mill electrical engineers must produce the results of their experiences. The writer sincerely hopes that Mr. Friedlaender's suggestion may be followed and that we may have more papers on installations and operation of auxiliary drives.

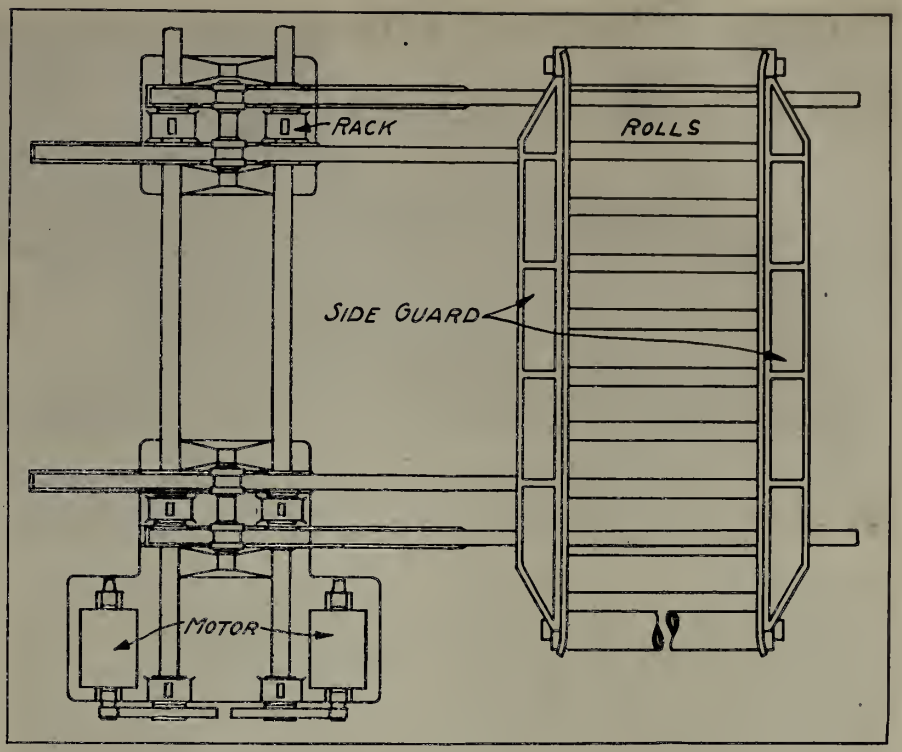


FIG. 5—OPERATING MECHANISM FOR SIDE GUARDS

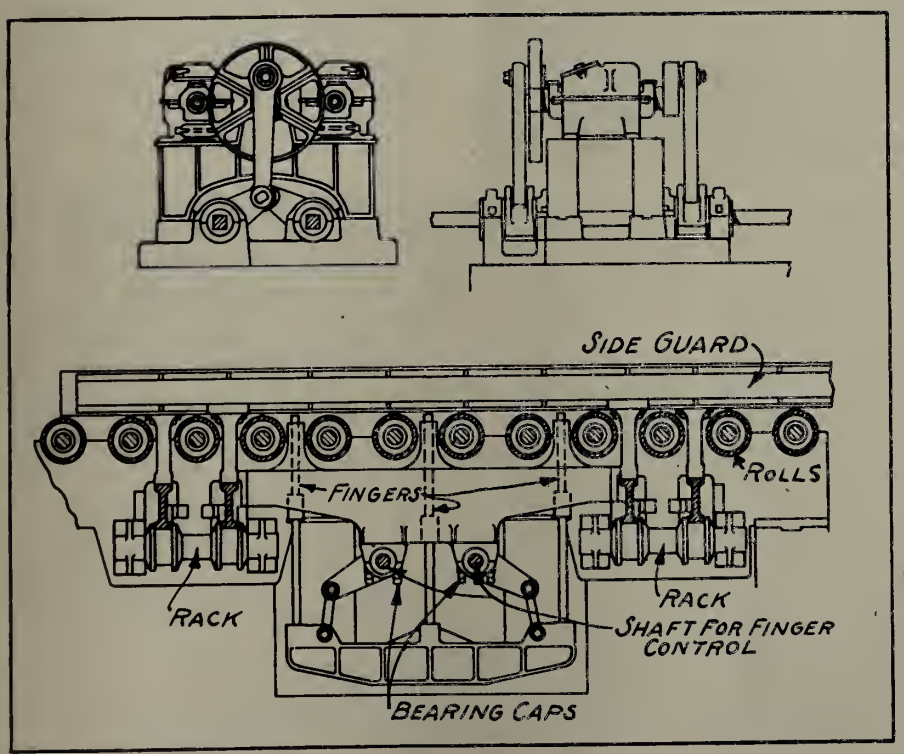


FIG. 4—OPERATING MECHANISM FOR LIFTING FINGERS

Show Large Earnings

Last year's earnings for the Chicago Pneumatic Tool Co., Chicago, exceeded those for any year in the company's history, and the business has increased four-fold as compared with what it was before the war. Net profits for the year were $2,006,371 as against $1,557,980 in 1916. After deducting for war taxes, etc., the balance left for dividends was $1,069,167, equivalent to almost 16½ per cent on the outstanding stock of $6,485,800. The previous year, the balance for dividends was $816,668, or about 12½ per cent a share. Surplus for the year totaled $811,215, making the total surplus $3,648,063 as against $558,716 in 1916, which made the total surplus Dec. 31, 1916, $2,836,859. Sufficient orders are on hand to keep the company busy for some time, according to President W. O. Duntley's statement, and plants have been taxed to capacity for some time. Mention is made in the report to stockholders of the formation of the Little Giant Truck Co., which is owned entirely by the Chicago Pneumatic Tool Co., to market and establish the truck.

Huge Planer for Rush War Job



Has Concrete Bed and Housing

THREE months ago a war problem that seemed to defy solution was put before a Chicago machine tool builder. The ingenuity with which the problem was solved and the rapidity with which the hurriedly conceived plan was put into effect, add another interesting story to the growing record of successful expedients with which the American manufacturer is playing the war game.

The problem was faced by the Amalgamated Machinery Corp., Chicago, which had contracted to manufacture large gun-boring machines. The beds of these great tools must be planed accurately or the bore of the gun will not be true, with disastrous effects upon the marksmanship. The beds of these machines are 70 feet or more long. No planers suitable for handling such sizes were available. Many months would have been required if the company had chosen to have the planers constructed by ordinary methods.

How the Problem Was Met

The solution was supplied by Lucien I. Yeomens, engineer for the corporation. He suggested that the planers be erected out of doors and that they be built of reinforced concrete. They were to be capable of handling planing work up to 90 feet in length.

This plan differed radically from any method ever employed, but a remarkable—and vital—saving in time was promised, so that the absence of precedents was not allowed to stand in the way of a thorough test. The drawings for the work were completed Dec. 24, and the first planer was put in operation early in March. The success of the expedient has led to the construction of four machines instead of the two originally planned. As a result the company has been able to contract for the delivery of additional gun-boring machines.

Construction was rushed during the most severe winter ever experienced in the Chicago district, and for that reason many additional problems had to be met. For instance the circus tent which was first used for shelter collapsed under the heavy weight of the constant snows. A light framework had to be constructed to support the fragments of the tent. Despite the cold and snow, the concrete work was carried on successfully.

In constructing the foundations, a steam shovel excavated a trench 10 feet wide and more than 184 feet long for each planer. An 18-inch concrete base was first placed in the trench and the reinforced concrete superstructure then was poured.

The concrete portion of the planer consists of the bed, 184 feet long, 8 feet 6 inches deep and 6 feet wide, with a trench 14 inches wide along its axis. At the center is the concrete housing. This consists of two uprights and a cross bar. The uprights are 9 feet 6 inches high above the bed, 30 inches thick, 7 feet 4 inches wide at the top and 20 feet wide at the base, the front edge being perpendicular and the rear edge at an angle to give ample bracing. The cross bar is 4 feet square. On the skeleton of concrete, practically a monolith, cast iron ways are placed for the platen to travel. A casting on the face of the crossbar provides the crossrail. Motor and gear drive is employed.

The ways are cast in 12-foot sections, 4 feet 10 inches wide and 10 inches deep. Lugs project 3 inches from the bottom into the central trench, giving a bearing for screws which permit lateral adjustment in lining up the bed. The ends of these sections are not machined, the space of about ¾-inch left between the sections being caulked with oakum to allow for expansion. Each section is provided with four rows of 1¼-inch anchor bolts, 16 in each row, to hold it to the concrete base. An equal number of 1-inch jackscrews bear through the casting to the concrete. These are properly tightened to give an accurate level, lateral alignment being obtained by screws and lugs as outlined above. One side of the bed has a V-shaped guide for the platen and the other slide is flat. Oil pockets with rollers mounted on springs provide lubrication to the ways. These pockets are in pairs, with a by-pass of ½-inch pipe to return the oil carried from one to the other along the rail.

Leveling the Bed

The bed had to be leveled accurately and this was accomplished by employing the latest engineering methods and devices available. Three levels were run, with the transit, the level and the straightedge. The error remaining is less than 0.002-inch in the 184 feet of length. The precise level employed is known as a 2-sec-

The Story in a Nut Shell

THIS giant planer is 184 *feet long and planes* 72 *inches wide by* 90 *feet long. The rail is* 4 *feet square. The railface and heads weigh* 24,000 *pounds. The housings are* 30 *inches thick,* 8 *feet wide at top and* 21 *feet wide at bottom.*

The planer contains nearly 250,000 *pounds of metal and* 13,500 *cubic feet of concrete, reinforced by* 34,000 *pounds of steel. Total weight of planer* 1,600,000 *pounds.*

A view of the assembled planer is shown above. At the top of the facing page the illustration shows the concrete ready for bolting the cast-iron ways into place. Below is shown the crossbar of the housing, toolholders and adjusting mechanism. The arrangement of the motor and belt drive is shown at the bottom, together with a view of the steam shovel excavating for the planer foundations 184 *feet in length.*

ond instrument. Much of this work was done by D. L. Derrum, works manager for Winslow Bros., Chicago. He formerly was in charge of the shellmaking shops of the Canadian Cement Co., Montreal, Que. Leveling work was also done by Professor Berger of Northwestern university, Evanston, Ill.

The platen of the planer is made up of nine cast iron sections. The head section is 9 feet 3½ inches long, the seven intermediate sections each 9 feet 11 inches long and the tail section 10 feet 11½ inches long. They were cast hollow with recesses through which reinforcing rods were passed. After assembly, concrete was poured to fill the interior and to give weight and rigidity. Each section has a staggered end with a bearing of 20 inches on the adjoining section. This offset is both vertical and horizontal and assists in making the platen rigid. The ends of the sections are not machined and the opening of about ¾-inch remaining on the top is caulked with oakum.

The platen sections are accurately machined on the top, then reversed on the planer and the bearing surfaces planed to a master-block, giving each section exactly the same thickness. The care given in leveling the planer bed and in making the platen of the same thickness from bearing surface to top eliminates as far as possible any possibility of error in the functioning of the planer.

Assembling the Platen

After being machined, the platen sections were assembled on the planer bed and a cast steel unmachined rack bolted to the bottom surface, the rack sections breaking joints with the platen sections. The motor then was started slowly and the sections pushed









tightly together. While held in this manner, dowel holes were drilled through the rack and platen and dowels were inserted, the bolts tightened, and the platen was fully assembled. Reinforcing rods then were placed in the hollow interior and concrete poured, binding the sections and giving the requisite weight.

On the face of the platen, three slots are provided for bolting work in place. A widened portion at each joint allows the bolts to be inserted. The sides of these slots are machined. The total length of the platen is 92 feet, with a width of 5 feet and a depth of 13 inches.

On the crossbar of the housing, a ribbed casting is secured by 12 bolts, 1½ inches in diameter, which pass through the 4 feet of concrete and are grouted in after being set. On this casting the crosshead is machined. This carries two heads and provision is made for each head holding two tools, one taking the roughing cut and the other, a few inches to the rear, making a second cut. Hand adjustment by micrometer gage gives the desired degree of accuracy in setting the tools. Adjustment is made to 0.001 inch.

Arrangement of Motor Drive

Power is supplied to each planer by two motors of 40 horsepower each. One is for the cutting stroke and the other for the rapid traverse return. They are automatically air controlled, the reverse being obtained by movable trip lugs placed on a bar along the side of the platen. The motor drives through a belt connected to a tight pulley and a 1110-pound flywheel on the jackshaft. A second belt connects with a tight and loose pulley and then by a train of five reduction gears to the bull gear that engages the rack. These gears are placed in the 14-inch trench in the center of the bed, the motors being placed close to the housing. The return is secured through the same gears, the automatic trip shifting the belts on the first reduction shaft, which carries the tight and loose pulleys.

Since operations were started an interesting fact has been demonstrated. The power required to carry the work under the tool is less than that required to return the platen at higher speed. In other words, the weight of the platen and castings is so great that the resistance caused by the cut is less than the speed requirement on the return. The cutting speed is about 20 feet per minute and the return about 60 feet per minute.

Bed and platen sections have been designed so that no two sets of joints ever meet at the same time, eliminating possible jars that would occur.

The gun-boring machines which will be planed on these huge planers will be manufactured in one type, three sizes being furnished. The spindle sizes vary from 6 to 10 inches and the swing from 27 to 48 inches. Lengths vary from 70 to 90 feet, according to the requirements of the purchaser.

The beds of the first gun-boring machines to be turned out are 70 feet long. They are made up of a head section 30 feet long and two 20-foot sections. These castings are squared at the ends and then bolted to the platen of the planers. The top bearing surfaces are machined to a high degree of accuracy, the work being done on the entire bed at one time to avoid irregularities that might result from machining them separately.



PLATEN BOLTED AND DOWELED WITH REINFORCING BARS IN PLACE READY FOR CONCRETE FILLING

To square the bed castings for the gun-boring machine an unusual machine has been devised. A jig is bolted to the top of the casting and this machine, weighing 10 tons, then is lowered to its position on the jig. From a motor, gears carry power to a solid cast gear, 6 feet in diameter, which carries a crossbar mounting two cutting heads. These engage the end of the casting and plane it to a true finish. A star wheel at the end of the crossbar is tripped by a projecting lug at each revolution, feeding the tools for the next cut. While one end is being cut square, a jig is being placed on the opposite end and the cutting-off machine then is picked up by a crane and placed on that end.

For assembling the gun-boring machines, a 50 x 250-foot building has been erected, with two immense doors, 40 feet high, one 43 feet and the other 50 feet wide. Two yard cranes, each serving two planers, enter these doors 25 feet above the ground. These cranes unload castings from cars to the planers and take the machined castings to the assembly building. The completed machines then are conveyed by the cranes back to cars for shipment. Each crane is of 25-ton capacity. A 5-ton crane, 12 feet above the floor of the assembly building, serves the floor.

Polishing With Alundum

Polishing plays an important part in the process of manufacturing practically all kinds of mechanics' tools and implements. Of the various polishing materials, alundum grain has been used for many years. From different places, however, where alundum has only recently been tried, there are many interesting reports in connection with these trials on new work. Of these the following are typical examples given by *Grits and Grinds*, published by the Norton Co., Worcester, Mass. One case is the polishing of shovels after the blade has been mounted. The material is ash wood and there is some contact with steel. The grain is mounted on belts five inches wide and six feet long. Belts set up with alundum are said to be running three days and are polishing 150 to 300 dozen handles without burning the wood. Sand was used previously and it is said that the sand belts lasted only from four to five hours while the production was from 10 to 12 dozen.

The following cost records are reported from a government arsenal after trying out alundum for polishing butt plates. The total wheel cost for polishing 300 pieces was 40 cents and 3 1/3 alundum wheels were used. The cost of polishing 1000 floor plates with 6 2/3 alundum wheels was 80 cents. The cost of polishing 1000 extractors with 2½ alundum wheels was 30 cents. In putting the first polish on receivers one alundum wheel polished 600. In polishing 1000, 1 2/3 alundum wheels were used at a cost of 30 cents. The arsenal records are said to show marked reductions in polishing costs compared with the costs before this abrasive was introduced.

In another plant, on polishing hardened steel skate runners, with a groove the full length, an alundum wheel averaged 16 pairs. This is a severe operation as the wheel is required to hold a corner.

Automobile manufacturers, also, have tried alundum for polishing purposes and the results are said to be satisfactory for polishing a number of parts.

Quartering the Industrial Army

Our Army Must Be Supported by Labor at Home—This Labor Cannot be Secured and Held Unless Housing is Provided—Housing is a Public Problem

BY H. W. FORSTER

THERE exists a nation-wide shortage of housing in our industrial centers. The situation is critical. Many of our communities are already suffering seriously from lack of adequate housing for their workmen. The situation is growing worse; houses cannot be conjured out of the earth. They require considerable time to build in large numbers. Vigorous attack upon this problem has been made in many cities and must be made throughout the country.

The present shortage is an outgrowth of three basic conditions: Under ordinary business conditions there is never an appreciable excess of adequate housing in our large cities. Normal building activities, during the past two years have been materially retarded, because of the high cost of material and labor. The great rush of workmen to our industrial centers has accentuated what would be an acute situation even under ordinary conditions.

Employers are behind a number of housing projects now under way, and the investigation of the situation by the United States government, with regard to the prompt delivery of large munition orders indicates the necessity for action. The conditions in a number of districts must be remedied if production under government contracts is not to suffer seriously. It is interesting to note that the concentration of Great Britain upon war operations has caused so serious a shortage in industrial housing that it has been recommended that $5,000,000,000 be appropriated for the purpose of building 1,000,000 homes after the close of the war. This will make up the housing shortage and furnish employment for a considerable portion of the soldiers who return from the front.

Why Housing is Essential

As it is impossible to get pure water from an impure source, or good crops from poor seed, so it is impossible to get stable, efficient, and satisfied labor from congested and insanitary homes. Most progressive employers have realized this for a considerable time, but it has never been brought home so forcibly as under present conditions. Bad news spreads rapidly, and American labor, including foreigners, is well advised as to the general housing inadequacy of industrial centers. Many good men refuse to go to such points to apply for work, and those who do go are likely to find conditions unsatisfactory, and move on.

The most obvious objection to crowded housing is the deleterious effect upon health. The records are clear upon this point. The greater the crowding, the greater the percentage of tuberculosis. Morals are seriously affected by crowding of families; more seriously by crowding together of several families; and most seriously by addition of boarders under congested conditions. The general experience has been that unhygienic living and a lower standard of morals, coupled with uncomfortable, inconvenient, and unesthetic living conditions, have a decided effect upon the efficiency of the worker. In order to obtain efficiency with the workmen now employed, and to take care of additional ones, adequate industrial housing must be provided.

It is difficult to ascertain the total housing need of a community, and even more difficult to determine what proportion of the total need is for Americans and what for foreigners. Most of the recent industrial housing developments have been designed primarily to take care of Americans of the higher type; probably on the assumption that as these families vacated houses from time to time, the less desirable quarters automatically would become available to those lower in the social or financial scale. It is, however, considered desirable to provide new houses of suitable types of foreign workmen in those communities where many are found; and that means in practically every community from the central states to the Atlantic seaboard.

It is obvious that it is necessary to provide housing to take care of families living by themselves, families who take boarders, and boarding houses.

Size of Houses

A recent compilation of data on 17,643 houses, covering some 200 industrial housing projects, made by the United States government, developed the information that one-third were four-room size; one-sixth were five-room size, and one-sixth were six-room size.

The average family generally consists of father, mother, and three children, and to house such a family properly there should be available at least three bedrooms (one for the parents, one for the male children, and one for the female children), a combined kitchen, dining room and living room, or two rooms, one for kitchen and dining room purposes and the other for living purposes. In other words, four and five-room houses are theoretically correct, especially for foreign families, and experience will bear out the fact that these are the most popular sizes. For larger families, and particularly for those who desire to keep a few boarders, the six-room houses have proved popular among foreigners. The average American family unquestionably prefers about a six-room house if the income is sufficient.

The United States government report, previously referred to stated that the information regarding 53,176 houses indicated the following arrangement: 48 per cent single houses; 35 per cent double houses; 11 per cent row houses; and 6 per cent no information.

There is little doubt that the single house is the ideal house to build where it is expected to sell. It is not difficult to sell half houses where they are built in pairs, but it is difficult to sell row houses individually. Experience seems

Morale

AMBITION, efficiency, determination, confidence, fight and a tenacious cheerfulness called "pep" are all bound together in that term—morale. Great admiration is expressed for the morale of the allied troops, and constant reference is made to those factors of food, clothing and amusement which contribute to the morale of our troops in the field. But is this term applicable only to the military? The industrial army cannot perform the huge tasks necessary to the progress of the war unless it is endowed with something of the same spirit characterized as morale. This in turn hinges upon the one great factor—comfortable home surroundings. Mr. Forster, in an able manner, analyzes this problem and suggests the solution.

From a paper presented at a meeting of the Engineers' Society of western Pennsylvania. The author, H. W. Forster, is general manager, Independence bureau, Philadelphia.

to indicate that row houses should be intended for renting purposes, as they do not sell readily, and lower building costs and less ground occupied make lower rents possible.

It is necessary that the smaller the house the better should be the design. Where one general room is used for several purposes and bedrooms are small, the importance of anticipating the actual needs of the occupants is particularly great. A number of architects have realized this, and have developed excellent plans for relatively small low-cost houses.

Equipment for Houses

Company after company that has put up housing for its employes has discovered that the cost was running far higher than anticipated, and that because of this fact it would not be possible to earn a satisfactory return upon the money if rents were on a scale which their workmen could afford. Analyzing each situation has generally developed the fact that the employer has tried to give too much. The engineer who built an industrial plant 50 per cent larger than necessary and who added a considerable number of frills would be no more at fault than the man who built unnecessarily large and elaborately appointed houses for working people. To be successful, industrial housing must be upon the same economic basis as any other form of industrial operation.

Looking at this question more closely the causes for excessive cost of construction are usually among the following:

Building generally six-room houses where four and five-room houses would answer very well.

Putting a large amount of money into roads and cement sidewalks, when it would be feasible to keep such improvements for some future time. A very large percentage of our Americans of the better class are today living on uppaved streets, and are making use of cinder or plank walks.

Furnace or other central heat is expensive under present conditions, and in many houses superfluous. Most families who come from less pretentious homes own a supply of stoves and are accustomed to using them. In fact most of the smaller homes rely upon the kitchen stove to heat the combined kitchen, dining and living room, and to provide a little heat for the remainder of the house.

Electric light in most communities is considered almost a necessity, and forms a convenient, low-priced, and relatively safe form of lighting. The need of extending gas to workmen's houses in which the women are used to cooking on coal stoves, is not nearly so great.

Running water is absolutely essential, because of its great convenience and feedom from the menace which always exists with wells. A sewerage system is not nearly so important, and the cost of many industrial housing projects has risen materially through installing an elaborate sewerage system. Where developments are in outlying sections, it is feasible to delay the installation of sewers for some future time. With running water, a privy does not constitute as much of a menace as where wells are used.

It is a hopeful sign that certain types of foreigners demand a bath-room in any house which they purchase or rent. In workmen's houses, bath-rooms occasionally are added afterwards and are placed in basements when there is sufficient room.

Industrial housing includes all types of construction, frame, stucco on wood, brick veneer, brick, tile, and reinforced concrete. The best material will vary with the locality and will depend upon cost, availability, speed of construction, and upon depreciation and upkeep. The depreciation and upkeep on a concrete house which is rented will probably be in the vicinity of 2½ per cent per year, and it may be double this on a frame house.

The fundamental question, if industrial housing is to be upon a business-like basis, is how much rent can workmen afford to pay for homes. There has been a tendency to make use of the rule that 20 per cent of wages could be paid for rent, and 25 per cent where payments are made upon the purchase. While 20 per cent works out quite closely in many average cases, the problem is how much the man has left for his rent and other expenses after he has paid for the necessary food. Food comes first in the scale of human needs. Unfortunately, the man with many mouths to feed has more need of a larger and more costly house and less money to spare for rent.

Recent careful investigations and calculations of the minimum cost of food necessary to feed an average family properly give the following total of necessary calories per day:

	Calories
Father, 150-pound laborer	3000
Mother, 150-pound woman, working hard	3000
Child, 12 to 15 years old	4500
Child, about 8 years old	2500
Child, about 3 years old	1300
Total	14,300

These figures are generous for growing children, but only moderately so for the parents. Assuming intelligent purchase of the food necessary to supply the above total number of calories, properly proportioned to take care of the needs of the body, the minimum cost of 1000 calories today will be about 11 cents, or about $1.57 per day, or something like $47 per month. It is true that many families are undernourished by reason of buying insufficient food, but it is also true that the average housewife does not buy with scientific intelligence, and consequently what is saved by undernourishment is probably spent through unwise purchasing. The problem then is to subtract from the family income the necessary food expenditures, and then take a percentage of the balance as being available for rent. This has been placed at a maximum of 40 per cent, especially with low-wage workers. The man who earns $90 per month, spends $47 for food, and has $43 left for all other expenses. If he pays 40 per cent of this for rent, he has approximately $17 as a maximum rent item. Many workmen, particularly skilled Americans, can and do pay considerably higher rents, but there are very large numbers whose rent paying capacity ranges from $10 to $15 per month.

The government reports show that out of 17,643 houses, 69 per cent. of the four, five, and six-room size rented for not over eight dollars per month. Such a rental is not economically possible in cities, where land and houses now cost so much, nor is it necessary with the relatively high wages which are now paid. These figures apply to a large extent to mining and cotton-mill towns, where houses are often small, poorly built and poorly maintained, and where low house rent unfortunately is a factor in establishing wage scales. It is interesting to observe that 57 companies, having invested about $15,000,000 in houses, earned a gross of 8.3 per cent average over a five-year period, that eight coal companies with $2,800,000 invested earned 11 per cent average over a five-year period, and that one company's annual return was as high as 20 per cent of its investment.

What Housing Costs Today

If houses are to be rented upon a 10 per cent gross return basis, the total cost of the house to the man who can pay $17 per month rent should not exceed $2000, and to the man whose rent is to be $10 per month not more than $1200.

Where houses are built of reinforced concrete, it probably is good business to rent them for nine per cent, or even eight per cent of their value, because of low depreciation and upkeep. With frame houses, 10 per cent is the absolute minimum that is advisable, made up as follows:

	Per cent
Return on investment	5.00
Taxes	1.00
Depreciation (sinking fund)	2.00
Upkeep	2.00

The range in house building costs is great. In the South, where frame construction is common and no elaborate heating systems are necessary, attractive cottages are built for as low as $700 to $800. Well-appointed four-room houses for rental purposes can be built in the residence sections of most cities at not to exceed $2000. Splendidly designed six-room houses of

attractive appearance, with all modern improvements, in large developments have been put up as costs of from $3000 to $4000.

Avoid Charity

The consensus of opinion of those who have studied the industrial housing problem is decidedly against anything savoring of charity or paternalism. The essential arguments are:

Workmen resent anything of this type, being possessed of as much self respect as the average citizen of somewhat higher social standing. Workmen feel that they should pay their way and that they should receive adequate wages to enable them to do this.

Any business activity which is not making money will prove unpopular, and indusfrial housing that is netting 2 per cent or some such figure will not be kept up in a manner to get the best results.

If an employer has not sufficient houses to take care of all of his people, there will be discrimination.

The building, in a large community, of some houses which are not rented on a businesslike basis will upset real estate values generally.

Housing projects where houses are rented or sold should return at least 5 per cent and preferably 6 per cent. The advantages of better labor conditions generally will make the housing investment attractive.

Selling and Renting

It is generally believed that houses should be sold when possible. A man who buys a house is a better citizen, is less likely to take part in labor disturbances, and is almost bound to remain in the community. The monthly payment method of selling houses to both American and foreign workmen is practically standard. An initial payment, preferably 10 per cent, closes the deal, and monthly payments upon a slightly higher basis than the rent take care of the principal and interest in a period of 10 to 20 years. It is necessary, however, in every industrial community to have a considerable percentage of houses for rental purposes, as many employes cannot and will not buy. On the other hand, if a large proportion of new housing is sold, those who purchase homes will leave old quarters to those who rent.

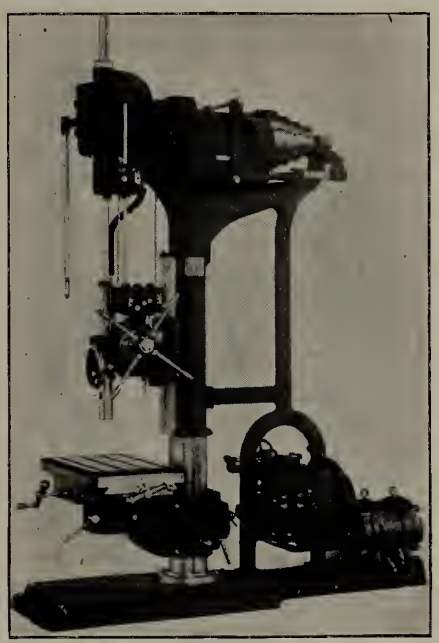
It is important to note that foreigners usually have stronger home-buying tendencies than Americans, and that those who deal with foreign workmen find them prompt in meeting their obligations.

Agencies for Securing Housing

Experience during the last two years has made it clear that employers cannot look to individuals or real estate operators to provide the necessary housing for employes. The ordinary workman generally does not build his own house. He is more interested in buying than in building. He is not certain of the permanence of his job and of his desire to settle in the place where he is now working.

The real estate operators are uncertain as to how long rush business will continue, have no enthusiasm for putting money into industrial housing, nor the necessary funds to handle big projects. This has made it necessary for employers, either individually or collectively, to provide at least a portion of the housing needed. A considerable number of such projects are now actively under way.

The United States government considers putting a considerable sum of money into industrial housing, either by providing housing directly or by loaning money at low rates of interest to employers who will build the houses.



MOTOR-DRIVEN UPRIGHT DRILL

A scheme of action by individual employers or by groups of employers has now been established along the following lines: A separate company is formed and a competent management put in charge of its operation. This tends to separate in the minds of employes at least, the employer from the housing operation, and relieves the manufacturing men from the responsibility of handling housing as a side line. Careful analysis is made of conditions and the probable needs of the community for a period of years ascertained. A careful plan is developed with an estimate of the amount of money needed for the initial development.

At least 50 per cent of the total cost can be carried by the banks on first mortgages. The housing company provides the additional capital, and, where property is sold, carries the second mortgage. Construction is put through in a systematic manner, and on a scale large enough to secure the advantage of wholesale methods, and on a long-time basis.

Rapid Upright Drill

The upright drill shown in the accompanying illustration was recently developed by the Weigel Machine Tool Co., Peru, Ind. This drill was designed for a rapid production machine and it embodies many interesting features. The compound platen is adjustable both ways by means of feed screws equipped with dials reading to thousandths of an inch. These dials are adjustable so that all readings can be begun at zero. Eight feed speeds are provided for each spindle speed and the feed changes are made by means of sliding gears. It is said that any feed is easily and quickly selected by means of a feed plate attached to the machine and through the medium of convenient levers for gear changing. The machine is equipped with a quick-return feed and an automatic stop which throws out the feed at any predetermined depth. A tapping attachment also is provided. It is placed directly on the spindle and has a reverse of two-to-one for backing the tap out of the work. These machines are equipped with either belt or motor drive. The machine illustrated is equipped with motor drive. The motor is mounted on a separate base bolted to the main base, and the driving head and pinion are entirely covered with guards. All other gearing and the lower cone pulley is also equipped with guards and a belt shifter is provided for shifting the belt from one cone step to another.

Adds Molding Capacity

A foundry addition has just been completed by the Burnside Steel Co., Chicago. The completion of this addition and the installation of a 2½-ton converter made recently will enable the company to double its capacity for making small and medium size steel castings, in which it has specialized for some time. The company is under the management of the following: President, H. F. Wardell; vice president and treasurer, George L. Pollock; vice president, John Fletcher; secretary, Charles S. Daniels. The company maintains sales offices at 548 Railway Exchange building, Chicago.

How Small Tools Were Made Quickly

New Method for Making High-Speed Steel Reamers Recently Developed in a Railroad Shop—Manufacturing Process Designed to Meet Emergency Shows Substantial Saving in Cost and Time

THE necessity at the present time of maintaining production at a high level has resulted in the development of many ingenious methods for cutting down the delays resulting from deferred deliveries of materials. For instance, the demand for high-speed steel has not only sent prices to a high level, but deliveries on this material now take from two to four months. Confronted by an emergency which made it necessary to secure small tools earlier than manufacturers could promise deliveries, a process has been developed at the Jackson, Tenn., shops of the Illinois Central railroad for making inserted-tooth high-speed-steel reamers. The reamers were in service a few days after the first plans for the process were conceived.

Tool Saves $55.20

The process consists of welding the blades of reamers and cutters into an integral body by the use of thermit steel. A spiral, high-speed steel reamer made by this process is shown in Fig. 1. This tool cost the Illinois Central railroad $13.25, which shows a remarkable saving over the cost of a like tool bought in the open market, the quoted price of which was $68.45, net, 90 days delivery. It is pointed out that the tool in question should show high efficiency in operation for two reasons: First, as it is practically a solid unit, any tendency toward chattering often present when inserted-blade tools are used, is eliminated; second, a solid tool conducts the heat, caused by cutting, away from the blades rapidly as the solid construction readily absorbs heat which tends to keep the tool cool through radiation.

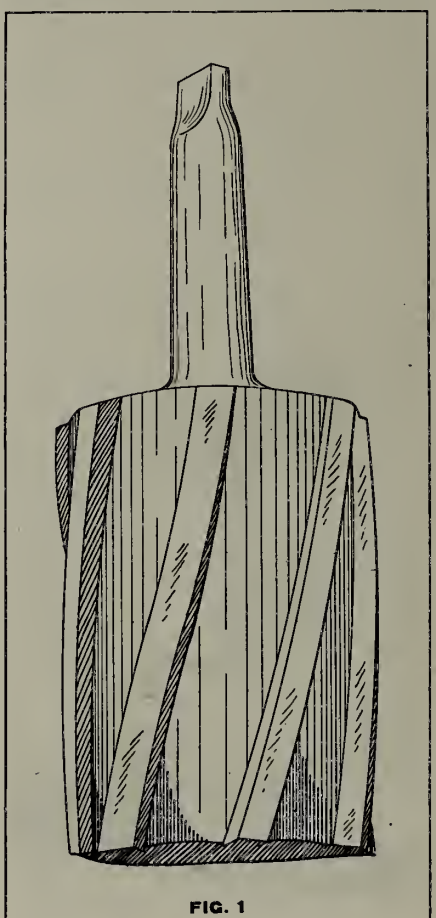


FIG. 1

As shown in Fig. 1, the blades, which are made of high speed steel, are helical in shape cut to conform to the length of the thermit steel body that confines them. These blades of course, can be set to any pitch desired, from a straight line to an extreme angle. The taper shank is made of round carbon steel, machined to the proper taper to fit a Morse taper socket.

Method of Manufacture

In making a reamer by this process, the first step is to cut the blades from high speed steel. They are then bent to the helical shape desired. The length should, of course, conform to the length of reamer desired. A cylinder is provided which is bored out to the same size as desired in the finished reamer.

The blades are set in this cylinder and spaced properly, with their cutting edges pressed firmly against the cylinder wall. Then a carbon-steel

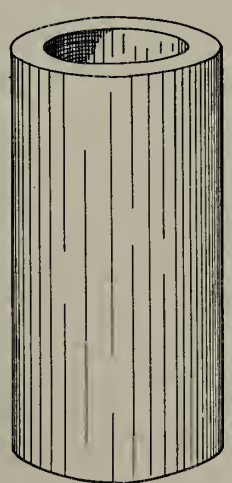


FIG. 2

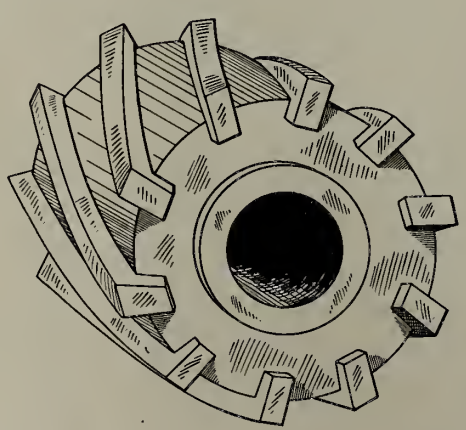


FIG. 3

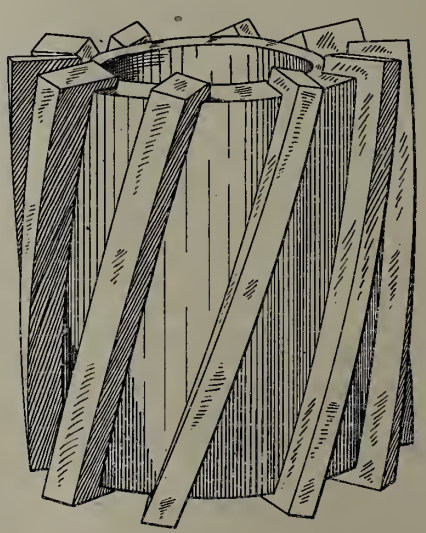


FIG. 4

FIG. 1—SPIRAL REAMER MADE BY THE THERMIT PROCESS
FIG. 2—THE CARBON-STEEL CORE. FIG. 3—THE HIGH-SPEED STEEL BLADES SET IN A WAX MATRIX.
FIG. 4—THE FINISHED REAMER

core, made of tubing, is placed in the center. This core is shown in Fig. 2. Next, the space between the core and the cylinder is filled with molten beeswax. After the wax has cooled, the contents of the mold, that is the core, wax and blades are removed intact. This is easily accomplished by heating the outside of the cylinder slightly, which causes expansion, and at the same time melts the outside of the wax slightly. The matrix thus formed is shown in Fig. 3. The tube core is now heated slightly on the inside, which allows it to slip from the wax matrix readily.

Thermit Must Flow Freely

Next a solid steel core is inserted. This core should be a little longer than the matrix and should be placed in position with one end flush and the other end protruding. The matrix is then ready to be placed in a regular mold for thermit welding. The matrix is placed in the mold upside down, the molding material being rammed to within 1½ inches of the blades. At this point, the heating gate is directed against the carbon steel core with the pouring gate about 3 inches away from the side of the core. The mold is now rammed up in the usual way. After the mold is rammed up to the top of the reamer, a round wooden riser, about 1 inch larger in diameter than the steel core, is placed in position. This permits a free flow of thermit steel through the mold and into the riser opening.

Completing the Process

The mold is now heated with the preheater to a white heat, which, of course, melts out the wax. The heating gate is now plugged up, the thermit ignited and after reaction has taken place the crucible is tapped. In half an hour the mold can be knocked down and the riser cut off while hot. The finished reamer is shown in Fig. 4.

Angle Bending Machine

Heavy demand at the present time for heavy angle benders, particularly for use in ship construction, has led the Kane & Roach Co., Syracuse, N. Y., to place a unit on the market designed to handle angles ranging from light gage 6 x 6 x ⅝ inches. Special rolls are designed to equip the machine for handling I-beams, channels, tee - irons, rounds and squares.

A special feature of the machine is the close position which the rolls bear to each other. Two advantages are claimed to result from this arrangement: First, the material entering the rolls is acted upon immediately, avoiding the straight or flat spot on either end of the piece which would have to be cut off; second, the machine is said to be capable of performing the entire bending operation itself, it being unnecessary to heat the material and start the correct bend.

The top roll can be lifted by a hand lever and the angles or other shapes placed between the rolls without other screw adjustment. When the top roll is in position for rolling it is locked down by means of a gag which is slid underneath the screw. The gag is withdrawn when the roll is raised.

Slide rolls are provided on each side of the bending rolls. These may be swiveled to any desired degree according to the diameter of the circle of the material being handled. They are also adjustable against the angle of the work and are said to keep the latter from twisting or buckling. Each machine is equipped with a scale and pointer to determine the position of the rolls.

An Automatic Motor Control Switch

Starting and stopping motors from a remote point is often found desirable. This is true in connection with pumps for railroad water tanks or other applications, and coal and ash conveyor installations. The control may be a float switch operated through changes in the water level of a tank; a pressure regulator performing similar service in a closed system; or push button stations,



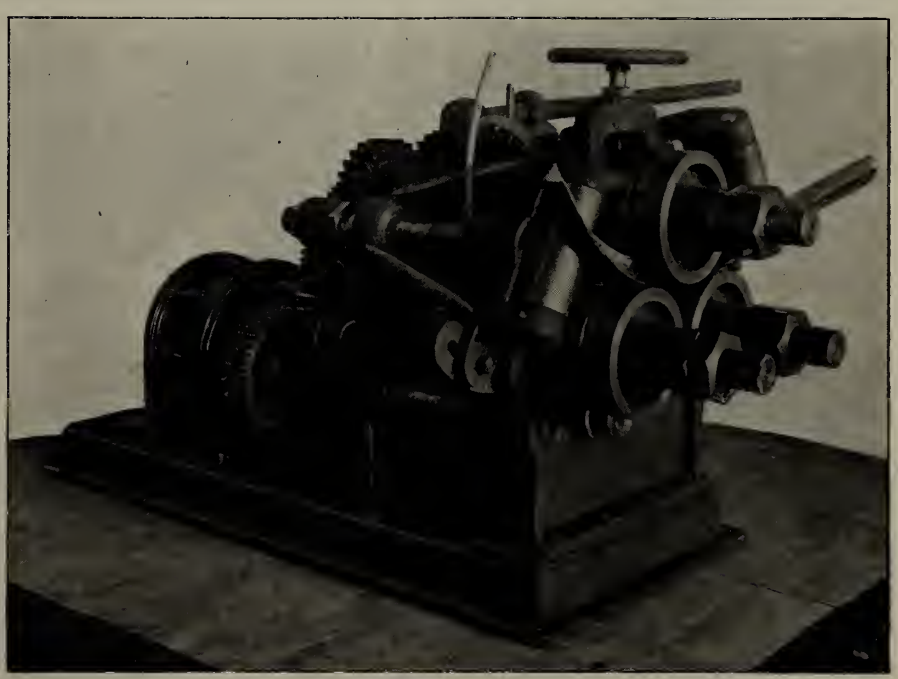
AUTOMATIC STARTING SWITCH

one button being normally open and one normally closed. In any case some form of automatic device must be used.

The automatic starting switch, shown in the accompanying illustration, developed by the Cutler-Hammer Mfg. Co., Milwaukee, is of the double pole clapper type and is designed for single-phase and standard polyphase motors up to 15 horsepower, and for high torque polyphase motors up to 50 horsepower. Mounted on the same slate with the double pole switch are two additional time element overload relays.

When used with float switch, pressure regulator or snap switch, the overload relays are arranged for manual reset, so that when an overload occurs the operator is required to go to the starting panels before the motor can again be started, a feature which is said to result in more careful attention to operating conditions.

Except on some of the smaller sizes both poles of the main contactor are equipped with powerful magnetic blowouts. The clapper switch fingers are the company's standard butt contact construction with hard copper tips.



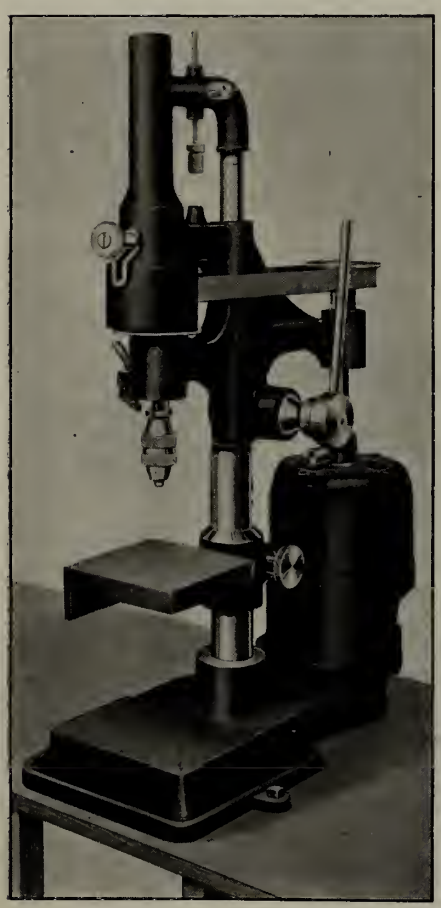
HEAVY ANGLE BENDING MACHINE

Sensitive Bench Drill Press

The motor-driven sensitive drill shown in the accompanying illustration has been developed recently by the High Speed Hammer Co., Inc., Rochester, N. Y. The machine is compact and portable, weighing 60 pounds, and occupying a bench space 7½ x 18 inches. It is designed for connecting to lighting circuits where the voltage is either alternating or direct current, 110 or 155 volts.

The machine is equipped throughout with annular ball bearings which are adjustable for wear. A spindle lock is provided to permit the operator instantly changing drills with one hand. As the illustration shows, the motor is placed in an upright position and drives the spindle through a belt which is equipped with an idler for taking up slack.

The machine is designed to drill holes from the smallest practicable size up to 3/16 inch. Two spindle speeds are provided, 2100 and 6000 revolutions per minute. Special pulleys are designed, however, to give any speed desired up to 10,000 revolutions per minute. The platen is designed to be adjusted quickly. It has a ground-working surface 5½ x 5 inches and will take work up to



SENSITIVE BENCH DRILL



FOUR JAW LATHE CHUCK

4⅜ inches high. The spindle end thrust is taken up by an adjustable ball bearing. This bearing is protected by a semitubular shield which prevents oil from being thrown on the operator. For precision drilling, as regards depth, a gage adjustable to thousandths of an inch is provided. The machine will drill to the center of a 6-inch circle.

Four Jaw Lathe Chuck of Simple Design

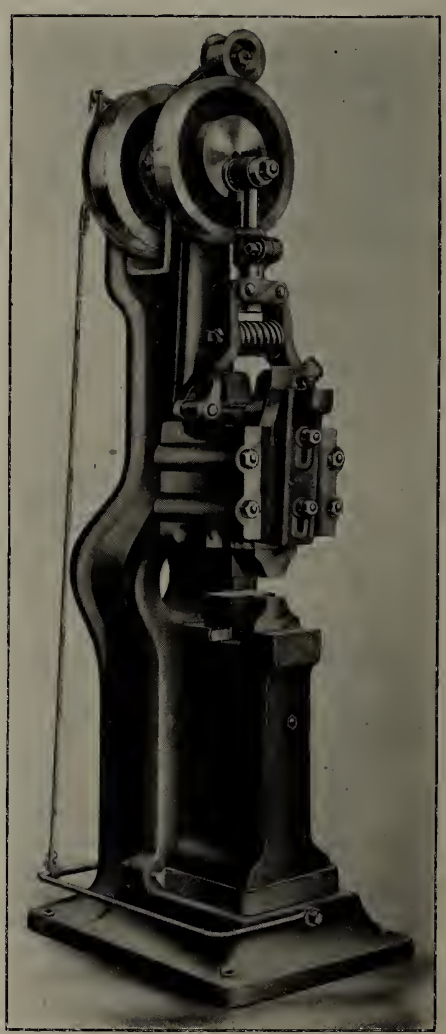
The Simplex Tool Co., Woonsocket, R. I., has recently developed a lathe chuck that embodies several novel features. As shown in the accompanying illustration, the sliding surface of the jaws exceeds their height. This feature, it is said, insures rigidity, owing to the fact that the tendency toward springing the jaws out of square is lessened. It is claimed that the chuck has great gripping power and that it will retain its accuracy through a long period of service. The jaws are reversible and slide in slots machined to accommodate them in the face of the chuck. The chuck is of the independent type, each jaw being actuated by a square-thread screw passing through a nut that is made integral with the stud which holds the jaw in place. The face of the chuck is provided with a series of annular grooves for aligning work and four ample slots are also provided for clamping counterweights in position, if necessary, while boring or turning castings the design of which calls for dynamic balancing.

Jib and Face Plate for Forging Hammers

In order to take up more effectively the wear on light forging hammers and also to make possible a finer ram adjustment. the United Hammer Co., Boston. has developed a standardized jib and face plate which will, in the future, be installed on all hammers manufactured by that company. As shown in the accompanying illustration, the jib is bolted through slots onto the face plates. The top of the face plate terminates in a projection and against this a bolt, connected to the ram by means of an arm, brings up at the end of each stroke of the ram. The shock, as in the old hammers, is taken up by the spring on the ram. In the illustration the bolt is almost touching the dog which indicates that the hammer is near the end of its thrust. If a shorter thrust is required, the jib may be raised to a higher position. Both face plates and jib can be installed on older type hammers.

The Dayton Malleable Iron Co., Dayton, O., is installing a 2½-ton electric furnace of the rolling cylinder type developed by Albert E. Greene, 1602 Hoge building, Seattle, Wash.

The Pittsburgh Thermoline Co., Pittsburgh, has issued a booklet advertising a gas made from petroleum for cutting steel and other uses.



LIGHT HAMMER EQUIPPED WITH FACE PLATE AND JIB

Analyze Labor Problems of War

Woman's Place in Industry, Securing Maximum Production from Non-Conscripted Forces, Reassimilation in Business of Returning Armies, Providing Useful Employment for Cripples and Other Subjects Studied by Chicago Conference

LABOR problems of an immediate character created by the war and those which will arise from conditions following the restoration of peace were presented and analyzed at a national conference held by the Society of Industrial Engineers and the Western Efficiency society at the Hotel La Salle March 27, 28 and 29.

Four main subjects were considered. These were women in industry; mechanical equipment in place of men; obtaining maximum production from the men remaining; and readjustments after the war to care for those returning, including the disabled. In view of the importance of the subject of women in industry the paper by C. E. Knoeppel, counsel on organization and management of New York City, took a high position in the program. This paper represented a study and summary of the answers to 1000 questionnaires sent out to manufacturers, labor heads and economists. Opinions were sought as to the need for women in the place of men, how to obtain them, what tasks are suited to their ability and how to surround them with best conditions for work.

C. E. KNOEPPEL'S voluminous paper covered the subject in much detail. He deduces from the answers that women are not now needed generally in industry because there is a vast reservoir of male labor yet untouched, which can be drawn on to supply the places of those who have gone to the front. He finds that thousands of men are employed in various occupations where they can be spared to industry without impairing business before it will be necessary to call on women. There are the men used in elevators, offices, retail stores, taxi drivers and a score of other employments where women can serve readily. Then there are alien enemies whose productive power can be utilized under supervision and the idle, both the rich and the poor, who can be forced into useful production. When these sources have been exhausted it will be time to call on women to come forward in large numbers to enter production fields and do the work of men, said Mr. Knoeppel. At the same time it is believed advisable to proceed now to plan for the utilization of women when the need does come and to this end part of the questionnaire was devoted. It was agreed generally that women must be placed at lighter tasks than men and that provision be made to allow them best working conditions, as to cleanliness, light, ventilation, health supervision and social surroundings.

An important point made by Mr. Knoeppel is that unless sufficient ship capacity is provided to carry manufactured products to Europe there will be no need of the efforts of women for a long time. Without ample transport across the Atlantic, goods will pile up at eastern ports and render unnecessary a concentrated effort to produce more. Throughout his paper the author quoted liberally from the opinions of those who answered.

Many Women Employed

A RECENT announcement by the bureau of labor statistics reveals that 1,426,000 *more women are employed in the United States than at the beginning of the war. In industries the greatest increase is shown. These took* 530,000 *more women since* 1914, *but the largest proportionate increase was* 215,000 *additional women taken into government service. Since* 1914 *women have replaced* 1,413,000 *men. Industrial and government work have taken* 400,000 *women formerly employed in domestic service or in dressmaking.*

Harrington Emerson, consulting engineer, president of the Emerson Co., expressed the belief conditions are shaping themselves toward a readjustment of labor conditions after the war in which some backward steps will be taken. He believes the influences that have set back progress in Russia more than a generation are at work in this country as well and will be revealed at the close of the war. It is difficult, he says, for men to change from high wages and short hours to lower wages and greater effort. This will form a difficult problem in the readjustment and every man must make his own solution as conditions arise.

Mrs. Joseph T. Bowen, chairman of the women's committee of the council of national defense, Illinois division, outlined what women have done and are doing to help win the war. Miss Florence King, president of the Women's Association of Commerce of the United States, spoke on what women should do to help win the war. Mrs. Bowen presented a complete report of what is being done in organizing along various lines. The underlying purpose is to maintain an organization to meet whatever call is made by the government where women can aid. Selling Liberty bonds, obtaining food pledges, obtaining marine glasses and distributing coal are some means by which they have served already. Miss King made a plea for giving women equal opportunity with men to show their value and to accomplish ends for the good of all. With wider demand for their services, she says, women are taking more and more important parts in the business life of the nation and can do even more. She cites the desire of many women to serve in this crisis and their lack of proper guidance to show what best can be done by them.

Barton T. Bean, of San Francisco, suggested a plan for stabilizing labor and prices after the war by voluntary agreement. He has had experience under the food administration where the middleman has been eliminated, a set price being established for the consumer, the jobber and the retailer. This has done away with speculation and has given the market a stable basis. He believes the same method can be used in practically all products after it has been demonstrated under war conditions.

A. Russell Bond, managing editor of the *Scientific American,* pointed out that the returning soldier, even though disabled, will be able to direct machinery and aid in production. He cited the results of research to determine the value of machinery as an aid to man.

He found that while the multiplication of effective result by machines varies over a wide area, it is a safe conclusion that by the aid of machinery a man at present is able to do 10 times as much as a man a little more than 100 years ago. He believes that the laborer who operates a machine is not truly a laborer, the machine being the true laborer and the man the director. Therefore he likes the term director for the man who directs the machine.

In conclusion Mr. Bond said:

"But wonderful as all these machines are, not one of them is endowed with real intelligence. Men can produce a machine that will play chess but the machine cannot do its own thinking; it will only do what it has been designed to do. It will react to the various conditions to which it may be subjected, but it has no will of its own and no power of thought. No matter how far we may advance in the development of machinery we shall always come up against this barrier—the impossibility of producing brains. The most perfect of machines is useless without an intelligent operator. In the industries of the future, no matter how far they are advanced, operators will be indispensable, they will be required for their directive intelligence rather than their muscular power. Instead, therefore, of bewailing the fact, as men frequently do even in these enlightened days, that machines are replacing men, we must look upon the subject from a broader point of view and realize that machines are demanding men and that they are elevating man to a higher plane."

Gives Intensive Course

Ellis F. Muther, sales manager for the Gisholt Machine Co., Madison, Wis., explained the methods used by his company in training men to operate machinery in its own plant and in those of its customers. Briefly this is to give an intensive course of a few weeks in a school attached to the plant, which affords as much instruction as would be received in several years under ordinary shop conditions. The learner is in charge of a teacher, one learner to one teacher. He takes the machine apart and assembles it until he knows its makeup thoroughly. Then he learns adjustment and operation. Having qualified in this he, in turn, becomes a teacher of a learner and goes through the cycle a second time, with his position reversed. It is valuable that the man know how to teach others as it is that he can learn for himself. The second cycle of the course teaches him this. A similar course for educating for government service is suggested. Mr. Muther's address was illustrated by stereopticon views.

Securing Maximum Production

Securing the maximum production from the men remaining behind brought out many uggestions. Irving A. Berndt, manager of the betterment department of Jos. T. Ryerson & Son, Chicago, and secretary of the Society of Industrial Engineers, classified workers under war conditions into three groups: those in the fighting service; those working on war requirements; and those carrying on normal industrial activities. In a short time probably 2,000,000 men will be in actual military and naval service, the first group. It is said that four to six men are required in industry to keep one man at the front. Taking an average of five for this service it is necessary to have 10,000,000 persons in war production, the second group. With 30,000,000 workers normally engaged there are 18,000,000 remaining when the first and second classes have been deducted. The first group are doing their utmost. The second class must be inspired to give their utmost efforts and the third group of 18,000,000 is left to bear the burden formerly carried by 30,000,000, and must be trained to greater productivity and efficiency to meet the burden laid on them.

In this effort the industrial engineer comes into his own. Mr. Berndt says:

"Consider for an instant our ideal. For years our cry has been elimination of waste, reduction of waste effort, conservation of man power, and now those words save, conserve, produce and economize which were during those times the hobby of a few, the self-assumed problem and responsibility of a small group, are now the slogan of a nation, the motto in every household and the creed of each man and woman. Are we not well drilled and well equipped in our ideals?

"The old hire and fire method must be entirely wiped away. The foreman already burdened with more responsibilities than he can efficiently handle must no longer be permitted or expected to handle this function; unless he has had an opportunity to study each job and understand its requirements in the way of man power and ability and then has time to carefully consider each applicant and the ability to analyze his qualification how can he be expected to place men well. It is not possible for the foreman under average conditions to give these problems their proper attention.

"We must have more centralized employment departments concentrating on this problem, applying practical character analyses plans and making as scientific and practical an analysis as possible each man for each job.

The final day of the session was devoted to the consideration of after-war conditions, with particular attention to readjustments to take care of those returning, including the disabled.

Planning for Disabled Soldiers

Douglas C. McMurtrie, director of the Red Cross institute, New York City, gave one of the most interesting and practical talks of the conference. He is in charge of an experimental school in New York City where studies are being made to give experience in establishing schools for re-educating crippled soldiers on their return from the war. Much has been done along this line in England and France. The United States can start at an advanced stage to carry on this work. One of the most interesting features of this talk was presentation of a number of stereopticon slides showing what is being done in Europe and motion pictures illustrating the actual use of the wonderful devices to replace missing arms, hands and legs Men were shown engaged in agricultural and industrial tasks, some with one arm missing and some with two. Mr. McMurtrie stated that in the past the crippled soldier could hope for little better on his return from the front than a pension, not sufficient to keep him but just sufficient to prevent him from using his efforts to earn a living, making him a dependent and perhaps a beggar. A few with sufficient character have managed to make their way in spite of the handicap, without assistance. "The same course has been followed in the past with industrial cripples," said Mr. McMurtrie, "but state compensation laws now have afforded a great deal of assistance toward better things."

"One of the things we will need most and probably will have difficulty in obtaining," said the speaker, "is the helpful attitude of the public which can make or mar our efforts. It is so easy to pity and help the crippled soldier. We all feel that we should do things for him since he lost his arms and legs in our cause. But the effect of this is to weaken the will-power of the cripple and leads inevitably to dependency and pauperism. The truest help is to awake in him the desire to help himself and to be independent. That will be one of our greatest endeavors and without it we will fail. If the soldier, stunned and disheart-

ened by his mutilation, cannot be made to see that there is a useful place for him and that there is much work he can do in comfort and with good results, thus supporting himself and and helping the country, our effort will be vain in many cases."

Business After the War

Willard E. Hotchkiss, director of business education, University of Minnesota, spoke on "Business After the War". He said in part:

"When it is maintained that the clue to business problems after the war is to be sought in the field of human relations rather than in the field of technical organization, it must be recognized at once that profound changes are sure to occur on the technical side. The extent to which mass production is being carried at the present time, the way in which manufacturing and assembling of parts is being segregated in different concerns, the changes in transportation, including the vast equipment for the production of shipping, and the possibility of serial transportation and communication—all of these things will tremendously affect the technical organization and will doubtless determine many of the lines in which business will develop.

"When we come to consider the way in which the various human factors will align themselves and the effect which this alignment will have upon future business development, we are, of course, in a much different realm, and one in which prophecy is extremely difficult. However, if present tendencies are to any extent indicative, there is one assertion which it seems comparatively safe to make, and that is that business policies are destined to be worked out with a very much larger participation of workers and of the general public than has been the case heretofore. By participation I do not here have primarily in mind participation in the actual determination, but first of what constitutes efficient business management and operation and second, how efficient management is to be secured.

"If we insist upon shutting our eyes to industrial forces which perhaps for the moment are disagreeable to contemplate, we shall almost surely have before us a painful process of disillusionment. For my part I do not believe that the difficulties of the employing class in adjusting themselves to the new forces arise primarily out of a desire to keep for themselves a larger portion of the industrial product. The greatest obstacle to a better adjustment in my opinion arises out of the viewpoint which is expressed by the oft-repeated assertion. 'I am willing to make any reasonable concession, but I must control my own business.' In this attitude of mind we have a clear distinction between purely economic and what I should call the psychological factors in the employer's side of the problem. We have the same thing on the employer's side when we make a distinction between a wider participation on the one hand and a more equitable distribution on the other.

Canada's Experience With Cripples

Norman A. Hill, general manager of the Carriage Factories, Ltd., Toronto, spoke along the same lines as Mr. McMurtrie on rehabilitation of crippled soldiers, with relation to what Canada is doing for her maimed who have been returning for months from European hospitals.

"Let us consider some actual statistics in round numbers, as follows: Canada has raised and sent abroad an army of over 400,000 and is raising an additional 100,000 under the compulsory service act. This army of 500,000 men is produced from a total population of but 7,500,000 and when one remembers that there are approximately 2,000,000 French Canadians who until affected by the draft came very far from doing their share, you can almost say that 500,000 fighting men were drawn from a population of not over 6,000,000 people.

"Now as to actual casualties, perhaps the greatest misconception is as to the number of soldiers made entirely blind. This percentage is approximately only one-eighth of 1 per cent of the 35,000 returned men of the Canadian expeditionary forces. This is remarkable, especially so, when prewar estimates on total blindness were placed at from 1 to 5 per cent. The next most surprising figure, at least to me, is that less than 4 per cent of the Canadian casualties are cripples classed as amputation cases, and when you remember that amputation cases include not only the loss of an arm or a leg but include as well even the loss of one finger this low percentage is also remarkable.

"Of all the invalided soldiers returned to Canada over 20 per cent are on account of disability due to disease, and of this 20 per cent not less than half are tuberculosis cases. These figures then would indicate that we need not look for a huge army of helpless cripples and blind when our soldiers have all returned from the front. One of the chief things in this course of reconstruction of men is to combat and overcome the habit of idleness, which is fixed upon them in the convalescent period, particularly if a man has been for some months in a hospital in England, and in all cases back of this, they have had the semi-idle life of the soldier in the field, which is generally brief periods of intense activity, and long periods of waiting, or comparative utter idleness."

Shifting the Manpower to Production

One of the interesting papers related to shifting manpower to emergency production, delivered by James O. Craig, president of the Business Men's Clearing House, Chicago. "Money, machinery and men are the three prime factors in solving the war problem," he said. "Money is plenty and is obtained in limitless quantities as the government needs it." Machinery is manufactured in immense quantities as it is needed and men form the greatest problem. To fit the man to the job and to find the man for the job, that the job may be well done but to avoid putting an executive into a minor position, thus losing the value of his services in a larger position, is one that stands high in the problem.

One source of loss is in the fact that many men hurried in the early days of the war to offer their services to the government in advisory capacities and now are situated in minor positions where their executive ability is lost and they are of little service, their work being such as could be done by a much less valuable man, while their real abilities are needed in production. Adjustments must be made to remedy this situation. There is need for an inventory of executive power and proper distribution to get the best results.

Montague Ferry, of the Armstrong Bureau of Related Industries, Chicago, argues for the development of team work to get best results in industry. He stated that only 60 per cent of labor is efficient in results and that 40 per cent is wasted or withheld. The three greatest wastes, he said, are labor turnover, strikes and withheld effort. Addressing himself to the latter he showed how team work, the awakening of a feeling of *esprit de corps,* among the men will eliminate much of this and gave instances where it had been aroused and excellent results had followed.

Lew R. Palmer, acting commissioner of the Pennsylvania department of labor and industry, told of the Pennsylvania plan for meeting after-war conditions. Particular attention is being paid in this effort to planning for the proper assimilation of women into industry and the care of men returning from the war.

Capital and Labor Pact Formulated

Past Month's Conferences Result in Signing of Agreement to Place Ban on Strikes for Duration of War—National Mediation Board Proposed—Workers and Employers May Organize

DELIBERATIONS of perhaps the most important industrial conference ever held, which began in Washington Feb. 25, have resulted in the recent signing of an agreement between representatives of labor and capital for the duration of war. The salient features of the plan, which represents the best thought of capital and labor, are that there shall be no strikes or lockouts during the war; a recommendation that all industrial disputes be settled by a government mediation body; both workers and employers shall have the right to organize and women substituted for men must be allowed equal pay for equal work.

General Plan Outlined

The plan provides that there shall be no strikes or lockouts during the war and that workers may organize in trades unions and bargain collectively through chosen representatives while employers have the same right to organize in associations and to bargain collectively. Workers shall not use coercive measures to obtain members or in dealing with employers, and employers shall not discharge workers for membership in trade unions or for legitimate trade union activities. Where union shops now exist, these shall continue with the union wage scales and the continuance of the open-shop policy shall not be deemed a grievance. Safety first rules and regulations shall not be relaxed. When necessary for women to be employed in place of men, they are to be allowed equal pay for equal work and must not be allotted tasks disproportionate to their strength. The basic 8-hour day will apply in cases where the existing law requires it; in others, the question of hours shall be settled with due regard to governmental necessities and the welfare, health, etc., of the workers. Maximum production in war industries shall be maintained and practices on the part of either employer or employe, which operate to delay or limit production or which tend to artificially increase costs, shall be discouraged. A permanent list of skilled and other workers will be kept on file by the department of labor for rapid and effective distribution purposes. All workers shall have a living wage and fixation of wages, hours and conditions of labor, local conditions shall always be regarded and a minimum basis established.

For the settlement by mediation and conciliation of any controversy in an essential war industry between employers and employes, a government mediation body to be known as the national war labor board is proposed. Its functions would extend to industries indirectly affecting essential war production, and it is intended to provide machinery in industrial centers for such purposes by appointing committees or boards to secure settlements by local mediation and conciliation. This war labor board shall not take cognizance of any controversy in any field of activity where there is by agreement or federal law a means which has not been invoked.

These conferences, instigated by Secretary of Labor Wilson, have been continuous for a period of more than a month between the five representatives of employers and the five representatives of employes. The first group selected former President William H. Taft and the latter, Frank B. Walsh, formerly chairman of the federal commission on industrial relations, to represent the public. Representatives of employers included L. A. Osborne, New York, vice president of the Westinghouse Electric & Mfg. Co.; H. B. Worden, Newark, N. J., president of the Submarine Boat Corp.; W. H. Van Dervoort, East Moline, Ill, president of the National Metal Trades association; L. F. Loree, New York, president of the Delaware & Hudson railroad; and C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge & Iron Co. The five representatives of labor were: Frank J. Hayes, Indianapolis, president of the United Mine Workers; William L. Hutcheson, Indianapolis, president of the Brotherhood of Carpenters; Victor Olander, Chicago, representative of the Seamen's Union; T. A. Rickert, Chicago, president of the United Garment Workers; and William H. Johnston, Washington, D. C., president of the Machinists' International Union.

Taft Praises General Spirit

At the conclusion of the conferences, ex-President Taft expressed himself as being gratified with the manifest self-restraint, tact and earnest patriotic desire of all in attendance to decide upon a most effective war policy. He said: "I believe the plan will work if it is administered in the spirit in which it was formulated and agreed upon."

Mr. Walsh likewise, in a supplementary statement, remarked: "The plan represents the best thought of capital and labor as to what the government's policy ought to be during the war with respect to industrial relations. It represents an industrial chart assuring maximum production to the employer while guaranteeing to the worker, a healthy growth of democratic principles as applied to industry as well as the highest protection of his economic welfare while the war for human liberty everywhere is being waged."

Labor Delegation to Sail

A delegation of nine American labor leaders with credentials of the American Federation of Labor will sail shortly for England and France to declare American labor's position with regard to the war. It is stated that the commission is sent in response to repeated invitations from French and British labor leaders. In the words of one of the members of the committee, its mission abroad "is not to tell labor of Great Britain and France what to do, but to tell them how American labor stands with regard to the war".

Will Aid Disabled

Pennsylvania as a state is formulating plans for rehabilitating its returning disabled soldiers and sailors. A state committee was recently appointed by Governor Brumbaugh, composed of the adjutant general as chairman, commissioner of health, commissioner of labor and industry and the executive secretary of the state board of education. It will study the problem in all its phases and will place all its facilities and co-operative bureaus at the service of the national authorities who are engaged in this work. Already offers of such co-operation have been filed with the surgeon general.

In the first three weeks of March, the conciliation division of the department of labor adjusted 24 strikes.

Sixth Increase

In Steel Plant Wages Means Aggregate of 95 Per Cent

Many independent steel companies have followed the United States Steel Corp. in granting a wage increase of 15 per cent, effective April 15, which is the sixth since Jan. 1, 1916. In the aggregate these advances represent approximately 95 per cent. As announced by Chairman E. H. Gary, wages of other employes than laborers will be equitably adjusted except in the cases of recent advancement. Railroad, coal mining and shipbuilding companies are not included. Chairman Gary said:

"It is rumored that some employers of labor have been discussing the adoption of an 8-hour per day base, and in view of this fact we have given careful consideration to this question and have decided against it.

"Extending over a period of many years we have been operating on an 8-hour basis in departments where the labor is unusually heavy and where the workmen and managers have both decided eight hours' work was most conducive to health and comfort; and we have also been putting into practice from time to time during the last few years an 8-hour day in most of our underground iron ore and coal mines. A little over 25 per cent of our total employes are on an 8-hour basis.

"The conclusions arrived at today as above stated, have been influenced largely by the reason that we believe the largest production will be thereby secured. This is always essential, and especially important in times like the present."

One Youngstown steelmaker recently made the statement that since the beginning of the war wages with the latest advance, have increased 153 per cent. In 1914 the day laborer rate was 15 cents and this last increase of 15 per cent brings it up to 38 cents.

Lake Fleet Smaller

Transfer of Vessels to Coast Cuts Ore Carrying Capacity

Removal of lake vessels to the Atlantic has materially reduced the carrying capacity of the Great Lakes fleet. Navigation on the lakes opens this year with a net loss of 16 vessels, 13 of which were taken over by the shipping board, while three were lost last year. These ships had a combined trip capacity of 59,500 tons, a total of 1,190,000 tons in an average season of 20 trips. Construction of vessels for lake service has stopped, the yards working exclusively on ocean steamers, so that there is no offset to these 16 ships.

A table prepared by M. A. Hanna & Co. shows that despite this loss the bulk freight fleet will be made up of 379 vessels with a combined trip capacity of 3,036,900 tons. For 20 trips the total is 60,738,000 tons Many of the ships make more than 20 trips a year, but the demands of the coal and grain trades will hold the ore carrying capacity down. Last year the trip capacity of the entire fleet was 3,113,200 tons.

The following table shows the number of vessels in each fleet together with their total capacity and average size:

	No. of vessels	Capacity per trip	Average size
Pittsburgh Steamship Co.	99	801,200	8,093
Interlake Steamship Co.	52	407,000	7,827
M. A. Hanna & Co.	30	276,700	9,223
Hutchinson & Co.	20	168,300	8,415
Great Lakes Stmshp. Co.	20	163,100	8,150
G. A. Tomlinson	17	136,500	8,029
W. H. Becker	17	132,400	7,788
Cleve. Cliffs Iron Co.	14	115,400	8,243
W. C. Richardson	14	104,700	7,478
Boland & Cornelius	13	101,600	7,815
Wilson Transit Co.	9	72,700	8,077
Shenango Steamship Co.	5	58,200	11,640
Peiss Steamship Co.	7	56,500	8,071
H. K. Oakes	5	49,800	9,960
John Mitchell	4	41,500	10,375
H. H. Brown & Co.	4	38,200	9,550
A. T. Kinney	4	35,100	8,775
H. & G. M. Steinbrenner	4	32,700	8,175
D. Sullivan & Co.	4	31,100	7,775
Davidson S. S. Co.	8	31,000	3,875
Paisley S. S. Co.	4	23,100	5,775
Morrow S. S. Co.	2	11,200	5,600
C. O. Jenkins	3	24,900	8,300
J. J. Barlum	2	18,300	9,150
C. M. Bryson	4	16,400	4,100
Valley Camp S. S. Co.	3	12,100	4,033
M. B. McMillen	2	15,800	7,900
Brown & Co.	2	15,200	7,600
H. L. Shaw	2	13,600	6,800
Wisconsin Steel Co.	1	10,500	10,500
E. N. Breitung & Co.	2	8,800	4,400
R. M. Sellwood	1	7,500	7,500
J. Playfair	1	5,800	5,800
Totals	379	3,036,900	8,013

Obituaries

W. A. BUXTON, who organized the Perry, Buxton, Doane Co., Boston, dealer in scrap iron, steel, metals, etc., with branches in Chelsea, Lowell and Worcester, Mass., Providence and Pawtucket, R. I., Portland, Me., and Philadelphia, and who was its general manager until he retired in 1913 because of ill health, died suddenly March 29 at his home in Worcester, Mass. Death followed a stroke of apoplexy. He was 42 years old and for the past two or three years has been in business for himself in Worcester. He was widely known in the eastern metal market.

Sir Collingwood Schreiber, 87, who for 60 years was a prominent engineer actively identified with railway construction in Canada, died recently in Ottawa, Ont. He was knighted in 1915 in recognition of his public services.

William J. Harvey, aged 72, who founded and was president of the Harvey Spring & Forging Co., Racine, Wis., died recently as the result of injuries sustained by being struck by a motor truck. His three sons are members of the company.

William Hadwin Ames, son of former Governor Oliver Ames of Massachusetts and head of the Ames Shovel & Tool Co., died at his home in Boston recently, after a year's illness. He was 58 years old and at one time was president of the American Pneumatic Service Co.

A. E. Spooner, affiliated with the Brown Hoisting Co., Cleveland, for the past 32 years, for the past eight or 10 years as assistant chief engineer, died suddenly March 25, following an operation. He has been connected with the iron ore movement for many years and had specialized on machinery for handling that material.

Horace W. Willson, Worcester, Mass., who retired in August, 1913, after 56 years of service with the American Steel & Wire Co., died at New York recently, aged 79. He was one of the best known wire salesmen in the east. President W. P. Palmer commissioned him to write a history of the company.

Austin Clement, president of the Page Steel & Wire Co., Adrian, Mich., formerly the Page Woven Wire Co., died March 30, at Henrotin hospital, Chicago, after a long illness. He was born at Bridgewater, Vt., Sept. 19, 1842, removing to Chicago in 1867 and engaging in the clothing business. Since he retired from that industry in 1902 he has been identified with the steel business.

Richard Ward Baker, who spent his entire business life in the service of the Watson-Stillman Co., Aldene, N. J., manufacturers of hydraulic machinery, commencing at the age of 14, died recently at his home in Roselle, N. J., following a stroke of apoplexy. In 1914 he completed a half century's service on which occasion he was presented with a substantial check as well as engrossed resolutions embodying the company's appreciation.

Near Danger Line on Iron

British Blast Furnaces Unable to Provide Margin of Safety in Supplies—Government Steel Buying Remains Large

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 20, 1918.

THE pressure for pig iron is keener than ever. The shortage of all kinds of raw materials becomes more serious every day. Scrap and pig iron are in very much the same category, and consumers of both have the greatest difficulty in keeping going; the supply leaves no margin and there is constant danger of a breakdown. The most urgent need of the moment is increased supply of hematite, although nearly every blast furnace is turning out all it can under present circumstances. Only a very limited quantity of hematite is alloted for making bessemer steel, open hearth getting a decided preference.

In the Cleveland district, substantial sales have been made on the monthly allotment for March. In that district, there is great scarcity, and everywhere the doling-out principle has to be applied. Stocks, in the old sense, in the north of England have long since disappeared. All midland smelters find increasing pressure, some of them no longer visit the Birmingham weekly meeting, as they have no iron to offer and no amount of pressure is able to stimulate either production or delivery. A significant feature is the appearance on the market of orders from foundries never before heard of in the Midland pig iron business. These consumers get no response whatever, unless they are able to produce an order from the ministry of munitions backing their claims. A general effect of the scarcity is extreme difficulty in getting any kind of special iron involving unusual analysis. A great deal of this business is for the present, in suspense. The greatest pressure appears to be for foundry material, the shipbuilding industry, in particular, calling for enormous tonnages of engine and machine castings.

Ore Scarcity a Factor

The scarcity of ore is causing much concern at South Staffordshire blast furnaces. The immediate cause of this is a scarcity of trucks. The usual practice at these furnaces is to calcine the ore in the open yard, in the neighborhood of the furnace, and fairly large dumps of raw ore are always kept ready for calcining; but latterly these accumulations have reduced in size, and great pressure is being put upon the mines to speed up supplies. In several occasions lately the scarcity of trucks has involved periods of idleness for the mines. The government now is speeding up discharges of cargoes, with the result that some little improvement in the truck supply has been effected. Owing to the scarcity, Manchester consumers who have been in the habit of getting their pig iron from Derbyshire latterly have bought, a portion of their supplies from Cleveland, which costs about 6s ($1.44) more per ton by the time it reaches the foundry, while there is much more uncertainty of delivery.

The government is still a good buyer of finished iron and steel. In the nonferrous department, there are numerous reports of slacking off in the supplies of cartridge metal, and various descriptions of brass and copper, but nothing like this has yet taken place in connection with iron and steel. The government is still ordering in large quantities practically every description of iron and steel made in British workshops.

It is believed, however, that, but for the shipbuilding situation, some slackening off in demand must have ensued in view of the long spell of quiet that has existed on the western front, and the vast supplies of munitions known to have accumulated. Among the busiest lines are black sheets and light strip used for aeroplane work and automobile construction, and wire.

Price Advances are Wanted

But, for the time being, the price question is uppermost. The strongest representations have been made to the ministry of munitions to add something to the 2s 6d (60c) recently given on unmarked bars. But the department is so far quite obdurate, and makers appear to have made up their minds to suspend their application for the present. In the meantime, all iron is being marked to bring it within the marked bar price category, and all sorts of extras are being charged, which the consumer is only too glad to pay. For some reason, the black country manufacturer has found it possible to send rather better supplies to the merchants' warehouses, where consignments were urgently wanted. The result has been the clearing off of fairly large arrearage of business particularly with country buyers and consumers of iron. Makers of billets are still negotiating with the government with a view to an increase in the price which for a long time past have been selling at £10 7s 6d ($49.80). This figure is considered absurdly insufficient in view of the recent advance of 12½ per cent in wages.

While labor unrest has been allayed by the recent advance in wages, the military withdrawals of men cause concern. The "combing out" operations at certain works are vigorously pursued, but the strongest efforts will be made to retain the working staffs at their present strength.

Plate Plant

For Canadian Government Will be Located at Dominion Works

Toronto, March 30.—The construction of a plant for rolling steel plates, angles, etc., the output of which will be sufficient to meet the demands of the shipyards of the dominion for some years to come, will be started immediately at Sydney, N. S., as the result of an arrangement completed between C. C. Ballantyne, minister of marine and fisheries and the Dominion Iron Steel Co., Ltd. A plant will be erected capable of turning out 150,000 tons of ship steel annually. The company will receive orders for its product from the Canadian government and also will be free to fill private commercial orders. The plant will entail an expenditure by the Dominion Iron & Steel Co. of from $3,000,000 to $5,000,000 and will be ready for operation in from 15 to 18 months. No direct financial aid is being given by the dominion government toward the construction of the plant.

The Fort Moody Steel Works is planning to remove the machinery from its present rolling mill to a new plant to be erected at Rocky Point, B. C. The city council of Port Moody has agreed to facilitate the movement of the plant and render what assistance it can toward securing government assistance for extensions. The plant now in use is located unsatisfactorily for its present purposes, but will be retained and operated as a cast steel foundry, nut and bolt works. The company will shortly install a 6-ton, 3-phase electric furnace in the old plant and also proposes to install a similar furnace in its new plant.

The Wellston Iron Furnace Co., Jackson, O., after June 1, expects to produce at its furnace pig iron with a phosphorus content under 0.075 per cent.

Plate Mills Put Under Pressure

Shortages in Emergency Fleet Corporation's Requirements in Addition to Steel-For-Ships Deal With Japan Intensifies Demand Upon Mills—Further Negotiations With Japan May Increase Plate Tonnage Greatly

WASHINGTON, April 2.—Plate mills now bear most of the burden of the shipbuilding problem, according to opinions here, following the demand of the Emergency Fleet corporation for increased shipments, the announcement of the war trade board of a plates-for-ships deal with Japan and the expected entry of the railroad administration in the market for steel for cars and locomotives. Coming on the heels of the coke shortage and the transportation tieups, the demand likely will be most keen for the next month.

The shipping board blames the shortage of steel for the failure of deliveries of new ships to meet expectations. It is claimed that 20 ships of 162,200 tons were completed in March, but that 30 hulls, of 232,786 tons, were launched, 12,000 tons more than had been expected. It is likely that priority orders will be issued giving the shipping board's steel requirements preference.

Big Tonnage is Wanted

In addition to the entry of the Submarine Boat Corp. in the market for 100,000 tons of fabricated steel, there is an order from F. T. Bowles, assistant general manager of the Fleet corporation, that mills during April must make up a shortage of 50,000 tons of plates booked for the Hog Island shipyard. Both of these tonnages are on top of the war trade board's arrangement by which Japan is to get 100,000 tons of plates, deliveries to begin in May and to continue through the third quarter.

The Japanese agreement provides that the United States is to get 12 ships, of approximately 100,000 tons deadweight capacity, in exchange for steel. The purchase of the ships and the buying of the steel are to be separate transactions. They interlink, however, as far as the barter for ships, which we need, and the steel, which Japan requires, is concerned. The deliveries on steel are to be made against delivery of the ships, ton for ton, according to the war trade board.

The announcement says:

"Arrangements have now been made, as a result of the negotiations between the United States and Japanese shipbuilders, for the purchase of 12 Japanese ships of approximately 100,000 tons deadweight capacity, which will be added to the fleet of the United States shipping board within the next few months. All of the vessels are large modern steamers, of 6000 tons or over, with one exception, and none over two years old. Some indeed are still awaiting completion. Deliveries of the ships at American ports are to begin not later than May and to be finished in September, a progressively higher price per ton to be paid according to the month of delivery as a premium on early deliveries.

"In return for the sale of the ships the war trade board has agreed to deliver to the Japanese shipbuilders a corresponding amount of steel for shipbuilding, ton for ton against delivery of the ships.

"Further negotiations are in progress to secure from Japanese shipbuilders 200,000 additional tons of new construction, the ships to be built in return for new steel placed at the disposal of the builders by the war trade board. Recent editorials in such papers as the *Jiji Shimpo of Tokio* show an encouraging disposition to regard the furnishing of tonnage for allied war needs in the light of a patriotic contribution to allied war purposes and with this spirit prevailing, a quick and satisfactory result from these negotiations is hoped for."

Under the export license system of the war trade board, Japan has been getting a less tonnage of plates than before the system became effective, but her imports of sheets and structurals have been larger. In January lowing table shows exactly what tonnages of plates, sheets and shapes have been licensed for exports to Japan in the last eight months, with comparison of last year.

	Plates		Sheets		Shapes	
Mth.	1918	1917	1918	1917	1918	1917
Feb.	8,402	12,486	8,996	1,071	5,385	3,247
Jan.	10,096	16,210	5,054	3,204	5,334	4,410
	1917	1916	1917	1916	1917	1916
Dec.	17,098	8,465	8,600	3,240	6,805	2,733
Nov.	21,659	9,410	2,320	480	5,628	5,350
Oct.	32,484	10,624	3,656	124	2,953	2,928
Sept.	28,738	8,790	3,296	47	3,739	3,378
Aug.	32,023	12,356	2,325	300	3,122	3,112
July	22,821	6,014	2,296	311	290	1,072
8 mo. total	167,026	84,358	36,538	8,359	33,256	26,030

Few New Capital Issues Approved by Board

Washington, April 2.—The capital issues committee of the federal reserve board, which has been passing upon the war importance of new financing while congress has been debating the war finance corporation bill, which likely will become a law this week, has approved only five new industrial issues, involving $7,850,000, of 11 submitted with a total of $19,200,000. The committee has, however, passed favorably upon 22 refunding issues which involve $98,850,900, making a grand total of $106,700,900 fully approved and $11,350,000 curtailed.

The capital issues committee has given no explanation of the applications, showing which were for steel and machinery manufacturers, but has announced that public utility applications, for $144,296,400, received favorable attention in all cases except one, which was for $3,000,000. Of the $141,296,400 approved, $118,640,000 was for refunding, leaving $22,656,400 in new issues sanctioned. Of the municipal issues considered, only $6,379,000 was disapproved and of the $31,660,000 allowed, only $15,831,912 was for refunding.

Summed up, the committee's work shows $300,386,752 in applications considered, with 32 per cent of the applications approved, 54.7 per cent of refunding issues sanctioned, 8.3 per cent disapproved and 5 per cent curtailed. Of the new issues, exclusive of refunding, 69.3 per cent of the amount involved was formally allowed. This aggregates $46,334,940.

Conferees on the war finance corporation bill last week compromised on the amount of turnover allowed in the bill, accepting $3,000,000,000 in lieu of the $4,000,000,000 passed by the senate and favored by Secretary McAdoo and the $2,000,000,000 passed by the house. It is believed generally that the conference report will be accepted by both houses and that the bill may be finally enacted this week.

If the bill passes as agreed upon in conference, it will capitalize the corporation at $500,000,000. The corporation will be managed by five directors, one being the secretary of the treasury, and the other four serving at $12,000 each annually. The bill also provides for a capital issues committee composed of seven members, the salary of each to be $7500. The four directors and the seven committeemen are to be appointed by

the President and confirmed by the senate.

The bill provides 125 per cent security be given, based on the value of the assets of the borrower; that the war finance corporation cannot make direct loans greater than 10 per cent of its capital stock to any one borrower except railroads or that it approve any indirect loan for more than 12.5 per cent of the total capital stock and authorized bonds.

Urge Uniform Standards on Steel Castings

Washington, April 1.—Recommendations that uniform specifications for steel castings be agreed upon by the various departments of the government, recently were embodied in a report by a committee of Steel Foundry Society of America, composed of L. E. Thomas, of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., chairman; W. D. Sargent of the Bayonne Steel Castings Co., Bayonne, N. J., and A. G. Field, of the Wheeling Mold & Foundry Co., Wheeling, W. Va. This action of the society is in the interest of speeding up deliveries and is intended to eliminate, if possible, the differences between the specifications issued by the various bureaus of the government. Some of the bureaus which now pursue divergent standards are the bureau of steam engineering, bureau of construction and repair, ordnance department, etc. The report of the steel castings producers to the government suggests that benefits may be derived by the adoption of uniform specifications along the lines of those proposed by the American Society for Testing Materials under which the inspection could be made by any government inspector who happens to be in the shop regardless of the bureau by which the purchases were made.

Embargo on Pig Iron Cuts Export Shipments

Washington, April 2.—That only essential export shipments of pig iron are being made from the United States, their necessity being measured in terms of their contribution to the prosecution of the war, is indicated in the fact that in February only 10,540 tons of pig iron were licensed for export. This figure is little more than one-half of the January exportation and little better than one-fifth of the amount shipped out in February, 1917. This is the smallest amount exported in any month since the European war began.

Italy, which a year ago received 8450 tons, last February was to receive consignment of only 1734 tons. England's 10,778 tons in 1917 fell to 2950 tons, while shipments to Canada a year ago reached 13,401 tons and this year amounted to only 4327 tons. France's 11,353 tons and Cuba's 55 tons dropped to zero in February. Other countries were licensed to receive only 1529 tons in February as against 4981 tons last year.

The sweeping effect of this embargo on pig iron may be seen in the eight months' total. February export of pig iron made the total for the period 309,207 tons as compared with 576,000 tons in the eight months ending in February, 1917. The last eight months have nearly doubled the export volume of the corresponding period in 1916, when the total was only 171,708.

Study of the relationship of pig iron exports and pig iron production shows the export quantity is becoming negligible. In February pig iron exports amounted to only 0.45 of one per cent of production. In February, 1917, exports amounted to 1.8 per cent of production and in January this year the relationship was 0.85 of one per cent. In January, 1917, the ratio was 2 to 1 per cent. The December 1917 and 1916 export totals amounted to only 2.3 per cent and 3.3 per cent respectively.

The following table shows the monthly total of export shipments for the eight months ending March 1.

Month	1918	1917	1915
February	10,540	49,018	15,016
January	20,581	69,146	19,319
	1918	1917	1916
December	66,573	105,195	21,827
November	25,733	106,781	24,551
October	47,200	92,756	21,212
September	44,287	64,122	29,222
August	62,038	60,264	18,667
July	32,368	28,718	21,869
Total	309,207	576,000	171,708

Capital Odds and Ends

WASHINGTON, April 2.—W. C. Kendall, manager of the car service section of the railroad administration, has asked the railroads to inaugurate the "sailing day plan", if possible, as a means of saving cars and expediting less-than-carload shipments. The plan is in effect on several roads and has proved successful. On the Pennsylvania railroad 600 cars have been saved daily. The New York Central railroad reports an average saving of 21,305 cars a month. The New York, New Haven & Hartford railroad reports as saving 780 cars a week. The Boston & Maine figures a saving of 354 cars a week since adopting the plan. The Buffalo, Rochester & Pittsburgh railroad has effected a decrease of 41 per cent in cars used.

* * *

President Wilson has authorized opening 88,685 acres of land in the former Ft. Peck Indian reservation, Montana, for entry under the homestead laws. Coal deposits on the land are reserved to the government.

* * *

The Alsen Portland Cement Co., Alsen, N. Y., with a capital stock of $2,400,000, entirely enemy-owned, has been assigned to Alien Property Custodian Palmer, who has named directors for it.

* * *

Carriers have asked cancellation of rates on ore and ore products from Chicago, Peoria, Ill., and related points to Sheldon and Hawarden, Iowa; and from points east of the Missouri river to Sioux City, Iowa, and Sioux Falls, S. Dak.

* * *

The Cleveland, Cincinnati, Chicago & St. Louis railroad requests cancellation of the carload rates on zinc oxide from Hillsboro, Ill., to points in Pennsylvania, New York, West Virginia, Ohio, Indiana and Michigan.

* * *

The interstate commerce commission has ordered the rail and lake class commodity rates applicable from the trunk line territory to and through Lake Michigan and Lake Superior ports, to be set aside. These rates wer to be effective from April 4.

* * *

The complaint of the Chicago Bridge & Iron Works, Greenville, Pa., against the Erie and other railroads was dismissed, the interstate commerce commission finding the rates charged on fabricated steel articles used in railroad water tank and tank tower legally applicable.

* * *

Reparation in the sum of $407.36 for overcharges collected by Morgan's Louisiana & Texas Railroad & Steamship Co. and others on four carloads of relaying steel rails shiped from Macland, Ga., to Whelen, Ark., has been awarded McDonald Bros., Helena, Ark.

* * *

The Isaac Joseph Iron Co., Cincinnati, scrap dealer, has been awarded $115.14 reparation for excess charges on a shipment of scrap iron from Cordele, Ga., to Lebanon, Pa. The complaint was filed against the Pennsylvania, Seaboard Air Line and other railroads.

* * *

Applications will be received at any time by the civil service commission for examination for the following positions in the war department: Engineer of tests of ordnance material, assistant engineer of tests of ordnance material, and inspector of machinery and machine tools.

Expect Extension of Fixed Prices

Railroad Supplies in Which Government Has Direct Interest as Sponsor for Transportation Interests Probably Will be Included—Price Committee Declares Continuous Hearings Not Meant to Interfere with Institute's Work

WASHINGTON, April 2.—The scope of government activity in naming prices on steel products likely will be extended before July 1 when the quotations which became effective yesterday for another three months, again will be subject to revision. This new field of prices will include railroad equipment material, such as rails, axles, wheels, etc., which the war industries board has not touched in any of its price negotiations and which the American Iron and Steel institute itself left out of its promulgation of maximum base prices on which the President has not placed his direct approval.

The railroad administration is now compiling a list of prices of steel products, including cast as well as rolled material, from which it will work when it starts making the tremendous volume of purchases it has under consideration. To keep the distribution of this steel in harmony with the other steel orders being allocated daily through the office of J. Leonard Replogle, director of steel supply, of the war industries board, it is altogether likely the board's price committee will pass upon the railroad purchase prices and ask the President to make them official.

Won't Usurp Institute's Function

This is the only immediate question affecting steel which is said to be waiting attention of the war industries board. The offer of that board, made through its price committee chairman, R. S. Brookings, when the steel men met the board March 20 and 21, to always be at the call of the steel industry's usual representatives, was misinterpreted by several of the manufacturers who attended the conference. They took it to mean that the committee intended to usurp the duties now performed by the American Iron and Steel institute. H. E. Ingels, secretary of the board said such was not the case.

Chairman Brookings of the price committee, when the question was raised relative to continuing the prices for a period longer than three months, said his committee would be sitting almost continually and would be glad at any time to take up any questions which the industry would like to have settled. This was understood here to mean, and has been so stated by Secretary Ingels, that the industry, through the institute, can submit any problems it cares; it was not a general invitation to any individual manufacturer or group to present individual complaints. The board is too busy for such proceedings, it is held.

The new committee, whose action on steel prices was the first official matter before it, feels it should be allowed to get more into the swing of its work before it should be asked to commit the government and the steelmakers to the present prices. It wants to have time to consider the cost figures to be presented from time to time by the federal trade commission, which now has representation on the committee. Because of the committee being in the position where it has its fingers on steel costs at all times, it is believed here that Chairman Brookings' offer was to make the steel men feel they are free at any time to go before the board. Formerly steel conferences were only on invitation of the board. The new offer is a blanket invitation.

While the railroad administration and the war nidustries board are considering the advisability of fixing the prices on railroad steel, the institute is engaged in revising some of the prices contained in its list of maximums recommended to the trade and accepted generally by the industry and the government. Some of these revised prices will be higher to meet the satisfaction of some manufacturers and others will be lowered to conform to more general approval of government purchasing officers. It is believed this special revision, to be announced fully in a statement by the institute's price committee later, will be generally satisfactory.

The navy apparently has receded from its position to force acceptance by the war industries board of the maximum prices recommended by the institute. This is particularly true since the navy has been given direct representation on the price-fixing committee. It is understood here now that all government departments will recognize the recommended maximum prices as they do those officially approved by the President. In confirmation of this it is indicated that the war industries board has convinced the navy and other purchasing departments that the President's announcement of steel prices Nov. 5, 1917, really accepted the recommended prices, even before the trade's maximums were promulgated. That announcement said:

"The iron and steel manufacturers have agreed promptly to adjust the maximum prices of all iron and steel products other than those on which prices have been agreed upon, to the same general standard as those which have been announced. It is expected that this will be done promptly and consistently in line with the basic, intermediate and finished products, for which definite maximum prices have been established."

Assurance has been given by members of the war industries board to individual steel manufacturers that the board by all means wants the full co-operation of the industry as given through the American Iron and Steel institue's subcommittees. The board, limited for power except as agreed in several instances with members of the President's cabinet, fully appreciates the services of such an organization as the institute. The co-operation enjoyed before section 3 of the food control bill became effective was keenly missed while the status of the council of nation defense's subcommittees was in question. The members haven't forgotten that and have endeavored to keep the steel committees on friendly terms with the war industries board.

Adds More Ovens

The Indiana Coal & Coke Co., Terre Haute, Ind., has contracted with the H. Koppers Co., Pittsburgh, for the erection of 15 Koppers by-product coke ovens, together with the necessary additions and changes to the plant to accommodate this increase of capacity. The present plant consists of a battery of 30 ovens. The new addition is so arranged that a second addition of 15 ovens readily may be made. With the increased capacity, approximately 800 tons of coal per day will be used. The surplus gas from this plant is used for domestic purposes in the city of Terre Haute. The coke produced is marketed for domestic and metallurgical uses.

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

W. G. WILCOX, who from November, 1914 to Jan. 31, 1918, was with the Massena, N. Y., works of the Aluminum Co. of America, as assistant superintendent, has been made advisory engineer of the Powdered Coal Engineering & Equipment Co., Chicago. After graduating from Syracuse university in 1906 and from Wisconsin university in 1909, he had charge of research work at the latter institution for two years and then served as research chemist for the National Carbon Co., Cleveland, from 1911 to 1913. Prior to his connection with the Aluminum Co. of America he was production engineer with the Cleveland Electro-Metals Co., Cleveland, in 1913 and 1914.

Thomas Crabtree has resigned as treasurer and superintendent of the Majestic Mfg. Co., Worcester, Mass.

Frank A. Hayes has been appointed chief engineer of the Willys-Overland, Ltd., Toronto, Can.

G. K. Hawkey has resigned as manager of the Cleveland offices of the W. F. Davis Machine Tool Co.

Frank S. Reitzel has been made first vice president of the Wright-Martin Aircraft Corp., New Brunswick, N. J.

J. B. Howell, formerly of the sales department of the Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., has entered army training at Camp Dix.

E. G. Sears, formerly sales manager of the W. F. Davis Machine Tool Co., with offices in New York, has been put in charge of sales from the Cleveland office.

R. S. Carter, formerly district sales manager at Pittsburgh has been made sales manager in charge of twist drills and reamers of the Whitman & Barnes Mfg. Co., Akron, O.

H. C. Thomas has resigned as assistant general superintendent of the Illinois Steel Co., at Gary, Ind., a position which he held for the past eight years, having been advanced from chief chemist and metallurgist.

H. I. Arnold, formerly with the Pierce Arrow Motor Car Co., Detroit, has accepted a position as supervisor of the planning and standards department of the Cadillac Motor Car Co., Detroit.

A. V. Magnusen has become actively affiliated with the molding machine department of the Davenport Machine & Foundry Co., Davenport, Iowa. He has been connected with the molding machine industry for more than 20 years.

Joseph R. Hague has resigned from the sales force of the Independent Pneumatic Tool Co., Chicago, to associate with the pneumatic tool division of the Knox-Andresen Co., Empire building, Philadelphia. The latter company recently accepted the selling agency in the Pittsburgh district of the Keller Pneumatic Tool Co., Grand Haven, Mich.

Paul R. Ketzer, formerly manager of the Ketzer Machinery Co., Philadelphia has become manager of the engineering and machinery department of the W. H. Robinson Co., with which has been consolidated the Ketzer Machinery Co. The new company will conduct a domestic and export business from offices in the Real Estate Trust building, Philadelphia.

A. B. Morrison Jr. and Earl E. Adams have recently become sales engineers for the Smith Gas Engineering Co., Lexington, O. The former has been with the Fort Wayne Electric Works and the Rathbun-Jones Engineering Co., and more recently with the John H. McGowan Co., at Philadelphia. The latter for some years had charge of gas producer work for the Power & Mining Machinery Co., and lately was sales manager in the powdered coal department of the Bonnot Co., Canton, O. He will be located at the Smith company's new plant at Dayton.

James E. Sague was recently appointed vice president of the Worthington Pump & Machinery Corp., New York, in charge of engineering and manufacturing. He has appointed William Goodman as his assistant and William Schwanhausser as chief engineer, both at New York. Neil C. Lamont was made works manager of the Laidlaw works, Cincinnati. Leon P. Feustman was appointed vice president in charge of general commercial affairs, including contracts, prices, purchases, traffic, etc. Frank H. Jones has been made vice president in charge of sales; he has appointed Edward T. Fishwick general sales manager and Charles E. Wilson the latter's assistant, with headquarters at New York.

Franklin E. Bassett, New Britain, Conn., has resigned his position with the Hartford Machine Screw Co., Hartford, Conn., to accept the sales managership of the Worcester Machine Screw Co., Worcester, Mass., a subsidiary of the Standard Screw Co. Mr. Bassett takes the position left vacant by the resignation of William E. Gifford, who has joined the Liberty Screw Co., Worcester, Mass.

Ira C. Rogers, formerly general purchasing agent for the Worthington Steam Pump Co., at New York, has recently been appointed general manager of W. R. Keene & Co., New York. W. R. Keene & Co. represent the Bay State Tap & Die Co., Mansfield, Mass., Alvord Reamer & Tool Co., Sterling Products Co., Keene Twist Drill Co. and Massey Vise Co. Mr. Rogers formerly was with W. R. Keene & Co.

J. Hilpertshauser, formerly manager of the machine shop of the Globe Foundry & Machine Co., Sheboygan, Wis., has been elected president to succeed John Henry Optenberg, founder of the Optenberg Iron Works, Sheboygan, Wis., who resigned to retire from active business. Mr. Optenberg has been president and general manager since the works organization in 1884. He will endeavor to recover his failing health in another climate.

William T. Price has been made president of the P-R Engine Co., Inc., New York City, with offices in Philadelphia, Baltimore and Toledo, O., and second vice president of the Rathbun-Jones Engineering Co., Toledo, which will undertake the manufacture and sale of Price-Rathbun stationary and marine oil engines, built in accordance with principles developed by Mr. Price. He formerly was manager and chief engineer of the oil engine department of the De La Vergne Machine Co.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM G. CLYDE, recently elected to succeed Col. Henry P. Bope as vice president and general manager of sales of the Carnegie Steel Co., assumed his new duties on April 1. His career in the steel industry has been most interesting. Mr. Clyde was born in Chester, Pa., and was educated at the Pennsyl-



WILLIAM G. CLYDE

vania Military college. After he was graduated, he became affiliated as civil engineer with Ryan & McDonald, Baltimore, contractors. He remained there seven months and resigned to become associated with Robert Wetherill & Co., Chester, machinists and founders. His next position began his experience in steel, as ingot tracer for the Wellman Steel & Iron Co., Thurlow, Pa. He then became a roller in that company's 132-inch plate mill and soon was promoted to the plate mill superintendency. After two and a half years with the Wellman company, Mr. Clyde became superintendent of plate mills in the south works of the Illinois Steel Co., South Chicago, Ill., where he remained for six years. He was then appointed district sales manager of the American Steel Hoop Co., establishing a branch office in Philadelphia. He continued in this capacity until the company was merged with the Carnegie Steel Co. After a sales service of three years in the Cleveland office of the Carnegie company, he was transferred to Pittsburgh to become assistant to Colonel Bope. For the past 13 years he has been assistant general manager of sales in charge of the bar, hoop and band division.

Charles L. Wood, formerly assistant to Mr. Clyde, succeeds him as assistant manager in charge of bar, hoop and band sales. He was born in Youngstown, O., and attended Ohio State university, graduating with a class in mining engineering to become a chemist with the Calumet Furnace Co., Chicago. Reversals forced the Calumet company to shut down and Mr. Wood then pursued mining engineering in Colorado and other western districts. In 1898, he became affiliated with the American Steel Hoop Co., and was placed in charge of the order department when the company moved to New York. Upon its consolidation with the Carnegie Steel Co., after the formation of the United States Steel Corp., he was transferred to the sales department of the former company. A thorough knowledge of the bar and hoop business gained for him the appointment as an aid to Mr. Clyde when the latter became assistant general manager of sales in charge of that department. Mr. Wood held this position until his present promotion. His successor is Samuel R. Hoover.

James A. Campbell, president of the Youngstown Sheet & Tube Co., left recently for a two-weeks' vacation at Hot Springs, Va.

A. C. Norborn resigned recently as president of the Pennsylvania Shipbuilding Co., Gloucester, N. J. Charles H. Moyer also resigned as vice president recently.

Herbert Longstaff has been made manager of the St. Louis office located in the Boatman's Bank building of the Asbestos Protected Metal Co., Pittsburgh.

Robert M. McGregor was elected a director of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., at the recent annual meeting to succeed his father, the late James D. McGregor, who was vice president and director since the company's organization. D. C. Jackling, New York, and M. Hinckley Smith, Philadelphia, were elected directors increasing the board to 16.

C. A. Morse was chosen president of the American Railway Engineering



CHARLES L. WOOD

association at its recent Chicago meeting. He is chief engineer of the Chicago, Rock Island & Pacific railroad, Chicago.

Herman M. Griggs, Cleveland, has been appointed manager of the new coal and ore exchange. He will direct the movement of coal in 1918 from Cleveland and other northern Ohio ports to the upper lakes and the northwest. Before taking charge of the Cleveland coal pool in 1917, Mr. Griggs was coal and coke agent for the New York Central railroad.

Griffith Coit is general purchasing agent of the Chester Shipbuilding Co., Ltd., and of the Merchant Shipbuilding Corp., agent of the Emergency Fleet Corp. of the United States shipping board. His headquarters are in the Finance building, Philadelphia. It was incorrectly announced that he was purchasing agent for the American Shipbuilding Corp.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

HORTON PENROSE will on April 10 assume the duties of assistant to President J. N. M. Shimer of Shimer & Co., Pittsburgh, sales agents for the American Manganese Mfg. Co., operating furnaces at Dunbar, Pa., and for the Atlantic Ore & Alloys Co. Mr. Penrose has been resident manager of the Pittsburgh branch of Shimer & Co., for a number of years prior to his recent promotion. He has been in the Pittsburgh office since 1901, when it was opened by L. & R. Wister & Co., which subsequently was taken over by Shimer & Co. F. G. Schultz, one of the salesmen in the Pittsburgh office will succeed Mr. Penrose as Pittsburgh district manager.

J. R. Dunsford, who has been sales agent for the American Steel Foundries, has become affiliated with the Wheeling Mold & Foundry Co., Wheeling, W. Va., in a similar capacity.

Herbert F. Black, after a visit of two weeks in Pinehurst, N. C., resumes his duties as assistant to the president of the Cambria Steel Co., with offices in the Oliver buildig, Pittsburgh.

W. J. Lynch has resigned his position with the Standard Tin Plate Co., Canonsburg, Pa., to accept the appointment of general manager for the Mahoning Valley Steel Co., Niles, O.

James A. Fayne, affiliated with Hornblower & Weeks, Boston, bankers, has been elected a director of the United Alloy Steel Corp., to succeed John W. Prentiss of the same firm, who has resigned.

W. B. Champ, who has been secretary and treasurer of the Hamilton Bridge Works Co., Hamilton, Ont., for several years, was elected managing director to succeed R. M. Roy, deceased. Arthur Martin, Hamilton, succeeds him as treasurer.

Whiting Williams has been placed in charge of welfare work of the Hydraulic Pressed Steel Co. Headquarters are on the fourteenth floor of the Illuminating building. Mr. Williams was formerly secretary of the Cleveland Welfare Federation and resigned from the group insurance department of the Equitable Life Assurance Society to accept his new position.

James L. O'Neil resigned recently as credit manager of the Carnegie Steel Co., Pittsburgh, and will be succeeded by L. F. Payne on May 1. Mr. O'Neil will be vice president of



HORTON PENROSE

the Guaranty Trust Co., New York City.

Charles E. Downton has been made superintendent of labor at the plant of the Atlantic Shipbuilding Co., Portsmouth, N. H., having resigned a position of that character with the New England Westinghouse Co., Chicopee, Mass.

Pope Yeatman, recently made head of the nonferrous metals department of the war industries board's raw materials division, was presented with the gold medal of the Mining and Metallurgical society at the University club, New York, at a recent dinner.

W. E. Watson succeeds George E. Day as director of the Continental Supply Co., a subsidiary of the Youngstown Sheet & Tube Co., Youngstown, O. Mr. Day was general sales manager of the latter company for more than 10 years and has been called to Washington to head the department in the oil division of the fuel administration devoted to supervising the "production, distribution and allocation of tubular goods and oil well supplies."

J. G. Esch, civil engineer, who has had many years of experience in structural steel and reinforced concrete construction, has been made general manager of H. Schmitt & Son, Milwaukee, general contractors and builders.

Walter H. Allen has become affiliated with the Taylor-Wharton Iron & Steel Co., New York. He formerly held an important position in the track department of the Pennsylvania Steel Co., Steelton, Pa., and more recently was connected with the Maxwell Motor Co.

George Higgins has become affiliated with the auditor's department of the Liberty Steel Co., Warren, O. For many years he was paymaster of the Youngstown plant of the Sharon Steel Hoop Co., and its predecessor, the Youngstown Iron & Steel Co.

William Breeden, sales agent at Philadelphia for the Lackawanna Steel Co., Buffalo, has been made chairman of the Liberty bond iron and steel section committee of Philadelphia. Other members are Howard Wood of the Alan Wood Iron & Steel Co., and G. Theodore Schnatz of the Lukens Steel Co.

Frederic Bonnet Jr. has resigned as professor of chemistry at the Worcester Polytechnic institute, Worcester, Mass., after occupying that position for five years, to become chief chemist at the new plant of the Atlas Powder Co., now under construction in Perryville; Md. He is an expert in sanitation work.

Charles E. Sanders succeeds Lewis M. McCallum as secretary of the Parker Wire Goods Co., Worcester, Mass., since the latter resigned to become affiliated with M. S. Brooks & Son, Chester, Conn. Mr. McCallum remains on the board of directors. Mr. Sanders is president and treasurer of the Stenman Wire Specialty Co., Worcester.

Iron and Steel Men in War Machine

J. B. Bonner, Vice Chairman, Subcommittee on Steel Distribution

JAMES BERNARD BONNER is playing such an important part in the present war that its history will not be accurate nor complete unless his effort is duly recorded. That, briefly, sums up official Washington's view of the man through whom the iron and steel industry today has its closest contact with the government's war machine. And the officials in Washington who express this view, naval and army officers alike, mean to see that Mr. Bonner's services are recognized as soon as the war is over.

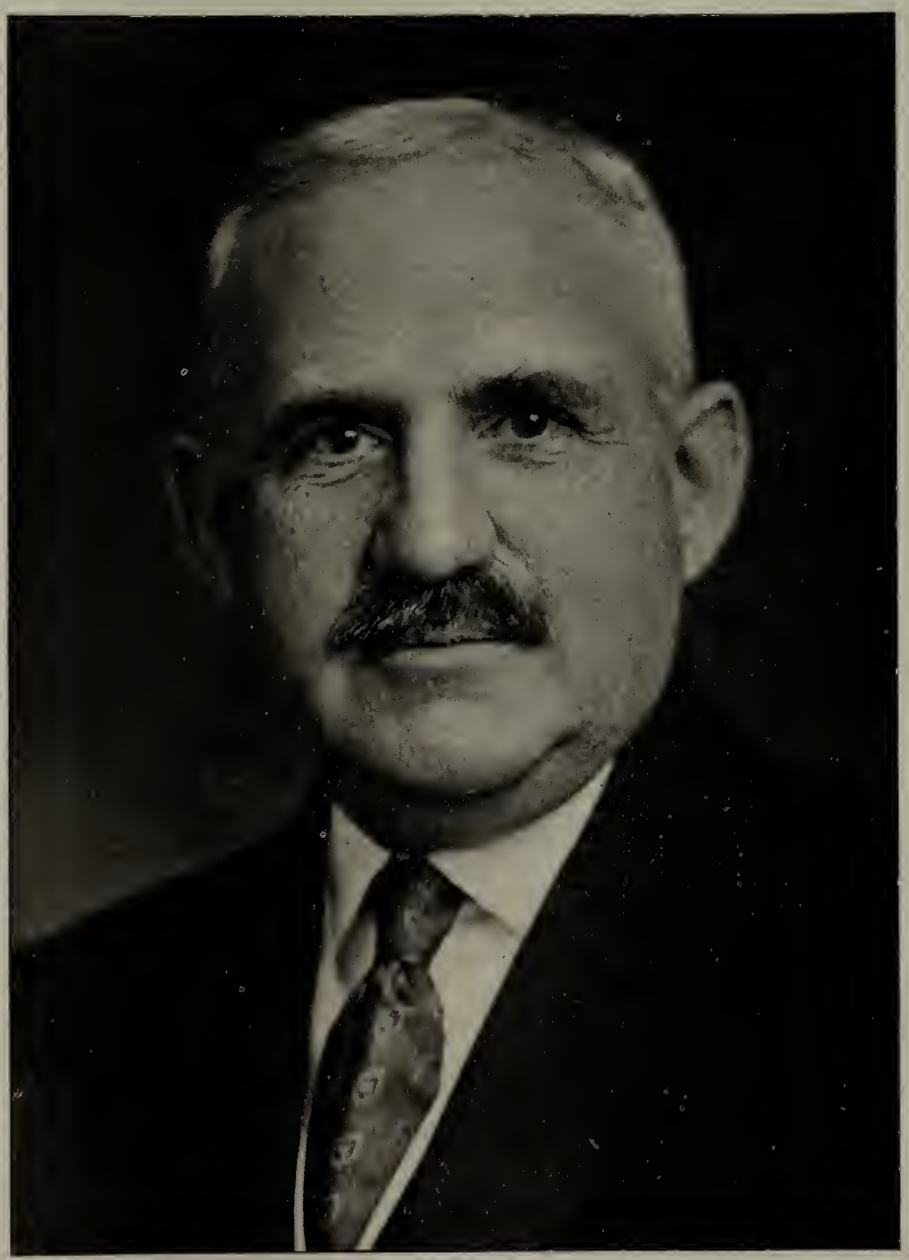
Mr. Bonner is vice chairman of the American Iron and Steel institute's subcommittee on steel distribution, with headquarters in Washington in the Wilkins building. In private life he is the Philadelphia district sales manager of the United States Steel Corp. Since he has taken up this part of the institute's work, steel men have come in contact with him as they never had before. And almost every one of them has praise for Mr. Bonner, whose staff in Washington, originally three or four, has been expanded to meet the war requirements and now numbers more than two dozen.

"Ask Bonner."

That phrase, used in connection with steel matters, is more universally employed in the national capital than any other. If the navy department wants to know when to look for deliveries on boiler tubes, they ask Bonner. If the army wants to know where to get projectile steel, they ask Bonner. If the shipping board is hunting for ship plates, they ask Bonner. So it is all along the line.

Everywhere in Washington it is believed that Mr. Bonner has done more for the government than any other steel man. This continual reference to him, even with the government's own steel division at their beck and call, is not confined to junior army and navy officers. Rear admirals, interested in the naval program, ask his advice. Major generals, deeply concerned in rushing steel "over there", seek him out. Even Secretary Daniels himself is known to have contributed to the praise of Mr. Bonner's work. Many have expressed their opinions privately and are only waiting opportunity to do so publicly. A look at the pictures on the wall in Mr. Bonner's private office gives some idea of the men who hold him in high esteem. Among them are Admiral Benson, General Goethals, Admiral Taylor, and Sec. Daniels.

Mr. Bonner's standing with these men has not grown up with the war. His intimate knowledge of government requirements has come through at least 15 years of close contact with various federal officers and army and navy specifications as well as the regulations and the laws affecting government purchases. The committee has been in operation about one year and under Mr. Bonner's supervision, orders for several million tons of steel have been distributed.



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JAMES BERNARD BONNER

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Midvale Adds to Capital Resources

ALTHOUGH at times during the past year, Wall street failed to support the shares of the Midvale Steel & Ordnance Co. as firmly as it did some other industrial securities, the company's annual report just issued in pamphlet form for 1917, shows the company to be in an extremely strong financial position. Like other leading steel producers, Midvale made a large provision for federal taxes, yet it added substantially to its capital resources. Its net earnings from operations and investments amounted to $71,405,775, out of which it charged $25,731,910 for federal taxes and $6,826,421, a total of $32,558,331. After payment of bond interest and other charges, it showed net income of $35,576,558, equal to $17.12 per share for the $100,000,000 capital stock of $50 par, compared with $16.11 per share in 1916. Out of total earnings for the two years of $33 per share four quarterly dividends, the first on Feb. 1, 1917, were paid, amounting to $6 a share, leaving $27 a share in undivided earnings. This surplus is equal to 54 per cent of the $100,000,000 capital stock. The consolidated statement of income for the year 1917 follows:

	1917	1916
Net earnings	$69,838,254	$36,718,819
Other income	1,567,522	887,198
Total	$71,405,776	$37,606,017
Other charges	407,939	188,904
Int. and guaran. div.	2,862,946	2,396,625
Balance	$68,134,891	$35,020,488
Premiums	.....	754,512
Total	$68,134,891	$35,775,000
Taxes	25,731,910	.....
Dep. and mineral exh.	6,826,421	3,560,276
Balance	$35,576,558	$32,214,724
Dividends	12,000,000	.....
Surplus	$23,576,560	$32,214,724
Prev. surplus	18,656,610	1,441,886
Adjustment	131,826	.....
Total surplus	$42,364,996	$33,656,610
Special deprec.	.....	15,000,000
Approp. surplus	903.434	.....
P. & L. surplus	$41,461,560	$18,656,610

The balance sheet indicates clearly Midvale's increase in financial strength as a result of additions to its capital. On Dec. 31, 1916, its current assets were $76,985,915, against current liabilities of $17,603,304, leaving net working capital of $59,382,611. On Dec. 31, 1917, current assets were $109,791,758, while current labilities were $37,593,811, of which over $25,000,000 was the aliowance for federal taxes, leaving net working capital of $72,199,947. Cash on hand Dec. 31, 1918, amounted to $18,833,078, as against $11,828,916 at the end of 1916. Marketable securities including United States certificates of indebtedness, amounted to $27,590,196, comprising another item of the current liabilities. The consolidated balance sheet follows:

ASSETS

	1917	1916
Property acct.	$158,909,900	$135,708,933
Invest. in other comp.	508,929	649,772
Cash	18,833,078	11,828,916
Customers' accts.	20,807,785	14,531,893
Sundry debtors	.....	618,047
Advance pay.	4,342,081	6,221,167
Bills and loans receiv.	1,460,245	8,987,384
Market. secur.	*27,590,196	1,375,821
Invent. fair cost	36,758,371	33,422,686
Deferred charges	763,399	867,562
Sinking fund cash	125,329	.....
Insurance fund assets	.....	633,251
Total	$270,099,316	$214,845,433

LIABILITIES

Capital stock outst.	$100,000,000	$100,000,000
Minority int. in sub.	2,033,450	4,126,851
Cambria Iron Co. guaranteed stock	8,468,000	8,468,000
Funded debt	57,908,000	54,877,000
Vouchers unpaid pay.	7,310,415	5,490,405
Deposits on contr.	477,739	7,902,650
Sundry creditors	.....	2,151,506
Accruals payable	†29,412,532	1,728,529
Bills and loans pay.	393,124	330,213
Depr. and mine exh. reserve	14,200,319	8,039,553
Misc. and contin. res.	4,512,723	3,074,114
Special surplus	‡3,921,451	.....
Surplus	41,461,561	18,656,610
Total	$270,099,316	$214,845,433

*Includes United States certificates of indebtedness.

†Mostly taxes.

‡Surplus applicable to minority stock interests, etc.

Chairman William E. Corey and President A. C. Dinkey in their remarks to stockholders, said in part:

"The action of the government in establishing prices in September, 1917, has been a disturbing factor; not so much on account of the fact of regulation but because most of the factors entering into the cost of manufacture have not been, and apparently cannot be, limited by the same authority. Notwithstanding the difficulties of adjusting business to these new conditions, your company, in common with all of the steel companies of the country, has given its earnest and loyal support to the government authorities in their endeavor to formulate a workable plan whereby a maximum output would be secured, together with fair prices to consumers of steel products.

"The war taxes have had a marked influence on trade, especially during the latter part of the year. Business men generally have had to face the fact that, while their balance sheets might show a highly profitable year, tax obligations could not be met with such assets as—accounts of solvent customers, inventories, or property accounts. As an inevitable result there has been and will continue to be a liquidation more or less drastic in order to convert these assets, so necessary to a going business, into cash, as the federal taxes, due in June, 1918, must, of course, be paid in cash or equivalent government securities. In order to accumulate the large cash reserves necessary to meet this obligation, which, in the national aggregate, is probably the largest payment due on one date in all human history, it has been necessary for the officers to conserve the cash resources of your company in every possible manner, even to the postponement of improvements and extensions, which under normal conditions would have been made.

"In October, 1917, the minority stock of the Midvale Steel Co., which was in the hands of the public, was acquired by your company and the company was enabled thereby to immediately therefater carry into effect the plans which it had under consideration from its organization for the taking over of the properties of the Midvale Steel Co., Worth Bros. Co., and Wilmington Steel Co., thus making your company an operating company. This result is expected to effect greater efficiency and economy of operation.

"Furnace and mill operations, during the last quarter especially, have been seriously hampered by lack of transportation facilities. The regular movement of coal and coke was particularly affected, so that in spite of the fact that the company has its

own coal mines and cars, the output of the blast furnaces and mills has been seriously curtailed.

"While it is a source of gratification to know that in the great crisis through which our company is passing, your company is an important source of supply for munitions of war, it is proper to state that materials used exclusively for war purposes, that is, armor, ordnance, shells, etc., but not including ordinary commercial products such as are used in shipbuilding and rounds for shells, constituted only 12.83 per cent of the total business for the year 1917.

"Under existing conditions, it would be futile to attempt to make any forecast of business conditions during 1918. The controlling factor will be the ability of the railroads to provide men and equipment to handle the raw materials to, and the finished material from, your works."

The Midvale Steel & Ordnance Co. shares at present are quoted about 45, the par value of the stock being $50. Late in 1915, shortly after the company began to do business in October, the shares sold on the curb market as high as 98½. For 1916 the high on the same market was 77½. In 1917, when the stock was listed on the New York stock exchange, the high price was 67½, touched in June. In some quarters the weakness in Midvale shares at various times has been ascribed to the public's conception of the stock as a "war baby". In this connection the management's statement that 12.83 per cent of the 1917 output was comprised of materials used exclusively for war purposes is of significance.

Gulf States Make Gains

A gain of $418,969 in profits was made by the Gulf States Steel Co., Birmingham, Ala., in 1917 the total net earnings amounting to $2,871,479. After paying preferred stock dividends, a balance of $2,666,936 remained for the common, equal to more than $32.70 per share, or 32.7 per cent on $8,139,200 common, compared with 30.2 per cent in 1916. The year's surplus was $1,792,748, which added to the previous surplus brought the total to $4,449,297. Reservation of $1,000,000 for federal taxes was made. The comparative income account follows:

	1917	1916
Gross profits	$4,199,925	$2,650,006
Depreciation, reserve	1,328,448	197,496
Net profits	2,871,479	2,452,510
Surplus after divs.	1,792,748	1,772,683
Previous surplus	2,656,549	883,866
Total surplus	4,449,297	2,656,549

Shipments of steel by the company last year totaled 176,949 tons, compared with 155,147 tons in 1916. Of last year's deliveries 73,250 tons were sold to domestic consumers, while 103,699 tons went abroad.

Among the salient features of the company's business in 1917, according to the report issued yesterday, were the completion and operation of by-product coke ovens and the acquisition of additional coal reserves. The coking coal reserves at the end of the year were estimated at 11,000,000 tons and iron ore reserves amounted to 125,000,000 tons.

Wheeling Has Fine Year

Net profits in 1917 for the Wheeling Steel & Iron Co., according to a pamphlet report just issued, were $4,037,911, after making all allowances and deductions, including $150,000 interest on bonds and $4,058,874 for income and excess profits taxes. The company's total income from operations and dividends with interest on investments, was $8,840,101. Dividends paid during the year included $966,108 in cash, or 13 per cent on the outstanding capital stock and $1,209,090 stock dividends, or 20 per cent. Surplus for the year totaled $3,071,803, while the total surplus carried to balance sheet was $6,205,569. The value of 1917 shipments was $27,964,341, as compared with $15,073,530 in 1916. President Isaac M. Scott in the statement to stockholders which accompanied the report predicted that 1918 profits in the steel industry will be considerably lower than the prevailing rate in 1917.

Net earnings	$8,551,519
Dividends, interest, etc.	288,582
Total income	$8,840,101
Deprec., exhaustion of min., etc.	4,593,315
Excess profits, taxes, etc.	4,058,875
Net profit	$4,187,911
Interest on bonds	150,000
Surplus	$4,037,911
Cash dividend	966,108
Net surplus	$3,071,803
Previous surplus	4,372,846
Total surplus	$7,444,649
Stock dividend	1,239,080
Surplus carried	$6,205,569

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	(nominal)
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52 to .55
Naphthalin	.10 to .12

Per 100 Pounds at Seaboard

Sulphate of ammonia (nominal)	$5.40 to 5.50

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia.....nominal

Large Increase

In Demand for Ammonium Sulphate for Nitrating Purposes Expected

New York, March 30.—Although the amount of sulphate of ammonia now being devoted to the manufacture of nitrate of ammonia for the government requires considerably less than 10 per cent of the output great increases in the demand for this purpose are expected soon. The large new nitrating plant at Baltimore, which is to be completed shortly, alone wil consume huge quantities. As a result of the increasing requirements of the government, producers are slow to adopt a policy with reference to contracts covering the needs of fertilizer manufacturers and other consumers over the coming year. Numerous consumers already have attempted to get themselves under cover. Contracts originally scheduled to expire in May and June in most cases will require at least a month or two longer to fill. The only sales now being made, with the exception of quantities sold under the authority of the government to makers of nitrate of ammonia, are made up of spot carloads around $5.50 per 100 pounds, tidewater.

Blanks, for the use of toluol consumers in making applications for their requirements, have been prepared by the committee of the war industries board of which C. A. Moorhead is chairman. Consumers will be asked to return this data and it is considered likely that some toluol will be available for release to the applicants within the next two or three months. In the meantime, all toluol not called for by old contracts, continues to go to plants making trinitrotoluol for the government.

Market activity this week involved principally benzol and solvent naphtha, but no abnormal quantities figured. Pure benzol continues to be quoted at 35 to 40 cents per gallon. The market lacks firmness. Solvent naphtha still is quoted at 18 to 22 cents per gallon but is exceedingly strong. Demand for phenol is restricted to spot lots which are going at 53 to 55 cents per pound. Demand for naphthalin continues far in excess of producer's capacity. Prices nominally are at 10 to 12 cents per pound.

The annual statement of the Canada Foundries & Forgings, Ltd., shows profits of $695,586, compared with $659,852 for 1916. The net surplus available for dividends was $585,874 and the surplus balance was $374,674. The total balance carried forward was $1,128,281.

Increased Shipping Steadies Exports

February Loss in Outgoing Iron and Steel Shipments Much Less Than in January —Semifinished Material Moving Freely—Pig Iron Shortage Reflected by Reduced Total—Machinery Volume Shrinks

SHIPMENTS of iron and steel products from the United States during the month of February fell off only 10,252 tons, or approximately 2.3 per cent compared with the tonnage for February, 1917. Advance figures just issued by the bureau of foreign and domestic commerce show exports of these products during the second month of the year reached a total of 438,848 tons, as

IRON AND STEEL EXPORTS, GROSS TONS

	February,		Eight months ending February,	
	1918	1917	1918	1917
Scrap	310	28,174	26,499	165,055
Pig iron....	10,540	49,018	309,207	576,000
Steel billets, ingots and blooms ...	173,272	131,566	1,358,519	1,221,527
Wire rods...	11,799	5,544	138,016	89,715
Steel rails...	35,586	46,153	289,717	422,343
Steel bars...	63,579	44,544	421,529	509,593
Iron bars...	5,002	2,904	36,016	42,039
Struc. iron and steel..	18,680	28,306	171,472	229,121
Hoops, bands and scroll.	4,510	2,673	40,722	28,644
Sheets and plates	51,580	40,656	527,403	379,393
Tin and terne plate	18,564	14,631	142,507	142,589
Barbed wire.	6,282	16,460	118,689	247,444
All oth. wire	11,639	12,138	122,585	167,958
Cut nails....	233	167	3,182	3,320
Wire nails..	8,698	5,707	84,947	90,900
Wood screws	193	.....	2,085	.....
All oth. nails incl. tacks.	748	1,988	9,850	11,930
Pipes & fit'gs	14,863	13,441	132,593	172,826
R. R. spikes..	367	2,639	11,299	12,866
Bolts, nuts, rivets and washers ..	2,086	1,714	21,472	19,652
Horseshoes .	189	161	7,727	3,078
Cast radiators	128	516	2,208	2,140
Total	438,848	449,100	3,978,244	4,538,133

against 449,100 tons in February, 1917. Comparing January, 1918 and 1917, the loss was 113,224 tons, or 18.6 per cent. This would indicate that the scarcity of shipping space available for the movement of iron and steel products during the last few months was somewhat relieved in February. It is probable, however, that with the licensing system fully in effect, these shipments will again show a decline in the month of March.

The extreme shortage of pig iron which is being felt so keenly in this country is reflected in the falling off of foreign shipments . Exports of this commodity for February, 1918, amounted to only 10,540 tons, compared with 49,018 tons in February, 1917, and 20,581 tons in January, 1918. Scrap exports also continue at the very low rate which has been noted during the past few months, February, 1918, showing a total of 310 tons, while in February, a year ago, the exports amounted to 28,174 tons.

The principal gain in tonnage was made in exports of semifinished material, with shipments of 173,272 tons, compared with 131,566 tons in February, 1917. This tonnage was somewhat less than the January figure of 195,385 tons, but the loss is partly due to the fact that February is a shorter month. Steel bar shipments of 63,579 tons, while not as large as the January movement of 73,772 tons, showed a good gain over February, 1917, when shipments amounted to 44,544 tons.

A comparison of the tonnage exported during the 8-month period ending with February shows a loss in 1918 of 559,889 tons, the 1918 and 1917 totals being 3,978,244 tons and 4,538,133 tons, respectively.

The valuation of iron and steel products products shipped to foreign countries during the month of February was placed at $78,087,483, which is $7,502,088 less than the February, 1917, valuation of $85,589,571. Although the tonnage exported during the 8-month period decreased, the valuation increased, owing to the higher prices received for iron and steel products. For the eight months ending, February, 1918, exports totaled $778,357,754, an increase of $136,160,685 over the total of $642,197,069 for a similar period in 1917.

Machinery exports fell more than $6,000,000 in value from the January total and nearly $700,000 from that of February a year ago. The total value of machinery exported in the eight months ending with January reached $189,902,943 as compared with $165,459,441 in the corresponding period in 1917. That eight months' total exceeded 1916 by nearly $60,000,000 and 1915 by $110,000,000. Of the $190,000,000 worth of machinery shipped abroad in the last eight months, $40,533,806 represented the value of metal-working equipment. This figure is nearly $15,000,000 less than the value exported in the same eight months last year. A sum of $3,108,431 represents February's exports, compared with $6,642,827 in February, 1917, and $5,504,954 in January this year.

The volume of machinery exports month by month since last June and the totals of each class for the eight months ending with February, is as follows:

Metal-working machinery: February, $3,108,431; January, $5,504,954; December, $4,650,325; November, $4,800,472; October, $5,983,070; September, $7,165,709; August, $4,585,206; July, $4,700,639; eight months' total $40,533,806.

Lathes: February, $592,398; January, $1,425,315; December, $1,656,906; November, $1,083,449; October, $1,787,379; September, $2,371,629; August, $1,621,168; July, $1,559,834; eight months' total $12,125,078.

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,548	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555
1918		
Jan.	20,581	195,385
Feb.	10,540	173,272

Machine tools other than lathes: February, $752,355; January, $1,048,511; December, $1,013,442; November, $914,841; October, $961,216; September, $1,006,481; August, $785,685; July, $769,435; eight months' total, $7,259,966.

Sharpeners and grinders: February, $328,879; January, $662,849; December, $489,768; November, $514,408; October, $669,108; September, $765,492; August, $406,670; July, $442,042; eight months' total, $3,950,337.

All other metal-working machinery: February, $1,434,799; January, $2,368,279; December, $1,490,209; November, $2,287,774; October, $2,565,367; September, $3,022,107; August, $1,171,683; July, $1,929,328; eight months' total, $15,434,747.

Machinery: February, $18,039,364; January, $24,178,146; December, $30,051,092; November, $25,128,024; October, $28,488,426; September, $27,947,134; August, $19,518,161; July, $18,208,429; eight months, total, $189,902,943.

March Marks Transition Period

Complete Assimilation of Existing War Work Through Distribution of Sub-Contracts, Supplies Steady Machine Tool Demand—Increased Production and New Undertakings of Size Are in Sight

WITH production of lighter war equipment rounding into shape, March has witnessed a direction of attention to the heavy ordnance program which is impending. The supplies of rifles for the equipment of the first army of a million and a half men are in sight under existing contracts and are expected to be ready by the first of June. The Browning gun orders were distributed early in the month among those existing manufacturers whose equipment is suited to rifle production. The operations of rifle making in a measure are similar to those involving the production of the Browning guns, although the heavy type Browning requires a number of new machines. Shells for the lighter ordnance have been assimilated. Plants throughout the east and as far west as Ohio were hard at work upon light guns and projectiles up to 6-inch in size.

Legislation Indicates Trend of Wants

THERE has been pending in congress an urgent deficiency bill carrying $400,000,000 for heavy ordnance which includes guns and shells up to 16 inches in size. This prospective construction will require an immense number of heavier tools, and the allotting of contracts is awaited with interest. The saturation of the eastern centers with the earlier war orders indicates that a wider distribution of this new business will obtain. Those manufacturers in the central states who are in position to handle this class of work have anticipated the receipt of orders in some cases to the point of obtaining options on tools for delivery conditional upon receiving contracts. A further indication of the tendency to give a wider distribution to the impending ordnance work is indicated in the plan of the war department to create 10 munition zones, each under a director who will be responsible for all contracts under his supervision. This system is compared with the zone plan of handling contracts at present in effect under the shipping board where excellent results are said to have been obtained. This decentralization is expected to expedite present work as well as to aid in placing new contracts.

Western Contracts Go Forward

DURING March many manufacturers through Ohio, Indiana, Michigan, Wisconsin and Illinois have directed their energies into channels which produce war materials. Those centers engaged in automobile work have received contracts or sub-contracts for airplane, motor, gun carriage, recoil mechanism, fuse and grenade parts, except in a few notable instances where heavier shells and gun tubes have been awarded. There are notable exceptions to these conditions where a complete warmaking device has been allotted to one manufacturer. The Ford plant for the construction of antisubmarine craft complete is an example of this sort of undertaking. This plant was commenced in March under a 75-day time limit. In much of the sub-contract work existing equipment has been converted to war service, but replacements and supplementary tools have furnished a steady demand. Used tools have not been forthcoming to supply the demand except in some instances where highly specialized machines have become available due to completion of contracts for 75-milimeter shells.

Several large contracts have been entered upon and others are under consideration which will furnish large tool requirements. The Studebaker Corp., Detroit, was awarded a contract for heavy projectiles early in the month; Dodge Brothers Co., Detroit, and the Willys-Overland Co., Toledo, O., were successful in securing ordnance work, and all of these concerns required additional machine equipment. Trucks and airplanes have entailed a heavy increase in motor construction during the last few weeks, and these taken with the growing tractor business have furnished a heavy burden for the manufacturers of gas engines. During the latter portion of the month shipyards have been added to the list of users of internal combustion engines. It was reported that the Winton Engine Works, Cleveland, has received a contract for 150 diesel engines for use on the heavier type of motor ship projected on the Pacific coast. In the east, also, an increased activity in motor manufacture is noted.

Shipbuilding Adds New Business

WITH the progress of the senate inquiry into the affairs of the shipping board, it has become apparent that new shipyards and additional facilities added to existing yards would result. Several yards are in immediate prospect and will furnish a demand for a number of miscellaneous machine tools and for various types of cranes. Labor shortage in the neighborhood of existing yards and harbor or launching facilities have induced a number of the proposed yards to seek locations along the southern seaboard or the gulf.

Will Double Production

DURING the latter part of the month, a new angle has developed which indicates a tremendous impetus to the machine tool demand in the near future. Coupled with the impending heavy ordnance work which has hung fire practically during the entire month, has come an increasing pressure towards increased production in all lines of war material manufacture. As an added spur the German drive, checked and awaiting a return smash by the allies has caused a heavy destruction of all sorts of equipment and the sapping of existing stores of munitions. These factors unmistakably spell redoubled effort on the part of American manufacturers. Foresight would indicate that despite the repeated attention which is directed to the "neck of the bottle", the present shipping facilities which are none too adequate, that production must go on, and must increase tremendously. This portion of the problem must be solved by the tool manufacturer and the government contractor, and other sources must supply the answer to the question of getting them across. At the present time it is being confidently asserted that 100 per cent increase in production of trucks, munitions and all classes of ordnance must be attained. The difficulties attendant upon securing this increase, and the demand which will be placed on the machine tool industry are apparent to those dealers who have handled the tremendous inquiries of the past months.

Will Require Doubled War Output

Urgent Needs in All Classes of Munition, Ordnance Supply and Motor Truck Manufacture Will Require 100 Per Cent Increase in Existing Shop Capacity—Sub-Contracts Furnish Steady Equipment Demand

URGENT needs abroad for all classes of ordnance, munitions, transport facilities and supplies have been rendered more acute by the destruction incident to the German drive. It is becoming increasingly apparent that America must step into the breach with a maximum production in practically every line of equipment and supplies necessary at the battle front. It is stated that these considerations are back of a contemplated effort to speed up and increase war production to practically double what it is at the present time. Manufacturers are being urged individually to expend extra effort and to increase their productive powers, but except in few cases the actual obtaining of additional machines has been left with the manufacturer. In cases where the need has been particularly urgent the government has exercised influence in obtaining needed tools and in remote instances has put in operation the power to commandeer and allot machines where urgently needed. Whether under the impending amplification of effort this will be increasingly evident is open to conjecture, but the tendency is apparent. Coupled with the heavy ordnance program which is taking shape slowly, the drive for increased production is expected to furnish a demand unprecedented in the machine tool trade. That new work will be distributed westward is becoming increasingly evident from activities throughout Indiana, Ohio, Michigan, Wisconsin and Illinois. The redistribution of orders with a constantly growing list of subcontractors continues until practically every machine shop finds need for some class of added equipment. This furnishes a steady demand. The crane market remains quiet with only occasional inquiries, following the rather heavy demand furnished by the government for navy yard and construction work abroad. An added impetus is expected in view of the continuing formation of new shipbuilding companies, a number of which are in the preliminary stages at this time.

New Buying Forecasts Ordnance Work

THE purchase of tools by the various departments at Washington is comprising the bulk of current business in the eastern machinery market. Much of this buying, which is being done quietly, is in anticipation of the government's proposed program for the production of heavy ordnance. A large number of tools needed for this work, including engine lathes, turret lathes, drilling machines, millers, etc., are for delivery not later than May 1. Perhaps the latest inquiry to come out from Washington is that involving about 15 miscellaneous tools for the government proving ground at Aberdeen, Md.

Industrial Demand Continues Light

Demand from industrial sources at this time is comparatively small. Included in new inquiries to come before this market is that of the Southern Valve Gear Co., Knoxville, Tenn., calling for three planers, three shapers, four steam hammers, three slotters, five lathes, two boring mills, three drills, two grinders and a few other tools. The Federal Shipbuilding Co., 54 Dey street, New York, continues to place orders for a few machines. Fred T. Ley & Co., New York, contractors in charge of the construction of a new munitions plant, are expected to be in the market shortly for a considerable amount of equipment. The Trenton School of Industrial Arts, Trenton, N. J., will need a few tools for a boat-building shop. The Singer Mfg. Co., New York, has recently closed on additional tools, principally lathes, for its plant at Elizabethport, N. J. A New York commission house recently has closed on a number of tools for shipment to the Orient, principally to China.

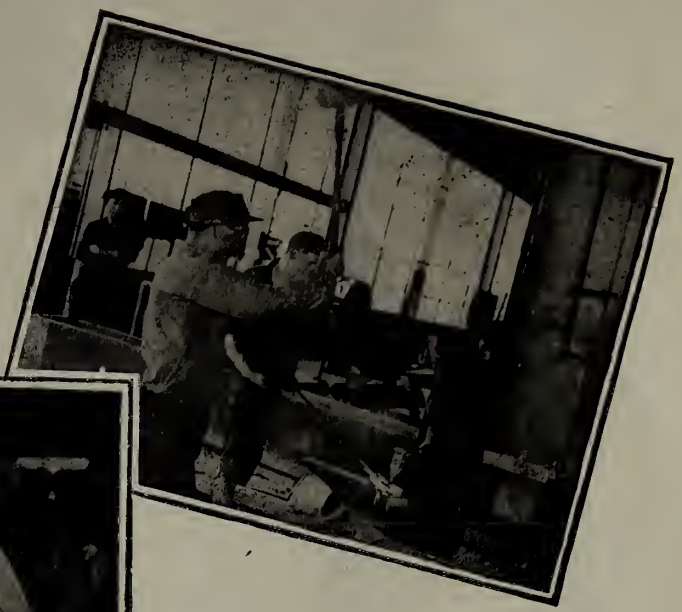
An advance of 10 per cent has just gone into effect on precision bench lathes, and a similar advance is to go into effect on April 15 on hand screw machines. As previously noted, an increase of 10 per cent has been made in the price of sensitive drills and 20 per cent on a line of shapers. These advances are attributed to increases in the wages of skilled labor.

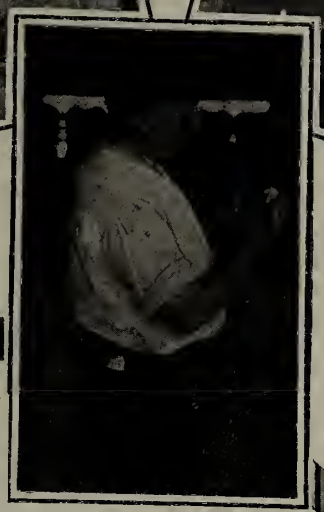
Industrial expansion in the east continues of fair volume. Preliminary plans are being drawn for a $3,000,000 power plant at Goat Island, Niagara Falls, N. Y., for the New York state reservation committee. The J. D. Taylor Construction Co., Syracuse, will build a $35,000 addition to the foundry of the Ames Iron Works, Oswego, N. Y. The Fowler Mail Co. will build an addition to its plant at Buffalo. It is understood that the American Shipbuilding Corp. will build a plant at Quincy, Mass., for the construction of wooden ships. The Edgemoor Iron Co., Edgemoor, Del., has awarded a contract for a $75,000 addition to its plant.

Crane Demand Slumps Following Government Bids

The crane market is dullest in several weeks. Although a fair amount of business is pending, the volume of current business is small. At present, in addition to the large number of cranes for eastern yards on which the government took bids a couple of weeks ago, there are four electric cranes pending for the Mare Island navy yard, two of 15 tons and two of five tons capacity. Bids on these cranes will be received by the navy department on April 9. It is reported that a Pittsburgh concern recently was given a contract for a 30-ton crane for the Washington navy yard. The Chile Exploration Co. in addition to the three 20-ton travelers recently inquired upon for export, is in the market for four 5-ton hand-power cranes. The American Power & Light Co., 71







AGATHON STEELS TRADE MARK

Physically, Agathon Steels are as near perfect as the most improved methods of steel making the world has ever known can make them.

But no small part of the credit for Agathon physical perfection belongs to the artisans who make Agathon Alloys.

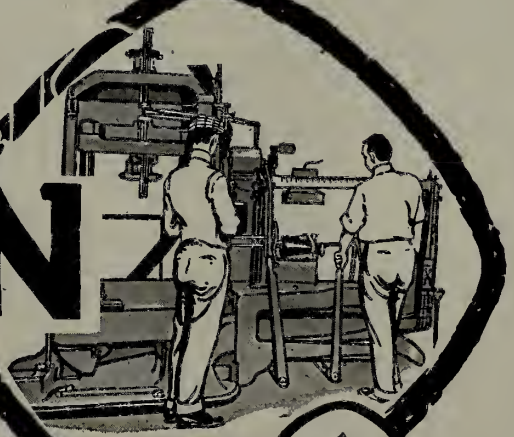
These men, with the superlative Agathon standard ever in mind are keeping Agathon quality "away up there."

The Central Steel Company

Massillon, Ohio

Detroit Office—326-27-28 Ford Bldg.
F. Walter Guibert, District Representative.
Cleveland Office—Hickox Bldg.
The Hamill-Hickox Company, District Representative.
Chicago Office—1370 People's Gas Bldg., 122 So. Michigan Blvd.
C. H. Beach, District Sales Manager.
Philadelphia Office—603 Widener Bldg.
Frank Wallace, District Sales Manager.
Syracuse Office—601 University Block.
T. B. Davies, District Sales Manager.
J. E. Deckendorff & Co., 20 Broad St., New York. General Export Agents.

AGATHON
Alloy Steels



AGATHON STEELS TRADE MARK

AGATHON Nickel Steels
AGATHON Chrome Nickel
AGATHON Chrome Steel
AGATHON Chrome Vanadium
AGATHON Vanadium
AGATHON High Carbon
AGATHON Special Analyses

Broadway, New York, is inquiring on one 40-ton electric crane and one 2½-ton electric bucket crane for the powerhouse of the Texas Power & Light Co., at Dallas, Tex. The Braden Copper Co., New York, is inquiring for additional conveying equipment. The Thompson-Starret Co., New York, will buy a 15-ton handpower crane for a powerhouse to be erected at the government's explosive plant in Charleston, W. Va. The company originally inquired for electric cranes of larger capacity. The Baldwin Locomotive Co., Philadelphia, still is in the market for two 50-ton travelers. The Interborough Rapid Transit Co., New York, is inquiring for a 3-ton handpower crane for a substation. The Pennsylvania railroad recently closed on 336 1-ton jib cranes for the American expeditionary forces in France. The New York Airbrake Co., 165 Broadway, New York, has placed a contract for a 5-ton traveler with the Northern Engineering Works, Detroit.

Normal Demands Continue Steady at Chicago

MANUFACTURERS of munitions, tractors and gas engines, as well as some agricultural implement manufacturers, are supplying practically all the demand at present received by Chicago machine tool dealers. Exclusive of these classes of requirements there is considerable demand for single tools from general users. Manufacture of government requirements seems to have been contracted and subcontracted until it has entered the activities of almost all machine tool users and most of them find need for further equipment to handle the business thus demanded. No large new projects are being undertaken, but a number of concerns already equipped for munition work are enlarging their facilities, some even doubling their capacity. This is bringing in some business. Deliveries are becoming somewhat better on the part of manufacturers. Dealers find difficulty in obtaining cars for moving tools from this center and this is hampering their efforts. The Standard Steel Car Co. continues to buy for its new munition plant at Hammond, Ind. Government arsenals are speeding up and tracers are out conferring with manufacturers to expedite delivery of equipment now on order for these plants. The Green Engineering Co., East Chicago, Ind., is building a foundry in connection with its plant. The Ruby Furnace Co., Dowagiac, Mich., is building an addition to its foundry and one to its main plant. The Northwest Boat Building Co., Green Bay, Wis., is building a machine shop addition. The Universal Foundry Co., Oshkosh, Wis., is preparing to build an addition. The Pelton Steel Co., Milwaukee, will build a cleaning room and core room at its foundry. The Ladish Drop Forge Co., Cudahy, Wis., will build a forge shop. Springfield, Mo., has voted $1,500,000 bonds to build a waterworks plant.

Government Requirements Rule in Pittsburgh

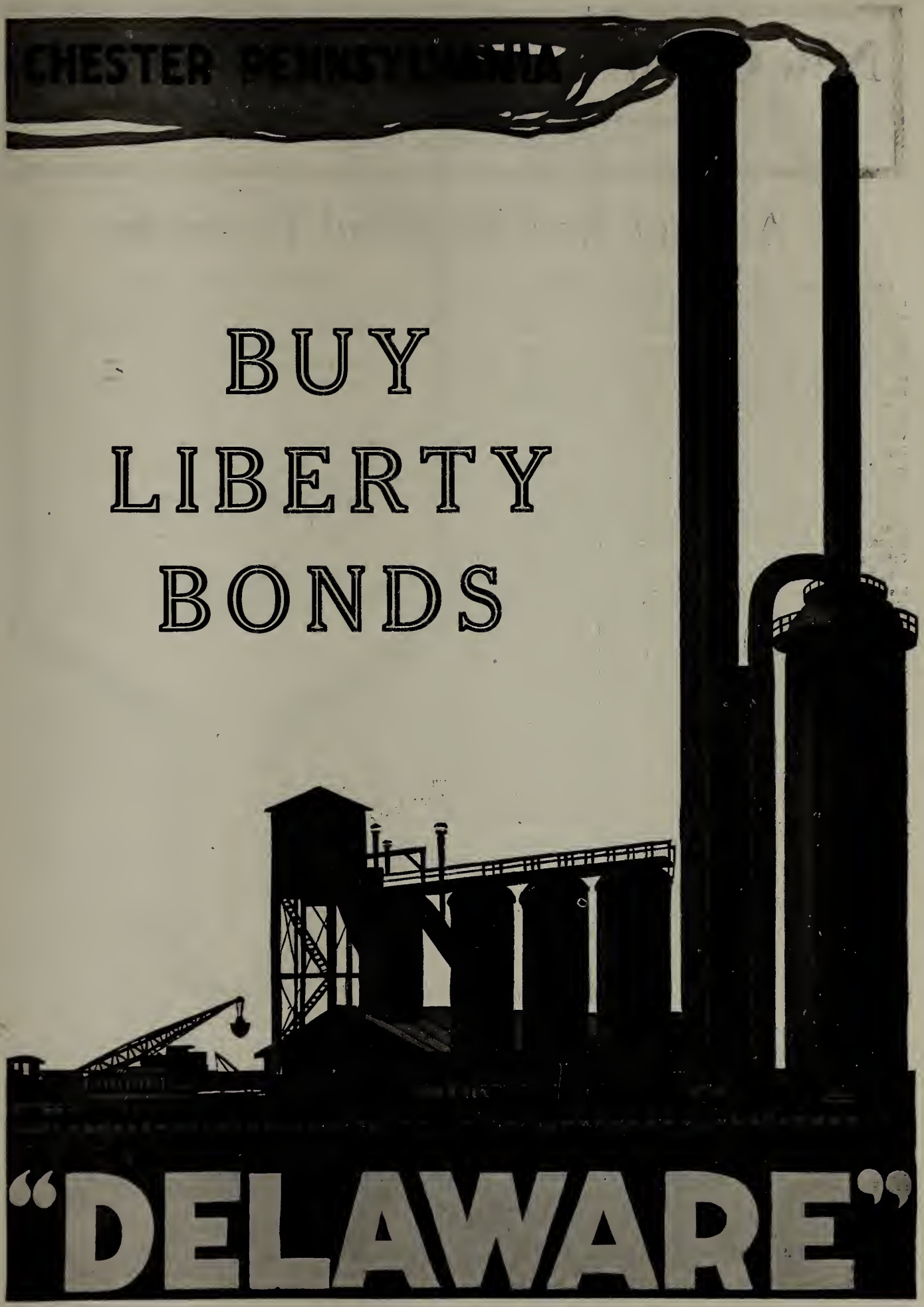
GOVERNMENT requirements for machine tools of various kinds, including cranes and lathes, are dominating the market situation to an increasing degree, according to sellers in the Pittsburgh district. Domestic inquiries and sales are falling off. Complaint is being made that it is more difficult to obtain material, such as steel and castings, that shipments are being held up, and that permits are difficult to obtain. The labor situation also is causing uneasiness. Mechanics who are being paid 45 cents an hour plus a bonus in private shops are going to government establishments where they are paid 62 cents an hour and appear to prefer the flat wage to that obtainable under the bonus system, although the latter offers better pay for those willing to exert sufficient energy. The market for rolling mill equipment, according to one maker, has not developed as much activity as had been expected. Deliveries in this line, however, are much better than they were recently.

Steady Buying of Small Lots Continues

NO LARGE lists are extant in the Cleveland district at the present time, but a steady demand continues for practically all classes of tools. Pressure from government sources has resulted in one or two instances in a requirement for additional machines to speed up contracts. In these cases, no formal inquiries have been issued, but the purchasers have called upon dealers where machines were available for immediate delivery. A growing tendency on the part of the government to aid contractors in securing machines is evidenced in a number of cases. One dealer reported a 36-inch boring machine ordered by a Detroit manufacturer and shipped by express at the instance of the government. Milling machines, planers of the larger dimensions, boring machines of some types and drills are becoming increasingly difficult to obtain. On some of these classes of machines, deliveries under a year are practically impossible. The used tool situation fluctuates. At the present time there is avaliable a quantity of special machinery which has been used in the manufacture of 75 millimeter shells by eastern manufacturers; but much of it is not practical as it is highly specialized. Light tools for airplane and similar work continues to be in steady demand, but in most cases orders are merely to supply replacements or to enhance existing capacity. A tendency has been evident among those manufacturers who are working on war contracts, to order in advance of their immediate needs and to anticipate repeated and enlarged orders. A national organization to promote production on munitions has come into existence through the efforts of Maj. B. A. Franklin. This organization, which is known as the American Fuse Manufacturers' association, will meet in Cleveland this week with a view to centralizing the work in progress. Officials from the ordnance inspection and design departments will take an active part in this meeting and in others which are to be held at the various munition centers throughout the country. The market on heavy machinery is quiet and not many orders are being placed. Several inquiries are out from foundries on sand-handling equipment. Another interesting feature is introduced by the difficulty which almost amounts to an inability to secure slack for fuel with a resultant inquiry for coal-crushing equipment. The C. O. Bartlett & Snow Co., Cleveland, reports that it has recently received seven inquiries on a large coal-crushing machine of a type to be manufactured, but of which as yet only one has been built. This company with others has received inquiries for and has entered bids upon the following material for the government; coal-handling equipment for the Alabama power plant, equipment for a chemical plant whose site has not yet been chosen, and conveying, coal-handling, chemical, and other equipment for the new explosive plant at Charleston, W. Va. One Cleveland builder is installing sintering equipment for a Colorado plant and has bids out on two additional installations.

Crane Market Consists of Limited Inquiries

A lull in the crane market is apparent, with but a few orders being placed, outside of cranes for government shipyards, etc., although inquiries are frequent. Revised specifications have made necessary the receiving of new bids on a large contract for navy yard locomotive cranes, which was to have been let last week. One 100-ton unit for the Washington navy yard is being built by the Cleveland Crane & Engineering Co., Wickliffe, O., and will be completed in the near future.



Say you saw it in THE IRON TRADE REVIEW

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BANGOR, ME.—The Banner Shipbuilding Co., capitalized for $100,000, has filed articles of incorporation. The company will build several three and four-masted schooners at the old Crosby shipyard at East Hampden, when has been idle for almost 40 years. The officers of the new company, all prominent Bangor business men, are: Charles Murray, president; Eben Leavitt, vice president; John H. Rice, secretary and treasurer; Roscoe H. Wing, general manager; and these men with Capt. Edward E. Harvey, Victor Hodgkins and Ernest W. Beach, comprise the board of directors.

PORTLAND, ME. — The Carragher-Hogan Co. has been incorporated to do all kinds of manufacturing, mechanical, mining, etc., with $10,000 capital by Harold O. Corson, Earl F. Coffin and William H. Murray.

PORTLAND, ME.—The Farrar-Brown Co. has been incorporated to make motor vehicles of all kinds, aeroplanes, etc., with $50,000 capital by Carroll L. Beedy and Frank K. Farrar.

ROCKLAND, ME. — The Francis Cobb Shipbuilding Co. has been organized here with a capital of $150,000 by H. N. McDougall, B. C. Perry, Arthur S. Littlefield, William T. Cobb, G. A. Lawrence, A. D. Spear and M. B. Perry, of Rockland and Maynard S. Bird, of Portland.

BOSTON.—Mayor Peters has signed a contract for erecting an elementary school in the Roger Wolcott district, Mattapan, at a cost of $117,000. The building will consist of eight regular class rooms, two kindergartens, teachers' and nurses' rooms and a master's office. The Murphy Construction Co. was the successful bidder for the contract.

BOSTON.—Plans have been completed for the group of buildings to be erected on Single Tree Hill, Brookline, for the Christian Science Benevolent association. The buildings, which will be of brick, will include several two and one-half story dormitories, each 130 by 40 feet and an administration building 100 by 50 feet. Bids are being received for the foundation work.

BOSTON.—Property on the corner of East First and K streets, South Boston, consisting of about 39,900 square feet of land, has been purchased by the Linde Air Products Co., which will begin building a manufacturing plant at once. The property is located near where the new warehouse is to be erected for the war department.

BROCKTON, MASS.—The General Fastener Co., Inc., has been incorporated with $20,000 capital by O. L. Carlson, John F. Donnelly and E. V. Carlson.

CAMBRIDGE, MASS. — The Cambridge Smelting Co. has let the contract for a concrete plant at 100 Pacific street.

CONCORD, MASS.—The 5-story plant of the Whitman & Pratt Rendering Co. was damaged by fire March 22, with a loss of $400,000.

CONCORD JUNCTION, MASS. — Fire, which started near the boilers, destroyed the plant of the Whitman & Pratt Rendering Co. here on Friday and caused a loss estimated at $175,000.

LOWELL, MASS.—The factory of George L. Cady & Sons, machinists tools, was damaged by fire recently, causing $50,000 loss.

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts, Washington:

One steam locomotive, 3631½, April 12, Lake Denmark.

Ten milling machines, one grinder, 3811½, April 12, New London.

One motor driven precision lathe, 3816½, April 12, Philadelphia.

One vertical testing machine, 3831½, April 8, Philadelphia.

One motor driven pipe threading machine, 3833½, April 8, Brooklyn.

One milling machine, 3870½, April 12, Philadelphia.

One acetylene welding and cutting apparatus, and machine tools including grinder, radial drill, and swivel base vise, 3879½, April 12, Melville, R. I.

Locomotive crane, 20 to 30 tons, 3880½, April 12, Philadelphia.

The schedule numbers dates of opening bids and places of delivery follow the specifications of the tools.

MEDWAY, MASS.—The Curtiss Aeroplane Co., Buffalo, is building a plant in North Medway, Mass., where it will make and test airplanes for the government.

SOUTH BOSTON, MASS.—The Linde Air Products Co. has purchased 39,900 square feet of land at East First and K streets and will build a manufacturing plant at once.

SPRINGFIELD, MASS.—The Atlantic Refining Co. has been incorporated with $50,000 capital by Frank D. P. Howland, Louis M. Coates and I. M. Mitchell.

SPRINGFIELD, MASS.—The Garage Heater Co. has been incorporated with $5000 capital by Albert J. Lane, Winthrop K. Lombard and C. W. Hale.

WARE, MASS.—The Ware & Brookfield Street railway will be put up for sale at public auction at noon on April 22. The American Trust Co., of Boston, will sell the road at a mortgagee's sale. The estate of J. Henry Brooks, of Boston, is the principal claimant. The road has been offered to the various towns through which it runs at a price which it is claimed it would bring for junk, or $75,000.

WORCESTER, MASS.—The Standard Oil Co., New York, will build a reinforced concrete and hollow tile fireproof, 2-story, 60 x 85-foot warehouse, a 2-story, 60 x 120-foot combination garage and stable and a 1-story wagon shed to cost $75,000 on Mulberry street.

WESTFIELD, MASS.—Bids are being received now by the Hampton Abrasive Co. for the construction of a factory building, store house and crushing plant. A. B. Harding is architect.

PROVIDENCE, R. I. — Plans are being drawn for a $6000 pump house for the Priscilla Worsted Co. Jinks & Ballou are the engineers in charge.

PROVIDENCE, R. I. — The Providence Fittings Co. has been incorporated to make pipe fittings, etc., with $100,000 capital by Philip C. Joslin, Alfred G. Chaffee and Ira Marcus.

WOONSOCKET, R. I.—The Woonsocket Spinning Co., Inc., has increased its capital stock to $100,000 and will start building an addition to its present plant here within a few weeks. Woolen and merino yarns are the product of this company.

BRIDGEPORT, CONN.—The general contract for the construction of an addition to the plant of the Armstrong Mfg. Co. has been let to H. D. Best & Co., 52 Vanderbilt avenue, New York.

BRISTOL, CONN.—The C. J. Root Co., brass hinges and automatic numbering machines, has increased its capital from $100,000 to $150,000.

FORESTVILLE, CONN.—The factory of the Bryce Mfg. Co., ball bearings, on Fredericks street, was burned March 23, with a loss of $50,000.

HARTFORD, CONN.—The Pratt & Cady Co. will build a brick boiler house and a coal pocket on Cushman street, to cost $23,000.

HARTFORD, CONN. — The Ellison Construction Co. has the general contract for erecting a $15,000 addition to the plant of the M. S. Little Mfg. Co.

NAUGATUCK, CONN.—The Wisdom Tool & Machine Co. has awarded the general contract for the erection of an addition to its plant to the Fred T. Ley Co., Springfield, Mass.

NEW HAVEN, CONN.—The New Haven Special Machinery Co. has been incorporated with $25,000 capital by Harris Botivenik, Hyman Botivenik and Charles L. Smith, Bridgeport, Conn.

PORTLAND, CONN.—The Pickering Governor Co. has increased its capital from $10,000 to $900,000.

STAMFORD, CONN.—The W. W. Penfield Co., manufacturing snap fasteners for 75,000 pairs of gloves a day, has plans for increasing its plant here and adding the manufacture of brass novelties.

OHIO STEEL CASTINGS

If your work is such that you must have steel castings -

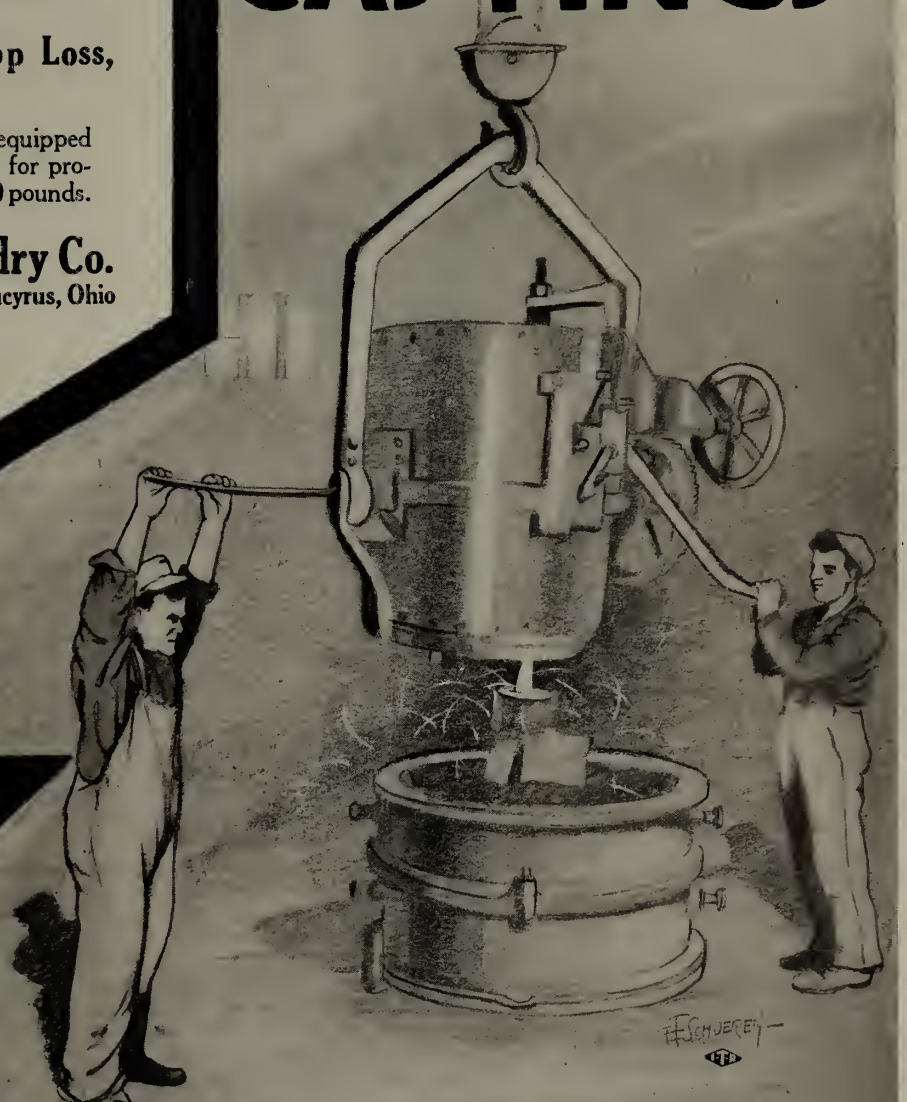
True to Pattern
and
Absolutely Clean

and you would be interested in procuring castings with which you would have a

Minimum Machine Shop Loss,
give us a trial.

Our Springfield Plant is the best equipped and most modern in the country for production of steel castings up to 250 pounds.

The Ohio Steel Foundry Co.
Spingfield, Ohio Lima, Ohio Bucyrus, Ohio



PLUS QUALITY SERVICE

Along the Middle Atlantic Seaboard

ALBANY, N. Y.—Work will start at once on the construction of a $100,000 pulp mill and paper factory for the Albany Perforated Wrapping Paper Co. The new building will be 1-story, 120 x 300 feet. It is expected that three more buildings will be erected later.

BROOKLYN, N. Y.—The Potdevin Machine Co. has awarded to Rufus H. Brown, 350 Fulton street, the general contract for the construction of a $20,000 machine shop, 1-story, 120 x 150 feet.

BROOKLYN, N. Y.—Architects Hoch & Wagner, 26 Court street, will build a 6-story, 50 x 200-foot factory building for the George W. Baker Shoe Co., 343 Classon avenue.

BUFFALO.—The Standard Hardware Lumber Co. is planning to rebuild its plant from private plans, at a cost of $20,000.

BUFFALO.—The Buffalo Nipple & Machine Co. contemplates the erection of a new plant addition. George Keppel, 335 Glenwood avenue, is receiving bids.

BUFFALO.—The Schwartz Mfg. Co., 58 Carlton street, let a contract to B. I. Crooker, Builders' exchange for an $8000 factory at 1527-29 Niagara street.

BUFFALO.—The Pullman Co., Broadway, will build a $15,000 dry kiln here.

BUFFALO.—J. J. Carrick has had plans prepared for a $40,000 factory on Clyde street, and will also erect a $10,000 factory.

BUFFALO.—W. D. Welch, 113 Charles street, is president of the Buffalo Wagon Works which is having plans prepared for an addition to its plant.

BUFFALO.—The Stuart Motor Co. will build an assembling plant 924 x 100 feet on East Delavan avenue.

BUFFALO.—The Delaney Forge & Iron Co., 300 Berry street, will have bids taken soon by Engineer G. O. Gonde, 300 Berry street, for a 1-story forge shop 130 x 500 feet.

BUFFALO.—The Augustine Automatic Rotary Engine Co., 1816 Elmwood avenue, is arranging to build an addition to its plant.

BUFFALO.—The Detroit & Cleveland Navigation Co., Main street, of which C. L. Perkins is manager, will build a 3-story warehouse 60 x 90 feet, about $50,000.

BUFFALO.—The J. H. Williams Co., 400 Vulcan building, let a contract to J. W. Ferguson, United Bank building, Paterson, N. J., for a $75,000 drop forge plant 75 x 200 feet.

BUFFALO.—The Arnold Co., 105 South La Salle street, Chicago, has a contract for a $2,000,000 repair shop here for the Pullman Co., 79 East Adams street, Chicago.

BUFFALO.—The Dormer Estate, Ellicott square, let a contract to V. J. Metz, 37 East North street, for a $75,000 factory.

COLLEGE POINT, L. I., N. Y.—The Austin Co., 217 Broadway, New York, is drawing plans for a $15,000 factory for the L. W. F. Engineering Co., builder of airplanes. The proposed building will be 1-story high and 212 x 250 feet.

ELMIRA, N. Y.—Architect H. M. Haskell, Bulett building, has plans for a 1-story factory, 23 x 144 feet, for the Hillard Clutch & Machine Co.

NEW YORK.—Anton Heiss, manufacturer of automobile supplies, is having plans drawn by Moore & Landisedel, architects, for a $15,000 addition to his plant at 518 East 133rd street.

NIAGARA FALLS, N. Y.—The McKinney-McGuire Construction Co. has a contract for a storage plant for the Union Carbide Co., of which George O. Knapp, 30 East Forty-second street, New York, is president.

WOODSIDE, L. I., N. Y.—A $20,000 plant will be erected by Jacob Maisel, for which plans have been drawn by Architect Richard Lukowsky, 477 Fourteenth avenue, Long Island City, N. Y. The proposed building will be 1-story high, 33 x 200 feet.

ALLENTOWN, PA. — The La Cleveland Christie Clay Products Co., St. Louis, Mo., has a contract for a glass furnace and annealing ovens for the Glass Casket Corp., under the direction of C. J. McKelvey, general manager of the company.

ALLENTOWN, PA. — The Majestic Silk Mills, Inc., New York City, will fit up a branch factory, under the direction of Julius H. Bernstein, president.

CLIFTON HEIGHTS, PA. — Frank E. Hahn, architect, Philadelphia, has completed plans for a 47 x 60-foot power house, for the Kent Mfg. Co. Bids will be received shortly.

ELLWOOD CITY, PA.—E. R. Koch, of this city, is largely interested in a new company which has leased property here and will fit up a plant for making cement building blocks.

LEBANON, PA.—The Bunker Hill Sand & Stone Co. will purchase considerable new equipment at once for their plant.

LEBANON, PA.—The Lebanon Steel Foundry Co. has had plans prepared for another building at its plant.

MANORVILLE, PA.—The Triple Airless Tire Co., Kittanning, Pa., has bought an old brick works property and will remodel it.

MEADVILLE, PA. — The Niagara Silk Mills Co. will build an addition to its plant this spring.

NORRISTOWN, PA.—The Birdsboro Steel Foundry & Machine Co. has let out a contract for an addition 125 x 60 and 50 x 60 feet to its plant.

PHILADELPHIA.—William Steele & Son, builders, will soon take separate bids on work involved in the construction of a machine shop for the C. H. Wheeler Mfg. Co. The proposed structure will be two stories, 58 x 108 feet, and will cost $60,000.

PHILADELPHIA. — The general contract for the construction of a power plant addition and boiler house, involving an expenditure of $30,000, has been awarded by L. H. Lieberman's Sons to the Conneen Construction Co.

PHILADELPHIA.—The Tacomy Ordnance Co. has let the general contract to the F. W. Mark Co. for the construction of a $10,000 locomotive house.

PITTSBURGH.—The Edward E. Rieck Co., 1345 Forbes street is having plans prepared by C. D. Cooley Co., Century building, for a 4-story dairy plant, 36 x 100 feet, on Locust street.

POTTSTOWN, PA. — The Concrete Products Co., which is headed by C. I. McKenzie, of Pittsburgh, and which is a subsidiary of the Pittsburgh Construction Co., is arranging to build a plant in this city.

READING, PA.—The Carpenter Steel Co. has awarded to Daniel Hunter the general contract for a furnace building, to cost $35,000.

SCRANTON, PA.—The International Silk Throwing Co. will build a 3-story, 51 x 113-foot mill addition, to cost $50,000.

SHARON, PA.—The Concrete Brick & Fence Post Co., Wheeling, W. Va., will build a factory; Theodore Smith, 2909 Jacob street, Wheeling, manager.

TITUSVILLE, PA.—The American Radiator Co. has awarded the general contract to the J. W. Cowper Co., Inc., for the construction of a $25,000 foundry. The proposed building will be 1-story, 80 x 100 feet.

WARREN, PA.—Gannoe Mfg. Co., Warren, Pa., capitalized at $200,000 was chartered to operate fire arms factory, by Thomas A. Gannoe, George B. Munn, Arthur T. Eaton, L. E. Chapman, Warren and I. G. Hyer, Clarendon, Pa.

WILLIAMSPORT, PA. — The National Foundry Mfg. & Supply Co. has let the contract for rebuilding a 1-story plant, 48 x 115.

YORK, PA.—The Frey Hostetter Co. has let out a contract for a warehouse 175 x 140 feet.

EAST ORANGE, N. J.—Foster Machine Co. has been incorporated with $150,000 capital to manufacture textile machinery. Charles R. Fowler, Edward T. Fowler and L. S. Lilley, all of Westfield, Mass., are the incorporators.

HOBOKEN, N. J.—The William Crawford Co., 7 East Forty-second street, New York, has received the general contract for the construction of a $50,000 addition to the plant of W. & A. Fletcher.

JERSEY CITY, N. J.—United Chemical & Organic Products Co. has been incorporated with $1,270,000 capital to manufacture chemicals, etc. M. Y. Haywood, H. E. Letter and C. L. Rimlinger, all of Wilmington, Del., are the incorporators.

JERSEY CITY HEIGHTS, N. J. — The general contract for a $100,000 factory to be erected in this city, has been awarded to Isaac A. Hopper's Sons Inc., 15 East Fortieth street, New York, by a concern whose name is withheld.

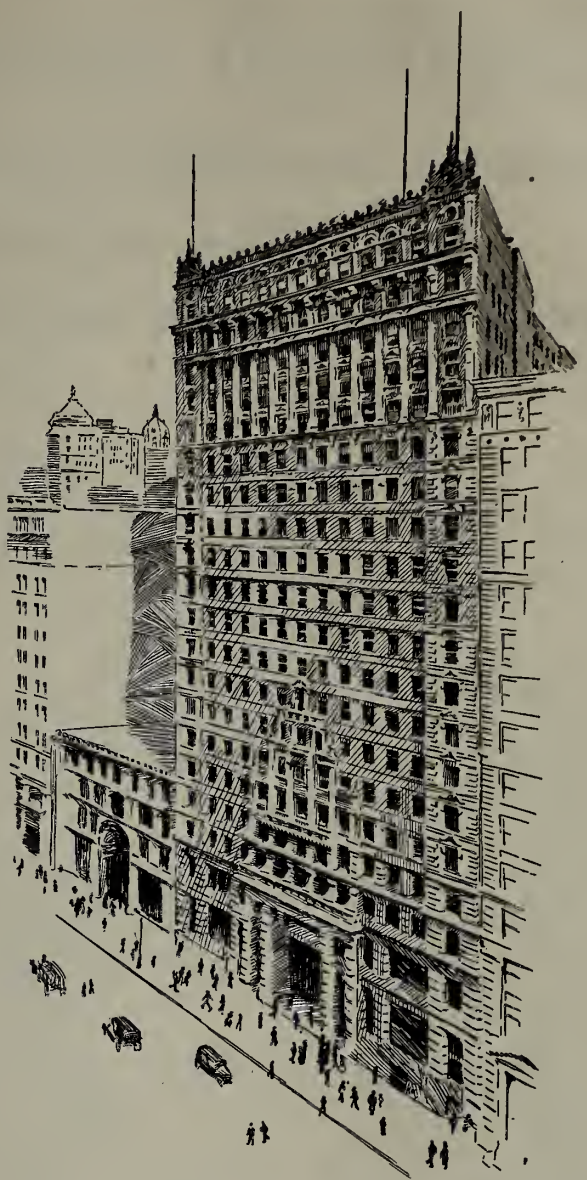
MORRISTOWN, N. J. — Morris County Chemical Works has been incorporated with $100,000 capital to manufacture chemicals, dyes, etc. The incorporators are Thomas L. Sexsmith, New York; William Joyce, Scranton, Pa., and John A. Marszalek, Flushing, New York.

NEWARK, N. J.—Herculite Co. has been chartered with $500,000 capital to manufacture plastic compositions. Incorporators are William F. Dill and A. J. Matter, New York, and L. Lawrence, Orange.

NEWARK, N. J.—National Metal Stamping & Mfg. Co., 190 Murray street, will erect a brick and steel machine shop and foundry, 1-story, 90 x 120 feet, to cost $20,000.

NEWARK, N. J. — Tidewater Warehouse Co., Blanchard street, will erect a four-story reinforced concrete storage building, 70 x 163 feet in size, to cost $75,250.

NEWARK, N. J.—The Mono-Service Co. is having Architect Edward E. Grant draw plans for a 50 x 60-foot plant addition.



42
Broadway
New York
U. S. A.

The New Home of the Federal Export Corporation

After May 1st, 1918, the headquarters of the Federal Export Corporation will be in the Federal Export Building, 42 Broadway, New York, where large office space has been provided for the various departments.

These offices, in the heart of the financial and shipping districts, are favorably located for the purposes of an international trading corporation. Here the visiting manufacturer interested in foreign trade will find provision made for his convenience and here, he will meet merchants from the principal markets of the world.

An invitation is extended to all interested in the future of American foreign commerce to visit the new headquarters of an organization earnestly devoted to furthering the interests of that trade.

FEDERAL EXPORT CORPORATION

ADDRESS UNTIL MAY FIRST

115 BROADWAY - NEW YORK

TRENTON, N. J.—The machine shop and pattern department of the William R. Thropp & Sons Co. was damaged by fire on March 20. The loss is estimated at $150,000. Joseph W. Thropp, secretary-treasurer, announces that the plant will be rebuilt immediately.

TRENTON, N. J.—Crane Co., 46 Escher street, has let the contract to Charles R. Randall, Trenton, for a 3-story addition to their plant to cost $10,000.

WESTFIELD, N. J.—Thomas N. Wrenn, Inc., has been incorporated with $10,000 capital to manufacture chemicals. Incorporators are W. H. Bond, South Orange; H. Couse and J. P. Callender, New York.

BALTIMORE.—Corcoran, Hill & Co. have awarded to the Consolidated Engineering Co. the general contract for a $250,000 cold storage plant.

WASHINGTON.—The Turner Construction Co., 244 Madison avenue, New York, has been awarded a contract by the bureau of yards and docks for the construction of a power plant, to cost about $400,000.

Activities in the Central States

BELOIT, WIS.—The N. B. Gaston & Sons Co., manufacturer of scales, is building additions to its machine shop, forge shop and foundry.

CLINTON, WIS.—A new garage and repair shop costing $12,000 will be erected by William A. Mayhew Jr., to replace the building destroyed by fire two weeks ago. Plans being completed by Architect W. H. Blair, Janesville, Wis., call for a 2-story building of concrete, brick and hollow tile, 50 x 80 feet.

DE PERE, WIS.—The C. A. Lawton Co. is building a 2-story machine shop building 40 x 120 feet.

EAU CLAIRE, WIS.—Architects Foeller & Schober, Green Bay, Wis., are taking bids for the construction and equipment of a boiler room and laundry for the Sacred Heart Hospital in Eau Claire. It will be 35 x 90 feet, and cost about $25,000.

EAU CLAIRE, WIS.—The Union Automobile Co., which recently absorbed the Darwin Motor Car Co. and Eau Claire-Chippewa Buick Co., is planning to build a $50,000 garage and service building, 105 x 125 feet, two stories and part basement, at South Barstow and Gray streets, Eau Claire. C. D. Moon is president of the company.

FOND DU LAC, WIS.—J. S. McCullough, city engineer, is preparing plans for a new steel bridge across the east branch of the Fond du Lac river at West Second street. The structure is expected to cost about $10,000. Bids will be taken some time in April.

GREEN BAY, WIS.—The Hudson & Sharp Machine Co. will build a 2-story plant 40 x 100 feet. D. W. Hudson is president.

GREEN BAY, WIS. — The Northwestern Engineering Co. is being organized with $1,000,000 capital to establish a shipbuilding and marine engineering plant, by L. H. and H. G. Burkhausen.

MADISON, WIS.—The state highway commission is taking bids until March 27 for furnishing 5000 mile markers; 1000 direction signs; 500 patrol signs, and 300 danger signs, both in wood and in metal, and 2500 concrete or wood posts, for the state trunk highway system.

MANITOWOC, WIS.—Bids will be taken after April for the erection of a two-story fireproof garage and repairshop, 40 x 100 feet, for Henri Meisner, 806 Washington street. Architect W. J. Raeuber, 826 South Eighth street, is in charge.

MILWAUKEE. — George E. Zimmermann, 3102 McKinley boulevard, has been awarded a contract amounting to $260,541 for the construction of an extension to the intercepting sewerage system at Milwaukee.

MILWAUKEE.—The capital stock of the Universal Tool & Apparatus Co., Stroh building, has been increased from $10,000 to $15,000.

MILWAUKEE. — The Armour Grain Co. has engaged Klug & Smith, consulting engineers, Mack block, to prepare plans for a 6-story elevator and warehouse addition, 66 x 75 feet, at Cherry and Commerce street, Milwaukee. The building with equipment will cost about $35,000.

Trade Announcements

The New York office of the M. B. Suydam Co., Pittsburgh, paint manufacturers, has removed to 280 Madison avenue. C. C. Potter, eastern sales manager, is in charge. formerly carriedon by the partnership of Marani & Moore, Euclid building, Cleveland, as the out-of-town interests of V. C. Marani occupy his entire attention.

The Liberty Steel Products Co. of New York has opened offices in the Newhall building, with A. L. Martin, formerly with the Sharon Steel Hoop Co., Youngstown, O., in charge.

J. E. A. Moore, M. A. Soc. C. E., will continue the consulting practice

The main office of The Amalgamated Brass Co., formerly in Cincinnati, has been moved to the new plant of the company at Blanchester, O. The Fulflo Pump Co. has also removed its offices to Blanchester, O.

Clark Bros. Bolt Co., Milldale, Conn., announce the removal of J. C. F. Yarnell, western sales manager, from Chicago to 2671 W. Grand boulevard, Detroit.

The A. R. Williams Machinery & Supply Corp., Toronto, Ont., has opened a branch sales office at 402 Fidelity building, New York.

MILWAUKEE. — Articles of incorporation have been filed by the Aronovitz Iron & Metal Co., Milwaukee. The capital stock is $10,000 and the incorporators are Patrick W. Dean, John W. Burkhardt and Emil Hirsch. The company will do a general scrap metal and junk business.

MILWAUKEE.—The central board of municipal purchases has accepted the low bid of the Western Electric Co. for furnishing 7800 feet of lead-covered cable at $3492.

MILWAUKEE. — Sealed bids are being taken until March 22 by the central board of purchases for furnishing 7800 lineal feet of lead-covered cable for the new municipal street illuminating system. Percy Braman is commissioner of public works.

MILWAUKEE.—The Utility Hoist & Mfg. Co., capitalized at $25,000 has been chartered to manufacture cranes, hoists and specialties for motor truck dump bodies. A. G. Kritch, W. C. Woodin and A. J. Jansen are interested.

NIAGARA, WIS. — The village board is taking sealed bids until March 26 for the construction of a municipal waterworks and sewerage system, which will cost about $50,000. The specifications were prepared by W. S. Shields, consulting engineer, 1201 Hartford building, Chicago. H. W. Yerkie is village clerk.

SHEBOYGAN, WIS.—An election will be held in April to authorize the construction of a reinforced concrete and steel viaduct 780 feet long, to cost $55,000, and a steel bridge 220 feet long. The Klug & Smith Co., Mack building, Milwaukee, is engineer.

SHEBOYGAN, WIS. — The Jenkins Machine Co., 315 North Eighth street, has had plans prepared by Juul & Sixta, architects, for a 2-story machine shop addition, 45 x 60 feet.

SHEBOYGAN, WIS.—The board of education has under consideration the proposition of erecting a central high school building, with manual training and domestic science departments. The probable cost will be $350,000. W. R. Roseman is city superintendent of schools.

SUN PRAIRIE, WIS.—The village board of trustees has let a contract to the Mierswa Construction Co., Oshkosh, Wis., for a complete sewage disposal and sanitary sewage system at $32,804.

SUPERIOR, WIS. — Riches & Son have taken the contract for erecting a steel and reinforced concrete highway bridge over the Pokegama river at Central avenue at $5775.

TIGERTON, WIS.—Sealed bids for the erection of a high school building in Tigerton are being taken until April 1 by Charles Buckbee, clerk of the board of education. Plans were prepared by Architects Swarthout & Speer, Wausau, Wis. The estimated cost is $40,000.

ALMA, MICH.—The R. & P. Tractor Co., recently chartered with a capital of $500,000 will build a plant. C. Parsons is vice president.

DETROIT.—The Anderson Tractor Equipment Co., capitalized at $10,000, has been chartered by John L. Hayden, James B. Anderson and William H. Anderson.

DETROIT.—The Freuhof Trailer Co., capitalized at $150,000, has been incorporated to

He says we are bluffing! Let's show him a big Card — and everybody in on the Pot.

Put up your ante now in the

3RD LIBERTY LOAN



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The Iron Trade Review

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manufacture automobile trailers. E. M. Freuhof, August C. Louis and E. M. Freuhof are the incorporators.

DOWAGIAC, MICH.—The Rudy Furnace Co. is letting the contract for a brick and steel addition to its present molding room. The addition will be 120 x 146 feet and will add materially to its present molding capacity. The contract is to be completed within 60 days. Plans were prepared by R. A. Le Roy of Kalamazoo, Mich.

GRAND RAPIDS, MICH.—The Michigan Boiler & Iron Works, capitalized at $10,000 has been chartered by William R. Cook, Carroll F. Sweet and Peter A. Gildhof.

JACKSON, MICH.—The Wolverine Grinding Wheel Co. has been chartered to manufacture straight internal grinding emery wheels, by Hugo C. Loeser, president, and William H. Loeser, secretary-treasurer.

AURORA, ILL.—The Aurora Tool Works has bought a site and will build an addition to its plant.

CHICAGO.—The Andrews Engineering Co. has let the contract for a 1-story truss-roof building, 150 x 150 feet, with a 40-foot ceiling. The building will be used for the manufacture of steel mill machinery and will be of special type construction. It will be equipped with a 10-ton electric traveling crane, and served by the Chicago River and Indiana Harbor Belt switch track at grade, which the Andrews Engineering Co. has contracted to purchase for $52,500. John C. McKeown is the contractor.

CHICAGO.—The Gits Bros. Mfg. Co., manufacturer of automobile and airplane oil cups, has bought 160 x 275 feet at Sixteenth street and Kilbourne avenue, and will build a 1-story saw-tooth roof machine shop to cost $27,000.

CHICAGO. — The Western Electric Co., Twenty-second street and Forty-eighth avenue, is having plans prepared by its chief engineer for a 6-story factory 211 x 675 feet, of reinforced concrete, to cost about $1,000,000.

CHICAGO.—The Roth Mfg. Co., 118 South Clinton street, is building, a 1-story factory, 299 x 309 feet, to cost $60,000.

CHICAGO.—The sanitary district, 910 South Michigan avenue, will take bids April 1, on the Calumet pumping station to cost $2,000,000.

ROCKFORD, ILL.—The Rockford Milling Machine Co., Eleventh street and Harrison avenue, is building an addition to its machine shop.

EVANSVILLE, IND.—The Hercules Buggy Mfg. Co., Martin avenue and Indiana street, is having plans prepared by W. E. Russ, architect, 1405 Merchants Bank building, Indianapolis, for a 1-story factory, 180 x 1000 feet. J. D. Craft is manager.

FT. WAYNE, IND.—Bids will be received until March 28 by the commissioners of Allen county for a 3-span reinforced concrete bridge over the St. Joseph river at State street. A. W. Grosvenor is county surveyor.

KOKOMO, IND. — The Liberty Pressed Metal Co., capitalized at $15,000, has been chartered to manufacture metal articles, by A. V. Conradt, F. S. McNeill and J. W Johnson.

KOKOMO, IND.—The Automatic Bale Tie Co., capitalized at $70,000, has been chartered to manufacture baling machines. Thomas S. Pearson, and Theodore M. Connor are the incorporators.

MUNCIE, IND.—The Muncie Gear Co., Vice and Wyse streets, will build a 1-story addition 139 x 450 feet. The Austin Co., Cleveland, will receive bids.

SOUTH BEND, IND.—The Anderson Co., capitalized at $20,000, has been chartered to manufacture automobile parts, by A. G. Graham, John W. Anderson and Adam Keasey.

UNION CITY, IND.—The Titan Engineering Co. is building a plant to manufacture starting, ignition and lighting systems for automobiles. W. F. Roberts, Anderson, Ind., is president.

VINCENNES, IND.—The Central Pipe & Supply Co., capitalized at $125,000 has been chartered to manufacture machinery and pipe by E. M. Kerlin, C. E. Clark and Thomas F. Morrissey.

WABASH, IND. — The Service Motor Truck Co. has plans for a 1-story addition.

HAMILTON, O. — The Peerless Foundry Co.'s plant was damaged by fire March 24. The estimated loss is around $50,000, covered by insurance.

CHARLESTON, W. VA.—The P. C. Lynch Coal Co., authorized to operate a coal and timber business, and capitalized at $20,000 was organized by P. C. Lynch, W. H. Cunningham, P. J. Lynch and W. J. Shepard, Raleigh county and H. E. Nease, Charleston.

CHARLESTON, W. VA. — The Virginia Elkhorn By-Products Coal Co., of Huntington, capitalized at $300,000 was organized to operate in Cabell county by J. R. Slayton, H. T. Lambert, J. F. Ratcliff, C. M. Love and A. C. Love, Huntington.

DUNBAR, W. VA. — The Whittenmore Glass Co., capitalized at $150,000 has been chartered by A. S. Whittemore, Ulysses G. Fletcher and others of Charleston, W. Va., and will build a glass plant.

WHEELING, W. VA.—The Pullman Co. is planning to erect a $1,000,000 plant at Beech Bottom for the building of pullman cars.

WHEELING, W. VA.—The Earle Chemical Co., capitalized at $15,000 was incorporated by E. I. Runner, E. H. Draher, Eugene Hill, Raymond Sypher and Cora Rader, Wheeling.

New Business in Eastern Canada

LONDON, ONT. — The Helena Costume Co., 190 King street, is in the market for a direct-current generator, 60 kilowatt, 110 volts, 680 revolutions per minute compound wound.

OTTAWA, ONT.—Boxes, Ltd., has been incorporated to manufacture boxes, containers, etc., with $250,000 capital stock. Harvey Fitzsimons, George C. Hurdman, Albert M. Davis and others are interested.

OTTAWA, ONT.—John A. Pearson, architect, Parliament buildings, will receive sealed tenders up to April 11 for the electric wire and cable required in the reconstruction of the Parliament buildings. Schedule of materials, specifications, etc., can be obtained from P. Lyall & Sons Construction Co., Ltd., Ottawa.

OTTAWA, ONT.—The Dillon Mfg. Co., Ltd., has been incorporated to manufacture barn and stable fittings, builders hardware and tools; $75,000 capital stock; Richard B. Dillon, Gertrude R. Dillon, William G. Henderson and others of Ottawa, provisional directors.

OWEN SOUND, ONT.—The Empire Stove & Furnace Co. is in the market for three motors, 15, 20 and 25 horsepower of the 60-cycle, 550-volt, 3-phase type.

OWEN SOUND, ONT.—Keenan Brothers, Ltd., are in the market for a 60 to 75 horsepower engine.

ST. CATHARINES, ONT.—The St. Catharines Taxicabs, Ltd., has been incorporated to manufacture automobiles, bicycles, motors, engines, machinery, etc., with $40,000 capital stock; by Francis J. Murphy, Frazer F. Summers, George B. Burson and others.

TORONTO, ONT.—George H. Gooderliam, chairman of the Toronto and Hamilton highway commission, will receive sealed tenders up to April 2 for the supply and erection of steel bridges over Mimico creek, Etobicoke creek, Credit river and Bronte creek. Also tenders up to the same date for the supply and erection of concrete bridges and approaches over these creeks.

TORONTO, ONT.—Union Chrome Co., Ltd., has been incorporated to carry on mining, engineering and metallurgical operations and operate mills, smelting furnaces and reduction works; capital stock to be 100 shares without nominal or par value; by Irving L. Wiltsie, Anna C. Austin, Abigail de Jongh and others, of New York.

TORONTO, ONT.—The Hercules Rubber Co., Ltd., has been incorporated to manufacture rubber, tires, etc.; $150,000 capital stock. John A. Campbell, James L. Ross, Jacob H. Greenberg and others of Toronto, are the provisional incorporators.

TORONTO, ONT.—The Rudd Paper Box Co., Ltd., 374 Richmond street, west, is in the market for a screw cutting engine lathe.

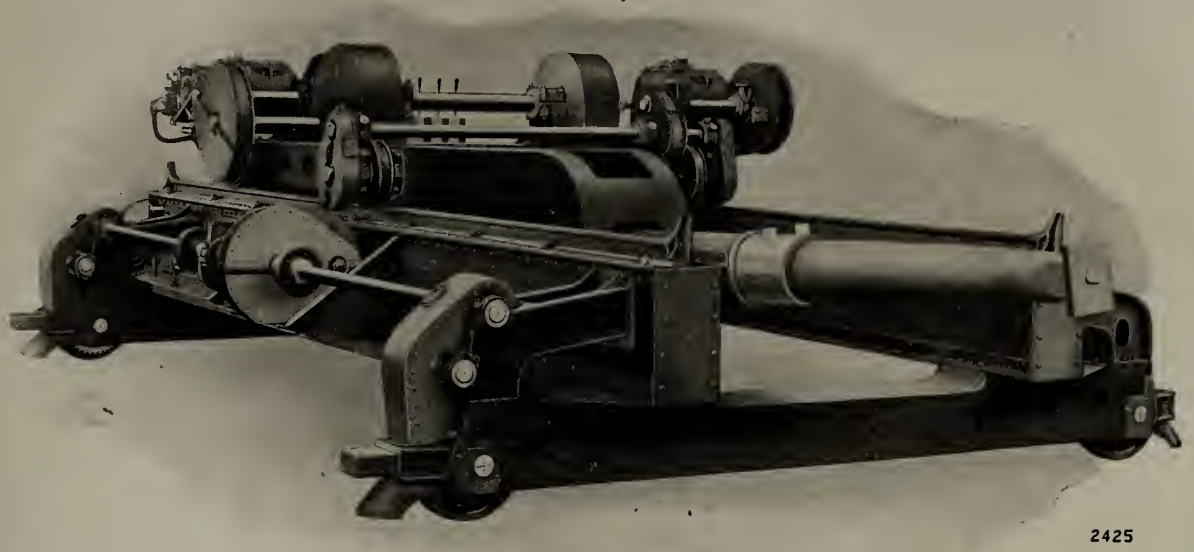
TORONTO, ONT. — James, Loudon & Hertzberg, Excelsior Life building, are asking for prices on malleable iron work machinery, new or second hand.

TORONTO, ONT.—The Cluff Ammunition Co., Atlantic avenue, will build a breaker building in connection with its munitions plant, to cost $25,000.

TORONTO, ONT. — The Martin Dome Hook, Ltd., has been incorporated to manufacture hooks and fasteners with $300,000 capital stock by Louis L. Martin, 81 Peter street; Elliott W. Langley, John Staunton and others.

TORONTO, ONT.—The Divinhood Co. of Canada, Ltd., has been incorporated to manufacture diving machinery, apparatus and suits, with $40,000 capital stock. Frederick H Market, Waldo W. Skinner, Gordon G. Hyde and others, Montreal, Que., are the incorporators.

WINDSOR, ONT.—The Universal Button Co., Walker road, Walkerville, Ont., will erect a factory at Windsor, to cost $15,000. Henry Ford is manager.



Low Type Charger Designed and Built for Republic Iron and Steel Co., Youngstown, Ohio

CHARGING MACHINES AND MANIPULATORS

A New W-S-M Bulletin

Of interest to users of charging and manipulating equipment is our new Bulletin A-7. It describes our various standard type Open Hearth chargers, also special machines for charging Heating Furnaces, for handling slabs, ingots, blooms, billets, wheels, tires, etc. We are prepared to build a special machine for your particular requirements.

Write for Bulletin A-7

The Wellman-Seaver-Morgan Co.

Cleveland, Ohio, U. S. A.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports
Old range Bessemer, 55 iron.....$5.95
Mesabi Bessemer, 55 iron..... 5.70
Old range non-Bess., 51½ iron..... 5.20
Mesabi non-Bess., 51½ iron..... 5.05

WAREHOUSE PRICES

Steel bars, Chicago.....	4.10c
Steel bars, Cleveland.....	4.035c
Steel bars, Detroit.....	4.085c
Steel bars, Philadelphia.....	4.10c
Steel bars, New York.....	4.095c
Steel bars, St. Louis.....	4.17c
Steel bars, Cincinnati.....	4.085c
Steel bars, St. Paul.....	4.22c
Steel bars, Buffalo.....	4.05c
Iron bars, Buffalo.....	4.65c
Iron bars, Chicago.....	4.10c
Iron bars, Cleveland.....	3.985c
Iron bars, Detroit.....	4.75c
Iron bars, St. Louis.....	4.17c
Iron bars, Cincinnati.....	4.085c
Iron bars, Philadelphia.....	4.50c
Iron bars, New York.....	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis.....	4.27c
Shapes, St. Paul.....	4.32c
Shapes, New York.....	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis.....	4.52c
Plates, St. Paul.....	4.57c
Plates, New York.....	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo...	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo..	6.45c
No. 28 black sheets, Cleve..	6.385c
No. 28 black sheets, Cinci..	5.45c
No. 28 black, Detroit.....	6.435c
No. 28 black sheets, St. L..	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo...	7.70c
No. 28 galv. sheets, Cleve...	7.635c
No. 28 galv. sheets, Cinci..	6.635c
No. 28 galvanized, Detroit..	7.685c
No. 28 galv. sheets, St. L..	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati...	$22.50 to 23.00
Bundled sheets, Pittsburgh..	$22.00
Bundled sheets, Cleveland...	23.50 to 24.25
Bundled sheets, Buffalo.....	21.00 to 23.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
City wrought, short, N. Y..	26.50
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts..	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo..	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci..	27.00 to 27.50
Heavy melt'g steel, east. Pa.	28.50 to 29.00
Heavy melting steel, N. Y..	25.00 to 25.50
Heavy melting steel, St. L..	28.00 to 28.50
Heavy melting steel, Birming.	24.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Knuckles, couplers, Chgo....	34.00
Knuckles, coup. St. Louis...	33.75 to 34.00
Low phos. steel, Buffalo....	37.50
Low phos. steel, Pittsburgh..	39.00
Low phos. steel, eastern Pa.	36.50
Shoveling steel, Chicago.....	29.00
Shoveling steel, St. Louis...	28.00 to 28.50
Springs, Chgo.	34.00
Steel rails, short, Chicago...	34.00
Steel rails, short, Cleveland..	35.00
Steel rails, short, St. Louis..	33.75 to 34.00
Steel rails, old, Birmingham.	28.00 to 30.00
Stove plate, Chgo.....	25.50 to 26.50
Stove plate, Cincinnati.....	20.00 to 20.50
Stove plate, St. Louis.....	22.50 to 23.00
Stove plate, N. J. points....	23.75
Stove plate, Birmingham....	17.50 to 20.00
Stove plate, Buffalo.....	24.00
Stove plate, eastern Pa.....	23.00 to 24.00
Stove plate, Cleveland.....	27.50
Stove plate, Pittsburgh.....	22.00
Bundled sheets, Cincinnati..	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.....	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul.....	4.54
Buffalo to:	
Albany, N. Y.....	$1.26
New England (rail).....	3.10
New York and Brooklyn (rail)..	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark..	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul.....	5.85
New York (r. and w.).....	6.00
Philadelphia (r. and w.).....	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul.....	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul.....	4.54
Duluth, Minn., to:	
Minneapolis- St. Paul.....	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul..	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail).....	75.0 cents
Pacific coast (tin plate)....	75.0 cents

IRON MILL USE

Angle bars, iron, Chgo.....	$39.00
Angle bars, steel, St. Louis.	35.00 to 35.50
Arch bars, transoms, Chgo..	46.50
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland.	31.00
Busheling, No. 1, Buffalo...	29.00 to 30.00
Busheling, No. 2, Buffalo...	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling No. 1, Cincinnati.	26.75 to 27.50
Busheling, No. 1, Chgo.....	28.00 to 29.00
Busheling, No. 2, Chgo.....	19.75 to 20.75
Busheling, No. 1, St. Louis.	27.00 to 27.50
Cast borings, New York....	16.50 to 16.75
Cast borings, eastern Pa....	19.00
Cast borings, Cleveland.....	19.00
Cast borings, Buffalo.....	18.00 to 19.00
Cast borings, Cincinnati.....	15.50 to 16.00
Cast borings, Pittsburgh....	19.00
Cast borings, Birmingham...	12.00 to 13.00
Cast borings, Chgo.....	18.25 to 18.75
Cast borings, St. Louis.....	17.00 to 18.00
City wrought, long, N. Y....	31.00
Cut forge, Chicago.....	33.00 to 33.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa....	26.50 to 27.50
Grate bars, Buffalo.....	24.00
Grate bars, Cleveland.....	20.50 to 21.50
Grate bars, N. J. points....	23.75
Iron axles, Pittsburgh.....	46.50
Iron axles, Cincinnati.....	44.00 to 44.50
Iron axles, Cleveland.....	46.50
Iron axles, eastern Pa.....	46.50
Iron axles, Chicago.....	46.50
Iron axles, St. Louis.....	46.00 to 46.50
Iron axles, Buffalo.....	45.00 to 47.00
Iron rails, Chicago.....	39.00 to 40.00
Iron rails, Buffalo.....	36.00 to 37.00
Iron rails, Cincinnati.....	33.00 to 33.50
Iron rails, St. Louis.....	34.00 to 35.00
Iron rails, Cleveland.....	34.00
Machine turnings, Cincinnati	17.25 to 17.75
Machine turnings, Cleve.....	18.25
Machine turnings, Buffalo...	17.00 to 17.50
Machine turnings, N. Y.....	15.50
Machine turnings, Pitts.....	19.00
Machine turnings, east. Pa..	18.50 to 19.00
Machine turnings, Birming..	16.50 to 18.00
Machine turnings, Chicago..	18.25 to 18.75
Machine shop turnings, St. L.	18.50 to 19.00
Pipes and flues, Cleveland...	24.50 to 25.50
Pipes and flues, Chicago...	26.00 to 27.00
Pipes and flues, St. Louis...	27.50 to 28.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo..	34.00
R. R. wrgt., No. 1, east. Pa.	34.00
Railroad wrgt. No. 1 Cinci..	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 1, Chgo.	34.00
Railroad wr'ght, No. 2, Chgo.	32.50 to 33.00
R. R. wrgt. No. 1, Birming.	26.00 to 27.00
No. 1 yard wrought East Pa.	34.00
No. 1 busheling wrgt., E. Pa.	32.00
Sheet wrought, Pittsburgh..	34.00
Railroad wrgt., No. 1, St. L.	34.00
Railroad wrgt. No. 2.....	33.50 to 34.00
Wrought pipe, Buffalo.....	27.00 to 28.00
Wrought pipe, eastern Pa...	31.50 to 32.50
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland....$24.00 to 25.00	
Axle turnings, Buffalo.....	24.00
Heavy axle turn'gs, E. Pa..	25.00
Heavy axle turnings, Pitts..	25.00
Shafting, New York.....	36.00
Shafting, eastern Pa.....	39.00
Steel car axles, Pittsburgh..	46.50
Steel car axles, Birmingham.	32.00 to 33.00
Steel car axles, New York..	43.00
Steel car axles, Buffalo.....	44.00 to 46.00
Steel car axles, Cleveland...	44.00
Steel car axles, eastern Pa..	46.50
Steel car axles, Chgo.....	46.50
Shafting, St. Louis.....	37.50 to 38.00
Steel car axles, St. Louis....	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts....	$29.00
Car wheels, (steel), Pitts....	34.00 to 35.00
Car wheels, eastern Pa.....	29.00
Car wheels, Buffalo.....	29.00
Car wheels, Chicago.....	29.00
Car wheels, St. Louis.....	28.50 to 29.00
Car wheels, Birmingham....	25.00 to 30.00
Car wheels, Cleveland.....	30.00
Tram car wheels, Birming...	21.00 to 25.00
Cast, No. 1 cupola east. Pa.	33.00
Cast, No. 1, Birmingham....	24.00 to 25.00
Cast No. 1, Cleveland.....	32.75
Cast No. 1, Cincinnati.....	29.00 to 29.50
Cast, 1, heavy, N. J. points.	32.25 to 32.75
Cast, 1, machy., N. J. points	32.25 to 32.75
Cast No. 1, Chicago.....	33.00 to 34.00
Cast, No. 1, Pittsburgh.....	34.00
Cast No. 1 St. Louis.....	27.50 to 28.00
Malleable, Cincinnati	30.00 to 35.00
Malleable, Cleveland	30.00 to 35.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.....	29.00
Malleable, cupola, East Pa..	35.00
Malleable railroad, Chgo.....	33.00 to 34.00
Malleable, agricultural, Chgo.	33.00 to 34.00
Malleable railroad, St. Louis	28.00 to 28.50
Malleabel agricultural, St. L.	27.25 to 27.75
Cast, No. 1, Cincinnati.....	26.00 to 26.50

MISCELLANEOUS USES

Boiler punchings, Chgo.....	36.50 to 37.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	32.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.....	44.00 to 45.00
Locomotive tires, St. Louis..	37.50 to 38.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, April 11, 1918 *No. 15*

War Steel Demand Is Tremendous

Shell Steel Requirements Partially Allotted Call For Over 4,000,000 Tons This Year —Realignment of Operations May Be Necessitated—Railroad Program Needs Are Large—Shipyard Delays Not Due to Plate Mills

WAR DEMANDS are crowding back every other consideration in iron and steel. As the government's unparalleled program of preparations advances into the production stage, the tonnage required is exceeding all previous estimates. The time seems not so far ahead when the industry virtually will have been converted into a vast unified war machine. Many mills now are able to ship nothing but Class A material and the list is growing steadily.

Shell Needs Enormous

Nothing so clearly illustrates the superlative scale to which the steel industry is being committed to war as the tremendous purchases of shell steel now being made by the government. The total requirements which the United States and its allies are calling upon the producers to supply in the current year are in excess of 4,000,000 tons of 4½ to 9½-inch rounds. Of this amount, about 1,200,000 tons for this government are undergoing allocation. The total of 4,000,000 tons represents probably one-sixth of the expected rolled output of the country from this date to Jan. 1, 1919. There is some question whether billet and bar mill capacity as at present operated will be sufficient to meet this demand. In that event, some sweeping changes in the present realignment of finishing capacity may be necessitated, thereby further dislocating established production. Another point of interest is whether present shell forging capacity is adequate to all needs. That advantage is to be taken of Canada's facilities in this regard is indicated by the award of 115,000 tons for that country, with 75,000 tons unplaced.

The steel requirements of the proposed government car purchases now may be more accurately figured. Exclusive of the castings, the 70-ton all-steel types will call for 19 tons, and the 50-ton types for 16 tons of material each. This means in the aggregate about 1,500,000 tons for the 100,000 cars to be distributed. The bids submitted by the builders are still under consideration at Washington.

Propose New Standards

The great demand for steel castings for railroad equipment and other war work has brought to a critical point the movement calling upon the government to modify its present chemical specifications and inspection methods. Manufacturers of steel castings acting concertedly have formally recommended to the government that the phosphorus and sulphur limits be raised and a uniform inspection system be adopted if production is to be increased or maintained at the required level.

If the lagging in shipbuilding has been due in any measure to the lack of steel in the yards, this is not to be charged to the mills. Statistics of the steel director show that more ship plates were rolled in the first quarter than were required by the builders. Recent shortages of plates in the shipyards are attributed to a lack of definite information as to what would be required and to transportation difficulties.

Problem of Iron Orders

The call upon the government by consumers to supply them with pig iron which they find themselves unable to buy in the open market continues to grow. The situation in this regard has reached the point where it is involving private obligations of the furnaces and this has forced consideration to be given to new methods of allocation. Heretofore orders for the government have been distributed and accepted by the furnaces largely on a loyalty basis. Since former obligations now are being displaced involving complications, it is proposed that the various government departments place in their name with the furnace forwal orders for the iron desired, which would supersede prior bookings for general consumers. An Ohio river steelmaker is seeking 15,000 to 30,000 tons of basic through government allocation. Lifting of the embargo on southern iron is not expected to release immediately the estimated 225,000 tons of sold metal piled on furnace banks there awaiting shipment, since the car supply still is inadequate.

The Iron Trade Review.

EDITORIAL

Government Co-operation is Needed

FOR many months the production of steel castings for various departments of the government has been retarded and delayed by inefficient inspection. This has involved the rejection of many tons of cast parts that would have been accepted commercially, but because they did not conform to the government specifications in some slight technicality the inspectors, lacking judgment, refused to pass them. One steel casting manufacturer has reported that an inspector sent to his plant was without knowledge of the progress that has been made in the welding of steel castings, whereby many defects are repaired, and accordingly all welded castings were condemned by this representative of the government. This critical inspection has reached a point where the construction of ordnance and parts of battleship and destroyer is being actually held up.

The Steel Founders' Society of America, representing approximately 175 steel casting plants, has addressed a communication to the various departments of the government suggesting a unification of steel casting standards and the establishment of a central inspection bureau. Today, all of the government departments have separate steel casting specifications, which differ in many important details, and separate corps of inspectors are maintained by each department. The establishment of an inspection bureau to handle all steel casting production would greatly reduce the cost of inspection, would reduce the number of inspectors employed, and would permit of securing well qualified inspectors.

A further recommendation made is for an immediate increase in the maximum limits of the sulphur and phosphorus content of steel castings. For many months the supply of low phosphorus pig iron and scrap has been inadequate to meet the needs of the open-hearth plants, yet notwithstanding the inability of steel casting producers to meet the low phosphorus limit, the government departments have refused to grant any relief. The Steel Founders' Society demands that for castings made by the open-hearth process, the phosphorus maximum be increased to 0.06 per cent from 0.05 per cent, and a similar increase in the sulphur limit also is suggested. A much greater increase in the sulphur and phosphorus limits for side-blown converter metal, however, is recommended. A sulphur maximum of 0.08 per cent is suggested, with a limit of 0.07 per cent for phosphorus.

The reason for the big increase in sulphur content is due to the inability to secure cupola metal sufficiently low in this element to charge into the converter. Coke is running high in sulphur and the absorption of this element while melting in the cupola furnace adds further to the content of the sulphur in the original charge. It also is pointed out by many steel foundrymen that sulphur is not nearly so undesirable as generally believed. Dr. Unger of the Carnegie Steel Co. has made tests of steel which proved that the physical properties of rolled products containing more than the allowable sulphur content were not impaired, and F. N. Speller of the National Tube Co. has made similar experiments on pipe and tubes with concordant results. The demand for a higher permissible sulphur content not only in steel castings, but in rolled steel products is growing more insistent and it is believed that users, including the government, no longer can turn a deaf ear to the demands of producers if they expect to obtain an adequate supply of material.

Just Appreciation of True Service

GRATIFICATION generally is expressed in the iron and steel industry that the functions and extent of the proposed hearings of the price committee of the war industries board have been elucidated and Chairman Brookings declares there is no intention of interfering with the present methods of contact between the manufacturers and the government. From remarks made at the recent Washington conference between iron and steel producers and the price committee, the impression had gone out widely that the former proposed to hold continuous sessions and consider any requests, complaints or suggestions that might be laid before it. So concisely was this belief entertained that much apprehension was aroused lest such a plan would undermine the present effective and harmonious relations between the government and the industry. The mischievous possibilities of a constant rehashing of complaints and points of dissatisfaction by individual interests before government representatives was pointed out editorially in these columns. It was urged that the government continue to recognize the wisdom of the policy of leaving largely to the industry itself the regulation and enforcement of price control.

Representatives of the committee, as stated in THE IRON TRADE REVIEW of April 4, have declared that Chairman Brookings' statement before the conference to the effect that his committee would be sitting almost continuously and would be glad at any time to take

up any question which the industry would like to have settled, has been misconstrued. It is explained that such questions are only to be considered as put up to the committee through the general steel committee of the American Iron and Steel institute, or in accordance with the method pursued in the past. It is pointed out there is no intention to usurp present functions performed by the institute committee. Such an explanation is salutary and has been needed to set the minds of the industry at ease.

The manner in which the price-fixing committee proposes to carry on its duties, as now more definitely outlined by its spokesmen, represents a tacit recognition and endorsement of the fair and honorable treatment the government is receiving from the industry through the latter's accredited representatives acting through the American Iron and Steel institute. It is well that this is so. If the war industries board ever has entertained the advisability of a policy of greater direct regulation of the industry in order to more fully exercise its inherent powers, the recent discussions even though happily based on a misapprehension will serve an instructive purpose. Iron and steel leaders in behalf of the industry cheerfully have accepted their responsibility in the present crisis and they may be expected to render the government the complete service that practical patriotism shall dictate. The results to date demonstrate there is no occasion for increased federal interference.

The Dilemma of the Dealer

REGULATION of the iron and steel industry by means of maximum prices has affected, more than any other class, the dealers and brokers throughout the country. With consumption so far in excess of production as it has been during the past year, selling competition has been wiped out. The usual methods of distribution have been reversed and it now is the consumer who seeks the favor of the producer.

The usefulness of the dealer in normal times has not been questioned. He studies the definite requirements of his customers, guarantees their credit and stands responsible for the delivery of the material, thus leaving the producer free to concentrate his energies on actual production.

In the case of pig iron, many dealers have suffered acutely of late through the refusal of some of the furnaces to pay the usual selling commissions. The latter in many cases insist upon getting the maximum price, thus giving the dealer the choice of collecting a commission from the consumer or of confining his compensation to the pleasure he derives from the transaction of business. Many of the dealers, in the lack of definite authorization to collect such a commission from consumers, have preferred to sacrifice this profit rather than charge anything higher than the government maximum figure. As long as prices remain at the maximum, they will have no opportunities for merchandizing. Another example of the dealer who has been hard hit by the lack of authorization to collect a commission for his services, is in scrap.

Under present conditions, the business of the legitimate dealer in iron and steel is left hanging in the air. Surely, in justice, he is entitled to know where he stands. If he serves a necessary and useful purpose in the current scheme of distribution, he should be given the proper credentials; if not he should be told exactly that his position is a superfluous one. It is to be hoped that the war industries board, if it reviews the claims of the scrap dealers for commissions, will make a definite ruling that will clarify the present situation.

Winning a Rightful Place

DOMESTIC makers of high speed steel have developed a product whose excellence is pronounced to be equal or superior to that imported to the United States in prewar days. Its quality has been thoroughly demonstrated and in tests made tools manufactured in this country have performed difficult cutting operations which those made from foreign steel could not accomplish. Development of this industry has been of invaluable aid in preparing the war machine and it is a source of satisfaction and pride that no longer will it be necessary to rely on foreign manufacturers for this grade of tool steel. The war has shut off much of the accustomed importations. In the meantime users are becoming acquainted with the high quality of the domestic product and those who have resorted to its use will no doubt continue to do so after the war, excepting perhaps those with whom the habit of using foreign steel, with well-established names, has become so firmly intrenched that nothing may overcome it. The American manufacturers deserve to be given preference, not only because it will give patronage to a domestic industry, but also because of the real merit of their product. The expanded tool steel industry will be vitally important in aiding this country to hold its share of trade after the war.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 954

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$275.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur.	70.00
Spiegel, contracts, furnace.	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	170.00 to 185.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1¼ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products April 10, average for March, 1918, average for January, 1918, and average for April, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices April 10, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Bessemer pig iron, Pittsburgh..	$36.15	$37.25	$37.25	$42.20
Basic pig iron, Pittsburgh.....	32.95	33.95	33.95	39.20
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	39.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	39.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	42.25
Malleable, valley	33.50	33.50	33.50	36.00
Malleable, Chicago	33.50	33.50	33.50	39.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.79
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	33.00	33.00	38.25
**No. 2X Virginia, furnace....	33.50	33.50	33.50	38.25
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	41.50
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	360.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	72.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	72.50
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	72.50
Open-hearth billets, Pitts.....	47.50	47.50	47.50	72.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.38
Steel bars, Chicago.....	2.90	2.90	2.90	3.54
Iron bars, Philadelphia.....	3.50	3.50	3.648	3.659

*5 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices April 10, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	3.50	$3.50	$3.50	$3.19
Beams, Chicago	3.00	3.00	3.00	3.79
Beams, Pittsburgh	3.00	3.00	3.00	3.70
Beams, Philadelphia	3.185	3.185	3.185	4.159
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	4.69
Tank plates, Philadelphia.....	3.435	3.435	3.435	6.909
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	5.75
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	3.75
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	3.75
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.20
Connellsville furnace coke.....	6.00	6.00	6.00	7.25
Connellsville foundry coke.....	7.00	7.00	7.00	7.87
Heavy melting steel, Pitts.....	29.00	30.00	30.00	28.12
Heavy melting steel, eastern Pa.	28.00	29.50	29.80	25.15
Heavy melting steel, Chicago..	29.00	30.00	29.70	26.63
No. 1 wrought, eastern Pa.....	34.00	35.00	35.00	38.50
No. 1 wrought, Chicago.....	34.00	35.00	35.00	33.30
Rerolling rails, Chicago.....	34.00	35.00	35.30	31.90

(For Additional Prices See Page 890)

Appeal to Government For Pig Iron

More Consumers Unable to Buy Themselves Seek Aid By Allocation—Increasing Infringement Upon Furnace Obligations Causing Complications and May Require Definite Official Orders—Inquiry Continues Large

Cleveland, April 9.—Requests from consumers for government aid in covering pig iron needs are more numerous. As a result former obligations of the furnaces are being infringed upon. Heretofore allocations have been made on a loyalty basis. It now is proposed that definite orders be issued by the government department in whose interest the iron is to be supplied. This is to avoid legal complications. An Ohio river steelmaking interest who has been seeking 15,000 to 30,000 tons of basic for second, third and fourth quarters has asked Washington authorities to get this iron for it. For a Kalamazoo, Mich., fuse manufacturer, 700 tons of No. 2 and 175 tons of 6 per cent silica are wanted for prompt shipment. The Watertown, N. Y., arsenal is inquiring for 800 tons of standard low phosphorus and 200 tons of copper-bearing iron for May-July shipment. For the Boston navy yard 150 tons of low phosphorus has been allocated. Alabama makers will supply 1000 tons of foundry to the Italian government and 2000 tons of bessemer for the same buyer is expected to be drawn from iron originally sold for export which has accumulated along the Atlantic seaboard. General inquiry remains heavy. The New York Air Brake Co. has asked for 10,000 to 20,000 tons of Nos. 1, 2 and 3 foundry for the remainder of the year. A southern Ohio steel plant still is active with a request for 10,000 to 20,000 tons of last half basic. The American Locomotive Co. has asked for 2000 tons of basic for plants in this country and at Montreal and for several thousand tons of foundry all for last half. Sales remain few as the furnaces have virtually nothing to offer. The embargo has been raised on southern iron which has been accumulating with some furnaces since November. Little relief is expected from this owing to inadequate car supply.

Last Half Tonnage Sold

Boston, April 8.—It is understood that a northern furnace has taken considerable business for last half, which presumably takes it out of the market for the balance of this year. The week locally otherwise, however, has been one of numerous inquiries, but with almost no iron available. Actual business has been small. Brokers and agents have literally been swamped with chances for business and an immense tonnage could have been turned over if nearby iron were available or the furnaces were inclined to book for last half. Present prices are to prevail only until July 1, and lacking any definite idea of what they will be after that date, makers naturally are not inclined to go freely into forward selling. The general report, however, is that deliveries are very much better than they have been. The shipments from northern furnaces are described as having been better in the past month or so than they have been before since December, while those handling Alabama irons also express complete satisfaction with the way shipments have come along recently. Deliveries, however, are entirely on government or embargo committee permits and it is noted that the Emergency Fleet corporation work is getting the call. The New Haven road has suspended the embargo against other New Eng-

land lines, which it established on March 23, but maintains the bars against freight from outside New England.

Bessemer and Foundry Sold

New York, April 8.—Activity in the pig iron market during the past week was divided largely between foundry and bessemer. The Gould Coupler Co., Depew, N. Y., bought a good-sized block of bessemer for second half, and Stanley G. Flagg & Co., Pottstown, Pa., closed for a moderate tonnage of this grade. The large tonnage of bessemer originally sold to France, but held up at Atlantic seaboards due to inability to ship, now has been entirely disposed of, it is understood. Most of this was sold some weeks ago to the American Bridge Co. and the American Steel & Wire Co. Sales of southern foundry here during the week aggregated fully 7500 tons. Of this total, 3000 to 4000 tons are for second half shipment. The remainder is for immediate shipment, in a number of cases to consumers who under ordinary circumstances never have used southern iron. One New York state melter closed for 2000 tons and a New England melter for 1000 tons. As a result of better shipments to the north late, it is understood southern furnace stocks have been considerably reduced. Government permits for shipments are required in all cases and frequently the iron is being consigned direct to the government or army or navy officers. As a result, second half sales are being made only to melters doing urgent government work. A Virginia furnace has set aside second half tonnages to a number of its regular customers, but no sales are reported. Several northern furnaces also have shown slightly more freedom in taking on second half foundry. Two furnaces sold 1200 tons each to a central Pennsylvania consumer. A number of other second half sales of northern foundry are reported, totaling several thousand tons. The Essex Foundry, Newark, N. J., has not yet closed on 4000 tons of second half foundry. The Pennsylvania railroad, it is understood, shortly will place the remaining tonnage on its second half inquiry. The American Locomotive Co. is inquiring for 1500 to 1600 tons of basic for second half for Schenectady, Dunkirk, Pittsburgh and Richmond, and also is in the market for foundry.

Sellers Few, Demand Large

Philadelphia, April 9.—A Buffalo maker who previously had booked extensively of second half foundry and malleable iron business and had added considerable tonnage to this total in this district during the week, now has withdrawn. A Virginia furnace has been active in making reservations in foundry iron for the last half of the year from its regular customers. Apart from these evidences, the market has remained restricted on the selling side with respect to standard grades of iron, although a heavy inquiry, much of which is going unsatisfied, continues to appear. The General Electric Co. has inquired for 10,000 to 11,000 tons, largely foundry iron and including 1700 tons of malleable for last quarter shipment to Lynn, Everett, Pittsfield, Schenectady and Erie. Numerous inquiries for second half foundry iron are current.

Bessemer and Basic Sold

Pittsburgh, April 9.—Sales of two lots of bessemer iron by a valley maker to a Pittsburgh district consumer have been made at the revised government price of $35.20, furnace. One transaction involves 2500 tons for April-August delivery and the other 1500 tons for April-May shipment. This iron is to go into the manufacture of government requirements and the sales do not denote a loosening of the market. The shortage of steelmaking grades, especially basic, still remains acute. One of the consumers buying the bessemer iron has also closed for 3000 tons of southern basic for prompt shipment. Delivery of this basic is dependent on several contingencies, such as the securing of cars and the making of shipment at a specified time, and it is not certain that these conditions can be met. The buyer is in pressing need of the tonnages. The general committee of the American Iron and Steel institute will meet in New York on Thursday, when it probably will pass on the disputed point as to what is the base price of iron. Differences of opinion exist on this subject, but it is thought to be highly probable that the committee considers $33, furnace, is the base level which was originally fixed. No single grade or grades of iron, it is maintained, represent the base, although as it happens the price of No. 2 foundry was left unchanged at $33. With the question settled in this manner, it would be made clear that the only grades affected by price changes for the second quarter are bessemer and basic. The differentials on the silveries and the lower grades of ferrosilicon continuing as heretofore with $33 as the base. Scattering inquiries are being made for foundry grades. Makers are unable to take additional business and some are oversold for both the first and last halves. Operations of furnaces are further improved. The Carnegie Steel Co. has added two furnaces to its active list and now has 48 of 59 making iron. Consumers in increasing numbers who are engaged on government orders are appealing to Washington authorities to see that they are supplied with iron.

Production is Pushed

Buffalo, April 8.—Operating conditions have improved slightly here, and makers are concentrating on the production end. Coke supplies are a little better and there is a slightly better car movement. Selling has almost entirely subsided. One maker has disposed of a considerable fixed tonnage for last half to regular customers. Most Buffalo furnaces are declining to assume contracts, though the inquiry is strong as ever. In most cases inquirers are not specifying given amounts but are asking for iron in any quantity. From present indications, it would appear that local furnaces would be able to do very little in the near future to counteract the famine of iron. At present it looks as if they would be out of the market indefinitely. One maker here states that he could sell 100,000 tons immediately if the iron was available. Two furnaces of one interest now going on hot metal will be turned into foundry the end of this month. This will give this interest four furnaces on foundry at that time. All shipments east are being shut down by embargoes except material for government use.

Chicago Inquiry Less

Chicago, April 9.—With all producers in the Chicago district entirely sold for 1918 production, inquiry has lessened as melters have discovered their inability to obtain further tonnage from this source. Some increased tendency on the part of southern producers to take on last half tonnage has relieved the situation here and there, as local consumers have found it possible to place some business in the south. While southern sellers are not selling freely such tonnage as they now are offering is very welcome since it is badly needed by melters here. The leading producer in this district has taken into account in selling last half production, the probability of a tonnage now going to steel producers being released for other use, when a blast furnace now under construction is completed and put in blast. Every effort is being made by pig iron producers to make shipments in a way to serve melters to the best advantage and where a

foundry needs less than it had estimated, shipments are being reduced to the advantage of other users whose needs are greater than had been expected. This is having the effect of equalizing supply with demand and saving possible shutdowns for lack of material.

Basic Famine in Evidence

Cincinnati, April 8.—Evidence of the scarcity of basic iron continues to be shown by the attempts of users of this grade to cover for their future requirements. A recent reported purchase of 6000 tons of southern basic by a steelmaker in this territory only partly satisfied the wants of the company in question. A southern Ohio consumer still is figuring on 10,000 tons for forward delivery. Basic has become so scarce that a future supply is a matter of deep concern with melters who have not provided for the entire year. It is rumored that a few basic makers are holding back on last half business so as to take care of their regular customers, but this does not seem to be borne out by reports from sellers that are undoubtedly reliable. Some southern off-grade foundry iron has been sold for the second quarter.

Inquiry Piles Up Heavily

St. Louis, April 8.—In the aggregate the inquiry for pig iron at this center continues enormous. During the past week quite a formidable addition to the outstanding demand developed, and so far as could be gathered tonnages allotted on old or new inquiries were insignificant. While the shortage is acute, especially with smaller interests, it must be said that in the case of the more important users apprehension is more psychological than actual, as all are covered for some months to come. The scramble to secure iron, however, is general.

Not Selling Freely

Birmingham, Ala., April 9.—Southern manufacturers of pig iron continue to hold off from the market and are not selling freely. Reiteration is to be heard that there is very little iron to be offered for the second quarter and that there is no reason for rushing last half business. A few sales are being made and regular customers are being given preference. Numerous inquiries are indicative of an open need for a large tonnage of iron. Expectations are entertained for some relief this week from the car shortage which recently caused an accumulation of iron on yards in this territory. It is estimated that upwards of 225,000 tons of iron are piled in this district.

Coke Car Supply Improves

Monongahela Road Shows 100 Per Cent Service, First in Nine Months—Washington Conference to Consider Distribution

Pittsburgh, April 9.—Marked improvement in the car supply in the Connellsville region has developed this week. On the Monongahela yesterday and today there was a 100 per cent supply for the first time in approximately nine months. For the entire region yesterday the average supply was 85 per cent. The average on the Monongahela last week was only 53 per cent. It is believed that the supply will continue at a good rate from now on. At different times recently good supplies were available, but after the cars were loaded and shipments made, difficulty was experienced in having the empties returned so that a low supply followed a satisfactory one, but it is hoped that this reaction will not recur. Most furnaces appear to be well supplied with fuel at present. No new contracts for either furnace or foundry coke are being made. Some operators are considering the idea of not making contracts after those now existing expire. It is pointed out that there is no real reason why they should, inasmuch as prices have been fixed and there is no advantage to the seller in making contracts. At the same time, operators say conditions as to shipments, government demands, etc., are so uncertain under prevailing conditions that they are not sure that they would be able to fulfill commitments. It is the idea of these operators that the most desirable way is to take care of their regular customers first as fully as possible and to supply new ones when they can Production during the week ended March 30 totaled 352,435 tons, as compared with 339,580 during the preceding week, according to *The Connellsville Courier.*

Will Consider Distribution

Cleveland, April 9.—Representatives of coke interests in this territory will attend a meeting at Washington, Thursday, called by Coke Administrator Blauvelt, to consider matters in connection with coke distribution to northern Ohio consumers. As noted last week, the local by-product plant of the McKinney Steel Co. is to be called upon the furnish foundry consumers in this territory from the surplus of its by-product coke over its own needs. This latter is estimated at 600 to 800 tons daily. Much of this coke now is going to the local furnaces of the American Steel & Wire Co., but it will be freed for open consumption when the by-product coke plant of the latter company in this city is completed by the mid-year.

Shipments More Active

Cincinnati, April 8.—In some fields reports are to the effect that laborers are working only about half time. Present wages enable them to loaf two or three days a week, should they desire to do so. Fortunately this condition does not exist throughout the coke producing districts, but it is one serious enough to invite the attention of furnaces whose output is dependent on a sufficient coke supply. It is generally understood that Pocahontas and Wise county furnace and foundry cokes are based on $8 per net ton at ovens. The supply from these districts is behind scheduled shipments but the fuel is moving much more promptly than at any time for the past six months.

Shipments are Maintained

St. Louis, April 6.—Receipts on coke contracts here during the past week were on a parity with the week before when about 70 per cent of normal was the estimated average. Efforts on the part of dealers to get tonnages through to customers in the west and southwest are meeting with a shade better success. Production of by-product coke in this district is on a large scale, and the leading ovens are doing much to help out the stringent situation. Coal has been moving across the Mississippi in large quantities, relatively, thus permitting of intensive coking operations and prompt deliveries. Fair tonnages have been quietly sold outside the district. Leading dealers report that ovens in the Connellsville district are offering nothing and spot foundry coke is out of the question. Southern producers are entirely out of the market.

Production is Improving

Birmingham, Ala., April 9.—Continued improvement in production of both coal and coke are noted in the Birmingham district. There is still need for more coke and also coal. The announcement the past week that the Tennessee Coal, Iron & Railroad Co. would begin immediately the construction of 154 Koppers by-product coke ovens was favorably received.

Commission Ruling Nears

Petitions From Consumers About to be Laid By Institute Before Price Board—Contract Revision Being Combated

FOR COMPLETE SCRAP PRICES SEE PAGE 954

Philadelphia, April 9.—About 100 petitions signed by consumers and asking that a commission be granted to dealers have been received by the American Board of Scrap Iron Dealers. It is expected these will be submitted shortly to the price fixing committee of the war industries board by representatives of the general steel committee of the American Iron and Steel institute, of the subcommittee on scrap and of the board of dealers. The American Board of Scrap Iron Dealers has taken exception to the ruling of the general institute committee regarding the revision of unfilled contracts April 1 where deliveries were prevented by causes beyond the control of the sellers. The dealers construe this interpretation is not in accord with the President's price announcement. Appeal along this line is to be made by the dealers to the price fixing committee. It is understood that the general institute committee already has outlined these protests to the price fixing committee. The Alan Wood Iron & Steel Co. has purchased 10,000 to 12,000 tons of heavy melting steel at $29 delivered with the understanding that the commission will be paid if allowed. Otherwise the market is quiet. All grades are plentiful except railroad and yard wrought and shafting. Shipping conditions are improving. The embargo against the Lukens Iron & Steel Co. has been lifted.

Local Movement Satisfactory

Boston, April 8.—A fairly good demand is reported for scrap and while shipments to distant consuming points are still very much hampered by the railroad embargoes, there is a fairly satisfactory local movement and in the lack of big supplies the market is quite firm. Cast scrap does not appear to be in very big demand, except from local users. Wholesale dealers' paying prices per gross ton, f.o.b. cars, shipping points, follow: Wrought No. 1 yard long, $29 to $29.50; horseshoes, $29 to $29.50; cotton ties, $21 to $22; stove plate, $19 to $19.50; No. 1 machinery, $31 to $32; No. 2 machinery, $27 to $28; car axles, iron, $42 to $43; steel, $42 to $43; rerolling rails, $30 to $31; iron boiler plate, $33 to $34; bundled barrel hoops, $16.50 to $17.50; wrought iron pipe, new specifications, $28 to $29; steel rails, $25.50; No. 1 railroad steel, $25.50; heavy melting steel, $24.50 to $25; axle turnings, $20 to $21; machine shop turnings, $14 to $15; cast borings, $15 to $16; drop forge trimmings, $22 to $23; cast iron car wheels, whole, $27; broken, $31.

No Advice on Commissions

Pittsburgh, April 9.—No ruling that dealers and brokers in scrap cannot be allowed a commission on sales to consumers has come officially to the notice of the trade here. Sellers say that in any event they will continue to press their argument before the war industries board for a commission supported by petitions signed by users. Some of them assert the denial of the commission virtually will force them out of business. The decision of the institute committee that consumers may pay the maximum prices plus the freight differentials between their plants and the nearest competitive buying points is welcome news. This would meet fully the contention that has been made by Pittsburgh dealers and users ever since scrap prices were regulated by the government. Since the Pittsburgh district consumes more scrap than it produces, it has to rely on outside sources for part of its tonnage, but with prices fixed uniformly on the delivered basis the tendency is for material to move to the nearest point of consumption because of the lower freight rates. Since freight differentials may be paid, Pittsburgh consumers will be able to get increased supplies by paying the higher charges. Supplies of consumers are running low. Material for operations has been secured largely by means of direct buying between consumers and producers and through shipments on old contracts. Malleable and No. 1 scrap are weak at and appear quotable at $32 and $33. It is doubtful if heavy melting steel can be bought for less than the new maximum of $29. The proposed readjustment in classification may involve slight reductions in malleable and No. 1 cast according to reports received here.

Trading is Confused

New York, April 8.—The announcement that scrap consumers unfavorably located can pay in excess of the government maximum an amount equivalent to their freight rate disadvantages is receiving wide attention here. This ruling will afford particular relief to the consumers in the Pittsburgh district who have found it difficult to obtain material from the eastern producing centers, as dealers found it to their advantage to sell nearby. Trading has been somewhat retarded during the past few days due to the confusion among buyers and sellers over the question of commissions. Last Friday it was announced that the 3½ per cent commission would not be allowed dealers and brokers. Later it was rumored that the decision of the scrap committee in this regard had been changed. It now appears, however, that the original ruling holds. As a result, scrap dealers now are petitioning the war industries board. With the exception of cast scrap and stove plate, the market is quiet. Prices are unchanged.

Melting Steel is Short

Buffalo, April 9.—A pronounced shortage of heavy melting steel remains and this has led to the use by consumers of bundled sheet scrap instead. The consequence has been an increase from $21 and $23 to $24 and $25 in the price of bundled sheets. The shortage may be still more pronounced in the near future because of the ruling which allows Pittsburgh and consuming centers to pay the regular price plus a differential by obtaining a permit from the chairman of the subcommittee on iron and steel scrap of the American Iron and Steel institute. The probability is that this will result in some of the scrap from sections tributary to the Buffalo district, going to Pittsburgh instead of its natural destination. Little scrap, it is predicted will leave Buffalo district proper, though. The demand is good for stove plate and the price has gone from $24 to $25 and $26. Car wheels are scarce. Consumers say it is impossible to buy at the government price of $29. The cost of breaking amounts to from 60 to 75 cents a ton and broken car wheels under the classification of cast scrap command a $34 price. The car supply has improved.

Dealers Are Bewildered

Cleveland, April 9.—Uncertainty marks the scrap iron and steel business in this district. Dealers regard unfavorably the statement of the American Iron and Steel institute that the $1 reduction applies to unfilled contracts as well as second quarter business. They point out that widespread disturbance may follow such an abrogation of contract prices. Speculation is less rife concerning the 3½ per cent commission, dealers having heard so

many false reports they are only willing to accept a formal and final decision. Little attention is paid the extra charge that may be paid for scrap on account of freight inasmuch as this has little effect in this territory. Stove plate has become a drug on dealers' hands here, and the price is lower. No. 1 cast, cupola size, is less firm. A New York Central scrap list, the first in several months, closes April 10. Considerable interest is manifested in the meeting here April 15 of the central division of the American Board of Scrap Iron Dealers at Hotel Statler. C. A. Barnes, Philadelphia, and Daniel Cohen, Chicago, are expected to speak.

Chicago Market Disturbed

Chicago, April 9.—Recent developments in the scrap iron and steel market, notably the refusal of a commission or compensation for the dealers' services, have unsettled the scrap market considerably. Trading is only moderate and most consumers are not actively seeking further supply. Somewhat more tonnage is coming out than has been the rule, holders of scrap apparently feeling that prices will not be higher and that they might as well unload. The effect of this has been to increase offerings somewhat and prices are a trifle weaker on a number of grades. Apparently railroads have not been holding back their scrap as offerings from this source are not materially increased. The Santa Fe is offering 2300 tons, and the Union Pacific 1600 tons. Acute shortage of steel rails for rerolling continues to be met.

Dissatisfied With Rulings

Cincinnati, April 8.—Dealers are up in the air owing to various rulings by the general committee of the American Iron and Steel institute which have unfavorably affected them. The partial solution of the commission matter has been succeeded by another question that involves the allowance of freight differentials.

Users Favor Commissions

St. Louis, April 8.—Both dealers and consumers have rapidly adjusted themselves to the $1 price cut and the effect on this market has been slight. The main topic among consumers and dealers is commissions.

Watching Future Prospects

Birmingham, Ala., April 9.—The scrap market in the south is doing nothing more than holding its own; in fact there is a belief it is a little weaker. It is true however the government maximum price on various grades never has been reached. The home demand is awaiting the future.

Shell Demand Tremendous

Government Allots 1,200,000 Tons of Steel—Canada Gets 115,000 Tons—Total Needs for 1918 Over 4,000,000 Tons

New York, April 10.—Orders for tremendous quantities of shell steel aggregating approximately 4,030,000 tons in billets and rounds are being whipped into shape by the United States munitions department for distribution among the various mills. This tonnage includes Italian, French, Canadian and British allotments and is to be rolled between now and Dec. 31, 1918. It is to be used for the production of 4.7, 6, 8 and 9.5-inch and 155-millimeter shells. About 1,200,000 tons now are being allocated among various mills by the government for its own use. It is estimated the government will also allot 1,300,000 tons later. In addition, 115,000 tons of billets which already has been placed, partially with mills in the Pittsburgh and nearby districts, will be shipped to Canada to be forged.

The French requirements this year are placed at 650,000 tons; the Canadian, in addition to the 115,000 tons, placed at 75,000 tons; the Italian, at 40,000 tons; and the British, at 350,-tons. In addition to the latter quantity, the British have 300,000 tons now under allocation. Mills working on shell-steel contracts have been told to speed up production and if necessary to convert every pound of open-hearth material into shell steel. This may cause some realignment of present finishing operations in order to meet the schedule of shell steel deliveries. The question has been raised whether there is sufficient forging capacity in the country to take care of this tonnage of steel for shells.

An interesting point in connection with the abrogation of shell steel prices has been made recently. One ally, through the British, ordered from a mill near the Pittsburgh district approximately 1000 tons of 5-inch shell rounds. The order was placed previous to the fixing of prices by the government. Following the recent price adjustment, the buyer requested the company to cancel the tonnage on account of the contract price being higher than the present fixed level. This the company refused to do and took the matter up with officials at Washington. The outcome of the matter was that the contract price has been held valid.

Discards are Offered

Philadelphia, April 9.—The only semifinished material offered plenti- develop soon inasmuch as supplies fully at present is shell steel discards. A Buffalo mill has been offering large tonnages. A middle western producer who has been in a position to market a round tonnage of forging billets is understood to have sold this material. Other sales of semifinished principally are in small lots of rerolling billets. One eastern consumer wants 5000 tons of billet blooms.

Unable to Get Steel

Pittsburgh, April 9.—Enormous requirements for shell steel for this government and the allies for the last half of the current year are involved in the program which is said to have been worked out by the government. The total quantity included in this program calls for not less than 4,000,-000 tons of shell steel, and it is believed that distribution about to be made will represent between 2,500,000 and 3,000,000 tons. It is reported that the distribution of this tonnage for this government and the allies has been partly determined upon and that for Great Britain will be forged in Canada. The actual production of the steel itself does not appear to be as great a problem as that of finding the necessary forging capacity in this country. Pressing inquiries continue to come to makers and sellers of sheet bars, but are not so numerous as they have been, simply for the reason that consumers realize that it is impossible to cover requirements. No offerings are being made and sales are extremely limited. The output has increased and some makers are hoping that toward the end of the present month they will be able to take new business. Manufacturers of sheets and tin plate are suffering considerably from a shortage of sheet bars. Inquiry for billets is active but not so much so as it is in the case of sheet bars. No billet tonnages appear to be available. A platemaker in this district has taken 6000 tons of slabs from a broker.

Strip Market Quiet

Pittsburgh, April 9.—Quietness continues to characterize the market for cold rolled strip steel. Demand by the automobile trade is expected to on hand are understood to be almost depleted. Stocks which have been piled by manufacturers have been reduced somewhat owing to the improvement in the supply of cars.

Large Rounds Selling High

Transactions in East Closed at 4.00c to 6.50c, Mill or Well Above Fixed Prices—War Bar Demand Large

Philadelphia, April 9.—The most noteworthy feature of the bar market in this district is the selling of large rounds ranging from 4 to 7 inches above the government price. One mill has been disposing of this material at 3.50c, mill, which is the fixed government price for 5 to 7-inch sizes, but most sellers hold for a minimum of 4c and as high as 6.50c is being done. Forged or pressed rounds up to 12 inches in diameter are bringing as high as 8.50c. On smaller than 4-inch sizes the government bar price of 2.90c is being observed. The Donner Steel Co. continues to sell in the open market steel bars up to 1⅞ x 6 inches.

War Demand Heavy

Chicago, April 9.—Western mills continue to receive heavy allocations of steel bars, both hard and soft, for reinforced concrete work, for shell rounds and for shipbuilding. While the tonnage of bars is not as heavy as of plates and shapes, it presents a total as large as mills can accommodate and seems likely to grow larger as time passes. With the govment in control of railroad buying, comparatively little domestic demand remains outside government requirements and practically all consumers are using the material for war purposes. Bar iron mills continue to take contracts for immediate shipment at about the same rate as their production and practically all business is filed with specifications accompanying orders. Demand for hard steel bars is heavy and rerolling mills producing this material from old rails find they cannot take on all the business which offers. Some offset to this condition results from the ability of several steel mills to produce considerable tonnage from bloom and billet discards and also from "secondary discards" which are required in the making of shell rounds. This steel is of proper analysis for hard bars and is of high quality although rejected for shell-making purposes.

Mill Operations Increase

Pittsburgh, April 9.—Operations of mills making soft steel bars have increased considerably and shipments have improved. Makers are not taking much new business, however, but expect to be able to do so soon. They will be called upon to take a large tonnage in connection with the car-building program and the implement trade is beginning to show increased interest in the market.

Inquiry Holds Good

Buffalo, April 8.—There is good inquiry for bars before mills of this district. One inquiry is for 1000 tons. Growing scarcity of cold rolled steel over 2 inches is noted. Some users are utilizing forgings by turning them down to suit their purposes. Large rounds are hard to get as the government is taking almost all the mills produce.

Big Bolt Inquiry Reappears

Cleveland, April 10.—Revised specifications having been issued, the govcrnment again is receiving bids upon the lot of 100,000,000 bolts for the quartermaster's department. This inquiry originally came up several weeks ago and was withdrawn.

May Enlarge Bolt Inquiry

Chicago, April 9.—A recent inquiry from the government for more than 10,000,000 bolts and nuts, which was being figured on a week ago, has been withdrawn temporarily with the suggestions that it will be reinstated later after considerable additions have been made to meet a wider program. It has been rumored that this list and others which may accompany it when it is revived may total close to 100,000,000 bolts. No other large business has been current recently.

Recommend No Price Change

Pittsburgh, April 9.—At a conference held last Wednesday in New York by manufacturers of nuts, bolts and rivets, it was concluded that no change should be made in the prices on their products and recommendation to this effect has been submitted to the committee on steel and steel products of the American Iron and Steel institute accompanied by cost sheets to support the contention of producers. It was claimed that if any change were to be made it should be upward instead of downward, the price of 2.90c, Pittsburgh, on steel bars affording only a moderate profit for makers of nuts, bolts and rivets, it was maintained. Operations of producers are estimated at about 80 per cent of capacity, having been increased as a result of the improved supply of cars and of steel. A great portion of orders on hand are for the government either directly or indirectly. Shipments on regular commercial requirements are being given in from 30 to 60 days, while on special business they are deferred from 90 to 120 days.

Fair Demand for Hoops

Pittsburgh, April 9.—Fair demand exists for hoop steel and comes from miscellaneous interests, particularly makers of oil barrels. The market for bands is dull and manufacturers are not soliciting business and consider the price of 2.90c unattractive. Producers of strip steel, hoop steel and bands continue to await the announcement by the committee on steel and steel products of the American Iron and Steel institute regarding the adoption of a single base price and differentials to cover all these products.

Fair Demand for Shafting

Pittsburgh, April 9.—Demand for cold rolled shafting is fairly active, considerable portion of which comes either directly or indirectly from the government. Less inquiry exists for smaller sizes, shipments on which are made in 60 days. Larger sizes are being used for the production of munitions. Shipments on commercial requirements are deferred from three to four months. The machinery trade is buying fair-sized lots but purchases by the screw stock trade are light.

Car Orders

By the Government Still Awaited—Builders in Washington

New York, April 9.—Car builders are in Washington, discussing the allotment of the large government order for freight equipment. Everything else in the equipment market hinges upon the decision about to be made in connection with this project. The American Locomotive Co. has received an order from the Central Railway of Brazil for six locomotives.

No New Rail Bids

Pittsburgh, April 9.—Makers of standard steel rails are committed on contracts for the remainder of the current year and are not quoting on 1919 requirements. Producers here say they have no knowledge as to the requirements that will be necessary in connection with the government's railroad building program, nor do they know what the government proposes to do in the way of fixing prices on rails. It is assumed, however, that levels will be established and that tonnages will be allocated among various mills. Demand for light rails is only moderate and shipments can be

made promptly. Some makers have piled stocks of sections from 25 to 45 pounds. Producers of small spikes in this district are heavily committed on contracts and have withdrawn from the market. Deliveries are deferred from four to five months. Numerous small lots of standard spikes are being sold and shipments now are promised in from four to eight weeks by some producers.

Await Government Order

Chicago, April 9.—Builders of railroad cars and mills furnishing the steel necessary for their construction are awaiting distribution of the government order which has been pending for some weeks. It is understood bids have been asked on 100,000 cars of various types, which are expected to require 1,250,000 tons of steel for their construction. No other car inquiry is current.

Only small lots of standard steel rails are being sold, but light rails are being contracted at about the same rate as production. These are required for mining and lumbering operations and for export.

Allot Wire

For Italy to Different Makers—Navy Nails Still Open

Pittsburgh, April 9.—The government has allocated the 60,000 tons of barbed wire wanted for shipment to Italy, the distribution having been made among three or four producers, it is reported. Shipments are to be made at the rate of 10,000 tons a month so that delivery will be completed within six months. So far as known, awards have not been made by the bureau of supplies and accounts, navy department, for the 40,000 kegs of nails for which it opened bids last Tuesday. Bids were submitted on a delivered basis to navy yards. The recommended level of $3.50 per 100 pounds, Pittsburgh, is said to have been named by manufacturers plus the freight rates to the yards and the freight war tax. It is reported that a valley producer will get considerable portion of the tonnage. Some makers are entirely out of the domestic market, and report that specifications are coming in in greater volume. Others are entertaining inquiries which come from regular customers exclusivcly and are able to take only part of their requirements. Nails and plain wire are in active demand.

The Victoria stack of the Southeastern Iron Corp., Goshen, Va., was blown out on April 1.

Speed Plates to Britain

Orders Placed by Government for Ally Are to Supersede All Others—Big Lake Vessel Order Expected

Philadelphia, April 9.—Orders for ship plates for England which recently have been distributed among practically all eastern mills, have been ordered by the government to supersede all other bookings. The total amount of this tonnage, while not given, is known to represent a large figure. The government apparently is very anxious that there be no delays in the filling of this order and the mills have been given to understand that urgent delivery is desired. The Emergency Fleet corporation has placed considerable additional tonnage of ship steel among eastern producers. The Reading railroad has been the purchaser of several thousand tons of plates. The general demand for plates remains very large but eastern mills are turning practically all of this away as they are unable to book any tonnage without a priority order.

Expects Big Ship Order

Cleveland, April 9.—While no formal orders as yet have been placed, it is understood that the American Shipbuilding Co. will receive contracts for probably from 80 to 100 vessels from the Emergency Fleet corporation for 1919 delivery. These contracts will keep the company's capacity fully engaged after the present orders are completed. This lake builder has speeded up its operations so that it now is turning out a completed vessel on an average of every 3 days and 5 hours. Local plate mills continue to operate on practically nothing but Class A orders. It is difficult to get steel for other than war purposes.

Demand Exceeds Production

Chicago, April 9.—Government orders for steel plates, principally for shipbuilding purposes, continue to be allotted to mills in this district in large quantity. Plates are sought for in excess of other finished steel products and the tonnage now being placed is much above productive ability of mills. These plates are mostly for shipbuilding. Some are being shipped to bridge shops and others to shipbuilders who do their own fabricating. One tonnage of 18,000 tons was placed in this district late last week.

Wait for Car Orders

Pittsburgh, April 19.—Car builders in this district are hoping that the government soon will have distributed all the cars it is understood it will order in connection with the first allotment that is to be bought. The heavy plate tonnage required for these cars will further tax mills which have been urged to hasten production and shipments. All of the larger mills are heavily committed and are making no offering to private consumers. Some of the smaller makers are well caught up on contracts and unless orders are forthcoming soon, probably will be actively soliciting business. The Pressed Steel Car Co. has taken 100 car bodies for the Newburgh & South Shore railroad.

Reduced Output

Caused in Tin Plate by Steel Shortage—Shipments Good

Pittsburgh, April 9.—Operations of tin plate mills were reduced last week owing to a shortage of sheet bars, a sizable tonnage of which was diverted at the request of the government. Shipments of tin plate were made at a good rate but at the cost of output, employes having been taken temporarily from tin mills and the pickling department to supplant those who had not returned after the Easter holiday. One large producer is suffering considerably from a shortage of cars and has been compelled to operate at a low rate. It still is necessary to get permits to make shipments to the east where embargoes are in effect, including the large plant of the Continental Can Co., at Syracuse, N. Y.

Freight Embargo Hampers

Boston, April 8.—Conditions with local jobbers in steel and iron products are much as they have been for some little time past. Demand from concerns directly or indirectly engaged on government work is good, but demand for goods for domestic use continues very slow. Deliveries from the mills are reported better, thanks to favorable weather conditions and improvement in the railroad situation. The movement, however, is not entirely normal and probably won't be until the New Haven takes off its present embargo on outside freight.

A voluntary increase in wages averaging 25 cents per day as of April 1, has been granted its 100 employes by the Empire Knife Co., Winsted, Conn.

More Ship Steel Wanted

Eastern Yard About to Place Large Additional Fabricated Tonnage—Seek Huge Number of Angles for Wire Posts

New York, April 8.—It is understood that the American International Shipbuilding Corp., Philadelphia, is preparing to take bids shortly on the fabricated steel for 16 additional steel vessels. One of the features of the structural demand here is the predominance of railroad new construction requirements. The Pennsylvania railroad is inquiring for four small bridges and five signal bridges, involving 300 to 400 tons of steel. The Delaware, Lackawanna & Western railroad has inquired for about 900 tons for a breaker. The Central Railroad of New Jersey awarded 250 tons to the Phoenix Iron Co. for a power house at Jersey City, and there have been smaller orders. Progress continues to be made on the war department's plans for establishing large storage warehouses at various eastern ports. The department will take over waterfront at Bay Ridge, Brooklyn, for a $25,000,000 warehouse, but details of building plans have not been announced. Demand for plain shapes is exceedingly slow and is almost entirely in small tonnages from stock for warehouses and fabricators. Export demand, which has been quite plentiful, has fallen off almost entirely, due probably to inability of the buyers to obtain export licenses.

Heavy Tonnages Being Placed

Pittsburgh, April 9.—Fabricators report that heavy tonnages for various kinds of construction are being placed by the government. It is understood that fabricators who have been awarded with contracts for hangars for France, and who are in the market for turnbuckles, have covered their requirements. One fabricator in this district who was in the market for 2,500,000 turnbuckles is said to have secured them. Makers of steel are being pressed harder for shipments to fabricators in order to hasten the shipbuilding program. The fabricated material will be moving to shipyards soon, and there is a question in the minds of some as to whether or not the shipbuilders can handle it as fast as it arrives. The car-building program will require an extremely large tonnage of shapes, but the exact amount has not been made known.

Many Wire Posts Needed

Cleveland, April 9.—War contracts are calling for miscellaneous lots of structural material, some of them of tonnage size, for a wide variety of purposes. An interesting inquiry current in this district this week calls for 500,000 1¾-inch angles in lengths of 3 and 6 feet representing about 3800 tons for use as posts in connection with barbed wire entanglements for the army. Another inquiry calls for material for 3000 gun carriages which are to be supplied by an automobile builder in northern Ohio. The shapes and plates for 30 gun foundations also are called for. The demand for material for tractors is brisk and some good-sized orders for large angles and channels were placed with Pittsburgh mills during the week. The McMyler-Interstate Co. is in the market for the steel covering a government order for 28 locomotive cranes.

Ships Take Most

Chicago, April 9.—Although demand for structural shapes for building purposes is at a minimum, shape mills are receiving sufficient tonnage to cover their production and in some cases it is in excess of their capacity. Most of this material goes to shipbuilders, although some is being used for government construction and an occasional tonnage is taken for railroad or mining needs. The only tonnage placed in the west recently involves 455 tons for bridges in Idaho, which will be fabricated by the Illinois Steel Bridge Co.

CONTRACTS AWARDED

Power house for Jersey Central railroad, at Jersey City, 250 tons, to Phoenix Iron Co.

Substation for Jersey Central railroad at Jersey City, 100 tons, to Eastern Steel Co.

Five 200-foot spans for the state of Idaho, at Clark's Fork, Idaho, 455 tons, to Illinois Steel Bridge Co., Jacksonville, Ill.

Large tonnage for DuPont powder plant at Nashville awarded to Belmont Iron Works.

Grain tanks for Sperry Flour Mills, Tacoma, Wash., 500 tons, Palmer & Peterson, 681 Market street, San Francisco, awarded general contract.

Elevator and warehouse for the L. Teweles Seed Co., Milwaukee, 810 tons reinforcing bars and other steel to the Interstate Iron & Steel Co. Fraser Co., Milwaukee, supervising engineers.

CONTRACTS PENDING

Bridges and miscellaneous requirements of Chesapeake & Ohio railroad, 1400 tons, bids being taken.

Central power station for government at Washington, 700 tons, revised bids being taken.

Warehouse for the war department at Bay Ridge, Brooklyn, to cost $25,000,000; tonnage indefinite. Government is taking over land.

Bridges for Pennsylvania railroad, about 300 to 400 tons, bids being taken.

Government building at Washington, 1400 tons. A. E. Norton & Co. low bidders.

Active Demand

In Ferro and Spiegel—Higher Sales Made Accept New Standards

Pittsburgh, April 9.—Numerous inquiries for sizable tonnages of spiegeleisen have come to producers and sellers in this district. Some consumers are still asking for the 20 per cent grade, tonnages of which are extremely scarce and quotations now are being made strictly on the basis of the new 16 to 18 per cent standard, which is quoted at $70, furnace, either for second quarter or last half. One inquiry for 18 or 22 per cent spiegeleisen calls for 900 tons for third quarter, another for 500 tons for second quarter, while a third is for 500 to 1000 tons for second half. Spiegeleisen above 18 per cent is quoted at $3.50 per unit, making the price of 20 per cent $77, furnace. The market for ferromanganese is only moderately active. One consumer is seeking 1000 tons of 40 to 50 per cent for last half which is quoted at $3.50 to $4 per unit, delivered. Under the new standard 70 per cent ferromanganese is quoted at $250 with a price of $4 per unit over that amount, making 80 per cent quotable at $290, delivered, for prompt shipment. Consumers are apparently well covered for the first half. Fair inquiry exists for 50 per cent ferrosilicon, of which there also is scarcity. This grade for second quarter shipment is quoted at $170, and for last half from $155 to $160, delivered.

Accept Changed Standards

New York, April 8.—The proposal to reduce the number of units of manganese in standard ferromanganese and spiegeleisen to 70 and 16, respectively, will be accepted without protest by the greater portion of the trade. Present indications are that the change in the standards is recognized as necessary in order to permit more extensive use of domestic ore and a consequent saving of vessel tonnage to bring in foreign manganese ore. Expectations are that a few consumers will claim 80 per cent ferromanganese is required in their practice. Producers, however, will ask a premium for all units in excess of 70 per cent and 16 per cent, respectively. The current belief is that this premium will range from $3.50 to $4 per unit. From the seller's standpoint, the market has been adjusted to the new standards. Standard 70 per cent ferromanganese now is quoted at $250, delivered, and 16 per cent

spiegeleisen at $70, furnace. These quotations apply to all deliveries.

Numerous inquiries for spiegeleisen are out, the largest involving 1000 tons for second half. The Whittaker-Glessner Co. have bought 500 tons for May-July shipment which was purchased before the raise in price. Before the application of the $250 price to 70 per cent ferromanganese a large amount of tonnage was booked for delivery throughout the year. This included forward requirements of the McKinney Steel Co., the Pittsburgh Steel Co. and others, who bought 80 per cent metal at $250. Negotiations now are on for a comparatively large tonnage of English 78 to 80 per cent ferromanganese for second half. The prospective buyers have offered to pay higher than the prices at which this metal previously had been sold during the past few weeks. The Andrews Steel Co., Newport, Ky., is reported finally to have closed for its 50 per cent ferrosilicon requirements over the second half at $155, delivered. Numerous inquiries are out for this metal for nearby delivery. The market on second quarter is quoted at $170 to $180, delivered. It is understood that the proposal to fix the price of 50 per cent ferrosilicon has been dropped.

Sell at Higher Price

Cleveland, April 9.—Sales of 78 per cent ferromanganese for shipment by July has been made in this district at $282 delivered. This is on the basis of $250, delivered, for 70 per cent, with $4 for each extra unit. It represents a recent advance of $32 for this grade. Recent sales of all grades of various positions in this territory total 2000 to 3000 tons. Spiegeleisen inquiry also has been brisk, totaling several thousand tons and there have been several sales. Prices are at $80, furnace, for 19 to 21 per cent.

New Basis in Effect

Chicago, April 9.—A virtual increase of $40 per ton for ferromanganese has resulted from the change in basis from 80 to 70 per cent with an additional charge of $4 per unit for manganese over 70 per cent. The prevailing quotation on 70 per cent manganese is $250 per ton at the furnace, with $4 per unit of manganese for higher analysis. The base price is the same as prevailed on the basis of 80 per cent manganese. Inquiry continues excellent and the local maker, having disposed of the greater portion of its 1918 production, seems likely to be sold out in a short time if the present indications of early business maintain.

Need Great Sheet Tonnage

Government Requirements About to be Distributed Placed at 70,000 Tons—Camp Kitchens and Stoves Call for Large Quantities

Youngstown, O., April 10.—Reports are current in the Mahoning valley district that the government is about to place orders for a tremendous tonnage of steel sheets to be used for camp kitchens, box cars and other purposes. While inquiries have not as yet been received from Washington, it is understood the aggregate will be close to 70,000 tons. This will be one of the largest orders ever placed among the mills in this country. A large per cent of the production of galvanized sheets of one valley mill is being fabricated by the Trussed Concrete Steel Co. of this city into shelter houses. Angle iron, strips and braces are riveted onto the sheets so that little time is required in erecting the houses in this country and France. The government has been buying steadily, but not in as large quantities as heretofore. Orders ranging from 15 to 50 tons for mostly galvanized come out from time to time from both the army and navy departments. The majority of the mills is working largely on federal contracts and is not inclined to accept new business. One valley producer has several tons of various sizes and gages of galvanized sheets up for resale. These originally were rolled for export but shipment was deferred on account of embargoes. They are offered for sale at this time to allow for more storage space in the producer's warehouse. Good inquiry from the domestic trade has appeared right along for various grades of sheets but only distant deliveries are promised. One mill remains sold-up for the second quarter as far as galvanized business is concerned.

No Improvement in Output

Pittsburgh, April 9.—No improvement was made during the past week in the output of sheets in this district. Operations are restricted on account of a shortage of cars and steel and shipments are not moving at a satisfactory rate. Not much headway is being made in reducing stocks which have been piled in warehouses. The production of sheet bars is increasing, however, and it is believed that sheet mills will be able to increase operations soon. Extremely large government requirements are being placed and mills are so heavily committed that they are taking practically no new business from domestic consumers. Deliveries are being made in from 30 to 90 days, depending upon the grades wanted. A middleman is offering 1000 tons of one-pass cold rolled sheets of gages Nos. 20 to 26, inclusive.

Stove Sheets Placed

Cleveland, April 9.—A northern Ohio stove manufacturer who inquired last week for 35,000 blue annealed No. 14 sheets and for 13,000 galvanized sheets for portable stoves for cantonments, has placed this business. This buyer now has a new inquiry out for 35,000 to 40,000 Nos. 10 and 14 black and blue annealed sheets for similar

Great Tonnage

Of Cast Pipe Wanted by Waterbury, Conn.—Makers Consider Prices

New York, April 9.—An inquiry for 32,000 tons of 42-inch cast iron pipe for water works construction at Waterbury, Conn., has been issued. This is the largest inquiry that has come out of the east for many months. Bids are to be closed in two weeks. Inquiries recently have been put out for several thousand tons for shell loading plants of the T. A. Gillespie Co., Perth Amboy, N. J., and California Loading Co., High Bridge, N. J. Both plants still are in the market for tonnage. The government soon is to inquire for several hundred tons additional for naval station at Pelham Bay. Binghampton, N. Y., closes bids tomorrow on small tonnage of 6-inch. Manufacturers of cast iron pipe are meeting in Philadelphia today to discuss a probable revision of prices.

Requirements are Scrutinized

Pittsburgh, April 9.—Owing to the heavy demand being made upon them, manufacturers of pipe are carefully scrutinizing requirements so that they may be able, so far as possible, to take care of their regular customers. Demand for lap weld iron and steel pipe coming from oil country interests is especially heavy and some makers are entirely out of the market.

Western Inquiry Slack

Chicago, April 9.—Western cities evidently are following the government's suggestion that improvements be kept down as low as possible and are not going into the market for cast iron pipe. The only new letting now in prospect is at Twin Falls, Idaho, where bids will be opened April 18 on 900 tons.

Urge Revised Casting Specifications

Steel Foundrymen Recommend to Government Raising of Phosphorus and Sulphur Limits and More Progressive Inspection Methods in Order to Increase Production to Degree Required by War Work

WASHINGTON, April 8.—For the purpose of increasing immediately the production of steel castings for the various departments of the government, the Steel Founders' Society of America has addressed a communication to the various purchasing bureaus which suggests increasing the sulphur and phosphorus content in existing specifications. For many months steel casting manufacturers have besieged Washington with requests for a slight increase in the maximum phosphorus limit, but have been unable to obtain government action. The manufacturers have contended that they are unable to comply with the phosphorus requirements of 0.05 per cent owing to the scarcity of low phosphorus pig iron and scrap. Producers of side-blow converter castings claim it is impossible to remain within the limits of 0.05 per cent sulphur owing to the high sulphur content of the coke available today for melting the iron in the cupola before it is charged into the converter for blowing into steel.

Steel Foundrymen Act

The Steel Founders' Society of America has a membership of approximately 175 steel casting plants in the United States and through a committee consisting of L. E. Thomas, chairman, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; H. E. Field, Wheeling Mold & Foundry Co., Wheeling, W. Va., and W. D. Sargent, Bayonne Steel Casting Co., Bayonne, N. J., it has recommended to the government that specifications for steel castings be so revised as to allow a maximum of 0.08 per cent sulphur and 0.07 per cent phosphorus in castings made by the Tropenas or side-blow converter process and an increase in the permitted sulphur content in castings manufactured by the open hearth process to 0.06 per cent phosphorus and 0.06 per cent sulphur. The specifications of the American Society for Testing Materials on Class A castings made by any process, which are not to be annealed, provide for a phosphorus maximum of 0.06 per cent and on Class B castings to be annealed, the phosphorus and sulphur must not exceed 0.05 per cent. In the statement compiled by this committee it is claimed that manufacturers no longer are able to guarantee lower phosphorus and sulphur limits and that most of the purchasers of steel castings, including the leading trunk line railroads, have already agreed to these increases in whole or in part.

Increasing Production

To speed up production which today is being greatly retarded by faulty, inexperienced and critical inspection, the establishment of a central inspection bureau for all branches of the government is recommended. This plan, if fully carried out, would make it possible for the government to handle steel casting inspection with a much smaller force and would permit the employment of inspectors trained in this particular class of work.

Another cause of great delay not only in the production of steel castings, but also in testing them, it is pointed out, is due to the fact that most of the government departments demand individual tests of castings whereas for commercial use heat tests serve the purpose. The only difference in test results of steel castings from one heat would be in the annealing and it is recommended, therefore, that if more than one heat is represented in an annealing charge one tension and one bend test shall be made from each heat. The annealing shall be determined by the use of annealing test lugs which should be attached to important castings when specified in advance and may be broken off by the inspector to examine the grain. These annealing lugs shall consist of small pyramids approximately ½-inch square at the base and 1-inch high. The adoption of the wording of the specification of the American Society for Testing Materials covering the number of tests required and the placing of test bars on casting is recommended, to be supplemented with a clause covering annealing test lugs about as follows: "Annealing test lugs approximately ½-inch section shall be attached to castings when specified in advance which may be removed by the inspector to ascertain whether or not the annealing has been done properly."

The establishment of a central inspection bureau by the government for steel castings would necessitate the adoption of a single set of specifications for all government work. Insofar as possible, the adoption of the specifications of the American Society for Testing Materials for steel castings is recommended. It is recommended that the inspection of government castings should conform to the inspection of castings for commercial work. Government specifications are so drawn and applied that it is impossible to produce steel castings at the same cost or quantity as those subject to commercial specifications and inspection. This is due to the requirements which demand a large amount of handling in the cleaning and finishing departments and applies particularly to the inspection after castings have been shaken-out of the mold and before they have been cleaned. This congests the steel foundries and greatly interferes with the crane service. This preliminary inspection is considered absolutely unnecessary inasmuch as the final acceptance of the castings generally is made in the machine shop.

Welding Steel Castings

Manufacturers generally have reported that they have experienced considerable trouble in convincing inspectors that steel castings could be welded without impairing the strength of the product. In its report the committee states that an inspector of steel castings should have sufficient practical knowledge of the use of castings so that he can decide whether defects that are bound to occur are serious or not, and the request is made that the use of welding should be permitted more generally than is allowed at the present time. A very timely article on this subject by H. Cole Estep, published in the Jan. 3 issue of THE IRON TRADE REVIEW, shows that welding can safely be resorted to and many castings may be used that otherwise would be condemned.

The subject of distorted castings is covered as follows in the committee report: "Many causes enter into the manufacture of steel castings that result in warping or distortion. Sometimes this is due to the design and cannot be avoided. Distortion also is caused by lack of precaution in the foundry, presence or absence of fins,

carelessness or error in preparing the molds and many other causes, some of which can and others which cannot be prevented. Information should be furnished the manufacturer before the castings are produced as to which are the important dimensions, so that every precaution may be taken to prevent undue distortion." It also is suggested that castings acceptable in all other respects should be accepted unless it is shown that they are distorted on account of carelessness on the part of the foundry. Furthermore, the manufacturer should not be held liable for any charges for straightening, welding or otherwise making castings acceptable after they are received by the purchaser unless the manufacturer has been so notified in advance and shall have given the purchaser authority for doing such work at his expense.

War Board

Reorganized But Baruch Has No Additional Authority

Washington, April 9.—The announcement yesterday by the war industries board of the plan on which it will be rebuilt does not alter the position in which the board was placed by the President in his letter of March 4 naming Bernard M. Baruch to the chairmanship. Nor does it give Mr. Baruch any more authority. The President's letter centralized in the new chairman the responsibilities formerly borne by the board, and the board's statement simply shows the lines along which Mr. Baruch's administrative machinery will operate. The Overman bill is needed to give the chairman the necessary powers.

The price-fixing committee of the board, named a few days before the conference which preceded the decision on the steel prices which became effective April 1, will not be changed by the reorganization. It is to benefit, however, by the assistance of what the board now calls "commodity sections", which are to be created through the grouping of representatives of the various government departments according to the particular commodities on which control is being exercised. This means J. Leonard Replogle, director of the steel supply section, is to have a special committee made up of representatives from each of the departments requiring steel.

Above all these commodity sections and immediately under Chairman Baruch will be a requirements division. This is to be headed by Alexander H. Legge and will include Mr. Replogle, representing the steel section; Judge E. B. Parker, the priorities section; George N. Peek, finished products, under whom will be machinery and machine tools; Col. George H. Estes, the army; Rear Admiral J. C. Peoples, the navy; F. A. Browne, the shipping board; T. C. Powell, the railroad administration; P. B. Noyes, the fuel administration; C. W. Merrill, the food administration; James A. Carr, the allies purchasing commission; W. S. Gifford, director of the council of national defense; and a representative of the Red Cross yet to be selected.

The requirements division is to pass upon the needs of the various government departments and delegate the particular commodity section interested to go fully and in detail into the question. The section is to handle the matter entirely, subjecting itself to the decision of the director in charge. When dissatisfaction with his determinations arises, appeal may be made to the requirements division, from there to the war industries board itself and finally to the chairman, Mr. Baruch, who will go to the cabinet officers or bureau chiefs under whom the questions arise, to have the problems finally solved. This procedure is regarded as the frankest admission that the war board and its chief still are without authority to determine matters finally.

Ingot Output

Shows Big Gain in March—Record Best Since November

Steel ingot production in March followed the upward swing shown in pig iron output. In both cases production was heavier than in any month since November of last year.

The monthly statement compiled by the American Iron and Steel institute showing the production of steel ingots by 29 companies which in 1916 made 88.14 per cent of the country's total, shows clearly this increase. These companies in March produced 3,110,381 gross tons against 2,273,741 gross tons in February. The average daily output was 100,335 and 81,205 gross tons, respectively.

The record of steel ingot production by these companies since June, 1917, follows:

Months	Open-hearth Gross tons	Bessemer Gross tons	All other Gross tons	Total Gross tons
June, '17	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
September	2,195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195,832	524,084	13,806	2,733,722
Jan., 1918	1,763,356	429,588	10,901	2,203,845
February	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381

Taft to Speak

At Annual Banquet of National Metal Trades Association

Former-President William H. Taft will be the speaker at the banquet in connection with the annual convention of the National Metal Trades association at New York, April 23 and 24 at the Hotel Astor. There will be no other speaker at the banquet.

The Wednesday morning session will be devoted to the usual preliminaries, including reports of officers, of standing committees, etc., and will be followed by a buffet luncheon. The remainder of the convention program is as follows:

Wednesday Afternoon, April 23.

Industrial Reaction, Judge Edward K. Nicholson.

National Industrial Conference Board, Robert Greene Duncan.

The Employment of Women in an Industry, W. A. Viall. Discussion.

Industrial Training for the War Emergency, H. E. Miles.

Thursday Morning, April 24.

New Lamps for Old, James A. Emery.

Present Socialistic Developments, William H. Barr.

Reports of convention committee.

Reports of convention committees.

Election and installation of officers.

Seek Data on Reduction of Alloy Standards

In order to determine whether a reduction in the number of units in standard ferromanganese and spiegeleisen will be acceptable a questionnaire has been sent to consumer by the subcommittee on ferroalloys of the American Iron and Steel institute. The questionnaire calls for information regarding the percentage of steel which is recarburized with ferromanganese and spiegeleisen; the production of steel containing more than 0.40 per cent carbon and what percentage of this tonnage is recarburized with spiegeleisen; the extent to which 60 to 70 per cent ferromanganese can be used in recarburizing steels below 0.40 per cent in carbon and the length of time which would be required in equipping plants, which have not already been thus equipped, with cupolas.

The questionnaire is accompanied by a letter, signed by James A. Farrell, chairman of the subcommittee on ferroalloys. In part, this says:

The war industries board and the shipping board have called the attention of the ferroalloys committee to the critical situation existing in ocean tonnage and the necessity of immediately further reducing the imports of manganese ores.

War Problems

Being Considered by Chamber of Commerce—Alien Newspapers Assailed

Chicago, April 10. (Special.)—Plunging immediately into effort to eliminate every possibility of secret aid to nations enemies through medium of foreign language newspapers national counsellors of United States Chamber of Commerce in session here yesterday tabled by close vote the proposal that such newspapers be suppressed. The meeting was preliminary to the sixth annual convention of the chamber. President Seiberling of Goodyear Rubber headed off precipitate action by declaring the most important thing is to Americanize alien through agency of foreign language press. President Lucius Teter of Chicago Association of Commerce this morning opened formally the convention by an address of welcome responded to by President R. Goodwin Rhett. The first business session will be held this afternoon when the war service committees will hear important address on shipping by Chairman E. N. Hurley of the shipping board, on the finance by Charles S. Hamlin of the federal reserve board, co-ordination of business and government in wartime by George N. Peek and other speakers.

That American business men collectively and individually should speed forward ship construction is the keynote of an address delivered by Edward A. Filene, chairman of the war shipping committee.

In emphasizing the responsibility that rests upon all, Mr. Filene said: "There are enough men to talk about the blame for delay due to causes which the government can correct. Let us emphasize the blame that rests upon communities and their business men and try to find a way to help. The problem of a contented and effective working force in shipyards will not be solved by talks during lunch hour, but by the definite solution of the discouraging problems of bad housing, inadequate transportation, etc. What can the business man of the United States do in these fields? He can see that business organizations, wherever ships or ship parts are being turned out, shall be organized into an effective shipbuilding aid, and he can help organize the community behind the shipbuilding."

Makes Big Subscription

New York, April 9.—Chairman Gary in a statement issued today states the Steel corporation will subscribe for $2[illegible]0,000 of new Liberty loan bonds [illegible] it will subscribe for $10,000,000 additional to be offered employes of corporation and subsidiary companies on an installment plan. Judge Gary stated corporation's blast furnace operations now are at the rate of 89 per cent, ingot capacity at 93 per cent and finishing mills at about 85 per cent.

Will Build Magnets

The Ohio Electric & Controller Co., 5900 Maurice avenue, Cleveland, has been incorporated with a capital stock of $200,000, for the purpose of manufacturing lifting magnets and electrical controlling devices. Lifting magnets will be built at once and a complete line of controlling devices added later. The officers of the new company include F. W. Jessop, president; W. B. Greene, vice president; and A. D. Walter, secretary and treasurer. Mr. Jessop was formerly works manager of the Electric Controller & Mfg. Co., Cleveland. He has had an extensive experience in the manufacture of lifting magnets and electrical apparatus for the control of light and heavy machinery.

Less Favorable

Are Operating Conditions in Pittsburgh District—Pig Iron Short

Youngstown, O., April 10.—Operating conditions in this and the Greater Pittsburgh districts are not as favorable this week as they were the week before. Reports for the week ending April 6 show that by-product coke ovens were operating at 93 per cent, the same as the week previous; open hearths at 87 per cent, a decrease of 11 per cent over the previous week; bessemer plants at 79 per cent, a drop of 4 per cent over the week before; and blast furnaces at 88 per cent, as compared with 92 per cent.

Scarcity of pig iron is slowing down the steel production somewhat in this district. One iron and steel company is in the market for large tonnages of basic and bessemer but is unable to buy. Another company which operates a 300-ton furnace in a nearby city has 2500 tons of bessemer in stock but is unable to load it on account of a scarcity of labor.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, April 9.—The shortage of tin continues acute. No spot metal is offering, while it is extremely difficult to buy futures of any grade excepting Chinese. Local importers received cables from their correspondents in Batavia last week requesting them for an extension of credits, originally provided for 30 days, which is clear indication that the Dutch vessels which had been scheduled for sailing in March were detained pending the outcome of negotiations between the allies and Holland over the seizure of the Dutch ships. Imports of tin from the Dutch East Indies have been figuring more and more in American consumption the past several years, the imports since 1913 having been as follows: 1914, 260 gross tons; 1915, 3253 tons, 1916, 7575 tons and 1917, 9273 tons. In January this year Dutch tin imports were over 1700 tons, against a little over 1200 tons a year earlier. Undoubtedly, in view of the declining output of Straits tin, gether with the increased consumption of this country due to tin plate requirements of our mobilized forces, the Washington authorities had been counting on considerable assistance from the Dutch East Indies. The tin trade is wondering how far these calculations are to be upset by the present holding up of shipments. Arrivals of all kinds of tin at Pacific ports in March were 3451 tons, and at Atlantic ports, about 1700 tons, making total in excess of 5100 tons, which is above the average consumption of about 5000 tons monthly. However, the prospects for arrivals during coming months apparently are not so good.

The spelter market weakened still further last week. Producers offered prime western at 6.87½c, St. Louis, for April and May shipment without arousing buying interest for more than a few cars. Consumers are not inclined to tie their money up in spelter stocks even at bargain prices. The market for prompt, April and May shipment may be quoted 6.87½c to 7c, St. Louis. The government fixed prices of 12c on Grade A, 14c on zinc plates and 15c on sheet zinc are unchanged.

The government obtained its lead requirements in March at 7.09c, St. Louis, this being the average quotation for the month as published in the *Engineering and Mining Journal*, which is accepted as the basis. The outside lead market has been gradually easing off until now it stands about ¼c a pound below the leading interest's quotation of 7.25c, New York, for prompt, April and May shipment from the West. Some spot spelter has been offered in New York at 7.25c.

The market for copper is unchanged and featureless, producers continuing to devote most of their efforts to filling government orders at 23.50c the fixed price. for carloads. Less than carload lots are obtainable at 24.67½c.

No activity has been reported in antimony the past week. The price ranges nominally from 12.67½c to 12.87½c, duty paid, New York.

The aluminum trade has become almost entirely adjusted to the new fixed price of 32c for 98 to 99 per cent ingots. Remelters are protesting against the price of scrap, which they say is quoted too high to make smelting profitable at the fixed price. The aluminum output is being taken largely by the government.



Motor Trucks Aid War Time Steel Production

BY D. M. AVEY

THE public is sated with sensation. Events of momentous importance pass almost unnoticed by a generation which has witnessed the greatest of advances in science and the remaking of the world's geography. During the past winter the first train of 30 massive trucks lumbered through an eastern city driven and guarded by soldiers who sat half concealed under the overhanging khaki coverings. A traffic officer at the busiest downtown corner checked the stream of vehicles and street cars long enough to allow the transport train to pass, and a few who felt that they could spare the time stopped for a moment out of curiosity and then hurried on. These were just a few of the new standardized army trucks being delivered across country for shipment to France, but they represented as radical a step in the advance of transportation as the first barrel-stack wood-burning locomotive that wheezed across the prairies.

Motor transportation in every field owes much to the war, for demonstrating broader fields of usefulness. France might have been overwhelmed had railroads been the only means for handling her troops and supplies. Motor trucks defeated the invaders at the battle of the Marne, and since that time all of the armies have been heavily dependent upon every sort of motor transport. In civilian life the dependence upon automobile carriers has been even more marked. The extra burdens of transportation coupled with the shortage of labor have thrown a responsibility upon the motor truck which it has met with splendid success.

There are three great uses for motor trucks in the iron and steel industry. They may briefly be described as the intra-plant, inter-plant, and inter-city haul. The first and last classes of service have been developed almost entirely as a result of war demands, while the second has been a gradual development parallel with automobile construction.

Scientific Management

Within modern iron and steel manufacturing plants, as well as in machine shops, foundries, etc., scientific methods have governed details of arrangement. Every factor which tends to increase production has met with encouragement. In fact, the universal demand for maximum production could not have been met without attention to that shop arrangement which entails a minimum of time and labor. During manufacture, materials are carefully routed through the different processes and operations and are handled as quickly and economically as possible. Specially designed cranes, handling machines, manipulators, locomotives, roll tables, traveling belts, storage battery trucks, tractors and motor trucks all do their bit in war time iron and steel production. In handling the heavier materials such as molten metal from the blast furnaces, open hearths, electric furnaces and bessemer converters, locomotives and railway cars perform the carrier service and a complicated system of tracks and switches is necessary. In practically every other branch of intra-plant transportation it is possible and economical to use motor trucks. Even when heavy ladles are handled by locomotives and ladle cars, trucks are sometimes used to spot cars and ingot buggies during intervals between other intra-plant services.

In bar and sheet mills, foundries, forging and fabricating shops, motor trucks perform almost continuous intra-plant service. Some peculiarity of plant arrangement often requires material to be moved and stored and then removed to a point where some additional operation is performed upon it. In other cases plant extension limited through the character of surroundings has required one part of a manufacturing business to be located at some distance from an earlier unit, so that material has to be transported some distance in going from one operation to another. Countless odd jobs of transportation, the moving of material, of repair parts, and smaller machines to remote points within the plant fences are encountered in every large concern. These and countless other exigencies form the daily task of the modern motor truck in intra-plant service. This hauling has been facilitated in several instances by the construction of roadways leading between the buildings and through the mills and shops in order that trucks may be operated with a minimum of tractive resistance. In one or two instances, permanent roadways of brick or concrete have been constructed.

From plant to warehouse or freight house, and from warehouse or freig



MERE LENGTH IS NO HANDICAP IN HANDLING STRUCTURAL SHAPES FROM THE FABRICATING SHOP

house to consumer may be classified as inter-plant service, and it is in this field that motor trucks are universally active. During the last five years teams and wagons have been supplemented almost entirely in this field, due to the economy and greater range of activity of motor transportation. All kinds of structural material, bars, plates and sheets as well as finished shapes, parts and machines are transferred over territories within a radius of 50 miles or more by automobile trucks. In almost every case cranes are employed in loading at the plant or warehouse, and a knowledge of delivery conditions forms the basis for the method of loading.

For example, if cranes are to be used to unload bars which are sent out from the warehouse, blocks are placed under the goods to raise them from the bed of the truck so that chains can be slipped under the bars for unloading. The strength of bridges, the character of the roads or streets to be encountered over the route govern to a large measure the loading of trucks and the laying out of delivery schedules. Special devices are used in many cases to provide for the handling of extremely long or odd-shaped pieces.

The greatest handicap to motor truck use outside the plant or warehouse at the present time is the lack of unloading facilities. In handling material to the freight house for example, efficient detail is not lacking at any point along the line until the railroad platform is reached. The goods are handled quickly and efficiently at the plant, where a skillfully operated crane, often one that may be moved about the plant or warehouse, loads the truck. Care as to routing, and an avoidance of overloading minimizes the delay in delivering the goods to the freight house. But at this point the truck is often compelled to wait its turn with many others, and upon finally reaching the delivery platform must discharge the load by hand or by other inefficient means unless it is itself equipped with a crane. These obstacles are not encountered so frequently in the case of delivery from warehouse to customer, as trucks are seldom delayed in unloading. In a number of iron and steel manufacturing plants experience has shown that a three to five-ton truck will displace at least two teams of draft horses for inter-plant work; the extra range



THE DRIVER IS THE GREATEST SINGLE FACTOR IN MOTOR TRUCK ECONOMY



THE TRUCK, ASSISTED BY THE TRAILER, AIDS THE SHIPBUILDING PROGRAM BY MOVING A 14-TON PILE DRIVER



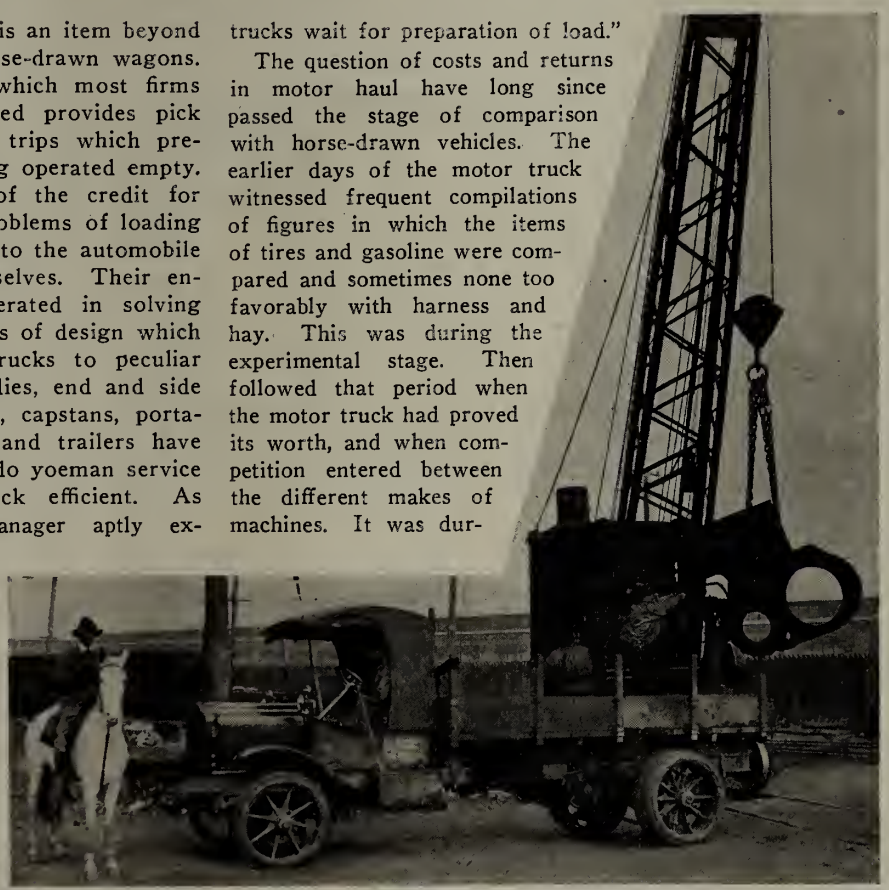
BRIDGES DELIVERED TO ORDER INDEPENDENT OF FREIGHT CONGESTION—A HEAVY AND AWKWARD LOAD

of territory reached is an item beyond comparison with horse-drawn wagons. Intelligent routing which most firms have carefully studied provides pick up work on return trips which prevents the truck being operated empty.

No small share of the credit for meeting the cost problems of loading and handling is due to the automobile manufacturers themselves. Their engineers have co-operated in solving the detailed problems of design which have adapted the trucks to peculiar service. Special bodies, end and side dump beds, winches, capstans, portable loaders, cranes and trailers have been devised which do yoeman service in making the truck efficient. As one steel plant manager aptly expressed it, "There is one big condition upon which economical track operation depends. You must keep them rolling. Your depreciation and labor costs are on the job while your trucks wait for preparation of load."

The question of costs and returns in motor haul have long since passed the stage of comparison with horse-drawn vehicles. The earlier days of the motor truck witnessed frequent compilations of figures in which the items of tires and gasoline were compared and sometimes none too favorably with harness and hay. This was during the experimental stage. Then followed that period when the motor truck had proved its worth, and when competition entered between the different makes of machines. It was during this stage that the iron and steel industries learned of the value of the motor truck to their business. Progressive methods of accounting have always characterized these industries, and a keen insight into cost factors was brought to bear on the problems connected with the motor transportation question.

One manufacturer whose company has developed concurrently with the iron and steel industry was a pioneer in the investigation of the motor truck. His company was induced to buy one of the earliest practical vehicles which







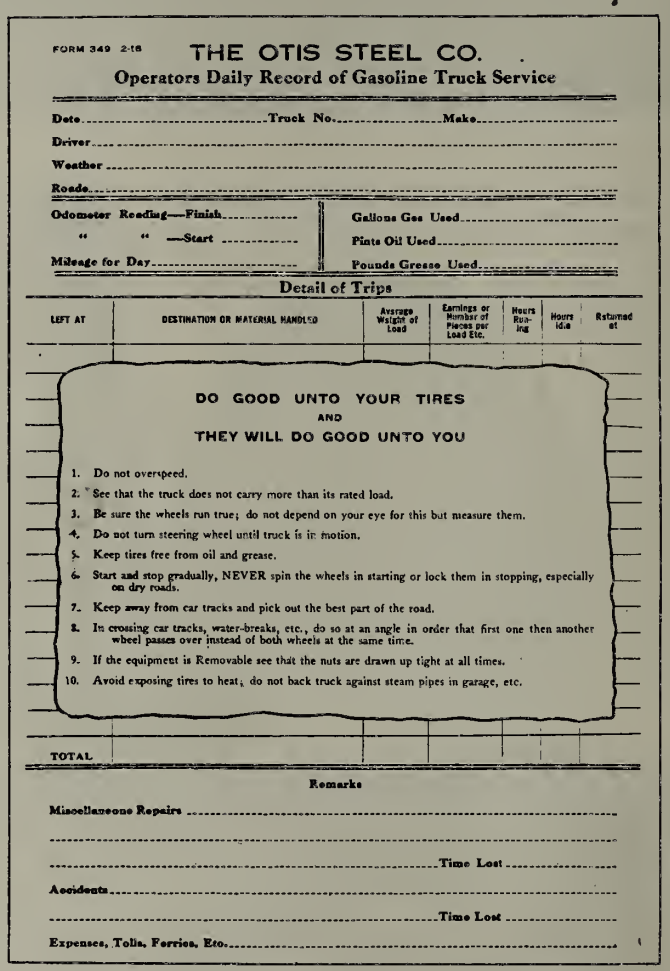
LOCOMOTIVES ARE BUILT WITH THE AID OF MOTOR TRUCKS WITHIN THE PLANT
A COMPLETE BOILER INSTALLATION ON ONE LOAD JUST A LITTLE BIT OF EVERYTHING—RUSHED

was placed in competition with a number of wagons. This truck, though it had many weaknesses of design which have been modified in later machines, demonstrated its economy under cost comparison with teams and wagons, and formed the nucleus for a fleet of nine trucks which this company now employs constantly. The same care in keeping costs is observed at the present time, even though there is no need for a comparison on a competitive basis with other kinds of equipment or with other types of trucks. A close record is kept of each truck, and the data secured when analyzed with a view to the class of haul and the character of the territory with reference to grades, road surfaces, etc., furnishes a basis for measuring the efficiency of the delivery system and the men employed.

There are many factors entering into the question of costs in motor truck hauls in iron and steel lines which require a careful system to bring out. The very character of the material handled in most cases is a challenge to the sturdiness of the motor truck. Steel plates, sheets, bars, forgings and castings have a comparatively small bulk for their weight. It is easy to overload a truck with such material, and an overload means a mounting depreciation, tire and repair expense. The light converted truck has failed under the rigorous trials of this class of work. The manager of a warehouse branch which employs a large number of trucks attribute this failure, however, to other factors in addition to lack of stamina. He says:

"We simply could not get our men to use the light machines properly. Whether this was due to a knowledge of the fact that they cost the company less, I cannot say. We had one small converted truck which we used to take light hurry-up orders around the city, and the drivers soon racked it to pieces. They would overload it constantly and always preferred to skid around corners rather than take them at a reasonable speed. The little truck simply could not stand the gaff. It cost us more in repairs than our largest machine."

Two factors confuse the question of motor truck operatings costs. They are labor and depreciation. Depreciation charges vary from 10 to 30 per cent with different companies as in almost every case the depreciation charges have been arbitrarily fixed and are based upon what the operating company regards as the probable life of the car. In one case, several trucks are in active service every day, which have been in use for over five years, and the entire first cost has been charged off long since. It would afford a less complicated basis for comparison if depreciation could be handled separately from operating expenses, as the other elements of cost are capable of more accurate compilation, and a closer analysis.



FORM 349 2-18

THE OTIS STEEL CO.

Operators Daily Record of Gasoline Truck Service

Date ..... Truck No. ..... Make .....

Driver .....

Weather .....

Roads .....

Odometer Reading—Finish .....
" " —Start .....
Mileage for Day .....

Gallons Gas Used .....
Pints Oil Used .....
Pounds Grease Used .....

Detail of Trips

LEFT AT	DESTINATION OR MATERIAL HANDLED	Average Weight of Load	Earnings or Number of Pieces per Load Etc.	Hours Running	Hours Idle	Returned at
TOTAL						

DO GOOD UNTO YOUR TIRES
AND
THEY WILL DO GOOD UNTO YOU

1. Do not overspeed.
2. See that the truck does not carry more than its rated load.
3. Be sure the wheels run true; do not depend on your eye for this but measure them.
4. Do not turn steering wheel until truck is in motion.
5. Keep tires free from oil and grease.
6. Start and stop gradually, NEVER spin the wheels in starting or lock them in stopping, especially on dry roads.
7. Keep away from car tracks and pick out the best part of the road.
8. In crossing car tracks, water-breaks, etc., do so at an angle in order that first one then another wheel passes over instead of both wheels at the same time.
9. If the equipment is Removable see that the nuts are drawn up tight at all times.
10. Avoid exposing tires to heat; do not back truck against steam pipes in garage, etc.

Remarks

Miscellaneous Repairs .....

..... Time Lost .....

Accidents .....

..... Time Lost .....

Expenses, Tolls, Ferries, Etc. .....

FACE AND BACK OF A COMPLETE DRIVERS REPORT CONTAINING ALL DETAILS NECESSARY FOR COMPILING THE MONTHLY COST SHEET

The labor factor or human equation in truck operation is of great importance, as the life of the car and the success of the entire system is dependent in a great measure upon the man at the wheel. With two men to a truck at 45 to 70 cents an hour, idle truck time soon becomes a serious loss unless a great care is exercised. Almost every plant manager has instituted some some of driver's report which will enable him to lay his finger on the causes where loss appears. An accurate report should include miles covered, gasoline, oil, grease, tires, repairs (classified as to kind and parts), tonnage and pieces handled, and time spent at customers' plants. This latter item is important so the company may have a record of such time consumed and point out to the customer the loss incurred through the idle truck time at the delivery point.

The traffic manager of a large steel mill expressed the opinion that motor truck costs were valueless unless a comparison might be had of a "thousand trucks operating under parallel conditions so that a suitable cost per ton-mile might be secured." This statement indicates a mistaken theory of the province of operation costs. A mere cost per ton-mile unless it is to form the basis for comparison of two types of machines under test, is of no value. Motor trucks have already proved their superiority to other forms of transportation and a ton-mile cost is not needed in this connection. The real service of truck operating costs, like those taken in any field is in pointing out the way to economy and efficiency. Two trucks of the same make and capacity operated under similar conditions many show radically different figures.

A striking example of this variation is shown in the accompanying figures furnished by a manufacturer of plates, bars, etc. Truck *A* handled plates and heavier material, while truck *B* carried only lighter parts and its average of tons per day was shown to be very much less than *A*. Both trucks were of the same make and capacity, and have been in service about the same length of time. Yet a reference to the tabulated costs of *B* shows almost every item greater than the similar costs taken over the corresponding period of time on truck *A*, and the truck hauling the heavier material obtained greater gasoline economy. The difference in this case was due to the nature of the territories covered by the two trucks. The one showing the lower costs had practically level roads over all of its routes, while the other, though it carried lighter material encountered numerous steep grades, bad roads and frequent delays due to congested traffic. The costs shown did not include depreciation nor tire renewal, as it happened that in the period covered neither truck required new tires. Each set of costs constitutes a basis for comparison with

other trucks operating under the same conditions or furnishes a month-to-month check on expenses.

A good driver takes a natural pride in the mechanical perfection of the modern motor car. This spirit is carefully fostered and healthful rivalry between drivers is developed by a judicious use of the cost sheets. Most companies handle their own repair work using mechanics from their own machine shops, and the drivers are encouraged to use their spare time during work hours to attend to minor repairs and to keep their machines cleaned and well oiled. The care of the cars on intra-plant service and on the comparatively short hauls incident to local delivery is easily handled by the operating company's own force. The development of inter-city motor truck freighting, however, will place many of the details of maintenance upon the automobile manufacturers' service stations and the cross roads garage.

The Coming of the Motor Freight

The possibilities of inter-city transportation (freight haul by motor truck), is a direct outgrowth of the war. The army truck trains loaded with extra parts and other equipment, which have rolled across the continent from the middle states to the seaboard, are only a symbol of a transition stage in moving commodities. The real significant feature, and one solely due to the war is the establishment of an increasing number of regular freight routes.

Under the added load of war time necessity, hampered by the coal situation and an unusually severe winter, railroad transportation has fallen down. Even the most essential freight has been delayed and congested at terminals beyond any hope of immediate extrication. As a result, the motor truck has not had to compete on a basis of truck haul costs vs. freight rates, but has rather competed with express rates, for even electrical machinery, pianos, safes and machine tools have been transferred by express during the past winter to avoid the delay of freight service.

Motor Truck Service

Motor truck trains are in regular service out of Boston, New York, Philadelphia, Baltimore, Buffalo, Cleveland, Chicago, Indianapolis, Providence, Akron, O., and Washington, and others will be in commission in the early spring. Some of these lines are operated by transfer companies, who handle their long haul by three to six-ton trucks and then pick up the freight from their landing platforms in the larger centers and deliver it to the consignees by means of lighter trucks. In a number of cases, large manufacturing interests have installed motor truck service to deliver finished products from their factories and to return with raw materials or supplies.

Insofar as the iron and steel industries are concerned, motor truck freighting has proved a friend in need. Trucks have delivered on schedule time materials for the construction of cantonments, shipyard equipment, supplies, foundry parts, and forgings for assembly into warmaking devices. On their return trips they have picked up vital materials and supplies to aid production. Those companies which maintain a warehouse service in the larger centers have found the motor truck an invaluable aid.

One such company has a warehouse situated in New Jersey from which it is necessary to make deliveries into New York City as well as to a number of manufacturing centers within a radius of 50 or 75 miles of the "Jersey side". Previous to the installation of motor truck delivery it required three days to reach customers in New York City from the New Jersey warehouse. It was necessary to ship by rail to a landing opposite New York, thence by lighterage to the other side and finally by truck or rail to the customer. Depending entirely upon the rail facilities for final delivery sometimes as much as two weeks were consumed. Since the company installed its own truck freight line, delivery is made in one day.

This instance suggests possibilities for relieving congestion at the freight terminals. The belt-line system allows freight to be shifted around instead of through cities, but freight terminals are usually located within the city. By using motor trucks to take all local freight which must go into a center, the freight depot could be located outside the congested district, and could also be made a sorting and routing point.

Character of the Truck Industry

The discussion of freight haul by motor trucks suggests the position of the truck manufacturer as a recipient of freight as well as a transportation agent. Hints of embargo upon the materials used in truck construction have raised the question and it has been met by a preponderance of evidence that should leave no doubt as to the essential character of the industry. The motor truck as a finished product asks no quarter from the freight embargo. Every day witnesses a long line of

Cost Analysis on Five-ton Truck A*.

Mth.	Mileage	Miles per day	Tons	Tons per day	Supplies Amount	Supplies Cost per Ton	Supplies Cost per Mile	Repairs Amount	Repairs Cost per Ton	Repairs Cost per Mile	Wages Amount	Wages Cost per Ton	Wages Cost per Mile	Total Operating Expense Amount	Total Operating Expense Cost per Ton	Total Operating Expense Cost per Mile	Miles per gal.
July	287	12	297	13.00	31.15	0.105	0.109	9.60	0.032	0.037	86.40	0.290	0.301	127.15	0.427	0.447	2.50
Aug.	369	15	318	13.30	30.37	0.095	0.082	3.25	0.010	0.009	97.20	0.304	0.263	130.82	0.409	0.354	3.00
Sept.	213	11	279	14.00	24.76	0.088	0.116	4.70	0.017	0.022	86.40	0.310	0.405	115.86	0.415	0.543	2.30
Oct.	274	16	294	14.00	26.94	0.092	0.098	1.10	0.004	0.004	84.70	0.290	0.309	112.74	0.386	0.411	2.50
Tot'l	1143	..	1188	.....	113.22	.....	.....	18.65	.....	.....	354.70	.....	.....	486.57	.....	.....	....
Av. for 4 mos.	286	13	297	13.60	28.31	0.096	0.099	4.41	0.016	0.016	88.68	0.299	0.310	121.64	0.411	0.425	2.60

Cost Analysis on Five-ton Truck B.

Mth.	Mileage	Miles per day	Tons	Tons per day	Supplies Amount	Supplies Cost per Ton	Supplies Cost per Mile	Repairs Amount	Repairs Cost per Ton	Repairs Cost per Mile	Wages Amount	Wages Cost per Ton	Wages Cost per Mile	Total Operating Expense Amount	Total Operating Expense Cost per Ton	Total Operating Expense Cost per Mile	Miles per gal.
July	439	18	208	8.31	53.63	0.258	0.122	.....	.....	.....	94.20	0.453	0.214	147.83	0.711	0.336	1.95
Aug.	619	23	173	6.41	73.65	0.425	0.119	.....	.....	.....	96.40	0.557	0.156	170.05	0.982	0.275	1.95
Sept.	488	26	201	10.53	78.38	0.390	0.161	2.82	0.014	0.006	90.00	0.447	0.184	171.20	0.851	0.351	1.95
Oct.	568	24	247	10.30	73.56	0.298	0.130	26.48	0.107	0.046	99.75	0.404	0.175	199.79	0.809	0.351	1.97
Nov.	416	21	180	9.00	69.39	0.386	0.167	18.97	0.105	0.046	99.55	0.553	0.240	187.91	1.044	0.453	1.93
Dec.	244	16	71	4.80	77.38	1.090	0.317	174.60	2.460	0.716	98.60	1.390	0.404	350.58	1.390	1.437	1.78
Tot'l	2774	..	1080	.....	425.99	.....	.....	222.87	.....	.....	578.50	.....	.....	1227.36	.....	.....	....
Av. for 6 mos.	492	21	180	8.22	71.00	0.394	0.153	37.15	0.206	0.080	96.41	0.536	0.209	204.56	1.136	1.136	1.92

Approximate Cost of Operation of a Five-ton Truck in 1911.

Av. for 1 yr.	...	50	...	.....	840.00	.....	0.056	450.00	.....	0.030	1040.00	.....	0.069	2330.00	.....	0.153	....

*These costs do not include tires, depreciation, interest or insurance.

drive-aways leaving the motor truck factories, and many times each truck carries another, mounted "pick-a-back", to its destination. Thus it is only through raw materials and coal that a freight embargo could check truck manufacture, and that such an embargo would be an economic error is shown by the fact that a truck repays in actual ton-miles of freight hauled many times its equivalent in a month's service. There are over 300,000 motor trucks in the United States at the present time, and of this number more than 80 per cent are engaged in some activity connected with housing, equipping, arming, or feeding our fighting forces or the industrial army behind them. In the iron and steel industries production is paramount; production demands adequate transportation; and transportation depends ever more vitally upon the motor truck.



SPECIAL TRUCK BED FOR HANDLING PLATES AND SHEETS, AND SIDE BRACKETS FOR BARS AND LONG SECTIONS

Equipment is Wanted

Atractivc opportunities for the marketing of American shop machinery, tools and other equipment, are set forth in a 164-page report by Commercial Agent Frank Rhea, on "Railway Materials, Equipment and Supplies in Australia and New Zealand", issued by the bureau of foreign and domestic commerce, department of commerce. A careful analysis of the workings of the government-owned roads of Australia and New Zealand is given. Copies of the report may be purchased for a nominal sum from the superintendent of documents, Washington.

Enlarge Scope of Pressed Metal Association

The Pressed Metal association will hold a meeting in Washington, Wednesday afternoon, April 17, when action will be taken to increase its scope by making it a national trade organization. The subject was discussed at a meeting in Washington, March 13, and was brought up by Douglas P. Cook, vice president and manager of the Boston Pressed Metal Co., Worcester, Mass., president of the association, who outlined the need for a pressed metal association of national scope. The purposes, he said, are to facilitate co-operation between the industry and the government during the war, to make possible co-operative study and united action on all problems affecting the industry at large, to exchange ideas on methods of manufacture and cost accounting, and to promote a closer acquaintanceship among the representatives of the industry. The details of perfecting the increased organization, expending the staff of the present war service committee and arranging the apportionment of dues, was left to the executive committee, which met in Cleveland, March 28. In connection with the apportionment of dues each prospective member is requested to report his competitive sales of pressed metal stampings for the first half of 1917 to the secretary's office at Washington. More than 70 pressed metal companies in the United States have expressed themselves as favorable to the plan of developing the association.

Urges State Furnace

Appointed by Great Britain in 1917 to inquire into and report upon the advisability of establishing state iron and steel works in Queensland, Australia, the royal commission has made a progress report. As a result of the investigation the commission recommends that steps be immediately taken to establish on a site to be chosen by the mines department, a state blast furnace to produce commercial pig iron where the country's iron ore deposits can be tested in bulk. In its report, the commission points out the fact that Queensland has all the essentials for successful manufacture of pig iron and that such a project would be profitable to the state in view of present prices and those which probably will obtain for a considerable time after the war.

Tin in Virginia

The United States is almost entirely dependent on foreign countries for its supply of tin. As this metal is a war-time necessity, and as a domestic source of supply is urgently needed, all known deposits of tin ore (cassiterite) in the United States have recently been examined by geologists of the United States geological survey. One of the most promising of these deposits is in the Irish Creek district, in the eastern part of Rockbridge county, Virginia, near the summit of the Blue Ridge. This deposit was recently examined by H. G. Ferguson of the survey, which in this research is acting in co-operation with the Virginia geological survey. Mr. Ferguson's report has been published as Bulletin XV-A of the Virginia geological survey, Charlottesville, Va.

The existence of tin ore in the Irish Creek district has been known for many years, and between 1883 and 1893 the deposit there was actively mined. The mining company, however, became involved in litigation as to land titles and abandoned work in 1893. Work on the deposit was never resumed, and the old workings are now caved and heavily overgrown with brush, so that a thorough examination of them is difficult, but what Mr. Ferguson saw in the field and the information he derived from old reports led him to conclude that the deposits along the Blue Ridge in this vicinity offer some promise as a source of tin, both through the systematic working of the known veins and the possible discovery of other deposits.

The cassiterite occurs in quartz veins that cut a granitic rock of peculiar appearance known as a hypersthene granodiorite. The veins do not continue for long distances and their content of tin is probably very irregular from place to place. Some high grade ore was found, however, and some tungsten ore occurs with the cassiterite.

The Birmingham-Trussville Iron Co., Birmingham, Ala., is planning to blow in its Trussville stack during the month of April.

Modern Electric Furnace Practice

Methods of Manufacturing Steel in Electric Furnaces Are Discussed—A Large Per Cent of Low-grade Scrap is Used—Importance of the Installation and Care of Linings

BY J. K. HARRISON

THE electric furnace is playing an important part in the steel industry today. Its great usefulness begins with the manufacture of alloy steels, and it is fast becoming a strong competitor of the crucible process. Where a minimum tonnage is desired, it is fair to assume that the electric furnace is practically indispensable in the manufacture of high-grade steels. Any one interested in those factors which contribute to the economical use of this type of furnace, would be doubly interested in a maximum service at a minimum cost. To develop the modern electric furnace and get the most profitable and economical use out of it, the furnacemen must be instructed concerning operating principles so they can take advantage of all that science has put into it.

Competent electric melters are difficult to obtain. The firm which educates its own men, with a view of retaining them in its service indefinitely, is far ahead of the company which operates its works with workmen who drift from one place to another.

Importance of Practical Experience

It is a well known fact that the production of a furnace is often directly proportional to one's knowledge of the working conditions. The important question to decide is the grade of steel which can be manufactured most profitably in a particular locality. The furnace should be housed in a building which affords ample protection against drafts and the weather if a uniform output is to be maintained. The design of the furnace door is also important and care should be taken to have it fit tightly. Any cold air which enters the furnace not only tends to shorten the life of the lining and electrodes, but oxidizes the steel and cools the furnace by taking up the heat from the inside.

Ventilation of the furnace building is necessary for the welfare of the workmen. A man who works in the shop with his lungs and eyes filled with carbide and lime fumes cannot work as efficiently as the man in a comparatively clean atmosphere. The expenditure of a few dollars would give a clean healthy air to breathe. No two men will get the same production from a furnace, even though they work under identically the same conditions. The old saying that "no two heats work alike" is a true one. However, good results are obtained if a premium is paid for maximum production with minimum furnace cost. It is most important to keep complete records which show the life of each furnace roof, lining and bottom. The electric furnace is well suited for the manufacture of all high-carbon and alloy steels. For the manufacture of low-carbon steels, nearly all specifications call for a low-sulphur content; and those that do not can be readily made in the open-hearth furnace. For this reason it would not be practical for the electric furnace when making soft steel to compete with the open hearth.

Sulphur is extremely difficult to remove from a low-carbon bath, for the reason that only a limited amount of coke can be used during the process of making a carbide slag. Steel held under a carbide slag should not be kept excessively hot unless the slag is high in sulphur. The latter has a strong affinity for iron, especially low-carbon iron and it does not readily leave the low-carbon metal to combine with the lime in the weak-carbide slag. It is much easier to make a white or carbide slag on a high-carbon bath than on a low-carbon bath. The sulphur is more readily removed under these conditions. It is not considered practical to make steel as low as 0.08 to 0.25 per cent carbon in an electric furnace where sulphur as low as 0.025 per cent is desired.

The electric furnace process of making steel is a competitor of the crucible process and is fast forging its way to the front. One of the greatest advantages of the electric furnace is that low-grade scrap can be utilized. The open-hearth process requires a ratio of scrap to pig of about 80 per cent, while in the electric furnace 100 per cent can be readily used. An electric furnace operates economically when an average grade of scrap which does not exceed 0.05 per cent sulphur and 0.10 per cent phosphorous is used. When scrap which contains a higher percentage of these elements is used it prolongs the process, lessens the production of metal and increases the cost of refractories and power.

Machine shop turnings which invariably are coated with rust should never be used in the charge because they increase the oxides in the metal and affect the finished product. The pouring temperature, the size of nozzles, and the condition of the molds, all play an important part in the final result. The usual procedure before pouring the molten metal is to bring the steel up to a temperature in excess of that desired for tapping and allow it to stand for 10 minutes in the furnace with the power off. This procedure tends to govern the amount of carbon which combines with the steel from the slag. The melting and refining should be subject to continuous laboratory observations. Molds should have every care and attention, so that the ingots can be easily removed.

With the constant demand for high-grade steel, the electric furnace has come to stay and in a comparatively short time the electric-furnace business will be classed as one of the leading industries. Most essential in the manufacture of electric steel is an adequate and constant supply of electric power at a satisfactory price. Insufficient transformer equipment has a tremendous influence on the economical operation of an electric furnace, and experience has shown that if the capacity of this equipment is insufficient, it not only occasions delays, but increases the power consumption per ton of steel.

Care of the Lining

In a well-constructed furnace the bottom is practically permanent, if given the proper care and attention. The roof and side walls are repaired frequently, it being necessary to practically reline the furnace from the slag line up about every five weeks. In my experience, from 90 to 100 heats is an average run on one roof and lining. This number of heats is only reached by a careful operator, who sees that the roof is kept free from dust and dirt, and at no time allows the temperature of the furnace to go beyond that actually required. The sides of an electric furnace below the slag line should be built so that each brick is set back on a rack and leaves an inch of the surface projecting from each course. This method of construction requires more brick, but strengthens the bottom and prevents the banks from slipping.

The author, J. K. Harrison, is superintendent of electric furnaces for the Anniston Steel Co., Anniston, Ala.

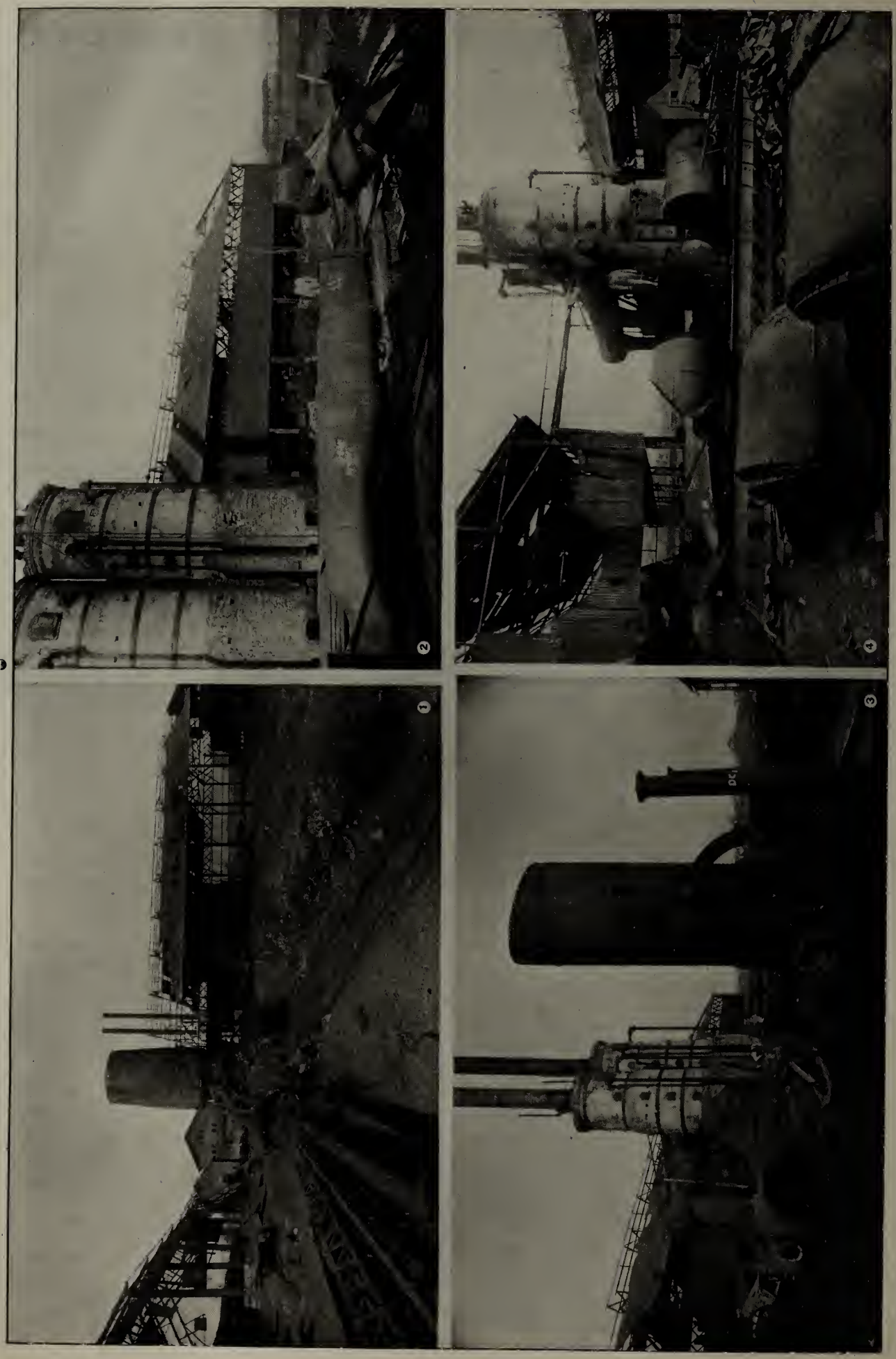


FIG. 1—STACK PARTIALLY CUT DOWN AND BUSTLE PIPE BEING REMOVED IN SECTIONS FIG. 2—VIEW OF OLD WHITWELL BRICKED-IN STOVES. FIG. 3—VARIOUS PARTS OF DISMANTLED PLANT INCLUDING GAS MAINS, FURNACE COLUMNS, FLANGE WORK, ETC. FIG. 4—FURNACE PLATES DISJOINED AND PILED READY FOR SHIPPING

Removing Old Virginia Stack Across Continent



General View of Bristol Furnace Plant at Beginning of Its Demolishment

SAVING of time as a chief element of profit in getting enlarged iron and steel capacity into commission has been the impelling motive behind some remarkable achievements of new construction and repairs during the past two years of highly stimulated industrial conditions. No more novel development has attended this period of speeded-up production than the dismantling and removal of practically abandoned blast furnaces to new locations many miles distant, where they are to be reassembled and restored to active service. This trafficking in second-hand furnaces has been occasioned primarily by the indefinite delays incident to the delivery of blowing engines and other stack equipment by the builders, as well as by the length of time required for the construction of completely new plants. This factor especially has been of weight where the companies have had available no regular organizations which would be capable of handling expeditiously many of the details of building new capacity under present conditions.

Old Battelle Furnace First to Go

In at least three separate cases in this country and Canada, transformation of discarded units into going stacks through their transfer to more advantageous surroundings now is being carried out. Probably the most interesting example has been the purchase and removal of the old Battelle, Ala., furnace by the Tata Iron & Steel Co., of Sakchi, India. This stack now is in the process of transportation thousands of miles overseas to the site of this works. There it is to be re-established as an integral part of the company's furnace group. The Algoma Steel Corp. has been carrying out a similar project in transporting an old furnace from Midland, Ont., to Sault Ste. Marie.

Another interesting operation of a similar character now in a well advanced stage, will redeem for productive use the old Bristol furnace of the Virginia Iron, Coal & Coke Co., at Bristol, Va. Some months ago the plant was purchased by O'Mara Bros., contractors of Philadelphia, who several weeks later sold it to the Pacific Iron Co., of San Francisco, for a large sum, it is reported. Under the direction of O'Mara Bros. the furnace now rapidly is being dismantled preparatory to shipment to the Pacific coast. While exact information as to the new location of the furnace is lacking, it has been reported that it is to be erected somewhere near the southern boundary line of California, and that it will operate on local, Chinese and South American ores. No definite announcement of the new site has been made by anyone responsibly associated with the enterprise. It has been persistently stated that Japanese capital is interested, and this has led to some speculation whether the ultimate location of the furnace may not be in that country.

Unusually severe weather conditions the past month in the south have greatly delayed the work of razing the furnace. The state of demolition can be seen from the accompanying illustrations the photographs for which were taken at a comparatively recent date. It is the plan of the new owners to have the dismantled furnace and equipment ready for shipment in the spring. A large number of cars will be required to convey the plant to the Pacific coast, and the cost of transportation is placed at many thousands of dollars. Each separate part of the dismantled furnace and equipment has been carefully numbered so that their adjustment and setting-up on the new location will be a comparatively simple operation.

The Bristol stack was built in 1890-91, and is 75 x 18 feet. It has a rated daily capacity of about 150 tons. It has been equipped with four Whitwell stoves of the bricked-in type, one of which is 60 x 20 feet, 2-pass, and the other three 60 x 20 feet, 4-pass. The character of the construction of these stoves is shown in the accompanying illustration. The driving units consisted of three steam blowing engines supplied from a battery of 14 water-tube and flue boilers. The furnace was built to smelt local and nearby ores. For a number of years it was operated to furnish metal for the Crescent Rolling Mills at Bristol, which consisted of a puddling plant and rolling mill and was a producer of merchant iron.

History of Furnace

When the Virginia Iron, Coal & Coke Co. was formed in 1899, the furnace and rolling mill plant were absorbed along with a number of other furnaces, ore and coal properties in southeast Virginia, eastern Tennessee and eastern Kentucky. The Bristol stack was operated actively during the next several years. When the business depression came on in 1907, both the furnace and mill were closed and they were not operated after that date. A large quantity of iron estimated at probably 50,000 tons was on the banks when the plant went into idleness, and this remained until it was absorbed by the active iron market of the past two years. The Crescent mills were sold and junked some months ago. For a time it was thought the furnace would be rejuvenated and operated by the Virginia company in view of the heavy general demand for pig iron. This plan subsequently was abandoned and the property was offered for sale. Some efforts were made by local capitalists to organize a new company to take over the furnace and operate it on ores from nearby deposits. These were not productive of results and the plant finally was sold as junk to John O'Mara.

Canadian Mines and Ore Deposits

Only 15.5 Per Cent of Ore Smelted in Canada in 1916 Produced in Canadian Mines—Descriptions of Three Foremost Ore Producers —Estimated Ore Reserves

DISCOVERY of iron ore in Canada is recorded as early as 1667 and the first forge was placed in operation in 1733. This solitary forge was succeeded in 1737 by a group of forges at Three Rivers, Quebec. The latter remained in almost continuous operation until 1882, being at that time the oldest active iron producer in America. A number of other small plants were erected at various points in Canada during the latter part of the eighteenth and the early part of the nineteenth centuries, but the iron industry did not assume any large proportions until 1896. Since then its growth has been rapid.

In the early days sufficient ore was mined to supply all the demands of the furnaces. Since 1896, however, this condition of affairs has been greatly altered: both the production of iron ore and its consumption in blast furnaces have increased, but the latter so much more rapidly that in 1916 the total production of iron ore in Canada was only equal to 15.5 per cent of the ore smelted in Canadian blast furnaces. The accompanying table shows more clearly than any attempt at description how these extraordinary figures have been realized.

Import Ore From the U. S.

Practically all imported ore comes either from Wabana, in the dominion of Newfoundland, or from the Lake Superior iron ranges in the United States. Wabana, however, is a British colony and upon it is based the Nova Scotia iron and steel industry so the word "imported" has not the same significance when applied to it as to mines in the United States.

At present, all the Canadian ore produced is the output of two mines, the Helen and the Magpie. Both are situated in the Michipicoten district, in Ontario, and both are owned and operated by the Algoma Steel Corp., Sault Ste. Marie, Ontario.

The Helen mine is approximately 1¾ miles wide by ¾ mile long. It is situated on mining claims 68 and 69 in the southern part of the Algoma mining district, and is only 11 miles distant by rail from Michipicoten harbor on Lake Superior. Here is located the ore dock of the Algoma Central & Hudson Bay railway, at which lake vessels of 21-foot draft can tie up.

This mine has to its credit the largest iron ore production of any mine in Canada, the shipments of ore from the commencement of mining operations in 1900 to the end of 1915 aggregating 2,263,522 gross tons excluding 37,572 gross tons of iron pyrites. The ore body has been almost completely worked over and the comparatively small tonnage extracted in recent years has come principally from caved ore, and from pillars left when the ore was extracted by stoping. Average analyses of 1914 shipments are as follows:

	Per cent
Iron	56.790
Silica	6.160
Sulphur	0.264
Phosphorus	0.095
Alumina	0.900
Lime	0.240
Magnesia	0.152
Manganese	0.170
Moisture	4.000

The main orebody lay at the eastern extremity of a small lake called Boyer lake, which has been pumped out. In plan the deposit was roughly elliptical with a longer axis of 700 feet on the upper level. The orebody had a pitch of about 60 degrees to the northeast and the vertical extent was about 700 feet. The mine was developed from two shafts, respectively, 435 and 821 feet deep.

An interesting though unfortunate feature of this deposit was the presence in it of pockets of pyritic sand varying in size from those containing a few cubic feet to others varying from 30 to 40 feet in their greater dimensions.

The claims comprising the Magpie mine were staked in 1909 on several showings of magnetite. Exploration by trenching, stripping and test-pitting, and by diamond drilling showed the deposits to consist essentially of siderite, portions of which had been altered to magnetite.

In 1910 a four-compartment shaft was commenced, and in 1911 the erection was undertaken of a roasting plant for the production of a marketable ore from the siderite, which had been shown to have an iron content of about 35 per cent and an objectionable amount of sulphur. The roasting plant was placed in operation in December, 1912, and was operated until October, 1913, when it was dismantled and replaced by a plant better suited to existing conditions.

Analysis of Ore

The average analysis of the 1916 shipments of roasted ore from the Magpie mine is as follows:

	Per cent
Iron	50.100
Silica	9.140
Sulphur	0.136
Phosphorus	0.013
Alumina	1.280
Lime	7.960
Magnesia	8.040
Manganese	2.740
Loss by ignition	none

The roasting kilns are six in number, each 8 feet in diameter and 125 feet long. At the upper end of each is a concrete dust catcher through which the waste gases pass on their way to the concrete stacks of which there are six, one for each kiln. Pulverized coal is used to fire the kilns, machinery used for its preparation being located adjacent to the roasting plant. Rotary cylindrical coolers convey the hot ore to the stock yard, where it is distributed by an electric trolley bridge equipped with a grab bucket. Air compressors, a motor-generator set, machine shop

(Concluded on Page 922)

Mines Report Now Completed

REFERENCES to Canadian iron ore deposits appear frequently in mining and scientific literature and many excellent descriptions of individual deposits and districts have been published from time to time. With the exception of two or three short papers, however, no attempt has been made to bring together all this scattered and fragmentary information and put it in a form both compact and accessible for reference.

Realizing the value and usefulness of such a work, the mines branch of the Canadian department of mines arranged with Einar Lindeman to secure detailed information on Canada's iron ore resources in connection with a general investigation being conducted by this department at that time. The reports of Mr. Lindeman and the reports of a committee of which he was also a member have been compiled by L. L. Bolton and the complete work, in two volumes, is now ready for distribution. The accompanying article is abstracted from Vol. 1 and is devoted chiefly to the descriptions of three mines, Magpie, Helen and Moose mountain.

The Hazard of Blast Furnace Work

A Review of the Causes, Circumstances, and Prevention of Accidents—The Practicability of Safeguards Which Result in a Decreased Number of Injuries and Fatalities is Demonstrated

BY F. H. WILLCOX

IN the past the blast furnace industry was under the stigma of being one of the most prolific sources of killed or seriously injured and permanently disabled workmen of any of the industries of the country. In the popular mind, labor at blast furnaces was little less hazardous than mining, powder making, or railroad work. This impression was based not so much on definite knowledge of the number actually injured and the causes of injury as on the spectacular nature of the accidents that from time to time were described in the press. As with a mine disaster or a railroad wreck so with many furnace accidents, the number fatally injured in such accidents constitutes only a minor proportion of the workmen who suffer more or less serious injuries. However, the reader of the daily paper receives a distinct impression of frightful and sudden disaster which is apt to be associated henceforth in his mind with work at blast furnaces. It is true that in the past this impression has not been without warrant, for from the time of the advent of Mesabi ores, taller furnaces and faster smelting, which began in the early nineties, the newspapers have chronicled a large number of blast furnace disasters.

Blast furnace men have never assumed to tolerate failures in construction or defective control of furnaces. But the admitted hazards of the work are many, and the slow development of improvements in the construction and control of the furnace and its auxiliaries have occasionally given rise to a tendency to accept as a part of the day's work not only the unforeseen and difficultly controlled accidents but accidents whose recurrence might be stopped by the adoption of suitable preventive measures.

In the smelting of iron, even more than in many other industries, safety is inseparably related to efficiency in production, and the accidents strictly incident to work about the furnace are proportional in some degree to the success with which obstacles to smooth working are overcome. This relation does not hold, however, in regard to such accidents as are incident to hand labor, falls, falling and flying objects, machinery and the use of hand tools.

When work is being done on cranes or runways where other cranes are running, the idle crane should be protected by track torpedoes placed 25 to 75 feet away, depending upon the effectiveness of the brakes. An ore bridge equipped with safeguards is shown in Fig. 6.



FIG. 1 — SAFETY ARRANGEMENT FOR ELEVATOR USED IN RELINING BLAST FURNACES. RISING ELEVATOR LIFTS TRAPDOOR COVERING SHAFT. PINS PUSHED THROUGH STRAPS IN ELEVATOR FLOOR PREVENT LOWERING OF ELEVATOR WHILE MEN ARE ON IT

Other suggested safeguards which are widely employed are the use of a sheet iron guard outside the skip track rails; covering the bottom of skip hoists with sheet iron, and the use either of a shield to stop flying rivets or the provision of a warning sign in the path of the flying material. A skip incline adequately protected is shown in Fig. 8.

Handling Brick

For pulling brick from the furnace, men should be given long hoes to enable them to stand away from bricks tumbling and rolling down the face of the pile. When men are loading and wheeling brick away from a pile, the "straw" or "shift" boss in charge at the bottom should have the men keep the brick pulled down to prevent a steep slope on the face of the pile.

The falling of bricks from hoist tubs and down through shafts from the working platform can be prevented by care in loading, or by using a tub with a cover attached to the bail, the cover closing automatically when the hoist is made. The working platform should be provided with trap doors over the bucket shaft, and also over the ladder shaft, to prevent the falling of brick. A safety arrangement for an elevator used in relining blast furnaces is shown in Fig. 1.

Injuries occurring from handling material can be eliminated only by not rushing the work too fast, and by carefulness in taking brick from the chutes and in laying them on the pile or bucket. In laying brick, the usual hazard is injury to the eye from flying pieces caused by chipping or cutting the brick to shape. Many plants now furnish goggles to bricklayers if cutting is necessary. Other injuries are caused by accidental hitting of the hand with the mason's hammer or by having the hand caught between brick in handling them.

Shot firing is almost universally done with a firing machine. Precaution should be taken not to use a greater number of detonators than the rated capacity of the machine. The detonators should be connected in series, and the ends of the lead wires should remain disconnected from the machine and in the hands of a responsible assistant until the foreman has made all connection to the charges in the salamander, has given warning, has stationed guards, and has reached the detonating machine. The lead wires should always be carefully examined each time. It is better to get new wires than to twist broken ends together or to patch defective insulation, for any unnecessary resistance or grounding in the wires makes the chance of misfire more probable. A misfired cartridge or charge in a salamander is probably one of the most dangerous misfires with which one can contend, because the heat in the salamander is apt to set it off after the danger is thought to be past, and while at-

This article is an extract from a bulletin entitled "Occupation Hazards at Blast-Furnace Plants and Accident Prevention," by F. H. Willcox, bureau of mines, Washington, D. C.

Table I

Summary of Data Regarding Location of Accidents

Location of accident	Total No. of accidents	Cause of accident: Hand labor	Hand tools	Falling or flying material	Falls of person	Burns from hot metal	Cranes, hoists, or rigging	Railroads	Machines or machinery	Burns from cinder	Flames or explosions	Illness (infection)	Electric machinery	Hot flue dust	Asphyxiation	Slips	Miscellaneous
Car dumper or ore bridge...	40	5	2	5	5	..	11	7	1	..	..	..	4	..	..	..	..
Trestle or ore yard	124	19	38	21	20	..	3	9	4	..	1	5	1	2	..	1	..
Stock house...	117	30	34	30	6	..	..	1	6	..	2	3	1	2	..	1	1
Scale car, skip, or hoist.....	37	1	3	4	4	..	4	15	1	..	1	..	3	..	..	..	1
Furnace top or stack	44	8	7	5	11	..	3	..	..	..	5	2	..	..	2	..	1
Blowpipe, tuyere, bosh, or bustle pipe	29	..	5	6	2	1	2	..	..	3	8	..	..	..	..	..	2
Tapping hole or cinder notch.	89	3	13	..	4	33	4	..	1	22	2	..	1	..	..	..	6
Runner or bed.	78	26	8	5	3	27	2	..	..	2	..	4	..	..	..	..	1
Elsewhere in cast house	96	32	11	8	7	8	8	2	1	..	1	6	4	..	..	2	6
Pig machine or ladle house..	110	12	9	18	8	22	15	..	7	2	3	3	3	..	..	..	8
Slag or flue dust disposal	58	7	4	3	7	..	7	5	5	8	..	2	2	8	..	..	..
Gas-main system	35	..	..	9	8	..	5	..	1	..	2	1	1	6	2	..	..
Pig iron or other storage	69	43	3	10	5	..	5	2	..	..	..	..	1	..	..	..	..
Stoves	39	6	5	8	3	..	2	..	..	..	4	1	1	4	1	2	2
Boilers	91	11	6	6	14	..	2	..	..	..	3	3	1	6	11	1	17
Engine rooms..	76	4	5	7	9	1	6	..	19	..	4	1	6	4	4	4	2
Shops	43	3	8	7	2	3	2	..	11	..	1	2	3	..	..	..	1
Yards	91	21	7	7	13	1	6	7	..	2	..	6	2	3	..	8	8
Tracks	68	6	7	5	13	5	8	20	..	3	..	..	1	..	..	..	..
Pavements or sewers	21	2	2	4	7	..	2	..	..	..	1	1	..	..	1	1	..
Misc.	16	6	..	..	3	..	1	..	..	..	3	..	3	..	..	..	..
Total 1372		245	184	168	154	101	98	68	57	42	41	40	38	31	21	16	59

tempt is made to remove it or to set it off again by digging down to it through the stemming, or by drilling a new hole near it. Some plants use the electric light circuit with success to set off charges.

Protecting the Furnace Columns

Both on account of the danger to furnace columns, and to life and limb, the hearth should be enclosed as shown in Fig. 5. Men should be stationed at every approach to the cast house, but out of range of flying pieces to prevent any unwary employes from approaching. A curious employe wandered into a central Pennsylvania cast house just as a blast was set off. A flying fragment of salamander took off the seat of his trousers, causing no injury except considerable shock. In the past several fatalities have occurred in blasting salamanders, and it has become the policy of several companies to employ contractors specializing in such blasting, who do the work more quickly and efficiently and also more safely than is possible by members of the furnace force who only infrequently encounter the job.

Familiar dangerous practices of working about buckets without lowering or securing the bail, of standing near end doors, of hooking on, and of grasping cables near the sleeve block are repeated. In 1914 two men were killed by the overturning of locomotive cranes at plants where outriggers and rail clamps were provided but not used. Some cranes are provided with electric indicators to warn cranemen when the crane tips to such an angle that further loading will result in overturning. Injuries caused by men being caught between buckets, magnets, etc., and side obstructions while attempting to steady hoisting units before they are let down can be avoided by providing hooks by which the men, working from a safe distance, can steady or stop the swing of equipment.

Stepping on rails in crossing tracks was responsible for five other minor injuries; tripping on rails caused one other injury. Coke along the tracks, insecure ladders, and working without scaffolding are causes that may be eliminated in great part.

Loading Pig Iron and Scrap

When pig iron is loaded, all stray pigs should be removed from the end frames and sides. Ladle-house and cast-house men should remove all large accumulations of scrap from the noses of ladles, and avoid overloading cinder ladles with loose cinder-runner skulls, and should not throw them in so that ends project over the sides. Men should be warned to keep away from cars being loaded or coupled or in transit about the yards.

The danger of handling flue dust and the precautions to be observed have been previously mentioned. Ladles of cinder and metal should not be filled higher than 9 inches from





FIG. 2—CINDER SHIELD IN ELEVATED POSITION. SHIELD IS KEPT UP WHEN CINDER IS RUNNING TO PREVENT ITS DESTRUCTION. FIG. 3—SHIELD FOR PROTECTION IN DRILLING TAPPING HOLE. ILLUSTRATION SHOWS THE SHIELD IN POSITION WITH A DRILL INSERTED



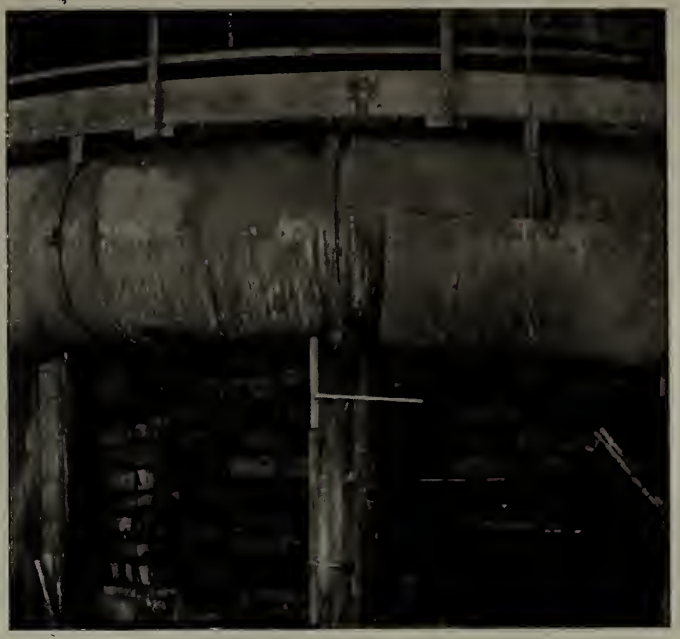


FIG. 4—AUTOMATIC WATER-COOLED BOTTING MACHINE IN POSITION. OPERATOR NOT IN DANGER ZONE. FIG. 5 HANGING BULKHEADS MADE OF RAILROAD TIES, COMPLETELY INCLOSING HEARTH JACKET DURING BLASTING OF SALAMANDER; WOODEN PROTECTION ON FURNACE COLUMNS

the top, and yardmen should be instructed to keep away from ladles in transit. Brakemen can lessen the hazards of splashes by adjusting couplings of ladles and engines or cars before the coupling is made. The practice of standing close to the sills or frames of road cars to observe whether automatic couplers engage is unsafe when loaded cinder or iron ladles are being coupled. When such ladles are being spotted at scales, at mixers, or pig-casting machines it is usually necessary for the brakeman to stand holding the coupling lever while the ladles are uncoupled; consequently the engineer should use special care not to pull away or to stop abruptly.

Leaks in the cinder ladles are nearly always due to cracks, or to iron settling in the bottom and eating through the iron or steel thimble. In attempting to chill leaky cinder ladles with a hose, the workman should remember that iron may be present, and should keep at a safe distance. When it is necessary to venture over cinder in the yard, it is safest to test the surface with a bar or to throw a plank or piece of corrugated iron on the crust to avaid breaking through.

Cracking is the most prolific cause of leaks and of stickers in cast iron thimbles. Cast steel thimbles are stated to be relatively immune from cracks.

Opening the cinder notch is perhaps the least hazardous of work about the front. Small splashes of slag are frequently thrown out but rarely come in contact with the person. At one plant a large shield, shown in Fig. 2, is employed. It is carried by two arms pivoted on an adjacent furnace column. The shield is used when the notch is opened or closed, the tapping bar or picking rod being placed in the cinder notch through a hole in the shield. Small shields, from 15 inches square up, are also used when the cinder notch is opened to prevent small splashes of cinder reaching the man working alongside the fall or runner.

Accidents at the cinder notch due to splashing cinder can be avoided by the use of an automatic bot of the type shown in Fig. 4. Such a bot has been tried for two years at an increasingly large number of plants and has proved satisfactory even with excessively heavy limy slags, and with no danger of explosions when it strikes molten iron coming over the monkey.

At various plants cleats or ribbed plates alongside the cinder fall are provided to insure a firm footing. An accident several years ago shows the desirability of such cleats. A monkey boss slipped while botting the monkey and fell into the cinder fall or runner which was full of cinder. He received severe burns.

The use of an adequate shield, similar to the one shown in Fig. 3, in front of the tapping hole should prevent such injuries in any plant

Table II

Summary of Data Regarding Causes of Accidents and Duration of Injuries

		Time disability ended											
	To-	First week		Second week		Third week		Fourth week		Fifth week		Sixth week		Fa-
Cause of accident	No.	No.	Days	No.	Days	No.	Days	No.	Days	No.	Days	No.	Days	tal
Hand labor	245	111	4.4	75	10.4	33	18.1	11	26.1	9	32.8	6	63.1	.
Hand tools	184	80	5.0	48	11.1	18	17.7	12	24.7	8	32.7	16	51.4	3
Falling or flying material	168	78	4.6	38	12.0	22	17.8	6	26.8	8	32.3	11	68.5	4
Falls of person	154	53	4.6	32	10.9	14	18.5	7	26.7	15	32.1	25	68.8	8
Hot metal	101	41	4.4	18	11.8	14	18.0	11	25.6	7	31.6	10	50.4	.
Cranes, hoists, or rigging	98	33	5.2	16	11.7	11	19.7	9	26.5	13	32.8	15	66.3	1
Railroads	68	23	4.9	14	12.9	7	19.6	3	26.3	1	30.0	11	60.1	9
Hot water or steam	59	18	5.1	14	12.2	10	18.2	5	24.4	3	31.3	9	51.5	.
Machs. or machy.	57	14	4.6	15	10.4	15	19.4	6	25.7	1	31.0	6	48.0	.
Flames or explosives	41	11	5.5	16	12.1	3	18.3	1	28.0	3	33.0	5	57.6	2
Burns from cinder	42	11	5.5	7	9.3	9	17.7	..	....	6	33.5	8	70.9	1
Illness (infection)	40	10	4.7	15	10.8	7	18.7	2	23.0	2	30.5	4	30.5	.
Electric machinery	38	17	4.2	12	11.4	4	19.0	1	28.0	2	30.0	1	132.0	1
Hot flue dust	31	5	4.2	12	11.3	4	18.3	2	26.5	2	32.0	6	50.5	.
Asphyxiation	21	12	5.4	..	....	4	18.5	1	25.0	.	....	1	56.0	3
Slips	16	8	5.0	3	11.0	2	19.0	1	22.0	.	....	1	70.0	1
Fighting or playing	3	2	2.0	1	8.0	..	....	..	....	.	....	..	....	.
Misc.	6	3	6.0	2	11.0	..	....	1	28.0	.	....	..	....	.
Total or average	1372	530	4.7	338	11.1	177	18.3	79	25.7	80	32.3	135	60.9	33

Proportion of nonfatal injuries after second week, per cent..... 35.1
Duration of injuries terminating after second week, days..... 34.1



FIG. 6—ORE BRIDGE EQUIPPED WITH SAFEGUARDS
A, guard for wheels; *B*, device for clamping bridge to rails; *C*, guard for driving gears

where the bar is driven by hand.

Six injuries resulted from pulling bars from the tapping hole. As is evident from the review of accidents incurred while men were driving bars the iron at times comes out when the bar is driven. When the skull is heavy and thick and mainly composed of iron a "welshman" must generally be put on the bar, and it must be driven back by sledging the wedge. Two of the injuries were to men having hold of the handle of the "welshman". In one case the hole was a little "green" or wet, and when the bar was pulled an explosion threw particles of hot iron over the man's face and neck. Lost time, six days. A similar accident in 1914 caused erysipelas, pneumonia and death.

Two men suffered burns of shoulder, back and arms from flames and iron from the tapping hole when the tapping bar was pulled. Disability, three and 24 days.

Other Accidents

One man received slight burns of face and ear when the iron burst out while he was using oxygen to burn out a tapping hole in which a tapping bar was stuck.

The sixth accident occurred to a keeper pulling a tapping far from the hole after the iron had come. The iron splashed up over his foot. Lost time, 16 days.



FIG. 7—COUNTERWEIGHTED DOORS ON BOILER; DOORS OPEN INWARD AND UPWARD

In pulling tapping bars the shield should be left in front of the hole until the bar is out; there is no necessity for removing the shield. In one plant, to enable the men backing the bar out to keep away from the trough, a sliding weight is placed on the bar and the men jar this against the "welshman" by yanking it up against the wedge with ropes attached to each side. In another plant, to enable men to keep away from the "welshman", a cable hooked into a clevis attached to the "welshman" by means of an eyebolt passes over a sheave to near the cast-house wall, where the "welshman" can be held at the desired height and pulled out of the trough when the iron comes and the tapping bar is free.

Men working about the tapping hole should always wear goggles and good shoes, tightly laced and not gaping away from the ankle or with cracks in uppers or soles. Leggings are used at few plants. They have, however, been found practicable in certain plants outside the state.

Men not actually employed in opening the hole should keep away, and if it is necessary to walk in front should get across the runner quickly. Some years ago a foreman was superintending work on a hard hole, and was standing directly over the dam in the trough. He was caught by a sudden outbreak in the hole, receiving burns of abdomen and legs which caused several months' layoff. Care should be taken to keep the legs and feet out of the trough, even on the first spell, and while working to stand as much to one side as possible. It is safest to place a shield and splasher, or cover plate, in front of or above the tapping hole after the first spell, as it occasionally happens that the hole is weak, "short," or "green," and unexpected outbreaks of iron are almost inevitable from time to time.

The use of roller tables or conveyors as shown in Fig. 9 instead of chutes for brick, together with some instruction in safe ways of taking the brick from the tables, should appreciably decrease the injuries from pinched fingers. The practice of tossing brick is to be discouraged when other means of moving them are available, as injuries are bound to occur. Injuries from the dropping brick on the hands and feet result from lack of skill or care, or from the hurry of the work and the fatigue of the men.

Fig. 7 shows blast-furnace boiler counterweighted doors which open in-

ward and upward, eliminating danger from any firebox explosion.

It goes without saying that safety work is of advantage to both employer and employe. Yet, in seriousness of burden, caused by unsafe conditions, the employer escapes lightly. With an accident rate of 500 per 1000 men, the estimated cost would be only $0.028 per ton of pig iron. The employe, on the other hand, stands one chance in two of partial impairment of earning power, amounting, on the average, to 2 to 3 per cent of his yearly income, not to mention his liability to loss in earning power of thousands of dollars by permanent disability. So it is true that accident prevention work on the part of the employer must rest on more than a desire for a good showing on the profit side of the ledger.

Another important inducement for the employer to provide the maximum of safety is embraced in the general labor situation. The mass of labor about blast furnace plants, except in one district, has been composed of immigrants, and the standard or level of wages has been the lowest of any department of the steel industry.

Labor—A Future Problem

It is a matter of record that Americans born of native or foreign parents are not attracted in large numbers to the industry. It is a live question as to whether it will be possible to continue to attract the immigrants, or whether with future changes of conditions in their native lands men will not cease to emigrate. It is more than likely that a future problem of the furnace industry will be to attract immigrants, or to attract American-born laborers, by making employment more inviting. The problem will be partly technical, involving the character of work to be required, and partly sociological, involving the conditions under which the work is performed. Development of safety measures, such as improvement of working conditions, that is, providing adequate sanitation, locker, bathing and lunch rooms, and drinking water facilities; encouraging better home life, conserving health; eliminating so far as possible fatigue and occupational diseases, and lessening the causes of dusts, gases, vapor and fume, excessive heat and cold, glaring lights will go far to supplement the work set for technical men in lightening and making more attractive the work performed about furnace plants. Thousands of dollars have been spent in this work and the tendency to make improvements is constantly growing. The record of many plants in this respect is one of progress and recognition of their responsibilities, and there has been almost more betterment in conditions of employment in the past five years than in the preceding 50.

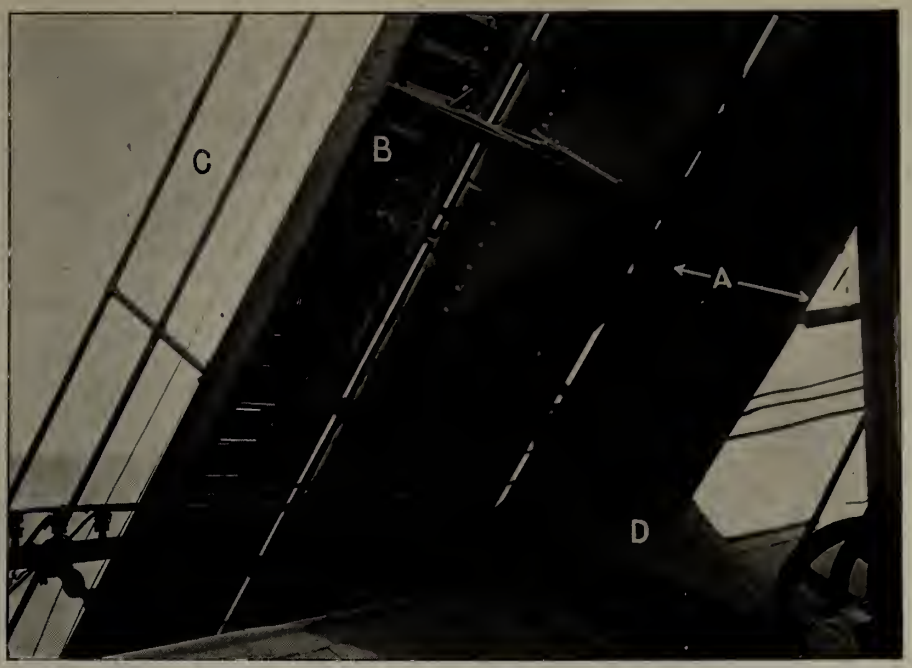


FIG. 8—SKIP INCLINE ADEQUATELY PROTECTED

A, steel-plate sheathing to prevent material from skip cars from falling on workmen passing below; *B*, stairway for workmen making repairs; *C*, handrail; *D*, chute for collecting falling material

Safety work, therefore, should rest on a very secure conviction in the minds of both employers and employes that it is a decided necessity.

The feeling that prompts men to ignore little wounds is their experience that former slight scratches or cuts have not caused trouble. Added to this conviction of immunity is the reluctance to report the injury for fear that it will result in their being ordered to stop work for a few days. Loss of wages may be a serious misfortune to a man earning an average wage about a furnace plant. The experience of more than one large company in the last two years indicates that it is possible to shorten to a marked degree the lost time attendant on minor injuries. Efficient treatment of minor injuries prevents a serious loss of time for those injured, and consequently their reluctance to report their injuries disappears. The reduction of lost time attendant on slight injuries is one of the most important accomplishments to be achieved in getting men interested in safe methods of work.



FIG. 9—HANDLING BRICK BY ROLLER CONVEYOR, SAFELY AND EFFICIENTLY

Canadian Mines and Ore Deposits

(Concluded from Page 916)

and blacksmith shop are located conveniently near the shaft.

All mine equipment is operated by electricity generated at Steephill Falls on the Magpie river, about 12 miles distant.

Moose Mountain Mine

Most of the deposits comprising the Moose Mountain mine are grouped around the village of Sellwood, province of Ontario. Sellwood is 82 miles distant by rail from Key Harbor.

Although the existence of deposits of banded iron formations had been known here since the early nineties it was only in 1901 that actual exploration was undertaken. The first development work was done in 1906 and in 1907 a small crushing plant was built. The first shipment of ore was made in 1908 when railway communication was established. The unfavorable reception which this ore was accorded because of its low iron content led in 1909 to the installation of a small magnetic cobbing plant, which was superseded in the following year by a larger and better equipped one. The enlarged plant continued in operation from August, 1910, to May, 1911, when it was closed down entirely, owing to unsatisfactory market conditions and to complaints made by buyers that the ore contained a too high percentage of fines. For the latter reason it was necessary to screen the ore before further shipment could be made. Since 1912 the fines have been treated by a Grondal concentrating and briquetting plant.

The ore deposits lie in a series of matamorphic schists of Archean age, the chief constituents of which are hornblende, chlorite, feldspar and quartz. The existence of 11 ore deposits of all grades has been established by surface and diamond drill exploration.

Up to the present mining operations have been confined to deposits Nos. 1 and 5, which consist chiefly of magnetite ore associated with hornblende and epidote.

The estimated ore reserves of the Moose Mountain district are slightly under 40,000,000 tons, the greater portion of which consists of fine-grained siliceous magnetite intervanced with siliceous material of both cherty and quartzitic texture. Experiments on the siliceous ore seem to indicate that 2.1 tons of siliceous ore are required to furnish one ton of concentrates averaging 65 per cent iron.

Concentrates necessarily have to be agglomerated in some way for satisfactory handling and for use in the blast furnace and this the owner of the mine has done by briquetting, the briquettes being burned in gas-fired kilns.

Iron Ore Produced and Smelted in Canada From 1887 to 1917

Calendar year	Production of iron ore in Canada short tons	Iron ore charged to Canadian blast furnaces: Canadian short tons	Imported short tons	Total short tons	Canadian ore in total ore charged per cent	Ratio Canadian production to total ore charged per cent
1887	76,330	60,434	.....	.....	....	....
1888	78,587	54,956	.....	.....	....	....
1889	84,181	65,670	.....	.....	....	....
1890	76,511	57,304	.....	.....	....	....
1891	68,979	60,933	.....	.....	....	....
1892	103,248	96,948	.....	.....	....	....
1893	125,602	124,053	.....	.....	....	....
1894	109,991	108,871	.....	.....	....	....
1895	102,797	93,208	.....	.....	....	....
1896	91,906	96,560	46,300	142,860	67.6	64.3
1897	50,705	53,658	55,722	109,380	49.0	46.3
1898	58,343	57,881	77,107	134,988	42.9	43.2
1899	74,617	66,384	120,650	187,034	35.5	39.9
1900	122,000	71,341	112,042	183,383	38.9	66.5
1901	313,646	156,613	361,010	517,623	30.2	60.6
1902	404,003	125,664	559,381	685,045	18.3	58.9
1903	264,294	82,035	485,911	567,946	14.4	46.5
1904	219,046	180,932	454,671	635,603	28.4	34.4
1905	291,097	116,974	861,847	978,821	12.0	29.7
1906	248,831	221,733	982,740	1,204,473	18.4	20.7
1907	312,856	244,104	1,117,260	1,361,364	17.9	22.9
1908	238,082	209,266	1,051,445	1,260,711	16.6	18.8
1909	268,043	231,994	1,235,000	1,466,994	15.8	18.3
1910	259,418	149,505	1,377,035	1,526,540	9.8	17.0
1911	210,344	67,434	1,628,368	1,695,802	4.0	12.4
1912	215,883	71,588	2,019,165	2,090,753	3.4	10.3
1913	307,634	139,436	2,110,828	2,250,264	6.2	13.7
1914	244,854	182,964	1,324,326	1,507,290	12.1	16.2
1915	398,112	293,305	1,463,488	1,756,793	16.7	22.6
1916	339,600	221,773	1,964,598	2,186,371	10.1	15.5

N. B.—This table is compiled from the figures given in the annual reports of the Division of Mineral Resources and Statistics, of the Mines Branch, Ottawa.

Study Post-War Problems

THOUGH peace terms and negotiations seem possibilities of the dim future, Great Britain vigorously is turning her head and hand to post-war problems. The British ministry of reconstruction has published a complete list of commissions and committees that have been created in various government departments to deal with questions which will arise when victory is won. Since the war began 87 commissions and committees have been appointed and these form 15 groups, which, with the number of committees to each, follow: (a) trade development, five committees dealing with general aspects and nine dealing with specific phases of the situation; (b) finance, two; (c) raw materials, six; (d) coal and power, two committees and four subcommittees (e) intelligence, two; (f) scientific and industrial research, two research boards, five standing, seven research, four inquiry and three provisional organization committees; (g) demobilization and disposal of stores, eight; (h) labor and employment, two; (i) agriculture and forest, four; (j) public administration, six; (k) housing, four; (l) education, eight committees and commissions; (m) aliens, two; (n) legal, three, and (o) miscellaneous, with three committees.

Consul General Robert P. Skinner at London states that special study is being given to carrying out the conclusions reached at the Paris trade conference and to meeting the changed trade conditions of the world after the war.

Measures are being devised to prevent an effective resumption of Germany's policy of peaceful penetration. Staples not made in England before the war are hereafter to be manufactured there, and especial attention is being given to the chemical and dye trades. In view of the heavy consumption of England's coal supply, effort is being exerted to establish a general policy of conservation.

The problem of atmospheric fixation, which has been such a powerful element of Germany's military advantage, is among the problems that the ministry of reconstruction is working upon. Another problem under consideration is the demobilization of the vast amount of labor diverted from its original occupations to war trades.

Pickands, Mather & Co. have issued an attractive 20-page booklet devoted to analyses of ores from their mines.

Standardized Cars Take Much Steel

Exclusive of Castings, Each Unit Calls for 15 to 19 Tons of Material—Approved Specifications Cover Many Parts—Both Cast Iron and Steel Wheels Will Be Used

NEW YORK April 9.—Car builders have submitted prices to the purchasing department of the railroad administration covering the various types of equipment for which standard specifications have been adopted. These bids are being studied and carefully checked preliminary to the reaching of a decision on how many cars will be purchased. There is also further consideration to be given to the appliances which will be used on the various types of cars. Until these matters are threshed out nothing may be expected with regard to a definite allotment of equipment.

The character and weight in net tons of the iron and steel requirements of each type of car exclusive of the castings are as follows:

	70-ton capacity		50-ton capacity	
Material	Hoppers, tons, per car	Gondolas, tons, per car	Hoppers, tons, per car	Gondolas tons, per car
Plates ..	9.583	9.855	7.334	7.105
Bars	0.811	1.039	1.270	1.005
Shapes...	3.761	2.820	2.916	3.006
Bolts and nuts ..	0.115	0.098	0.100	0.097
Rivets ..	0.531	0.578	0.476	0.428
Axles ..	2.014	2.014	1.658	1.658
Wheels...	2.600	2.600	2.600	2.600
Total..	19.415	19.004	16.354	15.899

What Specifications Cover

Specifications for the standard car types recently approved by the director general cover axles; bolts and nuts; brake beams and shoes; carbon steel bars for railway springs; cast-iron wheels; cast-steel bolsters and truck side frames; steel wheels; cast-springs; journal bearings; malleable iron castings; mild steel bars; steel castings; pressed steel bolsters; rivet steel and rivets; structural steel, steel plates and steel sheets for freight equipment cars; and wrought iron bars.

All bolts are to have square head and nut unless otherwise specified. Bolts for securing steel against steel are to have cotters, lock washers and lock nuts, in addition to common nut, and all bolts for securing wood against steel are to be riveted over nuts. The cars are to be equipped with KD-10-12 type of air brakes of either Westinghouse or New York Air Brake Co.'s manufacture. The brakes to be applied to all wheels. All piping to be black steel, merchantable, standard weight, and fittings to be malleable iron.

The draft gear is to be of the friction type, having a minimum capacity of 150,000 pounds. The drawbar yoke is to be of the vertical plane type of an improved design. The coupler is to be cast steel, in accordance with M. C. B. contour and specification. The center plate is to be (1) drop forged, or (2) cast steel. The side bearings are to be frictionless or plain. Frictionless side bearings to be of approved type. Plain side bearings can be used in repairs.

No. 22 Sheets Required

All box cars will have steel ends and underframes. The only difference in the bodies of the 40 and 50-ton single-sheathed box cars is in the trucks. The roof is to be galvanized steel No. 22 gage. The steel ends are to be (1) horizontal corrugated of three sheets; top sheet 3/16-inch thick, intermediate and bottom sheets ¼-inch thick with corrugations 2¼ inches deep; (2) vertical corrugated of two sheets, all ¼-inch thick with corrugations 2¼ inches deep; (3) plain steel ends with U-shape vertical stakes.

All hopper cars are constructed of steel throughout. The trucks for all the standard cars are covered by three specifications, one for the 40-ton cars, one for 50-tons cars and one for 70-ton cars. The truck frames for the 40 and 50-ton trucks are to be cast-steel side frames of U-section members with M. C. B. standards removable journal box; cast-steel side frame of U-section members with journal box cast integral; or arch bar type. Except for the exclusion of the arch-bar type, the same types of side frames are specified for the 70-ton truck. Tie bars for the cast-steel truck side frame are to be of the short type and two per frame.

The truck bolsters are to be cast steel with separate center plate, cast steel with integral center plate, or pressed steel. Cast-steel and built-up steel bolsters. Cast-steel bolsters must have a section modulus vertically 10 per cent greater than pressed-steel bolsters. Built-up bolsters must be as strong vertically as pressed-steel bolsters. All bolsters to have a transverse strength at least 50 per cent of vertical strength.

The center plates are to be drop forged or cast steel. Each 40 and 50-ton truck is to be equipped with two M. C. B. No. 2 brake beams, and each 70-ton truck with two M. C. B. No. 3 brake beams. The brake shoes are to be made with a reinforced back of cast iron. For the 40-ton truck, the wheels are to be M. C. B. standard for cars having axles with 5 x 9-inch journals. They are to be made of cast iron and weigh about 700 pounds each.

For the 50-ton hopper cars, the wheels are to be made of wrought steel, cast steel, or cast iron. For all other 50-ton cars, the wheels are to be of cast iron. They are to be M. C. B. standard for cars having axles with 5½ x 10-inch journals. Cast-iron wheels are to have a nominal weight of 725 pounds each.

The wheels for the 70-ton truck are to be M. C. B. standard wrought steel, for cars having axles with 6 x 11-inch journals. The axles are to be of open-hearth steel, smooth forged or rough turned between wheel seats and journals to be burnished. They are to be made in accordance with M. C. B. specifications with sulphur and phosphorus content modified to limit of 0.06 per cent. The journal boxes are to be of malleable iron, cast or pressed steel, complete with lids. The bearings are to be of brass, lined with lead. The bearing wedges are to be of drop forged or cast steel.

The railroad administration has prepared specifications for light and heavy types of the Mikado, Pacific and Mountain locomotives, and 6 and 8-inch wheel switch engines. These have been gone over by the locomotive builders and prices have been submitted.

Develop Sand Pits

Two large silica sand properties in Columbia county, Wis., recently have been purchased by new interests who will develop the properties for the use of foundries, glass factories, etc. F. A. Runkle of Portage, Wis., has purchased the property of the Silica Sand Corp. in Pacific. J. N. Hays, also of Portage, represents interests which have purchased a 33-acre tract in Columbia township, and is now preparing articles of incorporation.

Don't Need Women in Industry--Now

Whole Question of General Employment of Women Due to Labor Dislocation by War, Studied and Analyzed in Comprehensive Fashion—Long War Will Make Problem an Acute One—Unions Won't Suffer

BY C. E. KNOEPPEL

PARAMOUNT among the many important problems engrossing the minds of employers in these war times, is that of women in industry. With millions of places left vacant by the call to arms a possibility of the near future the industrial world is wondering how this slack best can be taken up. This question, when and whether women workers will be extensively needed and what preparation should be made for that contingency are ably answered in the paper presented by Mr. Knoeppel of C. E. Knoeppel & Co., New York City, industrial engineers, before the recent national conference on war's labor problems at Chicago.

ANSWERS to 1000 comprehensive questionnaires sent out by Mr. Knoeppel furnished the basis for an important discussion and conclusions on his paper. That women are not needed now but will be; that the present is the time not only to profit by Great Britain's experience of 1915, but to prepare for the recruiting of women workers; that ships are closely related to their entering the industrial army, and that there should be no antagonism to the movement by labor unions if the matter is approached by proper stages are some of the outstanding convictions he expresses and supports by various facts and statistics.

IN CONSIDERING this great subject, the first question to answer is whether or not we need women in large numbers in industry. To do this, three important factors must be taken into consideration:

The present military situation.
German strategy.
The shipping situation.

Germany, in addition to controlling the destinies of Austria-Hungary, Turkey and Bulgaria, is to all intents and purposes, mistress of Serbia, Belgium, Poland, part of France, part of Italy, Roumania and Russia. This gives Germany access to rich deposits of minerals; oils; vast wheat fields; the labor of conquered areas, through deportations; her several million prisoners of war, who are trained men, and the many hundreds of thousands of soldiers from eastern sections whom she can concentrate on the western front.

Can Germany break through, take Paris and then attack England? The foremost military expert in this country states that the result on the western front is a military stalemate. It has been demonstrated that no frontal attack by either side against the other, can break through, nor can the long, thin line be turned, with Switzerland at one end and Holland at the other. Can Germany be beaten economically? Not according to Ex-Ambassador Gerard, who knows the situation from four years of first hand study. Even if Germany gives up her captured territory, Pan-Germany will be an established fact with a population of 150,000,000, capable of maintaining an army of 30,000,000.

Truly, not a pretty picture when we see, after nearly four years of war, a successful conquest on the one side and a successful defense on the other.

The German Strategy

What is the reason for the above condition? Military preparedness? Yes, to some extent, but not altogether. Germany planned for a short war, but had to plan again and build a new machine. The allies, as they were for three years, were in a much better position from the standpoint of materials, men, money, command of the sea and ships. What accounts for the successful conquest of Serbia, Roumania, Russia and part of Italy, while Germany was holding the western front? German strategy, a fact admitted by Lloyd-George on Nov. 12 last.

I wish everyone here could read that admirable and illuminating article "Political Strategy",, by Andre Cheredame in the March issue of *The Atlantic Monthly*. The conclusion and findings of this remarkable man, who has studied the terrible strength of Germany for twenty years, are nothing short of uncanny. He states that from the battle of the Marne, down to the offensive against Italy, a period of 38 months, the whole strategy of Berlin was based on a plan developed in 1895. The remarkable thing about it is that this man submits a copy of a map contained in a booklet published in 1895 entitled "Greater Germany and Central Europe about 1950". The similarity between the map of 1895 and the performance of 1917 is sufficient evidence that there was more to it than just the military aspect. Plan and strategy are responsible.

The Shipping Situation

Since the allies are not at maximum efficiency, it will take from three to seven years to defeat Germany

decisively, and the reason the allies are not at maximum efficiency is lack of ships. If we cannot maintain a big army abroad through lack of ships, enormous quantities of aircraft, rifles, locomotives, trucks and automobiles, at the present rate of manufacture, will pile up in our ports, which will bring about industrial disorganization, as we will have to stop making war products, all of which shows that the key to our successfully waging this war is ships. If we can't get ships, and unless we double or triple our ship construction, it means but one thing, wait until we can get ships enough to put over the real American punch. We are going to get the ships, and they will be built faster than they are sunk, and when we have them we will put our army and supplies into Europe, which, with the allies, will put over the knockout. But not until every man and every woman, every boy and every girl, have done, not only their bit, but their utmost to win the war.

So you see that from the standpoint of the present military situation, the superior political strategy of the Germans, and the lack of shipping, a long and bitter war is ahead of us, requiring millions of men in the field.

We are told that the plan is ultimately to have 5,000,000 soldiers abroad. It is estimated that it takes 6½ persons in industry to maintain a soldier. This means an army of 37,500,000 persons. Statistics show that there are 45,000,000 between the ages of 18 and 45, 4,500,000 between 15 and 20, and 6,000,000 between 45 and 60, a total of 55,500,000 available. Taking from that the 37,500,000 needed in war pursuits, 18,000,000 are left available for regular activities.

As I see it, this answers the question as regards whether we will need women in industry or not. We will need them in increasing numbers before Berlin capitulates. If we are to win the war, it will be when 100,000,000 of us get behind the war as one man, giving time, money and, if necessary, lives, to the cause. Multiply all the latent ability and resources of each person by 100,000,000 and what will we have? The kaiser in exile. If we don't, he may decide to move his capital to Washington, from which point he would rule.

Are Women Needed in Industry Now?

WE WILL need women in industry, of that there can be no question. Do we need them now? My study does not indicate this, but it does indicate conclusively that later on we are going to need them in increasing numbers, and that now is the time to prepare and develop plans and policies so that when we begin to properly utilize their abilities we will be able to proceed along logical, fair and well-planned lines. The reason that we do not need women in industry now, is simply because we are not using our man power to the extent possible, nor as efficiently as we can.

In jails are men who under guard could be put to work in industrial or agricultural pursuits. Elderly men who have retired could perform work of a lighter character. Tramps, street loafers should be put at productive occupations. Workmen who take time off should be kept busy. We could take the cripples and the blind and teach them to be helpful—we have got to do it after the war—why not now? There are several million of male and female enemy aliens who could be placed at work under guards. We can also arrange for a carefully worked-out and properly executed plan of labor dilution, wherein a portion of the force in an efficient shop would be placed at the disposal of a less efficient plant. This by no means exhausts the list of places where men could be found, whose places, or most of them, could be filled by women.

In short, my claim is that we should first use the women in the lighter occupations in order to utilize our man power properly and avoid exploiting women, or putting them at industrial work before industry is ready for them, and my analysis indicates that industry is not ready for them as yet. By ready I mean providing safeguards, proper training, careful selection and the like.

This leads me to the conclusion that we need a policy, a plan of action, with the government behind it, and organized labor and the manufacturers of the country co-operating to the fullest.

The Broad Experience of Great Britain

THAT it takes 6.5 persons in industry to maintain a soldier, is sufficient evidence that military success depends entirely upon industrial success, and as yet we have not struck our stride industrially. A great deal remains to be done to get both capital and labor to co-operate with each other and with the government.

We can well consider the lesson that England was forced to learn. When the war was started, plans were made for the making of necessary munitions by employing women and inaugurating longer hours, overtime work and by speeding up production which had previously been strictly limited by the rules of the powerful English labor unions. When the plans were completed labor squashed them by refusing to work under conditions imposed. There was much talk of labor's lack of patriotism, though thousands of those who have laid down their lives for England were drawn from its ranks. Then the idea finally seeped in that it would be necessary to ask labor what it was willing to do before making additional plans.

The press of the world was quick to condemn the attitude of British workmen. While there was little that was commendable in their action, still it is probable that it was largely due to the methods used in dealing with them. This conclusion is justified by the later action of labor, after it had been taken into the councils of the government in placing all hard-earned rights, privileges and restrictions on

output upon the altar of the war god, enabling the employers to dilute labor, employ women, install automatic machinery, etc, so the men at the front might have shells, ammunition and other war needfuls.

How did England bring this all about? Miss Frances A. Kellor gives a concise description in her address on "Industrial Americanization":

First of all, England defined munitions work to cover the manufacture and repair of everything intended, adapted or suitable for use in war, including even housing of workmen. The result is that she has little difficulty today defining nonessential and essential industries.

A next important step was the suspension of trade customs. If there is controversy it goes to arbitration. This means any man can work at any job, skilled or unskilled, that women can be employed and all shops are open shops. At the same time, unions were protected. It is also provided that any departure during the war from any prewar practice shall be only for the period of war.

A very important action was the establishment of controlled industries. The minister of munitions has power to declare any establishment adapted for use in war a controlled industry. Wages were limited in such establishments, and when an employe changes from one to another where the rate is lower he is given a bonus to cover the difference. If workmen will agree to stay in such controlled establishments for six months, they are designated as munitions volunteers and get the standard rate of wages.

Employers are prohibited from soliciting by advertising or from inducing workmen in other industries to leave their work. Boards handle the dilution of labor for each industry. The mixing of skilled and unskilled workers and of women is carefully done. Strikes and lockouts have been made practically impossible. All such controversies go to the trade board. If it fails to deal with them, they go to arbitration boards for final award. The law not only deals with all concerted action involving a stoppage of work, but it penalizes any person who attempts to impede, delay, or restrict production, repair or transport of war material or any other necessary war work. A complete system of labor exchanges, nearly 400, is in operation.

What has been the result? An industrial efficiency in Great Britain undreamed of by the most radical efficiency crank. In England, having less than 50,000,000 population, there are, according to Helen Fraser, 1,250,000 women in industry replacing men, 1,000,000 in munitions making, 80,000 in government departments, 250,000 on farms, 10,000 per month are joining the women's army auxiliary corps, and 60,600 are in volunteer Red Cross work.

It takes from six to eight weeks to make the average English woman fit for the simpler operations on shells, shell parts and fuses, while the more intelligent in this line become lathe hands and tool setters. The British government has established 50 training schools since the war and thousands of women are being schooled in industrial activities. Most of the large plants have their own training classes.

Our Own Experience Up To This Time

MY STUDIES of the labor situation indicate that we are passing through Great Britain's experience during the first year of the war; that we have no well defined male or female labor program; and that there has not been the proper three-sided co-operation between employer, employe and the government. We have had strikes; we still have competition between manufacturers for workers, and we had to resort to a national advertising campaign to get shipworkers. We put enemy aliens outside of prescribed zones, without creating machinery to put them in productive occupation. We have withdrawn men from industry by the thousands with no program for replacing them. There are state, city, trade union and manufacturers' association employment bureaus and about 5000 private employment agencies. Employers say they cannot get help and must have women labor. Organized labor replies that there is no shortage of labor.

I agree fully with President Wilson and Secretary Baker, that we must protect and safeguard workers, especially women and children. I go on record by saying that we do not need women in industry now, if present man power can be made more efficient and we can recruit men from the lighter occupations. I go on record by also saying that in all discussions of plans and policies governing labor during war times labor should be presented, and now the council of national defense, the ordnance and labor departments all have woman's divisions.

Analysis of Countrywide Questionnaire

WITH a long war confronting us, calling for utmost effort, it is apparent that we will have to call upon the women in increasing numbers. It is further evident that we do not need women in industry to any great extent now. What is needed is a plan for the time when the need for women in industrial plants becomes pressing. In other words, we must first use our man power as efficiently as possible; then take men from the lighter occupations, substituting women, and then call upon the women for industrial work, during all of which time we should be so shaping things that women may be able to work to best advantage when the call comes.

The questionnaire had to do with location, selection and training of women; conditions—working, living and social; the work to be done by women; hours, fatigue and wages; existing laws; co-operation of the labor unions; women's organizations and the government, all of which are essential considerations in any intelligent presentation of the subject. It attracted no little attention. Answers were a revelation and a disappointment. A revelation, in that the general trend was thoroughly American, and showing conclusively that organized labor has nothing to fear from the manufacturing world on this question of women in industry. A disappointment in that there was a lack of plan and co-operation. No coordinated action so necessary in the successful solution of the problem existed.

From the answers received, manufacturers had no well-defined views as to what work women should do. A few felt that it would be unnecessary to subdivide operations. The concensus of opinion, however, was that work should be studied with the view to subdivision, in order that women might perform the lighter and less complex tasks and men the heavier and more complicated work.

After determining the nature of

work which women can perform with safety, the task becomes one of finding the women. Analysis of the answers to the questions revealed that there were a number of avenues of approach. A great many felt that as we become more and more organized for war, the nonessential industries employing women could contribute to the supply of female labor. Unquestionably, a great many women could be recruited from the ranks of those known as household servants. Childless married women could give all their time and the married women with grown-up families could serve part of their time. The so-called idle or leisure class could contribute many women to assist and many other unemployed women would like to work. A large number of wives and sisters of soldiers who have gone to camps or to the front, and a large number of women from rural districts could also be recruited. A review indicates that there would be plenty of women to draw from if they are needed.

The next point is how to induce them to enter industry. The concensus of opinion was that if wages for women are to be the same as paid men for the same work; if conditions are made both attractive and such that women can work without injury to their health, there would be no question about getting them to respond, should an appeal be generally made for women, through various means.

Knowing the work that women can do, and having worked out plans for inducing them to apply for work, the next step is that of selection. This problem seems easy of solution according to the answers received—simply match qualifications against requirements; find the women who can work and then train them.

Training the Women

Many of the women who apply for industrial work will be unfamiliar with factory work or the operation and handling of machinery, so that the matter of training becomes doubly important. It will be necessary to organize a system of competent instruction, if the change is to be made rapidly and efficiently.

Women hired should be immediately turned over to an instructor who should stay with them until they perform the operation as taught and return at intervals to watch progress. Instructors should be selected for their ability to explain things clearly; for pleasing personality, tact, patience, etc.

The matter of wages, hours of work and consideration of fatigue is most important. The principle "equal pay with men for equal work" was subscribed to by practically all who answered the questions, although several felt that earnings in advance of those paid men should be offered to attract women workers.

In analyzing the questions as to hours, rest and fatigue, the conclusions were, no night work, overtime or Sunday work; half Saturdays off; an 8-hour day, with a rest period in the morning and afternoon, in addition to the lunch period, and varying from 10 to 20 minutes. It was also felt that physicians, nurses or matrons should be employed to observe the conditions of women.

The question of the health of the woman worker is of vital importance, and too much emphasis cannot be put upon it.

Another very important factor in connection with the utilization of woman labor is the matter of the conditions under which they work. If they are not right, the result will be discontent and dissatisfaction. The shop is a second home. If this thought is made the basis for improvement in working conditions, there will be a much better relationship between workers and employers.

Women should first start on the lighter tasks, and as they become proficient can take up heavier work, and under no consideration should they be placed at what might be called dangerous occupations. Women should be segregated if this can be done, either by new buildings or rearrangement of departments or machines.

The contentment of a woman employe might be said to depend one-third on wages and working conditions, one-third on living conditions and one-third on good, wholesome amusement. The question of amusement is an important one and seldom receives the consideration which it deserves. Amusements are simple to provide, as they should be made self-supporting. Let the women determine their own social distinctions and run their own clubs. All you need to do is to supply the initiative to start them. Never deal with your employes on a charity basis. Let them pay for what they get.

It was felt, according to the answers received, that the labor unions would not take kindly to the introduction of women labor. The clash that is ever with us between capital and labor is another reason why this matter of employing women will not be settled without considerable discussion between workers and employers. This will be especially true if the labor leaders take the stand later on that there is no shortage in labor.

In the first place, no wholesale attempt should be made now to employ women. Man power should first be used fully and efficiently. Plans for women in industry should now be worked out, however, for in the event of a long war, which seems likely, women will be needed to the fullest extent. To this end steps should be taken by the government, by manufacturers and by women's organizations to make organized labor realize the seriousness of the international situation. It should be made plain to labor that no displacement of men will be made when men are available; that men returning after the war will be given work to do—and this must be a government promise. No difficulty should be encountered if in the use of women there are the following considerations: Equal pay for the same work; same hours; right of women to organize; suffrage, and maintenance of proper working, living and social conditions.

Post-Bellum Considerations

The question, "What about woman labor after the war?" is a most important one. One of the reasons labor is opposed to women in industry is its fear that women will remain to displace men after the war is over, which makes a consideration of this point very necessary. Many of those who answered the questions felt that the situation would take care of itself when the war was over.

The general feeling was, however, that the men who return should be given back their old jobs or that new work should be found for them; that home would make the real appeal to women and many would drop out for this reason. Several other factors must also be taken into consideration. Many foreigners will return to their home countries after the conclusion of peace. This will make large gaps in the ranks of industrial workers.

As a constructive measure a national commission should be appointed by the government or the war labor administration to consider this very point, and work up a logical plan of demobilization of women in industry; of maintaining the army as it returns and releasing the men to industry gradually, so as not to dump millions of them on the labor market before plans for the handling of both male and female labor have been worked out. Conferences with these ends in view, between labor unions, women's organizations, employers' associations and the government should also be arranged for, as well as a program of co-ordinated action between the employment bureaus of the country.

Plate Output Ahead of Ship Needs

Backwardness of March Vessel Production Shown Not to be Due to Failure of Mills—Steel Deliveries in First Quarter Exceed Requirements—Burden Put on Yard Management

WASHINGTON, April 9.—The point made by THE IRON TRADE REVIEW last week that the burden of the shipbuilding program now rests to a large extent with the plate mills, was thrice emphasized later in the week by J. Leonard Replogle, director of steel supply, of the war industries board. Stress was laid upon the plate mills' part in the program by Mr. Replogle in a letter to Charles Piez, vice president and general manager of the Emergency Fleet corporation, in testimony before the senate commerce committee, and in a statement to THE IRON TRADE REVIEW.

While the steel director's statements all emphasized the importance of unhampered plate production, they also very sharply called attention to the fact that any shortages which have occurred at the various shipyards or any which occur in the immediate future, have been due to lack of information from the corporation and the shipyards. Mr. Replogle said the steel industry has not been to blame for this condition and that he intends to defend the industry against attempts which may be made to place undue responsibility on the mills.

Failed to Give Requirements

Mr. Replogle's letter to Mr. Piez very frankly declared that the Fleet corporation has failed to make known its requirements as repeatedly asked by the steel director at various times since last November. His letter pointed out that the production of ship steel in the first quarter this year was in excess of the shipyards' requirements but that the so-called shortage was due to faulty instructions which resulted in some yards receiving less. This letter set forth month by month the production of plates and shapes as against the requirements, each month showing a surplus production.

While it is held inadvisable to make public the figures set forth by Mr. Replogle, it is, however, permissible to say that the steel delivered to the railroads for shipment to all yards in the first three months of the year was at a rate sufficient to build 550,000 tons of shipping a month, or more than 6,000,000 tons a year. This production rate, from the war industries board's point of view, is sufficient for the American merchant marine. In the week ending March 30, ship steel production reached 12,00 tons more than in any previous week in history.

But sufficient steel for American shipyards is not enough, Mr. Replogle emphatically declared. The demand for plates for England, which is urgent, the requirements for the railroad administration's car and locomotive building program, the orders booked for the navy's destroyer and eagle-boat schedules, the obligation of the United States to furnish plates in exchange for Japanese shipping, and several other equally important tonnage requirements, all are going to force sheet, plate and shape mills to roll steel as they never have before, Mr. Replogle said.

Fleet Orders Promptly Filled

Plate mills now are producing steel at 65 to 70 per cent of capacity, with Emergency Fleet orders receiving 100 per cent attention, Mr. Replogle assured the commerce committee of the senate. If the supply of raw materials, chiefly coke for pig iron, is kept up to requirements, and railroad transportation does not fail, shipyards should encounter little difficulty in the future, Mr. Replogle declared. With this object in mind, last week he conferred with Carl R. Gray, director of transportation in the railroad administration, and traffic managers of several leading coal-hauling roads with the result that sufficient cars will be supplied to keep in blast the furnaces serving the ship steel mills.

The shipping trouble, as far as steel is concerned, goes back to the days before the importance of ships was driven forcibly home, before the joint regime of E. N. Hurley, chairman of the shipping board, and Mr. Piez. Then orders for steel were placed regardless of the location of the mills in relation to fabrication plants or of the subsequent matter of delivery to shipyards. Some of those tonnages were reallocated, being given to mills nearer the fabrication plants, saving many thousands of ton-miles. New tonnages now are placed accordingly.

Emergency Fleet officials ten days ago attempted to shift the blame for the shortage of steel to the steel manufacturers. This was regarded generally as an unfair attitude and from the tone of a letter sent out later by Messrs. Hurley and Piez to all the shipbuilders, it is believed the real heads of the ship program recognize the fault really lies with the yards themselves, as stated by Mr. Replogle in his communication to Mr. Piez. The message to the shipbuilders said in part:

"Money, material and men have been supplied without stint by the nation. The keynote of the present situation is management—leadership. We are anxious that you should keep us fully informed concerning all causes of delay encountered in building ships this month, daily, by wire, if necessary. We will welcome any suggestions which you wish to make and if in your opinion the fault lies with the Emergency Fleet corporation, do not hesitate to advise us. We are holding you personally responsible for the successful management of your property. The American people want ships, not excuses."

The letter did not ask if the fault lay with the steel mills. No mention of them, or the lumber yards, was made. But the letter did show what had been done in steel shipbuilding in March. It said only 21 steel vessels, aggregating 166,700 tons, were delivered during March and that the minimum had been set at 197,075 tons. This estimate, the shipping chiefs said, had been made on estimates of shipbuilders. Thirty steel ships were launched for an aggregate tonnage of 219,586 tons, as against 11 wooden ships of approximately 40,000 tons.

Charged Slow Steel Delivery

The request asked of the shipyards and Mr. Replogle's letter to Mr. Piez followed the charges of George J. Baldwin, chairman of the board of the American International Shipbuilding Corp., that failure of the steel mills to make prompt deliveries was responsible for the Hog Island yard falling behind in its schedule. His charge was made before the senate committee and was somewhat similar to a statement made earlier in Philadelphia by F. T. Bowles, assistant general manager of the Fleet corporation, that mills would have to deliver 50,000 tons of steel more in April than this month otherwise would require.

While Mr. Replogle was testifying before the senate commerce committee on the question of ship steel, Eugene G.

Grace, president of the Bethlehem Steel Co., which is also heavily obligated in the shipbuilding program, both as a producer of steel and as a builder of ships, was testifying before the military affairs committee in secret session on the matter of ordnance steel for the army's artillery program. It is understood that he pointed out the labor and housing problems as the vital questions affecting the contracts his company holds.

Will Not Deal With Scrap Men Direct

WASHINGTON, April 9.—Present indications are that iron and steel scrap dealers will have to do business the remainder of the quarter without the 3½ per cent commission for which they have been bending every effort the past few weeks. Following the refusal of the steel products committee of the American Iron and Steel institute to sanction additional compensation on scrap sales other than those approved by the President, the war industries board's price-fixing committee appears to be lending a deaf ear to the deluge of telegrams and letters which have been asking authority for the commission.

As far as the question concerns the price committee of the war board, it has been learned authoritatively that the committee will have nothing to do with it unless the matter is formally presented by the institute's committee in accord with the plan laid down by R. S. Brookings, chairman of the price committee, at the steel conference, March 20 and 21 The war board's committee has declined to take up individual complaints of manufacturers or dealers and it has been stated that the scrap men's complaint is in the taboo class.

Commissioners Never Recognized

While the board and the committee are not expecting to mix in the discussion which seems to be centering among the scrap dealers themselves, the government's price control division officially has never taken cognizance of the dealers' commission, one way or another. The board has not interfered with customary trade practices, it is said. As far as official action is concerned, it believes customary practices still are followed. Recognition of the fact that the institute's committee omitted the commission in its revision of scrap extras and differentials, Feb. 21, would be acceptance, or rejection, of the entire extra list promulgated by the institute. This general list, now it may be stated, is more freely accepted by the government as meeting the obligation placed on the industry by the President in his price announcement of Nov. 5.

Unless the price committee recedes from its apparent stand, it is likely the scrap men will have to wait until the next steel price conference, to be called possibly for the middle of June, before the question can be taken up with the committee. The price-fixing body wants to adhere to the plan of receiving all communications on steel through the industry's usual representatives. If the scrap men should be given an individual hearing, precedent would be established for pig iron producers, rail makers, sheet and plate manufacturers, or any other group which might want special favors.

Would Exceed Minimum Price

While many of the petitions which have been circulated by the scrap men to the price committee contain the names of consumers as well as dealers and brokers, many of the steel men in Washington feel as does the institute's committee, that allowance of a commission will exceed the maximum prices announced by the President. The 3½ per cent commission would about offset the $1 cut in scrap prices which became effective April 1.

Stettinius Heads Industrial Branch of the Army

Washington, April 9.—The President last week officially answered the question of "what is to become of Stettinius" when he sent to the senate the nomination of "the surveyor general of army purchases", Edward R. Stettinius, formerly with J. P. Morgan & Co. in charge of the buying for the allies, to be second assistant secretary of war. The senate subsequently confirmed the appointment. Mr. Stettinius will be the legal head of all army matters affecting industries generally and individually.

Prior to nominating Mr. Stettinius, the President signed the bill creating the second assistant secretaryship and a third assistancy also. This latter post goes to Frederick F. Keppel, dean of Columbia University, who has been a special assistant and close adviser of Secretary Baker. The first assistant secretary, now acting secretary in the absence abroad of Mr. Baker, is Benedict R. Crowell.

Mr. Stettinius already has had a flying start for the new position for which he is named. He was called into service for the war department early in February, shortly after which it was announced he would be the "surveying eye" for Brig. Gen. Palmer E Pierce, director of purchases and supplies for all buying branches of the department. Since then his status, as far as legal authority is concerned, which seems to be a question generally raised, has been more or less doubtful. But he hasn't wasted any time. He has carefully studied the war department in all its activities and gone into every question pertaining to supplying and equipping the army.

Results of this preliminary work soon may be expected to be seen. In fact, it has been believed generally that most of the recent reorganization of the entire department has been on the suggestions made by him, by Assistant Secretary Crowell, Major General Goethals and other "progressives" who have supplanted the old school of militarists who were running the army machine as of its peace time basis. While at the capitol it is believed the insurgency of Senator Chamberlain and his senate military affairs committee is responsible for the new stride of the war department, at the lower end of Pennsylvania avenue it is declared the reorganization was "in the air" before the committee cut loose.

Launchings to Date More Than Million Tons

Washington, April 9. — Further details regarding the present program of stimulated shipbuilding made public by the shipping board show that a total of 182 steel vessels have been launched since the inauguration of the present campaign. Of these, 170 represent requisitioned vessels of 1,173,217 tons and 12 are contract ships of 99,200 tons. Of the latter, three have been fitted out. A total of 85 requisitioned vessels have been furnished and turned over to the shipping board; and 15 requisitioned ships have been reconveyed to their former owners before completion and now are in service. More favorable weather conditions have enabled Pacific coast yards to make more speed than those along the Atlantic.

Capital Odds and Ends

WASHINGTON, April 9.—Suit of the Atlantic, Gulf & Pacific Co. for $470,700.44, representing cost plus profit in the construction of a dry dock at Mare Island, has been denied by the court of claims. The government's counterclaim of $489.22 for excess cost of completing the dry dock upon the reletting of the plaintiff's forfeited contract to the Schofield Construction Co. was dismissed. The first company contracted in 1899 to construct the dock of timber for $729,000. The materials were changed to concrete and stone in 1900, and by agreement the price was raised to $1,125,233.83. The cofferdam gave way in 1903, this loss making it impossible to complete the dock at a profit within the contract price.

* * *

A short course in farm tractor operating will be open to women at Rutgers College, New Brunswick, N. J., if 10 applications are received.

* * *

A transfer charge of 10 cents per 100 pounds on galvanized culvert pipe at Mankato, Minn., is sought by the Chicago Great Western railroad.

* * *

S. A. Leland, representing the southwestern lines has filed an application with the interstate commerce commission to increase the loading of cars on shipments of pig iron from 50,000 tons to 56,000 tons.

* * *

The war trade board has decreed that repair parts of agricultural machinery may be shipped by mail under special export license to Japan, Italy, France and Great Britain providing they are posted by April 15.

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Presidents of railroads have been selected by Director General McAdoo as the operating heads of the railroads even where there are chairmen of boards or committee actually serving in that capacity.

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The Bronze Powder Works, Elizabeth, N. J., and the K. & E. Neumond Co., New Orleans, the majority of whose stock is owned by Germans, have been reorganized by the alien property custodian.

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The Chicago, Milwaukee & St. Paul railroad requests the establishment of a charge of $7.50 per hour or fraction thereof for use of locomotive and switching crew in handling cars for loading of iron ore from stock piles, or otherwise serving iron mining companies in Wisconsin and Michigan.

* * *

More than 350,000 acres of land in southwestern Idaho, north and south of Snake river, withdrawn for classification as to coal value, have been restored by President Wilson. They were found to be noncoal in character.

* * *

An increase of approximately 15 per cent in the carload rates on scrap iron is asked by the Raritan River railroad from points on its line to stations on the Pennsylvania, the Reading, the Erie, the Cornwall and the Central of New Jersey railroads.

* * *

F. S. Harmon & Co., Tacoma, Wash., has been awarded $103.20 excess charges on a shipment of 8600 pounds cast iron store stool bases from North Chicago to Tacoma. The railroads had charged a rate of $2.95 but the interstate commerce commission held that the rate should not exceed $1.75.

* * *

Exports in February decreased $93,000,000 from the January value, according to the bureau of foreign and domestic commerce, while imports fell $27,000,000. Exports for the eight months ending with February were valued at $3,857,000,000, as against $4,083,000,000 for the corresponding period in 1917; and imports went to $1,841,000,000, compared with $1,548,000,000 for the 1917 period.

Foreign Ore Imports Fade

February Receipts Drop to Remarkably Low Figure of 15,743 Tons—Other Iron and Steel Totals Small

THE extent to which the United States is relying upon its own supplies of iron ore for the production of the great tonnage of iron and steel products being furnished for war purposes, is clearly shown by the report of ore imports in February. Figures just issued by the bureau of foreign and domestic commerce show receipts for that month amounted to the remarkably small total of 15,743 tons. About two-thirds of this total came from Cuba and one-third from Spain, Canada being the only other shipper with 80 tons. February ore imports show a loss of 22,338 tons compared with the January figure of 38,081 tons, but are only about 18 per cent of the February, 1917, receipts of 86,314 tons. During the eight months ending with February, 1918, 565,258 tons of ore were shipped into this country, compared with 874,611 tons for a similar period in 1917, a loss of 309,353 tons.

	February,		Eight months end'g February,	
	1918	1917	1918	1917
Ferromanganese	1,417	6,379	17,252	55,735
Ferrosilicon	238	572	4,836	4,647
Manganese ore...	56,289	39,796	412,418	428,624
Tungsten bearing ore	482	353	3,386	2,683
Nickel, nickel oxide and matte.	3,102	5,038	37,718	38,965

IRON ORE IMPORTS, GROSS TONS

	February,		Eight months end'g February	
	1918	1917	1918	1917
Spain	4,663	23,738	25,459	140,854
Sweden	.....	15,439	17,718	123,376
Canada	80	5,687	141,687	83,952
Cuba	11,000	33.750	361,957	466,595
Oth. countries	.....	7,700	18,437	59,834
Total	15,743	86,314	565,258	874,611

Imports of iron and steel products in the second month of the year showed a total of 12,941 tons, which is practically the same as the low record for January of 12,875 tons, but is only about half of the February, 1917, figure of 24,947 tons. Both scrap and pig iron imports show an increase in February over January, but are considerably below the February, 1917,

IRON AND STEEL IMPORTS, GROSS TONS

	February,		Eight months ending Feb.,	
	1918	1917	1918	1917
Scrap	4,934	15,943	51,725	130,374
Pig iron.....	3,435	7,237	38,066	91,269
Steel ingots, bl'ms and billets.....	2,672	706	34,152	13,042
Wire rods.....	271	.....	1,435	2,063
Rails	33	240	6,376	10,836
Bar iron.....	400	95	2,110	3,990
Structural	117	12	6,658	676
Sh. and plates...	610	111	1,627	1,205
Tin and terne plate	32	35	32	553
Tin scrap.....	437	568	5,643	5,322
Total	12,941	24,947	147,824	259,330

tonnage. The pig iron imports for February amounted to 3435 tons, an increase of 1943 tons compared with January, when only 1492 tons were received in this country. Steel ingots, billets and blooms for February fell off to 2672 tons, compared witn 4847 tons in the previous month. This is, however, a considerable increase over February a year ago, with only 706 tons. The tonnage of other products imported is so small as to be almost negligible.

Better Output

Shown in Refractories and More New Business Being Accepted

Orders are being booked by makers of refractories in fair volume for first and second quality fire clay brick. The latter, because of the greater tonnage required, is in heaviest demand, largely from operators of blast and open-hearth furnaces. New brick-making capacity having been put into operation, producers are in a better shape to take care of inquiries and to make more satisfactory shipments, a considerable portion of which is for second quarter delivery. Shortage of coal and of lime is interfering with output, but improved car supplies are expected to develop and to allow greater operations. The latter now are estimated at about 60 per cent of capacity.

Prices remain unchanged, and so far as known, no revision is being contemplated. Makers say, however, that if a change were made, it would call for higher levels, and they are showing no concern about the government regulating their prices. As a matter of fact, it is reported that, when there was considerable talk about this being done, the refractories interests invited the government to make any investigation regarding their costs and prices, feeling confident that at least no reductions would be made. No change has been made in prices since the war broke out.

A serious condition exists in the refractories industry. Cars are not forthcoming to provide transportation for materials in which the blast furnaces and open hearths stand in imperative need. One producer summarizes the situation existing in his plant by citing the fact that for the past few weeks less than one-sixth of the cars asked for have been placed, and his plant has over three months output stacked and awaiting transportation. An embargo on box cars through the east has had its influence. Even open cars are wanting. The orders of steel companies having urgent government business seem to have no weight in securing cars for the delivery of needed refractories. The occasional intervention of someone with authority in the production department of the government secures relief for only one consumer and often leaves standing on the books of the refractories producer, orders which have already waited months for delivery.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.

(First Quality)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK

(Second Quality)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 160.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK

(Per Net Ton)

55 per cent	$40.00 base
76 per cent	100.00 base

Until federal officials can arrive to arrange for an adjustment, the Pittsfield, Mass., employes of the General Electric Co., have voted against a strike and to stay at work.

Obituaries

HENRY M. ATWOOD, aged 80, a prominent foundryman, died Saturday, April 6, at his home in Leetsdale, Pa. Before retiring from active business three years ago, Mr. Atwood was chairman of the board of directors and president of the Pittsburgh Valve, Foundry & Construction Co., which was organized in 1900. He was formerly a member of the firm of Atwood & McCaffrey, which along with other companies was absorbed into the Pittsburgh Valve, Foundry & Construction Co., and he became its first president. Mr. Atwood was born in Pittsburgh, the son of Moses Atwood, and moved to Leetsdale when he retired.

Archibald K. Baxter, president of the Baxter Gear Cutting & Mfg. Co., Cleveland, died in that city April 5, aged 41.

William J. Boland, Chicago, manufacturer of machinery, died April 3, following an attack of pneumonia. He was born in Ottawa, Can., 59 years ago and moved to Chicago in 1881.

J. R. Van Ormer, who for the past 18 years has been general sales agent of the Lukens Steel Co., Coatesville, Pa., died March 27, following a lingering illness of about seven years. He jointed the Lukens organization over 22 years ago.

Robert Perkins, who retired two years ago from the Massnick Phipps Mfg. Co., Detroit, auto parts, in which he owned the controlling interest, died recently at his home in Cleveland. He was born in Woolwich, Eng., in 1859, located in New Britain, Conn., as a young man and entered the automobile business with the Corbin Motor Vehicle Co. Later he moved to Detroit and became factory manager of the Gemmer Mfg. Co., steering gears and transmissions, resigning to purchase the Massnick-Phipps Mfg. Co.

Sidney A. Grant, inventor of envelope machines and attachments on chainless bicycles, died in Thompsonville, Conn., recently. He was born in Ovid, N. Y., 75 years ago but spent most of his life in Connecticut. He was one of the first to introduce the chainless bicycle on the market.

Frederick Ayer who with J. M. Longyear, Marquette, Mich., disposed of their coal and mineral interests in Spitzbergen to Norwegian capitalists at the outbreak of the war, died recently in Washington, aged 96. With Mr. Longyear, Mr. Ayer was identified with many iron ore and copper mining, timberland and other commercial operations in upper Michigan.

John F. Wilcox, prominent mechanical and consulting engineer of Pittsburgh, who was one of the country's pioneers in the development of the by-product process of coking coal, died recently at Tryon, N. C., where he had made his home for the past 10 years in an unsuccessful effort to regain his health. After he was graduated from Worcester and Philadelphia Polytechnic institutes, he entered the mechanical engineering profession in Pittsburgh and for many years specialized as a consulting engineer on blast furnace and steel construction. Mr. Wilcox erected the Otto-Hoffmann type of by-product plants at Glassport and Johnstown, Pa., Boston and Sydney, N. S., as well as at many other points through Fayette and Westmoreland counties, Pennsylvania.

Aircraft Work Grossly Mismanaged

—Aeronautical Society Committee

Report of Investigating Committee of Aeronautical Society of America Makes Sweeping Charges of Incompetency, Carelessness and Failure to Use Country's Productive Capacity or Specialized Skill in Airplane Program

DETAILS of disastrous delays which are preventing the fulfilment of the government's aircraft program, condemnation of the alleged shiftless direction of its execution and charges that false statements have been issued by government authorities regarding progress in airplane construction, are embodied in an extensive report of an investigating committee of the Aeronautical Society of America, Inc., just made public. The report of the investigating committee, which is composed of Leon Cammen, Thomas A. Hill and Charles W. Howell, allegates that not only is the present execution of the airplane program characterized by gross mistakes and misdirection which are bound to prevent effective results but the officials in charge of the work absolutely refuse the co-operation of experienced aeronautical engineers whose aid is essential. The report characterizes the present direction of the aircraft program as incompetent and demands that in the public interest changes in personnel be made without delay. In issuing the report, the society states that to maintain silence would be treasonable.

The most serious charges contained in the report are those which designate certain official statements of the government as untrue. A statement by Secretary Baker, in an official bulletin of Sept. 13, 1917, that "The United States aviation engine has passed its final tests" is characterized as unqualifiably untrue, since the statement which was made by Major J. C. Vincent in December, 1917, shows that the only test given to the engine at the time referred to by Secretary Baker was a 50-hour test, not at maximum horsepower. In fact, the report states it is doubtful that the engine even now has received the final test. Secretary Baker's statement also asserted that "tools for building the first engine were made even before the drawings were finished on the assumption that they would be correct." "It is absolutely impossible that this could be true," the report states, "as before the tools can be made, the dimensions of the parts have to be known." After alluding to several other misstatements by Secretary Baker, the report declares his assertion in October, 1917, that "work is in progress on practically the entire number of aeroplanes and motors, for which provision was made in the aviation bill passed by congress in July," as an inaccuracy of a still graver character, as at that time practically no work was in progress on the manufacture of machines, and in many cases the buildings in which the machines were to be manufactured were not yet built.

Only Two Planes Shipped

The report quotes as misleading Secretary Baker's announcement in February, 1918, which stated that the first American battleplanes were enroute to the front in France; it is pointed out that, as a matter of fact, only two planes then were shipped. At that time Secretary Baker stated that "these planes are equipped with the first Liberty motor from machine production; one of them in a recent test surpassed all records for speed and climbing for planes of that type." In view of the fact that several weeks after the shipment of these planes, the report states, such a vital piece of construction as the lubricating system of the Liberty motor has been found to be unsatisfactory, the talk about breaking a record sounds discouraging.

What Report Charges

Untruthful statements regarding progress of program by Secretary of War Baker.

Stifling of criticism of present Liberty motor.

Careless supervision in training methods leading to many accidents.

Ignorance of the recruiting requirements for the airplane service.

Retardation of research and invention by methods pursued.

Failure to utilize the country's full productive capacity.

"According to Reuter's agency," states the report, "the French general staff has in its possession proofs that the Germans, spurred to greater effort by the fear of American achievement, have vastly increased their aerial forces. Some 400 furniture, woodworking and piano factories have been converted to new uses; the Fokker company has taken over the great Berzina piano factory, near Schwerin, and large orders for parts have been placed in Switzerland. The production in Germany has reached 700 to 1000 planes a week, and is growing. The American danger also has been referred to on several occasions in German general staff orders. This would have been bad enough if the American planes were there," states the report, "but they are not."

The censorship which has been exercised over all matters connected with the execution of the aircraft program, not only has been unreasonably rigorous, it is declared, but in the majority of cases it has no military value whatsoever and at the same time materially interferes with production. The original statement about the Liberty motor was issued in September, 1917, but nobody was allowed to know any details of construction. About six weeks later a brief notice in *Power* gave a few details about this construction, enough to recognize the type but not enough to be of any other use. In the early part of December, Major J. G. Vincent presented a paper before the society of automotive engineers, which gave sufficient data for the enemy to recognize the vital features of the design of the engine, but not enough for American engineers to be of service to the government. Since then, little items of information have filtered through, indicative mainly of various teething troubles in the growth of the motor. If an American engineer were to go to the signal corps and ask to see the motor so as to offer his suggestions, the report intimates, he probably "would be thrown out of the room." "The result of this policy has been quite disastrous," the report continues. "The tooling up of the motor has been delayed, because the designers of the motor were not machine shop men. Several troubles, such as ignition in the high-altitude type, cooling and lubrication, could have been avoided if advice had been early sought or welcomed. The Liberty motor contains, even now, features which would not stand the open criticism of American engineers but this criticism is stifled by the fact that nobody but those who can be 'politically trusted' are permitted to see the motor."

Unsparing condemnation of the methods which have permitted the numerous accidents to aviators in training, is embodied in the report. These accidents are assigned to careless supervision and

it is stated that if some of the accidents which have taken place at training camps lately had happened at flying schools in civil life, the men in charge would have been indicted for homicide. The report details the various types of accidents, and the methods of preventing them.

The signal corps is quoted as offering the statement that "there is no lack of human aviation material, no matter if fit boys do go to other arms of war service," in explanation of the fact that recruiting for men for the flying service has been entirely discontinued. This is a plain case of careless ignorance of the problem before us, the report states, which shows that the men in charge of American aviation have failed to learn from European experience.

"The best flying material is furnished by young men between 21 and 25," it is stated. "The June, 1917, registration showed approximately 10,500,000 men of the ages between 21 and 31. Hence, roughly, 4,500,000 men would fall within the limits 21 and 25. Of these 4,500,000, roughly 25 per cent have to be eliminated as covering aliens and colored men, who could not be considered for the service. This leaves 3,375,000 men. As about one man in 100 makes really good material for the aircraft service flying branch, this would indicate that we have roughly about 40,000 men available. Perhaps 10,000 more could be secured by lowering the age limit to 19 years, which would be advisable anyhow. Still, going by averages, we have only 50,000 men. Of course this is more than sufficient for the number of planes which the present aircraft administration can produce, but it is entirely insufficient for the number which this country may need if the war is carried into 1919.

"It is by no means exaggerated to expect that between 75,000 and 80,000 machines with the American star may have to be delivered to the European front by the middle of 1919, if we want to smash the Hun. If 75,000 or 80,000 machines have to be delivered, that will mean 150,000 men, which again will mean that even a country with the best human resources in the world practically untouched, may have to strain its resources to the utmost and perhaps use the second best material to meet the most urgent situation that human history has seen.

"We can train our men," states the report, "so as to produce at least 300 per cent better men than either England or France have been able to produce, and we are not doing it, exclusively because everybody seems to think that we must copy every mistake and every defect of the foreign systems. Americans have never been so lavishly subservient to foreign examples. There seems to be some kind of a fog around the whole aviation program which precludes the men in charge from seeing either the great resources, human or material, of our country, or the ultimate aim of our program, and our boys will pay for this with their lives.

"The art of aviation is tremendously new," says the report, "and the efficiency of the engine, plane and accessories is comparatively low. In fact, it would not be an exaggeration to say that the efficiency of the aeroplane as a whole is hardly more than 3 per cent. It is because of these facts, that research and invention play an unusually important part in the development of aeronautics. The aeroplane is an American invention and America has the best machine shop men, the best makers of automatic machinery, and the biggest makers of automobile engines, so that when we entered into the struggle, the world had a right to expect that a new era had begun for aeronautical development. The matter of invention and research is of far greater importance than mere sentiment or advertising. One thousand bigger and better machines than any now available at the front, would be far more valuable than 5000 machines of the usual size and capacity and than 10,000 machines of inferior speed or carrying ability."

Need Research Facilities

The report reviews the present facilities for research and invention, stating that they are woefully inadequate, and that it is essential to reorganize the national advisory committee for aeronautics, provide ample laboratory facilities and a staff of men, and an appropriation of something like $25,000,000, instead of the $260,000 which now is being asked by the committee for next year.

"Probably not more than 5 per cent of the productive capacity of the country is being utilized for manufacturing airplanes, because apparently the ability to produce goods urgently needed, is by no means a sufficient consideration for securing a contract. It is found," states the report, "that in some cases, a broker's commission must be paid to a favored company by those who desire to get work.

"Thus, there have been before the United States entered into the war, several small aeroplane companies who have been doing very fine work on a small scale. When the United States entered the war these companies offered their facilities to the government. Cases are known," states the report, "where such companies were told that they could work only as sub-contractors to the Curtiss Aeroplane & Motor Corp., and when they went to the Curtiss company, they were told that they could secure such contracts only by paying the Curtiss company a commission somewhat in excess of 1 per cent, and further by recognizing the validity of the Curtiss patents, some of which now are under litigation and some others not considered as valid by American builders. Howard E. Coffin was asked by the directors of the Aeronautical society to explain why a company could make planes as a subcontractor to the Curtiss company, but not as a direct contractor to the United States government. Mr. Coffin startled the directors of the society by declaring that he was entirely ignorant of the existence of such a situation.

"That there have been great delays in production has been vigorously denied about three weeks ago," states the report, "and in fact there was a tendency to brand as pro-German propaganda all assertions that there have been delays. Of late, however, the pitiless logic of facts forced the war department to concede a delay at the rate of about 60 to 90 days, resulting in the fact that instead of thousands of planes being delivered to France by July 1, only the pitifully ridiculous number of 37 planes might be so delivered, sufficient for about six hours of fighting at the present rate." The report sets forth in detail the causes of the delay. It concludes with a statement that something like 75,000 and perhaps 100,000 aeroplanes may be expected of this country by April, 1919, and that in order to achieve this end changes both in the personnel and in the methods of the aircraft board are imperative.

On the subject of the Liberty motor, the report says: "The true story of the Liberty motor is one of which the country may well be proud." It points out, however, that the effect of fanciful, untrue and boastful statements employed in the publicity campaign of the aircraft officialdom, has been to create considerable uneasiness and suspicion regarding the motor in the minds of the people. It relates how the Packard Co., long before the country went to war, foresaw the emergency and spent on its own volition a large sum of money and two years of valuable experimentation in the development of an airplane engine which has formed the basis for the Liberty motor. "The Liberty motor represents in the first place the result of these two years of experiment, and further, the additional work put into it by a number of engineers, who though not specialists in aeronautical motors have done in the past splendid work in the production of the high speed gasoline engine. The motor is therefore without doubt an excellent motor but it is not the best motor that the country could have produced and it is not yet the motor which it is safe to use on the front."

How Lake Trade Will Be Handled

Details of Plan for Co-ordinating Movement of Iron Ore and Coal With Supply and Distribution of Transportation Facilities—Speakers at Meeting Urge Relief for the Railroads

DETAILS of the plan for mobilizing lake trade are being worked out. Most of the committees charged with the responsibility of directing lake trade have been chosen and are at work perfecting their organizations. Favorable ice reports lead to the hope that navigation on the Great Lakes will open earlier this year. Every effort is being made not only to have the boats ready to go into commission promptly but also to have the directing committees prepared to take up their tasks from the start.

The plan for handling the ore and coal trades through a closer co-ordination with the transportation agencies is shown graphically in the accompanying illustration. The plan was approved at meetings held last week by the different interests concerned. The newly organized ore and coal exchange will co-ordinate lake trade through the assistance of an administration committee composed of one representative from each of the four interests. Each of these interests in turn will have a major committee responsible to the American Iron and Steel institute, the shipping board, the fuel administration and the regional director of railroads, respectively. Each interest also will have an operating committee to handle properly the details of the ore and coal movement and the vessel and car supply.

At the meeting held last week by the shippers and consumers of Lake Superior ore, the co-operation of every firm was requested by the speakers and was unanimously granted by all the companies represented. H. G. Dalton of Pickands, Mather & Co., presided as chairman. Abstracts from his address and from that of Harry Coulby, president, Pittsburgh Steamship Co., are presented below. Railroad conditions are the crux of the whole situation and the speakers all emphasized the point brought out by Matthew Andrews of M. A. Hanna & Co., that "we have ample boats and the whole game is to avoid overloading the railroad machine."

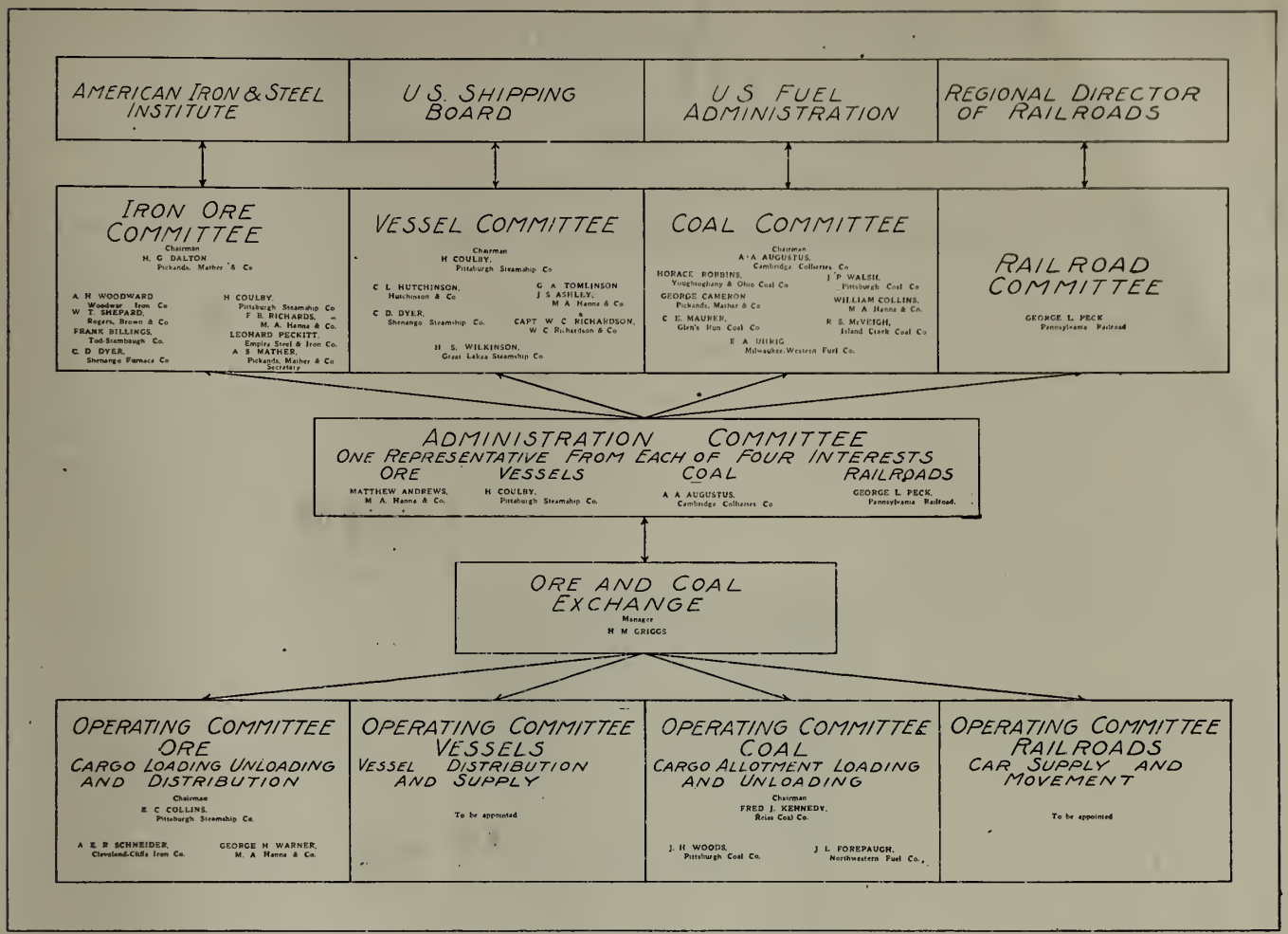
Importance of Conserving Transportation

BY HARRY COULBY

We all know that the weak link in our chain over here is our railroad transportation and our man power. We also all know that this is a war of steel and that it is vital that the great iron and steel industries should be kept going to the full limit of their capacity. We had experience last year in trying to work out co-ordination and co-operation between those industries, and the sum total of it is, notwithstanding it may have taken a little skin off in places, inconvenienced some people, and the methods may have seemed a little rough, the sum total of it was that here, on this second day of April, we are able to say that we moved all the ore that was needed, all the coal that was needed, all the grain that they could give to us up to the close of November. So while our methods may have been rough and crude, the result was fairly satisfactory.

Now, the men who are charged with the responsibility of this water and rail transportation, believe, in the light of their experience of last year, that we can do better the coming year than we did in the past. The past season illustrated our shortcomings and the places where we could show improvement. The basic principle, of course, of co-ordination and co-operation, must be absolute fairness. Everybody connected with the allied industries—ore, vessel, coal and railroad—and the committees that have been formed in these several industries will have to regard themselves as your servants and trustees for you, whether your interest is small or great, and will have to guard your interest jealously to see that every man gets fair treatment.

Each and every company is going to be a user and buyer of railroad transportation. It is a patriotic duty not to ask for or use a car of transportation during the season of 1918 that you don't absolutely need to carry you over until the season of 1919. I know how impossible it is at this time for any consumer of iron ore in this room to state definitely just how much ore he will consume between now and June 1, 1919, but if he will go at it from a patriotic standpoint, if he will realize that there is a vital thing in which he can be most helpful in helping out this nation in conserving railroad transportation, if he will sit down by himself and of himself, regardless of whether he thinks or is told that some other fellow is hogging it, and say, "Now, they are all going at this thing in the spirit of co-ordination, and they are my trustees, they represent me, and I am only going to ask those men and the railroads of this country to take care of me to the extent of my actual requirements," and refusing them, as you may find, they will have to as the season goes on, in accord with your consumption of ore, if every man in this room will make up his mind that so far as he is personally concerned he will do that, that he will give all these committees such information that they require about his ore movement, which rests entirely upon the rail transportation, if he will realize that we are only asking for that information because it will enable these committees to help him and the general industry of the country, if he will approach it from that standpoint and come across and do his duty in conserving the railroad transportation, my own belief is that with the railroads all centralized under one management, with the flexibility that comes in the routing and distribution of cars, if he will feel that whenever he is



HOW DELAYS IN MOVING LAKE FREIGHT ARE TO BE CUT DOWN

delaying the unloading of iron ore when he could unload it faster, that it is up to him to correct that, I feel satisfied myself that we can take care of every requirement of the furnaces, and of the coal men, and we can conserve the labor, which is essential. And if every man in this room will catch the spirit of it and will come across, when we get through at the end of the year you are all going to be satisfied, and you are all going to have all you ought to have, which is enough to carry you through until the spring of 1919.

Why a Plan of Co-operation is Needed

BY H. G. DALTON

We were rather successful last year in trying to mobilize and co-operate iron ore shipping as connected with the movement on the lakes, and we believe that we can profit by experience and have a better arrangement this year. We are going to try as far as possible not to interfere with any concern's business or any man's way of running his business. Necessarily, in times like these, where coordination is necessary, some questions have to be asked in order that the committees may intelligently perform their work, and some statistics will be required. They are going to be as few and far between as we can get along with.

The plan aims in its essential points, of course, to deal as lightly with the railroads as we can.

From the information supplied on the statistical blanks we are sending out, we are going to make a start and see if we can regulate the shipments so that these congestions of boats that we had last year will be avoided. The matter of large accumulations of ore in the upper lake parts, interfering with the operations of the mines, will be avoided. The embargoes in the lower lake districts, and the condition where one plant has more ore than it can work and another plant is idle—all those things we are going to try to regulate so that each concern will get its fair share of the facilities, continuously.

I want to emphasize again that this is a question of dealing lightly with the railroads. I think the government above all things wants you to be sure that you have your ample supply of ore, with proper mixtures to carry out your business. But they don't want you to have more than you need. So in estimating your requirements up to June 1, 1919, don't try to ask for more than you need, don't want and try to get it down faster than it can come regularly, or than the railroads can handle it and furnish cars for it. Don't try to get your ore any quicker than somebody else gets his ore. Be satisfied to work with us to try to give everybody his proportionate amount as we go along.

Labor Districts Assigned

United States Divided Into 13 Territories for Clearance and Distribution of Workmen—Several Chiefs Named

IN order to facilitate labor clearance and the distribution of workers under the auspices of the dement of labor, Secretary of Labor Wilson announces that the United States has been divided into 13 districts. This division has been made according to homogeneity of industries and employment problems. Each district will have a chief, whose duty it will be to not only keep track of the available labor supply in his district but to receive requests for workers from the employers in it. From data in hand, workmen will be distributed to the best possible advantage, and plans are being perfected in connection with their transportation.

Several district chiefs have already been appointed and the remaining territories will be assigned in the near future. The 13 districts with chiefs appointed to date, are:

District 1.—Maine, New Hampshire, Vermont, Massachusetts and Rhode Island, H. A. Stevens, district superintendent, Boston.

District 2.—New York, Connecticut and New Jersey.

District 3.—Pennsylvania and Delaware.

District 4.—Ohio and West Virginia.

District 5.—Maryland, Virginia, North Carolina and South Carolina, Ralph I. Izard, district superintendent, Richmond, Va.

District 6.—Georgia, Florida, Alabama, Mississippi and Louisiana.

District 7.—Indiana, Illinois, Michigan, Wisconsin and Iowa, Dr. P. L. Prentis, district superintendent, Chicago.

District 8.—Kentucky, Tennessee, Missouri and Arkansas.

District 9.—Minnesota, North Dakota, South Dakota and Montana.

District 10.—Nebraska, Kansas, Oklahoma, Colorado and Wyoming.

District 11.—Texas and New Mexico.

District 12.—Arizona, Utah, Nevada and California, William T. Boyce, district superintendent, San Francisco.

District 13.—Washington, Oregon and Idaho, Henry White, district superintendent, Seattle.

Thanks Labor Board

President Wilson has sent a note of thanks to each of the 12 members of the war labor conference board, comprising five representatives of employers, five of employes and two of the general public, who recently signed and presented what is practically a code of conduct for both capital and labor during the war. A copy of the congratulatory message sent ex-President Taft, public representative chosen by employers, follows:

My Dear Mr. Taft: I have been so much and so deeply gratified, in common I believe with the great body of our fellow citizens, by the outcome of the conferences of the war labor conference board that I cannot deny myself the privilege and pleasure of writing you at least a line to say how highly serviceable I believe the result attained will be to the country and how fine an example it is of the spirit of co-operation and concession which is drawing our people together in this time of supreme crisis.

Cordially and sincerely yours,

WOODROW WILSON.

Wants Each Community to Handle Housing

To correct a misapprehension concerning the government's intentions relating to the housing problem in industrial centers, Otto M. Eidlitz, director of housing and transportation, of the department of labor says it is the duty of each community to solve its own difficulty. "It is," he states, "a matter of much concern to all governmental departments that various districts are getting a wrong idea as to the government's intention in relieving the housing shortage. Communities should realize that due to the high cost of building materials, housing has been inadequate to meet even a normal growth and war work has accentuated this situation."

With reference to ways and means to solve the problem, Mr. Eidlitz recommends that those who have not done so be urged to take in boarders during the emergency and houses or institutions that could be converted into rooming houses for large numbers. He suggests that every possible method be followed and only as a last resort should new houses be erected, since the demand for government aid is greatly in excess of the funds available. "For workers who are induced to come from outlying districts," he states, "transportation facilities should be increased and improved." He calls attention to the fact that if war business is bringing large sums to a locality, it is not unreasonable to expect that a portion should be devoted to increasing that locality's housing.

Will Adjust Shipyard Pay to Living Costs

That shipping yard wages will keep pace with the high cost of living is the intention of representatives of the department of labor and the United States shipping board. Recent conferences have resulted in the recently issued statement that if satisfactory figures showing the exact living cost in shipbuilding centers, can be worked out, an effort will be made to arrange for the periodical adjustment of wages. Assistant Secretary of Labor Louis F. Post recently stated: "Unless wages and food prices which have been racing each other with the latter in the lead, can be equalized, the worker is going to receive smaller real wages no matter how much money he gets. The cost of living has been advancing at least 2 per cent a month and the man receiving the same wages as he received a year ago is only three-fourths as well off."

Statistics gathered by the labor department of conditions in the New York shipbuilding district show that from the beginning of the war until December, 1917, men's clothing had advanced 51.4, women's clothing 51.63, furniture and furnishing 56.47, food 55, housing 2.6, fuel and light 19.92 and miscellaneous items 44.68 per cent.

Lose Foundry Labor

Philadelphia, foundrymen are worrying over the extent to which the demands of the various shipyards in that district are taking their molders, coremakers and laborers away from them. Many of the foundries most seriously effected are working on urgent government contracts for castings. Owing to the loss of men who have gone to work in the shipyards lately, the output of these foundries is badly crippled. This subject was discussed at length at the meeting of the Philadelphia Foundrymen's association, April 3, and methods to cope with this difficulty were suggested and will be worked out. The meeting was addressed by H. A. Plusch, chemist for the Abrasive Co., of Philadelphia. Mr. Plusch spoke at length on the subject of abrasives, and particularly on the use of manufactured abrasives in the manufacture of the vital necessities of modern warfare. The Lansdale Foundry Co., Lansdale, Pa., of which H. I. Landis is president, has been proposed for membership.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

GEORGE L. DANFORTH JR., who has been appointed assistant general superintendent of the south works of the Illinois Steel Co., to succeed Herman A. Brassert, resigned, was born in Louisville, Ky., Nov. 8, 1879. After leaving school, he started to work in the open-hearth department of the Birmingham Rolling Mill Co., Birmingham, Ala., where a few years later he was made melter foreman. He was next employed in the open-hearth department of the Tennessee Coal, Iron & Railroad Co., at Ensley, Ala. In 1900 he entered the service of the Illinois Steel Co., at South Chicago, in the open-hearth furnace department. He has been with the Illinois Steel Co. ever since, with the exception of a short period, as furnaceman, melter foreman, superintendent of open hearths, superintendent of steel production and now as assistant general superintendent. On account of his early connection with the open-hearth department, and a natural ability and aptitude for his chosen work, Mr. Danforth became thoroughly proficient with this branch of the steel industry. He long has been considered one of the leading authorities in the manufacture of open-hearth steel. He is the originator of many important improvements in open-hearth practice and in open-hearth furnace construction.

J. W. Barber on April 1 became vice president of the Manown Mfg. Co., Pittsburgh, brick, fire clay, cupola linings, etc., succeeding C. H. Van Dyke, resigned.

A. E. Ostrander has been promoted from the position of mechanical engineer to that of general mechanical engineer of the New York office of the American Car & Foundry Co.

W. O. Duntley has resigned as president of the Chicago Pneumatic Tool Co., Chicago, in order to take a rest and then give more attention to his other business interests.

W. D. Bunker, former manager of the Judson Mfg. Co., San Francisco, was recently elected vice president and general manager to succeed A. D. Shepard, resigned.

C. S. Cleland on April 10, addressed the New England Foundrymen's association at Boston on the subject of core binders. He is sales manager of the Black Products Co., New York.

Wallace H. Rowe, president of the Pittsburgh Steel Co., who has been seriously ill, since the fall of 1917, is now well along the road to recovery. He is able to see his friends and enjoy automobile outings.

William A. Ragan, formerly special sales agent of the U. S. Reduction Co., has been appointed Indiana and western Ohio sales representative of the United Smelting & Aluminum Co., Inc., New Haven, Conn.



GEORGE L. DANFORTH JR.

Irving C. Berroyman has been made general superintendent of the Cleveland Worm Gear Co., Cleveland. He was for a number of years efficiency engineer for the Packard Motor Car Co., Detroit.

Thomas Crabtree, who has served as treasurer and superintendent of the Majestic Mfg. Co., Worcester, Mass., bicycle specialties, for a number of years, has become treasurer of the National Plating Co., Worcester, metal plater.

H. C. Dodge has been elected chairman of the board of the Laconia Car Co., Laconia, N. H. C. A. Towle is now vice president and general manager and W. A. Kilvert was made assistant treasurer.

W. Maxwell Reed, Framingham, Mass., has been made plant manager of the American Wringer Co., Woonsocket, R. I., a newly created position. He was formerly affiliated with John A. Roebling's Sons Co., Trenton, N. J.

H. F. Roberts affiliated for 10 years with the E. L. Essley Machinery Co., Chicago, recently as secretary now is connected with the sales force of the Marshall & Huschart Machinery Co., in that city.

F. W. Olsen was recently appointed general purchasing agent for all plants of the United States Radiator Corp., to succeed the late B. F. Rennison. The company's general offices are at Detroit, which will be Mr. Olsen's headquarters.

K. B. MacDonald, who formerly was vice president and director of the Curtiss Aeroplane & Motor Corp., Buffalo, has received a commission as lieutenant commander in charge of naval aircraft manufacture at League Island shipyard.

E. G. Howell, for 13 years associated with the Chicago sales office of the Republic Iron & Steel Co., has become associated with Briggs & Turivas, Inc., Westminster building, Chicago, dealers in iron and steel scrap.

James M. Smith is in charge of the shipbuilding plant of the Canadian Car & Foundry Co., at Fort William, Ont. The plant has a contract to turn out 12 trawlers for the French government before the end of the 1918 season, and is almost ready for operation.

J. A. Moore, who for two years has been foundry superintendent of the Russell Wheel & Foundry Co., Detroit, returned to the employ of the American Blower Co., Detroit, upon his recent resignation, resuming his duties as superintendent of the foundry.

Harry Fitch, who for a number of years has been associated with the John H. Fitch Co., Youngstown, O., wholesale grocer, resigned recently to accept an important position with the Liberty Steel Co., Warren, O. He will assume his new duties about July 1.

Theron L. Loose, who for five years has been superintendent of the Hendee Mfg. Co., Springfield,

Mass., motorcycles, resigned recently and has made no announcement as to further plans. His successor has not been named.

Fred H. Cozzens was recently made general sales manager of the Topp-Stewart Tractor Co., Clintonville, Wis., which expects to be manufacturing farm tractors on a large scale by May 1. Mr. Cozzens was formerly export sales manager of the Four Wheel Drive Auto Co., of that city.

Julius Nahoum, who resigned as managing director of the Vulcan Trading Corp. recently, has accepted the management of the Bi-Continent Trading Corp., 50 Broad street, New York City. The latter has enlarged its facilities for acting as an agent or principal in import and export business.

Charles Kramer, formerly chief clerk at the Carnegie Steel Co.'s warehouse at Waverly, N. J., has been promoted to the superintendency to succeed E. A. Amaden, who some time ago was appointed general superintendent of warehouses for the Carnegie company. J. H. Fogwell succeeds Mr. Kramer as chief clerk.

H. D. Mortenson is president of the reorganized Grants Pass Iron & Steel Works, recently incorporated under the name of the Klamath Iron & Steel Works. The former company has moved from Grants Pass, Oreg., to Klamath Falls, Oreg. J. W. Fitzpatrick is secretary and treasurer; B. M. Hall is general manager.

Howard J. Griffin, who for the past year has been Chicago district manager of the Milwaukee Electric Crane & Mfg. Co., Milwaukee, has been made Pittsburgh district manager, effective May 1. Prior to joining the Milwaukee Electric Crane organization, he was affiliated with the Allis-Chalmers Mfg. Co., for about 15 years.

William H. Barr, president of the Lumen Bearing Co., Buffalo, and president of the National Founders' association, and H. H. Rice, Detroit, past president of the National Metal Trades association, were speakers at the annual meeting and banquet of the New Haven, Conn., branch of the latter organization, April 3.

James A. Galligan has been appointed coke administrator for the Chicago district by the fuel administration and will have charge of the apportionment and distribution of coke. He is affiliated with the by-product coke industry in an important way with Pickands, Brown & Co., and the By-Products Coke Corp. Similar duties in the Detroit territory have been assigned to James A. Ballard.

T. E. Agnew has been appointed assistant superintendent of blast furnaces of the McKinney Steel Co., Cleveland, taking the place vacated by George O. Hollenbaugh, who became superintendent when Charles E. Ash resigned. Mr. Ash was recently made superintendent of blast furnaces of the Taylor-Wharton Steel Co., Wharton,

Charles R. Putnam has been transferred to the Cleveland district works of the American Steel & Wire Co. For the past two years he has been superintendent of the north works of the company at Worcester, Mass., prior to which he was located at Waukegan, Ill., going there from Cleveland. J. Lester Perry, superintendent of the south works, Worcester, succeeds Mr. Putnam as superintendent of the north works.

H. B. May, who for the past year has been efficiency engineer with the Youngstown Sheet & Tube Co., Youngstown, O., enlisted recently in the aviation corps and has reported at Washington for assignment. After being graduated with the 1913 class in mechanical engineering from the Louisiana State Institute, he was affiliated with the American Steel Foundry at its Alliance, Franklin and Welland, Can., plants before locating in Youngstown.

William E. Hoblitzell, who formerly was affiliated with the American Steel Foundries and more latterly with the Commonwealth Steel Co., Granite City, Ill., as general manager, has been appointed general manager of the Duquesne Steel Foundry Co., Coraopolis, Pa., to succeed R. A. Bull. Mr. Bull who recently received a captain's commission in the ordnance bureau of the war department, has left the services of the Duquesne Steel Foundry Co., temporarily.

Allan C. Davidson, who has been cost accountant in the pressed steel department of the Sharon Steel Hoop Co., and more recently in the auditor's office at Sharon, Pa., has been named chief clerk of the Mahoning division of the Steel Hoop company at Youngstown to succeed Walter E. Brown, who retired recently to manage the Jersey farm owned by Jonathan Warner, president of the Trumbull Steel Co. Mr. Brown was presented with a diamond pin by his associates.

Leon O. Hart, who has been assistant treasurer of the Driver-Harris Wire Co., Harrison, N. J., since March, 1917, prior to which time, he served as electrical engineer, was made treasurer at the company's recent annual meeting. He was born in Hoboken, N. J., in 1885, and was graduated from the Stevens institute of technology with the class of 1907 with the degree of mechanical engineer. After his graduation he worked as cadet engineer with the Public Service Gas Co., of New Jersey for about a year and then joined the Driver-Harris forces.

E. A. Taylor succeeds C. W. Adams as general production superintendent of all plants of the Maxwell Motors Co., that latter being appointed general factory manager. Mr. Taylor formerly was general superintendent of the company's Dayton plant but latterly occupied the same position at the Chalmers plant of the Maxwell company in Detroit. Myron Holzapple, Mr. Taylor's assistant at Detroit, has been made general superintendent of the Chalmers plant.

John A. Oartel, who for two years has been safety engineer of the Edgar Thomson Steel Works of the Carnegie Steel Co., at Braddock, Pa., has been made head of the safety first department of the Carnegie Steel Co., Pittsburgh, in charge of safety work in all plants of the Carnegie Steel Co., in the Pittsburgh and valley districts. He succeeds E. M. Peak, who enlisted in the United States army several months ago and who now holds the rank of captain.

H. D. Savage, vice president of the American Arch Co., New York and Chicago, has been made vice president of the Locomotive Pulverized Fuel Co., 30 Church street, New York, of which he has been manager of sales since 1917. Mr. Savage was born in Memphis, Tenn., and started his business career with the Ashland Fire Brick Co., Ashland, Ky. He became sales manager and served for 10 years. He was instrumental in forming the Refractory Manufacturers' association and served as its first president.

Archibald J. Wolfe has been placed in charge of the far western division of the W. J. Crouch Co., Inc., 253 Broadway, New York, exporter. He has been in charge of various sections of the foreign department of the National association of Manufacturers and for three years traveled abroad as commercial agent of the United States department of commerce. At one time he represented the United States Steel Corp., in Petrograd, visiting the Balkan States and Asia Minor.

Peter Stewart, Boylston, Mass., was recently promoted to the position of general superintendent of the south works of the American Steel & Wire Co., Worcester, Mass., to succeed J. Lester Perry. He was formerly assistant superintendent which position now is filled by Charles P. Vaill, who has been superintendent of the cable works. George T. Jones takes the latter position. J. Lester Perry has been transferred to the north works to succeed Charles R. Putnam as superintendent who has joined the organization in the Cleveland district.

Iron and Steel Men in War Machine

Christian Girl, Mover of Millions—Men and Munitions—By Motor Truck

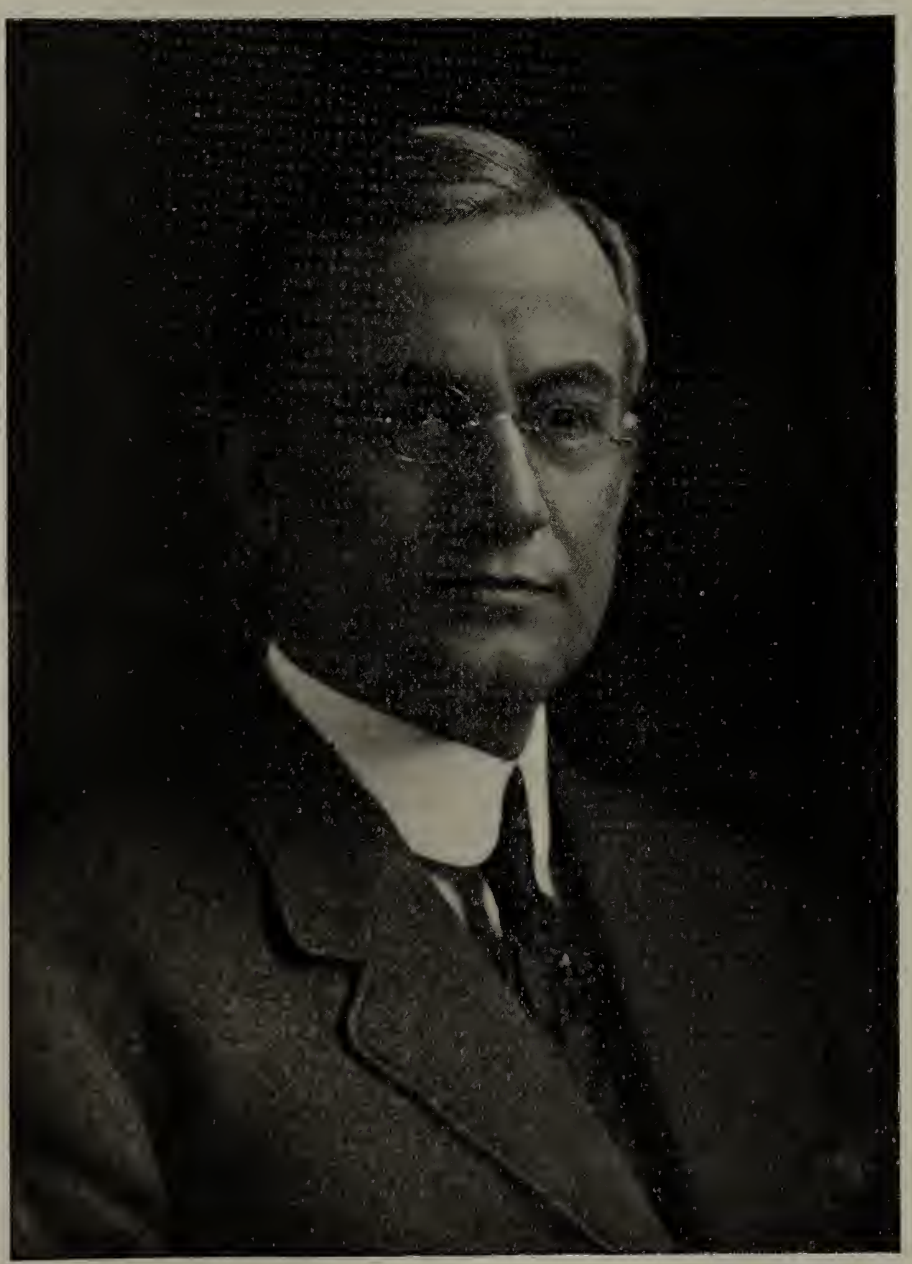
CHRISTIAN GIRL, ex-farmer, ex-preacher, ex-waterboy, ex-street sweeper, ex-laundry distributor, ex-coachman, ex-milk wagon driver, ex-postman and now automobile spring maker, steel parts manufacturer and chief supplier of motor trucks to the United States army, would seem almost to have run the whole gamut of occupations. All of which disproves his own statement that he dislikes work. In the ranks of those to whom the war has brought an enlarged scope of activity, in proportion to their ability, Mr. Girl stands high. Last August the war department realized that trucks would play an all-important part both at home and abroad in the successful prosecution of the war. Speed was a paramount necessity. Somebody must be secured who could bring the country's truck production facilities into line. Secretary Baker consulted with automobile makers. They unanimously voted for Mr. Girl. Why? Because they were familiar with his peculiar faculty for organizing others to do great things. They perhaps had heard him say "standardization means co-operation and co-operation means increased production." They could see that a standardized truck would mean the army's needs quickly filled. He was selected. In 48 hours, his personal affairs were in shape for his departure to Washington where within 10 days not only was his office established but a national organization perfected for the army's truck supply. That the confidence of the government and of the auto builders in Mr. Girl was not misplaced is demonstrated by the published statement that he now supplies the war machine with 12 motor trucks an hour.

The winding up of his personal affairs in 48 hours speaks well for the systematic side of Mr. Girl's character since he is president of the Standard Parts Co., Cleveland, capitalized in December, 1916, at $35,000,000. This company now operates 13 plants making automobile parts. This great business unit is the outgrowth of the Perfection Spring Co., Cleveland, formed in 1906 with Mr. Girl's $100 in cash and Michael McIntyre's ability to make automobile springs.

When a postman, Mr. Girl always on the lookout for an opportunity to break away, saw it in steel. Of this commodity he has said: "Steel is a basic product which people have to use at all times and in all seasons." He said to Mr. McIntyre: "Whatever we make must be perfect." So by expending 50 per cent of the cash on hand for fees, the Perfection Spring Co. was incorporated, with Mr. Girl as president and chief stock salesman. Without help from bankers, but founded upon an absolute belief of the president in himself and in his product, the company won out handsomely in the face of many obstacles.

Mr. Girl stated recently: "While the automobile is over draft age, liberty's greatest weapon against the kaiser's minions today is the motor truck." He is wielding that weapon vigorously by placing standardized trucks under Pershing in France sufficient to meet every call.

Mr. Girl was born on a farm in Elkhart, Ind., in 1874 and was educated in the Elkhart high schools.



CHRISTIAN GIRL

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Begin Loan Drive With Cheerful Spirit

WITH American troops taking their place in the allied line to combat the final assault of the German armies on the western front, the third big war loan has been launched under auspices differing from previous loans. Enthusiasm is greater than ever and on every side are expressions of determination to eclipse previous efforts. A direct appeal is being made to the people all over the country by means of a gigantic advertising campaign which is unprecedented in its scope and organization. Wall street is extremely optimistic over the prospects for large oversubscription to this loan. It also is greatly relieved over the fact that the treasury had overestimated its needs, reducing the minimum on this loan by several billion dollars. Iron and steel and allied manufacturers responded heartily to previous calls by the government for money and indications are that the third loan will receive similar broad participation, despite reduced earnings of many corporations during the first quarter of this year. The feature of the new issue of 4¼ per cent bonds is the placing of the redemption date in 1928, or only 10 years away, as against a 25-year maturity for the outstanding 4s and a 30-year maturity for the outstanding 3½s.

Wall Street Confident

Wall street opinion, as reflected in the stock market, since the first onslaught has been that the efforts of the Germans would fail. After the beginning of the first attack on March 21 the stock market declined slightly but recovered almost immediately, since which time it has been dull but steady. Trading was less active last week than at any time since August, 1916. Stocks of iron and steel producers advanced fractionally. President Wilson on Saturday signed the bill creating a War Finance Corp., with a capital of $500,000,000 and with authority to issue $3,000,000,000 in bonds for the assistance of essential war industries. The railroads are expected to benefit greatly by this step and the placing of orders by them will likely follow.

Carbon's Net Large

That the high peak of earnings for the Carbon Steel Co., Pittsburgh, was reached in the final quarter of 1917, and that earnings for the first quarter of 1918, because of fuel shortage, adverse weather conditions, freight embargoes, etc., will be much less was the purport of President Charles McKnight's recent statement to stockholders. Net profits for the quarter ended Dec. 31, less sundry adjustments were $871,604. While the total surplus at the end of the year was $3,851,167. After deducting $250,000 for dividends; $76,491 employes' bonus for fiscal year ended Sept. 30; $349,722 estimated income and express profits taxes, and $188,070 for depreciation, the net surplus on Jan. 1 was $2,918,633.

Stock Again Raised

With the proposed increase of $600,000 in capitalization, made necessary by contemplated plant extensions, the Liberty Steel Co., Warren, O., will have outstanding $1,000,000 common stock, $500,000 preferred and $150,000 bonds. This will make the second increase in capital stock before the plant is completed. It is reported that work will go forward immediately on the four proposed additional tin mills, making 12 in all, with an annual capacity of about 900,000 base boxes.

Earnings Exceed Record

An annual report of the condition of the By-Products Coke Corp., Syracuse, N. Y., shows that 1917 was the best year in its history. Total earnings for the year ended Dec. 31, were $3,415,259 compared with $2,473,345 for 1916. The company's best year prior to 1916 was 1913, when the earnings were $869,359 as against $780,724 in 1915. Net earnings in 1917 totaled $3,089,783, compared with $2,219,643 in 1916 and $607,985 in 1915. Assets and liabilities, according to the company's trial balance sheet as of Dec. 31, totaled $17,771,002, as compared with $11,986,646 at the end of 1916.

Sloss Net Liberal

Earnings of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., during 13 months ended Dec. 31, 1917, totaled $2,152,373 as against $1,990,675 for the year ending Nov. 30, 1916, according to the financial statement just issued. The fiscal year has now been changed to correspond with the calendar year and the following comparative income account gives the figures for those periods:

	1917	1916
Balance	$2,152,373	$1,990,675
Operating profit	$3,370,614	$2,230,000
Interest	227,500	239,325
Deprec. and depletion.	665,741	.....
War taxes	325,000	.....
Preferred dividend	573,881	469,000
Common dividend	148,869	.....
Surplus	$1,429,623	$1,521,675

The amount available for common after preferred dividends was equal to $15.78 a share as compared with $15.22 the previous period.

Lull is Experienced

W. H. Westinghouse, chairman of the board of the Canadian Westinghouse Co., in presenting its financial statement said:

"The business aspect of the first half of the past year was a continued activity at high pressure in execution of previously placed orders for war supplies. In the latter portion of the year, with the realization that for reasons entirely apart from the record of successful performance made by the manufacturers of Canada, further allotments on a like scale would not be forthcoming in the immediate future, a general curtailment of operations took place which was the first lull in a continued strain of more than two years. These circumstances found your company with a some-

what greater than normal accumulation of orders booked for its standard lines of apparatus, and, with completion of its munitions work, successful attention was given to expanding output of this regular product."

Net operating income for 1917, after deductions for war taxes, patriotic contributions, etc., was $957,285. Other income brings the total to $1,011,276. In 1916 the operating income was $1,154,534 and in 1915 it was $860,628. After deducting $165,000 for depreciation, a balance of $846,276 was available for dividends.

Huge Earnings Enjoyed

Among those who have made records for high earnings in 1917, the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., stands high. Net earnings increased from $359,374 in 1916 to $1,619,569, or over 300 per cent. After deductions for interest, contingencies, war taxes, etc., $540,154 was left for dividends. Preferred dividends of $131,341 were paid and the surplus of $408,813 was equal to $25.55 a share on the $1,600,000 common stock. At the end of 1916 the surplus was $79,205 and was equal to $4.99 a share. The comparative income account follows:

	1917	1916
Net earnings	$1,619,569	$359,374
Interest	211,053	147,500
War taxes	410,000	.....
Reserves	458,362	.....
Balance	$540,154	$211,874
Preferred dividends	131,341	132,669
Surplus	$408,813	$79,205

Doubles Its Profits

With sales and profits more than double the 1916 figure, the United Alloy Steel Co., Canton, O., had the most successful year in its history during 1917. Gross sales approximated $33,700,000 as against $16,700,000 in 1916, compared with $9,800,000 in 1915. This increased production was made possible by the new plant B, which practically doubled the company's ingot capacity. Net profits for the year were $6,400,000, while in 1916 they totaled $3,000,000 and in 1915, $2,600,000. Federal taxes were estimated at $1,500,000, and this deducted with an allowance for depreciation, the net earnings amounted to $4,400,000 equivalent to $8.80 a share on the capital stock.

Largely on Cash Basis

President Finley P. Mount of the Advance-Rumely Co., La Porte, Ind., and Battle Creek, Mich., in his annual report to stockholders says that 80 per cent of the company's business is now on a cash basis. "Your company's cash position," he states, "has been so strengthened that no borrowing was done in 1917 and none is contemplated in 1918."

Net earnings for 1917 were $550,557 or 4.40 per cent on the $12,500,000 preferred stock, as compared with $283,478 or 2.27 per cent earned in 1916. During the year $701,625 was set aside as a reserve against depreciation of assets. The comparative income account follows:

	1917	1916
Gross profit	$2,101,832	$1,757,344
Other income	317,394	420,976
Total income	2,419,226	2,178,320
General expense	1,703,468	1,689,941
Net profits	715,758	488,379
Interest	165,200	204,901
Surplus	550,557	283,478
Previous surplus	283,478	.....
Total surplus	834,035	283,478

Submarine Gains Reduced

While the net income of the Electric Boat Co. in 1917 was $2,080,038, equivalent to $27.11 per share, as compared with $6,479,449 in 1916, or $84.45 per share, dividends paid out in 1916 totaled $4,603,260 as against only $1,380,978 in 1917. Surplus for the year amounted to $699,060 as compared with $1,876,189 in 1916. During the year $1,168,094 was written off against the reduction in the market price of Russian rubles owing for submarines shipped to Russia. The net income of the Submarine Boat Corp. for the year was $1,248,099, and President Henry R. Carse explains that the margin of profit in the building of submarines has been narrowed by the increased costs for labor and materials. "Production has been interfered with," he states, "because of the need for training large forces of men in special lines of work". Unfinished business on the books of the Electric Boat Co. and the Electro Dynamic Co. Jan. 1, 1918, was in excess of $53,000,000.

Tool Companies Merge

Representing a merger of the Aurora Automatic Machinery Co. and the Independent Pneumatic Tool Co., Chicago, a certificate has been filed at Dover, Del., by the former changing its name to the Independent Tool Co. The Independent company has previously been a subsidiary of the Aurora Automatic, which owned all the former's outstanding stock. The combined pamphlet report of the Aurora Automatic Machinery and Independent Pneumatic Tool Cos. for the year ended Dec. 31, 1917, shows net earnings of $819,636 from which a reserve of $179,731 was set aside for war taxes, interest, etc. The cash position of the company shows a remarkable gain over the previous year, the figures being $274,042 in 1917 as compared with $8373 in 1916.

Release Toluol

For Private Consumption But Price Not Fixed—Benzol Weaker

New York, April 6.—The committee of the war industries board named to co-ordinate the government requirements of toluol so that sufficient quantities might be set aside for essential commercial requirements, has acted favorably upon a number of applications from consumers. The quantities granted so far are not large and only a few releases have been allowed. It is expected, however, that the action of the past week foreshadows a policy of providing for essential commercial requirements on a growing scale. It is unlikely that at any time in the near future, enough toluol will be released to take care of all requirements. It is felt by the committee that some uses not imperative to public welfare will have to be eliminated during the war. No price has been fixed on the toluol released for private consumption but it is expected that higher than $1.50 per gallon at producers' plants, the price that the government is paying, will be set. The market probably will range from $1.75 to $2 per gallon at producers' plants.

The market on benzol is weaker and prices cover a wide range. Pure benzol may be quoted at 30 to 40 cents per gallon. A number of large sales have been made during the week at 30 to 35 cents. Phenol, solvent naphtha and naphthalin reflect no change. Sales of phenol in only occasional spot lots are going at 52 to 55 cents per pound. Solvent naphtha continues strong at 18 to 22 cents per gallon. Naphthalin is quoted at 10 to 12 cents per pound, but this range is almost entirely nominal, since producers, by reason of their sold-up condition, are unable to accept any business.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.30 to .40
Toluol	(nominal)
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12

Per 100 Pounds at Seaboard

Sulphate of ammonia (nominal)	$5.40 to 5.50

Contract

Pure benzol	$0.30 to .40
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia.....nominal

Western Tool Inquiries Increase

Steady Demand Indicates Fulfillment of Promised Westward Trend of Heavy Ordnance Construction—Eastern Requirements Are Light in All Lines—Limited Crane Business Develops from Isolated Sources

LIGHT buying and a comparative lull governs in the eastern machine tool market, while the districts west of Pittsburgh report a steady and increasing demand for practically all classes of shop equipment. This condition has been indicated by the trend of war orders and expected contracts during the past two weeks. Clearly defined lines of demarcation relative to the class of equipment needed cannot be closely drawn geographically as practically every class of machine shop is being steadily called into war service. However, during the past week Detroit has developed a large demand for heavy equipment suitable for the manufacture of carriages, mounts and tubes for large guns. The shell situation seems dormant, following the absorption of contracts covering the needs of the current period of the war. Increased activity on this class of munitions, however, may be expected soon. That the government is thoroughly awake to every ramification of the machine industry is evidenced by the supervision which this week diverted from export to France a list of machines which is capable of doing valuable service in this country. Dealers are appreciating the government attitude in the emergencies which arise, and are cooperating without question in allotting such tools as they can obtain, to manufacturers whose needs are for war essentials. The question of price has not up to the present entered into those individual cases where priority has governed. Deliveries show little change, but the lull in some quarters, it is hoped, will allow manufacturers a breathing spell in which to catch up, and incidentally to prepare for the demand which is impending. In remote instances, a tendency to secure stock tools against the coming increase in demand has been noted. Tool prices show an upward trend all along the line. Crane orders are slack.

Additional Tool Demand Gathers Volume

WHILE the situation in the eastern machine tool market has been quiet for some time, sellers pronounce the volume of demand as now being the smallest in many weeks. No large lists are extant and there doesn't appear to be even the volume of small inquiries which has comprised the bulk of demand during the past month. This lull, while welcome in many respects to machine tool builders, is causing some apprehension owing to the speedy deliveries which no doubt will be demanded once the government gets its new program under way. There has been some quiet buying by the government in anticipation of this work, however, and in this connection an action of considerable significance recently was taken by a Pennsylvania builder in cancelling a large order for tools from a New York export house. These tools, which aggregated many thousands of dollars, were purchased for stock and were later to be sold, as demand arose, in France and other allied countries. That these tools would soon find their way into effective use, there was little question. Yet, inasmuch as the purpose and the urgency of the work for which they would serve was not apparent, influence caused the machine tool builder to cancel the contract.

Machine Deliveries Improve

Deliveries on machine tools generally are somewhat better, although large lathes, ranging from 32 inches up, and shapers are exceedingly scarce for early shipment. It is believed that the best that can be done in a majority of instances on these tools is six or seven months. Radial drills can be had in about two months, while shapers may be obtained in little less time. Milling machines, as a rule, are being quoted for delivery in about three months. Small lathes appear plentiful. Despite the somewhat easier position of machine tool builders, prices in several instances are tending upward. In addition to advances recently noted, an increase of 5 per cent went into effect April 5 on a line of shapers and a boost of 15 per cent in turret lathes is scheduled for April 15. It is thought that these advances soon will become more general. This upward trend in prices is said to reflect the steadily increasing costs of skilled labor.

Included in recent business is an order by the Virginia Shipbuilding Co. for a number of tools for its plate and angle shop at Alexandria, Va. The Sun Shipbuilding Co., 1428 South Penn Square, Philadelphia, recently bought a few radial drills. Several turret lathes were included in the recent purchase of the John Thompson Press Co., Long Island City, N. Y. The Pneumatic Tool Supply Co., Rahway, N. J., is buying equipment for a new machine shop. Some tools still are to be bought by the Singer Mfg. Co., which is erecting a $300,000 addition to its plant at Elizabethport, N. J.

Demand for cranes shows no improvement, as little is coming out in the way of new inquiry. Included in business now before sellers are 13 3-ton electric hoists for the Chester Shipbuilding Co., Chester, Pa., three travelers and one transfer bridge for the Braden Copper Co., New York; one 20-ton electric crane for the Thomas Iron Co., Philadelphia, and one 15-ton traveler for Westinghouse, Church, Kerr & Co., New York City, for installation in the government's new explosive plant at Sheffield, Ala.

Intermittent Small Lots in Chicago Market

LARGE lots of shop equipment seem to be a thing of the past in the Chicago market for the present and attention now is being given to fill-in buying and single tools for concerns which have expanded their needs.

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There's an Agathon Alloy for every purpose, and each is uniform in its adherence to the superlative Agathon standard of quality



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AGATHON Chrome Vanadium
AGATHON Chrome Steel
AGATHON Chrome Nickel
AGATHON Nickel Steels
AGATHON High Carbon **AGATHON Special Analyses**

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Cleveland Office: Hickox Building. The Hamill-Hickox Company, District Representatives
Chicago Office: 1370 People's Gas Bldg., 122 South Michigan Blvd. C. H. Beach, District Representative
Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager
Syracuse Office: 621 University Blk. T. B. Davies, District Sales Manager
J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents

Say you saw it in THE IRON TRADE REVIEW

Even the arsenal at Rock Island is buying only the odds and ends not at first needed, to round out shop equipment. The Standard Steel Car Co., Hammond, Ind., is still taking some machinery, supplementing former heavy buying. This expansion is believed to be about complete. The Davenport Mfg. Co., Davenport, Iowa, has taken a subcontract for war work and is in the market for general machine shop equipment. Deere & Co. have bought the plant and business of the Waterloo Gas Engine Co., Waterloo, Iowa, and will make it their tractor department. Considerable equipment is being bought by tractor manufacturers, as this industry is expanding rapidly under stress of war demand. Numerous price advances are being made taking the general market level gradually upward. The Western Foundry & Machine Co., Moline, Ill., will build a foundry. The Andrews Engineering Co., Chicago, is building a large shop equipped with 10-ton crane to manufacture steel mill machinery. Chicago is planning to spend nearly $5,000,000 for new bridges of the bascule type. The Tri-City Steel Co., Madison, Ill., manufacturer of railroad equipment will build a rolling mill at that place. The Allis-Chalmers Mfg. Co., West Allis, Wis., will build an additional foundry. The Hebb Motor Co., Lincoln, Nebr., plans to build a plant at Havelock, Nebr. The Schultheis Co., San Diego, Cal., is building a plant at Los Angeles, including foundry and machine shop.

Brisk Demand Noted in Cleveland District

DEALERS in northern Ohio and Michigan report a steady and increasing demand for machine tools, particularly the heavier equipment. The inquiries do not comprise large lists in most cases, but consist of imperative requests for individual tools for plant extensions and to supplement existing equipment. The requirements from Detroit have been particularly large. The class of machinery needed in most cases being that employed in machining heavy gun carriages and gun mounts, and gun tubes, as very little additional shell business is in sight. Three firms, the Kelsey Wheel Co., the Maxwell Motor Co., and the Timken Detroit Axle Co., all of Detroit, have furnished a large bulk of business of this class. Dealers are practically unable in most cases to furnish some classes of machine tools or to promise delivery unless the machines desired are for specific government work. Increased activity is also apparent in the vicinity of Dayton. The class of tools desired is for the most part light, although some heavy machines are asked. The Ohmer Fare Register Co., Dayton, O., is inquiring for 5 and 6-foot radial drills, horizontal boring mills, a large vertical milling machine, three 6-foot vertical boring mills, one 10-foot vertical boring mill and other miscellaneous tools. The Monarch Engineering Co., Dayton, O., is in the market for a precision bench lathe and a surface planer.

Shipments Improve in Pittsburgh Region

SHIPMENTS are improving in the Pittsburgh district, according to makers and sellers of machinery and machine tools. Only moderate activity characterizes the market for rolling mill equipment. Both government and private lists coming to the Pittsburgh district are lacking in heavy requirements. The Riverside Engineering Co., Huntington, W. Va., has been incorporated with a capitalization of $5000. The Kelly Bros. Mfg. Co., Belington, W. Va., has been incorporated with a capitalization of $50,000, to operate a foundry. The Armstrong Cork & Insulation Co., with main offices in Pittsburgh, has closed for a number of Sidney lathes and turret lathes for the production of 4.7-inch shells at its Lancaster, Pa., plant.

Many Changes and New Ventures Are Announced

The Reliance Coal & Coke Co., Cincinnati, has taken over the Pittsburgh office of its subsidiary, the Reliance Iron & Coke Co., 1226 Park building, Pittsburgh, of which Ray S. Fox is manager.

The general offices of the Maxwell Motor Co., Detroit, have been moved from Woodward and Warren avenues to the Chalmers plant.

The Grants Pass Iron & Steel Works has been reorganized and incorporated under the name of the Klamath Iron & Steel Works to operate a general foundry and machine shop at Klamath Falls, Oreg.

The McDowell Mfg. Co., manufacturer of metal stampings, has closed its office at 541 Wood street, Pittsburgh, and removed to the works at Millvale Station, Allegheny county, Pennsylvania.

The general sales office of the Interstate Iron & Steel Co. has been removed from the First National Bank building to the Monroe building, 104 S. Michigan avenue, Chicago, where also will be located the sales department formerly maintained by the company at the Grand Crossing plant.

Mayer & Clarkson Co., Inc., 453 Ellicott square, Buffalo, has been incorporated and will maintain warehouse and sales facilities in Buffalo, Cleveland and Canton, O., for the handling of iron, steel, brass, copper and mill supplies.

The offices of the Cromwell Steel Co. have been removed from the Guardian building to 1125 Leader-News building, Cleveland.

The general sales office of the Vulcan Soot Cleaner Sales Co., 230 South La Salle street, Chicago, has been transferred to Du Bois, Pa., with G. L. Simonds in charge.

The Abell-Howe Co. has removed its Chicago offices to 332 South Michigan avenue, and has been appointed direct representative for the Standard Malleable Iron Co., Muskegon, Mich., for the sale of malleable castings through its offices at Chicago, Pittsburgh, Cleveland and New York. The Abell-Howe Co. also has been appointed direct representative of the Northern Engineering Works, Detroit, builder of electric traveling cranes, electric hoists and foundry equipment, in territory tributary to Chicago.

The Aborn Steel Co., Inc., 22 Clarke street, New York City; and 133 Andrews street, Rochester, N. Y., has been appointed sales agent for the Century Steel Co. of America, Inc., manufacturer of crucible steels, Poughkeepsie, N. Y.

The New York district sales offices of the Trumbull Steel Co. have been removed to a new suite in the Grand Central Terminal, New York.

The Biggs-Watterson Co., Cleveland, has removed its Cincinnati office to 38 S. Jefferson street, Dayton, O. W. P. Dolle will have charge of the new office.

The Wolverine Metal Sales Co., Detroit, seller of ferromanganese, ferrosilicon and other alloys, has recently moved into its new quarters in the Griswold building, that city.

EXPANSION with ROLLING MILL JIM



Say fellows—was out to the Hubbard the other day and the boys showed me the plans of the new steel foundry they're putting up. She sure is a humdinger—electric furnaces and all that. The next time I go over I'll rubber around a lot more and tell you all about it.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The United States Chemical Copper Co. has been incorporated with $5,750,000 capital by Clyde R. Chapman, E. L. McLean and E. M. Leavitt.

EASTPORT, ME.—The Eastern Steamship Co. suffered $50,000 damage from a fire suspected to be of incendiary origin.

BANGOR, ME.—The Bangor Shipbuilding Co. has been incorporated with $200,000 capital by Charles Murray, Victor Hodgkins, John H. Rice, Everett W. Beach, Lee, Me., Edward E. Harvey and Eben Leavitt. It will use the old Crosby yard for building ships.

MILFORD, N. H.—The Milford Co. has been incorporated with $5,000,000 capital to provide hydro-electric power in southern New Hampshire.

SWANTON, VT.—The plant of the International Explosives Co., engaged in making primers and detonators for the government, was destroyed by an explosion, March 28.

BOSTON. — Burnham's Marine Railway, which has been under lease to the Atlantic Works for several years has been bought by that corporation and will be extensively repaired.

BOSTON.—Papers were recorded at the local registry on Wednesday, transferring to the United States government the Lockwood Manufacturing Co. wharf at 63-65 Sumner street, East Boston. The purchase price was $115,000. The property, which has a frontage on Sumner street of 185 feet, contains 120,000 square feet of land. There are several buildings on the premises, a marine railway and necessary hoisting apparatus for hauling out vessels for repairs. The government proposes to make extensive changes and addition and to use the place for repairing and equipping all kinds of power craft.

BROCKTON, MASS.—Bids are being received by Architect W. F. Barlow on a $30,000 plant addition. The owner's name is being withheld.

FITCHBURG, MASS.—The Simonds Mfg. Co., saws and machine knives, is having plans made for a brick, mill construction, 3-story and basement, 140 x 50-foot addition to its factory on Willow street.

HOLYOKE, MASS.—The American Braiding Co. has leased a floor of the new building of the Holyoke Valve & Hydrant Co. and has ordered an equipment of 175 modern braiding machines.

MILTON, MASS.—The Walter Baker Co., Ltd., will build a brick and stone, fireproof, 3-story, 75 x 67-foot administration building on Washington street, Milton Lower Mills, Mass.

NORTHBORO, MASS.—A $10,000 factory addition will be erected by Whittaker & Bacon. The new structure will be 40 x 150 feet.

PITTSFIELD, MASS.—The General Electric Co. has bought 37 lots on the East branch of the Housatonic river, adjoining the company's land. General Manager C. C. Chesney has announced plans for a rolling mill to be built here.

QUINCY, MASS. — The American Shipbuilding Corp. is reported to have taken an option on land on the Quincy side of the Neponset river, where it is understood a plant will be erected for the construction of wooden vessels.

SPRINGFIELD, MASS. — The Republican Co. has let the contract for a steel, 20 x 120-foot storage building on Cypress street.

WATERTOWN, MASS.—The Stanley Motor Carriage Co. will erect a new factory on Galen street.

WORCESTER, MASS.—A property damage estimated at $10,000 was sustained Thursday, when an explosion wrecked the factory portion of the Shepard Mfg. Co. plant at Greendale. The explosion blew out practically every window in the 1-story plant, wrecking the rear portion, about 50 by 75 feet, and blowing heavy doors as far as 25 feet from the building. The concern is engaged in the manufacture of a very important product for the government.

PROVIDENCE, R. I.—George E. Boyden & Son will build a brick, mill construction, 2-story, 44 x 160-foot addition to their mill on Borden street, to cost $20,000.

PROVIDENCE, R. I.—The Lord Construction Co., 105 West Fortieth street, New York City, has secured a contract for equipping 20 seagoing vessels with steam plants and engines. As a partial result, a new plant will be established at Field's Point, Narragansett bay, near here.

WARREN, R. I.—The Lynn Rubber Mfg. Co., of Lynn, Mass., has started to build a new rubber factory here.

HUNTINGTON, CONN. — The Shelton Tool & Machine Co. has been incorporated to manufacture tools, gages and machinery, with $20,000 capital by Frank E. Birschfield, Frederick G. Bouteiller, Derby, Conn., and Harold E. Drew, Ansonia, Conn.

MANCHESTER, CONN. — The F. W. Cheney Co. has been incorporated here with a capital of $50,000 to handle machinery. The incorporators are Horace B. Cheney, Austin Cheney and Frank D. Cheney, all members of the silk manufacturing concern of Cheney Brothers.

NAUGATUCK, CONN.—A four-story factory building 100 x 250 feet of concrete is being erected here for the United States Rubber Co. When completed, it will be one of the largest manufacturing plants here.

NEW HAVEN, CONN.—The Al-Ko Co. has been incorporated to make machinery with $25,000 capital by Arthur B. Alling, Frederick H. Wiggin and I. Dwight Dana.

NORWICH, CONN.—The Versailles Sanitary Fibre Co. has awarded to the Connecticut Engineering Co. the contract for the erection of a 2-story addition. The company has made a number of improvements in its plant during the past winter.

NORWALK, CONN. — The MacMahon, Cremins & Worthington, Inc., manufacturers of lace curtains in New York City, have leased the vacant building of Vanderhoef & Co. on Orchard street and will renovate and equip it for manufacturing purposes.

STAMFORD, CONN.—The United Dress Manufacturing Co. is planning for the addition of two stories to its plant here.

STAMFORD, CONN.—A. B. Bensch & Co., controlling the Davenport Foundry here, will begin work at once upon a large 1-story brick factory building, increasing the size of the plant about one-half, for the manufacture of automobile trucks and motors. About 200 hands will be employed in the addition and new machinery will be installed.

STAMFORD, CONN.—The Brown Foundry has commenced work on a new building, 90 x 130 feet, to be equipped with molding and other machinery. This concern is now working indirectly for the government on brass castings and marine engines.

VERSAILLES, CONN. — The Versailles Sanitary Fibre Co. has let the contract for a 2-story addition.

WATERBURY, CONN. — The American Brass Co. has let the contract for a brick, steel and concrete, fireproof, 1-story, 50 x 105-foot mill building.

Along the Middle Atlantic Seaboard

ALBION, N. Y.—Plans are being drawn for the construction of a plant comprising two buildings, each one-story high, 75 x 100 feet. George Whelan, of this city, as a representative of a company now being organized, is in charge of the project.

AUBURN, N. Y.—A 2-story, 60 x 100-foot factory building will be erected in this city by the Auburn Button Co.

BINGHAMTON, N. Y.—Charles E. Magill, 34 Commercial avenue, is interested in a new company which is having plans prepared for



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CASTINGS

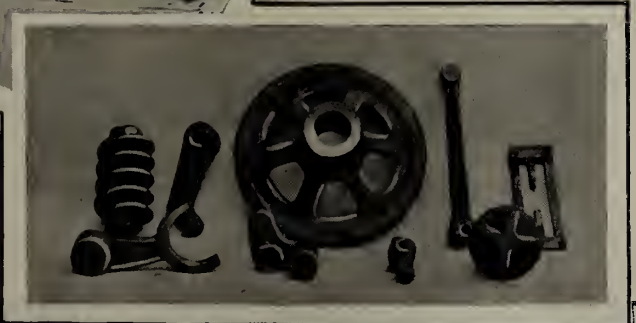
We specialize ***Tractor, Truck*** and ***Machine Tool*** Castings. Particular attention paid to the strain and stress under which castings are to be subjected.

If you wish castings with the greatest resilient strength and minimum weight, specify ***Farrell-Cheek Castings.***

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Farrell-Cheek Steel Foundry Co.

SANDUSKY, OHIO

Branch Offices:
PHILADELPHIA
NEW YORK
CHICAGO

a plant on Emma street, to manufacture heavy machinery and tools.

BROOKLYN, N. Y.—A $35,000 factory will be erected by Frank Richards, 160 Jamaca avenue. William C. Winters, 106 Van Sicklen avenue, is drawing plans for a 4-Motor Co. will build an addition to its automobile plant, which will be four stories, 78 x 228 feet. Fred T. Ley & Co., 19-25 West Forty-fourth street, New York City, will be in charge of the construction.

BUFFALO. — B. H. Westcott, Ellicott square, has plans for a 4-story factory 50 x 100 feet at this place.

BUFFALO.—Estimates are being taken on a factory building for the South Buffalo Terminal, Inc., which will cost around $30,000. The building will be one story, 60 x 90 feet.

BUFFALO. — A $20,000 factory will be erected in this city by the Standard Mirror Co. According to plans now being drawn by Architect G. Morton Wolfe, the proposed structure will be one story, 82 x 119 feet.

JAMESTOWN, N. Y. — The Jamestown Wood Finishing Co. is having plans prepared by Chapman Graham, Inc., for a 2-story faddition to the plant of R. M. Hollingshead & Company.

NEWBURGH, N. Y.—Plans are about completed for the construction of a 1-story, 100 x 200-foot storage building for the Central Hudson Steamboat Co. Tooker & Marsh, 101 Park avenue, New York City, are architects in charge.

NIAGARA FALLS, N. Y.—A $3,000,000 power station is being contemplated by the New York state reservation committee, Albany, for construction on Goat Island.

OSWEGO, N. Y.—The general contract for a $35,000 foundry extension for the Ames Iron Works has been let to the J. D. Taylor posed addition will be one story high, 52 x Construction Co., Syracuse, N. Y. The pro-200 feet.

ROME, N. Y.—The Rome Brass & Copper Co. has awarded to W. D. Jones the general contract for a $25,000 storehouse.

WATERTOWN, N. Y. — D. G. Corbett plans the construction of a 1-story, 50 x 50-foot machine shop.

ALLENTOWN, PA. — The International Motor Co. is planning to build a 1-story machine shop, 100 x 480 feet; cost, $75,000.

BETHLEHEM, PA. — The Aldrich Pump Co. will take bids shortly on the construction of a 1-story, 41 x 150-foot addition to its plant.

CHAMBERSBURG, PA. — The Chambersburg Woolen Mill Co. will build an extension to its plant here to cost $20,000. The contract has been let to E. M. Shields of tbat place.

CORRY, PA.—The Howard Tanning Co. is having plans prepared for a $50,000 addition to its plant here.

DUNMORE, PA. — The Duckworth Bros. Co., 1 Exchange building, Scranton, Pa., has plans for a 2-story factory 30 x 186 feet for the Perpetual Spark Plug Co., about $30,000.

FARRELL, PA.—The American Sheet & Valley railroad. The extension will cover 148 x 88 feet and will cost $35,000.

FRANKLIN, PA.—The Chicago Pneumatic Tool Co. is planning to improve its plant to the extent of $200,000; W. O. Duntley, president.

GROVE CITY, PA.—Rose and Fisher, 1719 Pennsylvania avenue, Pittsburgh, have a contract for a 3-story power plant for the Grove City Creamery Co.

HAZLETON, PA.—The Austin Co., this city, has a contract for a $100,000 powder mill at Havre de Grace, Md.

HAZLETON, PA. — The Lehigh Valley railroad is planning to build a plant for repairs to engines and cars.

HILLSBURG, PA. — The Dillsburg Mfg. Co., capitalized at $20,000, will purchase some equipment for its men's hosiery plant here.

KENNETT SQUARE, PA.—The Fiber Spe-Westinghouse building, have plans for a $20,-000 candy factory on North High street, Columbus, O., for the Busy Bee Kitchen Kandy Co. of that city.

LANSDALE, PA.—The Lansdale Foundry Co. has let contract for an addition 40 x 60 and 40 x 50 feet. H. I. Landis is president of the company.

MARCUS HOOK, PA.—The Benzol Products Co. is having plans drawn for an aniline building, laboratory and office by F. W. Van Loon, North Eleventh street, Philadelphia.

MILTON, PA.—The Milton Car & Foundry Co. has let a contract for a 1-story rivet shop.

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts, Washington;

Electric traveling crane for gunshop, 2908, April 15, Puget Sound, Wash.

High speed steel cutters, 3835½, April 22, Washington.

One switching locomotive, 3963½, April 19, f. o. b. works.

One locomotive, 3971½, April 15, Mare Island.

Four steel flat cars, 3972½, April 19, Indian Head.

Eight workshop trucks, 3980½, April 19, Philadelphia.

The schedule numbers, dates of opening bids and places of delivery follow the specifications of the tools.

The General Engineer Depot, 1438 *U street, Washington, under proposal 767 will receive bids until April* 12 *on* 10 *solid frame vertical punches, 24-inch throat, and* 80 *punches and dies for the same.*

PHILADELPHIA. — The Warren-Moore Co. has received the general contract for the construction of a 3-story addition to the machine shop of Hugo Bilgram.

PHILADELPHIA.—The Henry A. Hitner's Sons Co. has purchased 38 acres at Richmond and Buckius streets, as a site for a steel plant.

PHILADELPHIA.—The bureau of yards and docks is preparing plans for a submarine base at the Philadelphia navy yard. The bureau also is planning a number of store houses at Lake Denmark, N. J.

PHILADELPHIA.—Bids have been asked by the navy department on electrical equipment for a power house at the Philadelphia navy yard.

PHILADELPHIA. — Tbe Union Transfer Co. will soon take bids on a $20,000, 2-story storage building.

PITTSBURGH. — Bartberger and Fisher, cialty Co. of this city has let a contract for a plant, 150 x 60 feet to William N. Worrell.

PITTSBURGH. — The Pittsburgh Rolls Corp. has secured a permit for the erection of a 1-story brick and steel foundry building in Willow street, between Forty-first street and Almond way, to cost $6000.

PITTSBURGH.—The Pennsylvania Chocolate Co., 5850 Center avenue, is arranging to build a $350,000 addition to its plant.

PITTSBURGH. — Charles D. Hall Co., Jenkins Arcade building, has plans for a power house for the Fox Coal Co. at this place. Address H. H. Wolf, First National Bank building.

SCRANTON, PA. — A $30,000 warehouse and service station will be erected from plans by the W. G. Wilkins Co., architect of Pittsburgh. The owner's name is being withheld.

SHARON, PA. — The Sitterding-Carneal-Davis Co. will build a 3-story warehouse; about $10,000.

WHEATLAND, PA. — The Pennsylvania railroad, it is reported, will build a round house, coal tipple, repair shop and turn tables here to cost $1,200,000.

BAYONNE, N. J.—American Reclaiming & Refining Co. has been chartered with $250,-000 capital to reclaim and refine metals. The incorporators are Bernard Rubin, Charles Dembe and H. B. Dembe, all of Bayonne.

BLOOMFIELD, N. J.—A. J. Krohn & Sons, Inc., has been incorporated with $10,-000 capital to manufacture metal beds. A. J. Krohn, Bloomfield, and Herman Krohn, of Newark, incorporators.

BUTLER, N. J.—Morris County Chemical Co. has been chartered with $100,000 capital to manufacture, chemicals, dyes, etc. The incorporators are Thomas S. Sexsmith, New York; William Joyce, Scranton, Pa., and Walter A. Clark, Butler.

CAMDEN, N. J.—Bids soon will be received by Irwin & Leighton, architects, 126 North Twelfth street, Philadelphia, for a $25,000 warehouse. The structure will be three stories high, 60 x 80 feet. The owner's name is being withheld.

CAMDEN, N. J.—Work will go ahead shortly on the construction of a $10,000 ad-story, 52 x 100-foot structure.

KEARNY MEADOWS, N. J.—It is understood that bids will be received soon by Architects Harris & Richards, Drexel building, Philadelphia, on a $2,000,000 plant for the Niles-Bement-Pond Co., 111 Broadway, New York City.

NEWARK, N. J.—Pipe & Bending Corp., of America has been chartered with $400,000 capital to manufacture pipes, tubes, etc. The incorporators are William Schmidt, Newark; H. H. Kistner, Elizabeth, and W. S. Weiss, New York.

NEWARK, N. J.—Perfection Tool & Machine Co. has been incorporated with $50,000 capital to manufacture engines, tools, etc. The incorporators are Emil Hurliman, Nathaniel Turock and Max Raschinsky.

NEW BRUNSWICK, N. J. — The Web Wire Works has completed plans for a 2-story, 35 x 45-foot addition to its plant.

PLAINFIELD, N. J.—The International Power Corp. contemplates the construction of a power plant in the village of Freeville, near here.

TRENTON, N. J.—Architect J. O. Hunter took bids April 1 on the construction of a $40,000 boat building plant for the Trenton School of Industrial Arts.

EDGEMOOR, DEL.—The general contract for a $75,000 shop addition at the plant of the Edgemoor Iron Co. has been let to E. E. Hollenback, 1804 Branywine street, Philadelphia.

SALTVILLE, VA.—The Fraser Brace Co., 1328 Broadway, New York City, has been awarded the general contract for the construction of a $1,500,000 plant at this place for the ordnance department.



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A new factory—an extension—an entire new plant? If so, you can practically solve the building operation difficulties of the present times by placing your engineering and construction problems in the hands of The Arnold Company.

This highly specialized organization is thoroughly experienced in handling industrial problems. By centralizing in one competent source, the entire responsibility for the designing and construction of your plant—from preliminary study to completion, buildings and equipment, turned over to you ready for operation—you will save money and much time and needless worry over details.

Employing the Arnold Company to conduct your building operations, insures you of your plant being correctly designed for operating efficiency and of construction costs being kept to a minimum and of your plant being completed in the shortest possible time. You are invited to compare the Arnold Service with any similar organization—both as to costs and results—by referring to our many satisfied clients, some of whom we have served for more than twenty years.

Explain your problem to us and let us submit our proposition. No obligation.

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ENGINEERS—CONSTRUCTORS—ELECTRICAL, CIVIL, MECHANICAL

105 South La Salle Street, Chicago, Ill.

The building illustrated above is a good example of what Arnold Methods have accomplished in the reduction of building costs, yet maintaining the high standard of design and construction the Arnold Company have adhered to for the past twenty years.

Practically sixty days from the first broken ground, this new factory for the Walker Manufacturing Company of Racine, Wisconsin was completed.

All equipment was installed and the plant was in operation within ninety days from the date of starting the work. We made the complete plans for building and equipment and turned the plant over ready for service.

The plans were made to cope with the present building conditions. For instance, a special type of steel structure was designed which required minimum shop work in making, greatly reducing the cost and avoiding delay. The steel for the structure was delivered in two weeks.

For this building, we originated a new method of providing a fireproof roof, using Structolite in ten foot spans, the first building of its kind in the United States.

The special type of roof construction, together with other new ideas, made possible a modern structure entirely of non-inflammable materials, at a saving of thirty per cent over the cost of similar buildings and at a great saving in the time required for completing the job.

In a multitude of ways the Arnold Company plans for saving time and money for its clients. No detail is too small to be given careful attention by the Arnold engineers.

By arranging for delivery of materials and equipment so they arrive on the site at the time they are needed, costly rehandling is avoided. By grouping and arranging proper sequence of operations, duplication and conflict of effort are minimized, and mistakes avoided.

Skilled, experienced men of the Arnold organization are placed in charge to direct the work from the time the ground is broken until the job is completed, and every phase of the work is carefully inspected, during construction and after completion insuring that every detail of Arnold construction comes up to the Arnold Standard.

Activities in the Central States

CUDAHY, WIS.—The Ladish Drop Forge Co. will build a forge shop 50 x 250 feet, of reinforced concrete and steel at its Packard avenue plant.

GREEN BAY, WIS.—The board of education is considering the proposition of erecting an additional high school and manual training institute, the estimated cost of which is given as $350,000. An architect has not yet been selected.

MADISON, WIS.—Sealed bids are being received until April 15, at 2:30 p. m. for the construction of Bradley Memorial hospital and infirmary at the University of Wisconsin. Plans call for two buildings, 51 x 140 feet, two stories and basement, and the estimated cost is $100,000. Lew F. Porter is university architect.

MADISON, WIS.—The Municipal Appliance Co. of Madison has been organized by Hal R. Martin and A. T. Earle, Edgerton, Wis., to manufacture and market a line of automatic traffic signaling devices designed and patented by A. L. Masterson. The capital stock is $50,000.

MADISON, WIS.—The Madison Hardware Specialty Co. has been organized by a number of retail hardware dealers to engage in the wholesale hardware trade. The capital stock is $10,000 and the incorporators are Louis Hirsig, V. S. Kubly and T. E. Wiedenbeck. A large warehouse located on the Illinois Central tracks in West Madison has been leased and offices will be opened on the second floor of the Wolff, Kubly & Hirsig hardware store on South Pinckney street. The retail and wholesale business will be kept entirely independent.

MANITOWOC, WIS.—Bids will be taken soon for the construction of a new signal and light tower on the north breakwater of Manitowoc barbor. The estimated cost is $21,000. The building will be steel-sheathed with plates. Maj. Lewis H. Stoddard is district engineer, at Milwaukee.

MILWAUKEE.—The Babcock Auto Spring Co., 192 Milwaukee street, is building a 2-story factory and garage 60 x 120 feet to cost $20,000.

MILWAUKEE. — Architects Robert A. Messmer & Bro., Majestic building, have been engaged by the county board of administration to prepare plans for a $100,000 children's hospital to be erected at the county group in the city of Wauwatosa, Milwaukee county.

MILWAUKEE.—The Harley-Davidson Motor Co. has been granted a permit to erect a two-story reinforced concrete and brick shop addition, 120 x 180 feet, at its main plant at Fortieth and Chestnut streets. The building will cost $50,000 and is being erected under the direction of the Federal Engineering Co., Stephenson building, Milwaukee.

MILWAUKEE.—Alfred C. Clas, architect, Colby-Abbot building, is preparing plans for a viaduct to connect Mason street with the new Lake Shore drive, over the Chicago & Northwestern tracks. The structure will be of reinforced concrete and steel and about 500 feet long. F. P. Schumacher is secretary of the park board.

OSHKOSH, WIS.—The Universal Foundry Co., Warren and Pine streets, has increased its capital from $10,000 to $25,000 and will build an addition. R. Zibell is president.

RACINE, WIS.—The Wohlrab Gear Co., operating in leased quarters in part of the former Wisconsin Engine Co. plant at Corliss, Racine county, has taken a long term lease of the big factory building recently vacated by the Secor Trunk Co. at Lake avenue and Fourth street, in Racine, and will largely increase its output of motor truck, tractor and automobile gears. Considerable new equipment will be installed, together with new dynamos and other electrical apparatus.

REEDSBURG, WIS.—The city light and water commission has recommended the immediate installation of an additional 250-300 kilowatt generating unit, direct-connected to either a steam turbine or uniflow engine. An engineer will be selected at once to prepare specifications and estimates.

SUPERIOR, WIS. — The Lake Superior Electrical Co. has increased its capitalization from $50,000 to $250,000 and has changed its name to the Benson Electric Co. M. B. Benson is president and J. H. Cooke treasurer.

SUPERIOR, WIS. — Whitney Bros. have started work on the erection of a new punch shed for handling steel plates at its new shipbuilding plant at First street and Cummings avenue. It will cost about $10,000.

WAUSAU, WIS. — The National Auto Wheels Corp., organized at Wausau, Wis., about six months ago, has completed arrangements for erecting a factory in that city and expects to be engaged in a regular production of patented wheels for motor vehicles and trailers. The company is capitalized at $150,000 and its officers are: President, E. J. Coerper, Moon, Wis.; vice president, Henry Sternitzky, Crandon, Wis.; secretary, M. Philipp, Wausau; treasurer, R. R. Sternitzky, Rothschild, Wis.; director, G. E. Clase, Wausau. The factory will cost about $25,000 and designed so that additional units may quickly be provided.

WEST BEND, WIS. — The West Bend Aluminum Co., maker of drawn aluminum ware, utensils, etc., has decided to start work at once on the erection of several large factory additions which were projected during the summer of 1917 but indefinitely postponed because of conditions in the building material and labor markets. The main addition will be a three-story shop, 70 x 200 feet, and a one-story extension, 59 x 60 feet, will be made to the present shop. The buildings will be of reinforced concrete and brick. The work is in charge of the Federal Engineering Co., Stephenson building, Milwaukee.

DETROIT.—The Detroit Copper & Brass Rolling Mills, 1350 West Jefferson street, will build a plant.

NORTH MARQUETTE, MICH.—The Arnold Co. also has been awarded the contract for constructing all buildings included in plans for the new headquarters and terminal which the Munising, Marquette & South Eastern railroad will build near the Presque Isle dock at North Marquette this year. The work includes a locomotive and car building and repair shop, roundhouses, machine shops, etc., and all will be of steel, concrete and steel sash.

PORT HURON, MICH.—The city of Port Huron plans a bond issue to buy machinery for its waterworks pumping station. E. A. Whitmore is city engineer.

YALE, MICH.—The Yale Trailer Co., capitalized at $10,000, has been organized to manufacture automobile trailers. The incorporators are Rene V. Card, of Detroit, president and Earl R. Card, of Yale, secretary-treasurer.

CHICAGO.—The Pittsburgh Building Co., care Mundie & Jensen, 39 South La Salle street, architects, will build a 1-story machine shop, 125 x 185 feet at Kedzie and Forty-seventh streets.

CHICAGO.—A. J. O'Leary & Son, iron works, Lake and Jefferson streets will build a 1-story addition 60 x 70 feet, plans having been made by L. H. Heinz, architect, 128 North La Salle street.

DECATUR, ILL.—The Miller-Holbrook Engineering Co. has been incorporated with capital of $6000. Robert A. Miller, Frank D. Holbrook and Charles Connaghan are the incorporators.

MOLINE, ILL.—The Western Foundry & Machine Co., capitalized at $30,000, has been chartered by J. H. Johnson, A. C. Sinclair and R. S. Sinclair, to operate a foundry.

SPRINGFIELD, ILL. — Tentative plans have been drawn for the proposed Centennial building to be erected this year. The plans will soon be reviewed by the Centennial building commission.

SPRINGFIELD, ILL.—St. John's Hospital will erect an $80,000 St. John's tuberculosis sanitarium. Address, Father Joseph C. Stuart, Springfield, Ill.

SPRINGFIELD, ILL. — The Springfield Plow Co. will erect a brick, four-story warehouse, to cost $35,000.

EAST CHICAGO, IND.—The Green Engineering Co., Kennedy avenue and Fourteenth street, is building a foundry 45 x 100 feet costing $15,000. F. A. Keaser is superintendent.

INDIANAPOLIS. — The Steel Vehicle Wheel Tire Co., capitalized at $20,000, has been chartered to manufacture special machinery. Incorporators are C. R. Wofford, T. S. McGehee and C. A. Wofford.

MICHIGAN CITY, IND.—The Joseph W. Hays Corp., capitalized at $275,000, has been chartered to manufacture draft gages, gas recorders, and recording thermometers by Frank R. Warren, B. A. Tuttle and F. A. Deahl, the latter of South Bend.

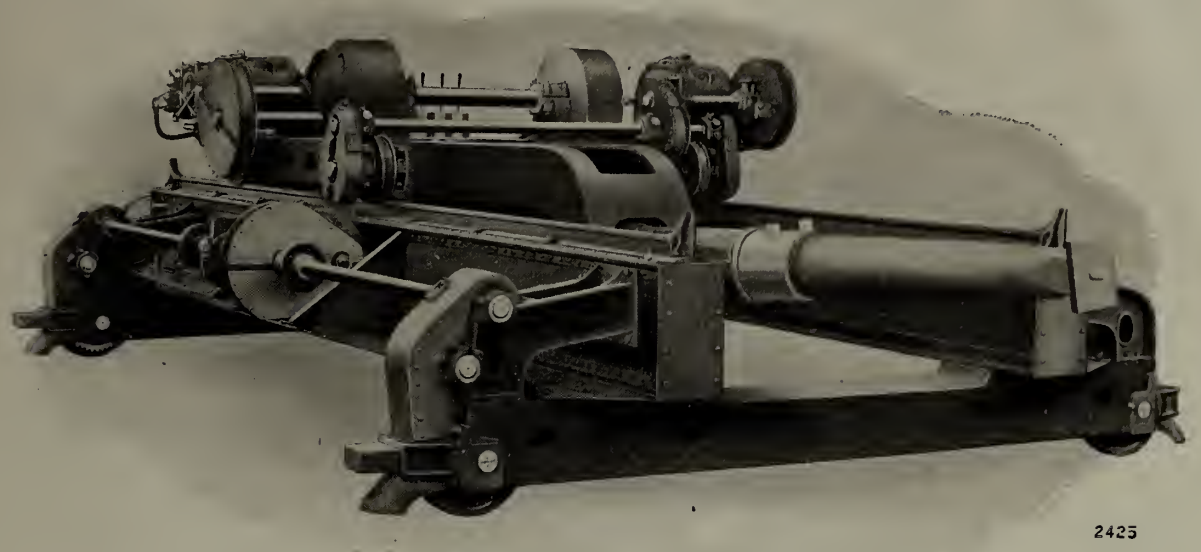
MONTPELIER, IND.—The National Cup Co., capitalized at $10,000 has been chartered to manufacture valve cups by C. H. Morse, B. H. Stoltz and D. J. Stoltz.

SOUTH BEND, IND.—The Anderson Co., recently chartered with $20,000 capital, will build a plant to manufacture automobile parts. J. W. Anderson is manager.

CLARKSBURG, W. VA.—The Fisher Summit Coal Co., capitalized at $50,000 was chartered to operate mines in Lewis county, by Walter S. Stewart, Florence B. Stewart, C. L. Currey, Harry W. Sheets and B. B. Jarvis, Clarksburg.

DUNBAR, W. VA.—The Whittemore Glass Co., capitalized at $150,000, will build a glass plant here.

HUNTINGTON, W. VA. — The Jeffery-



Low Type Charger Designed and Built for Republic Iron and Steel Co., Youngstown, Ohio

CHARGING MACHINES AND MANIPULATORS

A New W-S-M Bulletin

Of interest to users of charging and manipulating equipment is our new Bulletin A-7. It describes our various standard type Open Hearth chargers, also special machines for charging Heating Furnaces, for handling slabs, ingots, blooms, billets, wheels, tires, etc. We are prepared to build a special machine for your particular requirements.

Write for Bulletin A-7

The Wellman-Seaver-Morgan Co.

Cleveland, Ohio, U. S. A.

Say you saw it in THE IRON TRADE REVIEW

Dewitt Co. is having plans prepared for a $60,000 factory.

HUNTINGTON, W. VA.—The Huntington Lumber & Supply Co. has let a contract for a factory.

HUNTINGTON, W. VA. — The Handley Coal Co., capitalized at $25,000 to operate mines in Wayne county was chartered by W. Handley, E. N. Pyle, M. A. Simms, G. A. Koontz and E. E. Williams, Huntington.

MARTINSBURG, W. VA. — The Dunn Woolen Co. will build a 3-story addition costing $40,000.

NEWELL, W. VA.—The Kenilworth Tile Co. will rebuild its plant at a cost of $40,000. The plant will be 140 x 300 feet.

PARKERSBURG, W. VA.—Kahn & Feldman, of this city, have had plans prepared for a silk plant in this city. Address President C. M. Martin, of the Commerce building of Parkersburg.

WARWOOD, W. VA.—The Liberty Transit Co. is planning to build a river terminal at this place.

Up and Down the Pacific Coast

CHEWELAH, WASH.—The further sum of $150,000 will be appropriated for equipping the plant of the Northwest Magnesite Co. R. N. Bishop is manager.

EVERETT, WASH.—The estimated cost of the machinery for the new steel plant of the United States Steel Co. to be erected here is $70,000 divided into the following expenditures: Rolling mill machinery $9000; reheating furnace, $4000; electric furnace $20,000; motor and machinery $7000; cranes and equipment $15,000; sundries and incidentals, $10,000.

NORTHPORT, WASH.—The Electric Point Mining Co. has completed plans to install an aerial tramway to cost $40,000 to $50,000.

SEATTLE.—Authorization has been given for the Milwaukee to extend its Olympic Peninsula line, operating westward from Port Angeles as far as Deep Creek into the large spruce timber belt in East Clallam and Jefferson counties.

SEATTLE.—Gerrick & Gerrick Co., Central building have the contract for erecting three steel bridges for the Spokane, Portland & Seattle Railroad Co. at about $30,000.

SPOKANE.—Colonel Chester T. Kennan, mining engineer of the Coeur d'Alene district, is working in the interest of a co-operative smelter which it is proposed to erect on Coeur d'Alene lake in Idaho.

SPOKANE.—The Pine Creek branch of the O. W. R. & N. Co., it is reported, will be constructed to Beeler, Idaho, at least and further if steel is available.

SPOKANE.—Issuance of $40,000 in bonds was recently authorized by Loon Lake Copper Co., same to be used in constructing a mill and equipping a mine four miles from Loon Lake, Washington. Equipment is to be driven by electric motors. Frank G. Crane is the secretary-treasurer of the company.

TACOMA, WASH.—In order to accommodate increased business the Atlas foundry has started construction of a new building to its plant at South Thirtieth and Alaska streets, to cost $1000, to be of frame.

ASTORIA, OREG.—The Interests of the Oregon Pacific Mill & Lumber Co., which some time ago arranged with the government for construction of a railroad from junction with the Spokane, Portland & Seattle line at Clatsop, have been taken over by a syndicate that will proceed at once with construction of first section of 17 miles, toward the Nehalem valley.

BURNS, OREG.—This place has voted an additional bond issue of $75,000 for securing railroad transportation.

FREEWATER, OREG. — Preston-Shaffer Milling Co. of Seattle, will build a concrete grain elevator of 85,000 bushels capacity at this place, which will be equipped with the latest appliances for handling and cleaning bulk and sacked grain. Fred A. Wilson Engineering Co., 322 Central building, Seattle, will design and supervise the complete installation, including the entire mechanical layout.

GRANTS PASS, OREG. — Contract has been awarded for installation of a large ore reduction plant for the Almeda Mines Co. on Rogue river, 27 miles below this place. There is to be a concentrating mill of not less than 200 tons daily capacity and blast furnaces of not less than 150 tons daily capacity, including power machinery for operation of entire plant. Contract price to be paid for the plant is .$200,000.

PORTLAND, OREG.—Northwestern Electric Co. has a permit to erect foundation and walls for a boiler room at the foot of Lincoln street. Charles C. Moore & Co. are the engineers.

New Business in Eastern Canada

NANAIMO, B. C.—The Granby Consolidated Smelting & Power Co. is proceeding with its preparations to install a coal plant. Ground is being cleared for the colliery, railroad yard and village. About $200,000 will be spent on the work.

NEW WESTMINISTER, B. C. — Mayor Gray confirms reports from Ottawa that application has been made to the Dominion government for a lease on the Indian reserve lying on an arm of the Fraser river for the construction of electric furnaces for the production of pig iron and steel billets.

BROCKVILLE, ONT. — T. J. Davidson, Crawford street, has the general contract for the erection of an addition to the plant of the Canada Carriage Co., Park street, estimated cost $40,000.

HANOVER, ONT.—The town council will install a waterworks plant and system to cost $40,000. John Taylor is clerk.

HICKSON, ONT. — The Canadian Milk Products, Ltd., 10 William street, Toronto, will build an addition to its plant at Hickson, and install machinery to cost $40,000.

LONDON, ONT.—The London & Petrolea Barrel Co., will build a dry kiln to cost $5000 and a boiler house to cost $3000.

OSHAWA, ONT.—Bradley Bros. are in the market for a 5-horsepower, 220 volt, single phase motor.

PORT ARTHUR, ONT. — Bids will be called about April 15, for the erection of an elevator for the Saskatchewan Co-operative Elevator Co., 332 Grain Exchange building, Winnipeg, Man., to cost $450,000.

STRATHROY, ONT. — The town council will purchase a motor driven turbine pump to be installed in the waterworks plant at a cost of $5000.

SAVANNE, ONT.—The Hyamdo Pulp & Paper Co., of Rochester and New York, has purchased Patrick Hogan's holding of nearly 300 square miles of timber limits and will build a pulp and paper mill at Savanne.

TORONTO, ONT. — The Canadian Allis-Chalmers Co., Ltd., Lansdowne and Royce avenues, will build a galvanized iron and steel addition to its smith shop to cost $6000.

WELLAND, ONT.—Plans are being prepared for remodeling the foundry of the Welland Iron & Brass Co., and new machinery will be installed. E. J. Anderson is manager.

MONTREAL, QUE.—The Canada Casting Co. has awarded contracts in connection with the erection of a plant which will cost $60,000.

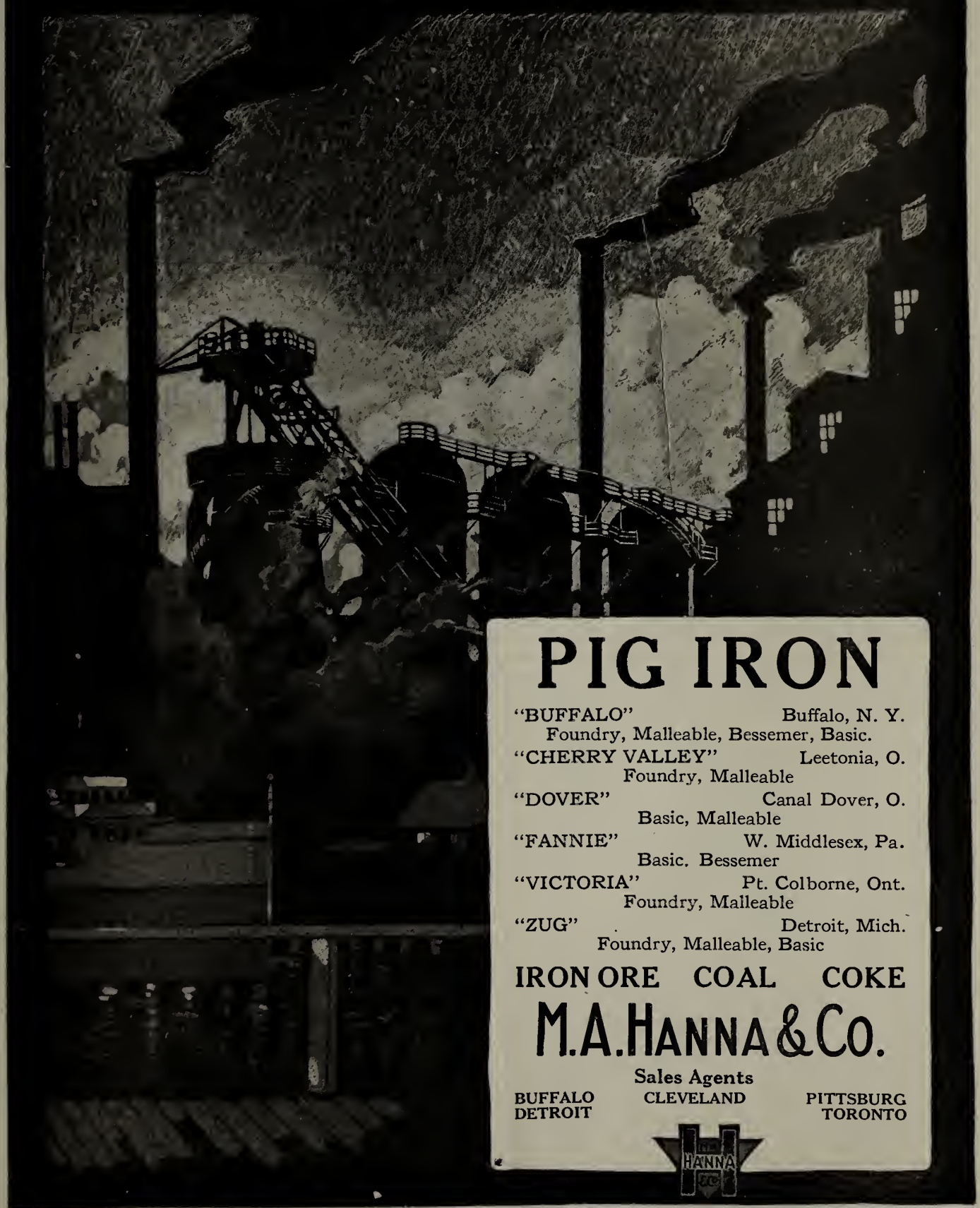
OUTREMOUNT, QUE.—Bids are in and contracts will be let at an early date for the erection of a plant for the Canada Metal Co., Ltd., 50 Brennan street. C. A. Mitchell, 14 St. John street, Montreal, is architect.

BRIDGEWATER, N. S. — The Davison Lumber Co., La Havre street, will build a sulphite plant, planing mill and box factory estimated to cost $100,000. A. F. Pamenter is acting manager.

YARMOUTH, N. S.—The Milton Shipbuilding Co. will establish a shipbuilding plant estimated to cost $100,000. Armand Deveaux is interested.

MONCTON, N. B.—Matthew Lodge, 274 Union street, is interested in a company which is being formed to develop the tungsten mine at Burnt Hill. A concentrating plant, etc., to cost $150,000 will be erected.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic.

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic. Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M.A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

HANNA

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports
Old range Bessemer, 55 iron.....$5.95
Mesabi Bessemer, 55 iron..... 5.70
Old range non-Bess., 51½ iron..... 5.20
Mesabi non-Bess., 51½ iron..... 5.05

WAREHOUSE PRICES

Steel bars, Chicago.....	4.10c
Steel bars, Cleveland.....	4.035c
Steel bars, Detroit.....	4.085c
Steel bars, Philadelphia.....	4.10c
Steel bars, New York.....	4.095c
Steel bars, St. Louis.....	4.17c
Steel bars, Cincinnati.....	4.085c
Steel bars, St. Paul.....	4.22c
Steel bars, Buffalo.....	4.05c
Iron bars, Buffalo.....	4.65c
Iron bars, Chicago.....	4.10c
Iron bars, Cleveland.....	3.985c
Iron bars, Detroit.....	4.75c
Iron bars, St. Louis.....	4.17c
Iron bars, Cincinnati.....	4.085c
Iron bars, Philadelphia.....	4.50c
Iron bars, New York.....	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis.....	4.27c
Shapes, St. Paul.....	4.32c
Shapes, New York.....	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis.....	4.52c
Plates, St. Paul.....	4.57c
Plates, New York.....	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo...	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo..	6.45c
No. 28 black sheets, Cleve..	6.385c
No. 28 black sheets, Cinci..	5.45c
No. 28 black, Detroit.....	6.435c
No. 28 black sheets, St. L..	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo...	7.70c
No. 28 galv. sheets, Cleve...	7.635c
No. 28 galv. sheets, Cinci...	6.635c
No. 28 galvanized, Detroit..	7.685c
No. 28 galv. sheets, St. L..	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati...	$22.50 to 23.00
Bundled sheets, Pittsburgh..	$22.00
Bundled sheets, Cleveland...	23.50 to 24.25
Bundled sheets, Buffalo.....	24.00 to 25.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts..	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo..	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci..	26.50 to 27.00
Heavy melt'g steel, east. Pa.	27.50 to 28.50
Heavy melting steel, N. Y..	26.75
Heavy melting steel, St. L..	28.00 to 28.50
Heavy melting steel, Birming.	24.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Knuckles, couplers, Chgo....	34.00
Knuckles, coup. St. Louis...	33.75 to 34.00
Low phos. steel, Buffalo....	37.50
Low phos. steel, Pittsburgh..	39.00
Low phos. steel, eastern Pa.	36.50
Shoveling steel, Chicago.....	29.00
Shoveling steel, St. Louis...	28.00 to 28.50
Springs, Chgo.	34.00
Steel rails, short, Chicago...	34.00
Steel rails, short, Cleveland..	34.00
Steel rails, short, St. Louis..	33.75 to 34.00
Steel rails, old, Birmingham.	28.00 to 30.00
Stove plate, Chgo.....	25.50 to 26.50
Stove plate, Cincinnati.....	20.00 to 20.50
Stove plate, St. Louis.....	22.50 to 23.00
Stove plate, N. J. points....	23.75
Stove plate, Birmingham....	17.50 to 20.00
Stove plate, Buffalo.....	25.00 to 26.00
Stove plate, eastern Pa.....	22.00 to 23.00
Stove plate, Cleveland.....	25.00 to 25.50
Stove plate, Pittsburgh.....	22.00
Bundled sheets, Cincinnati..	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.....	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul.....	4.54

Buffalo to:

Albany, N. Y.....	$1.26
New England (rail).....	3.10
New York and Brooklyn (rail)..	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark..	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul.....	5.85
New York (r. and w.).....	6.00
Philadelphia (r. and w.).....	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul.....	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul.....	4.54

Duluth, Minn., to:

Minneapolis- St. Paul.....	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul..	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail).....	75.0 cents
Pacific coast (tin plate)....	75.0 cents

IRON MILL USE

Angle bars, iron, Chgo.....	$39.00
Angle bars, steel, St. Louis.	35.00 to 35.50
Arch bars, transoms, Chgo..	46.50
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland.	31.00
Busheling, No. 1, Buffalo...	29.00 to 30.00
Busheling, No. 2, Buffalo...	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati.	25.00 to 25.50
Busheling, No. 1, Chgo.....	28.00 to 29.00
Busheling, No. 2, Chgo.....	19.25 to 20.25
Busheling, No. 1, St. Louis.	27.00 to 27.50
Cast borings, New York....	16.50 to 16.75
Cast borings, eastern Pa....	18.00 to 19.00
Cast borings, Cleveland.....	19.00
Cast borings, Buffalo.....	18.00 to 19.00
Cast borings, Cincinnati.....	15.50 to 16.00
Cast borings, Pittsburgh....	19.00
Cast borings, Birmingham...	12.00 to 13.00
Cast borings, Chgo.....	18.00 to 18.50
Cast borings, St. Louis.....	17.00 to 18.00
City wrought, long, N. Y...	31.00
Cut forge, Chicago.....	32.00 to 33.00
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa....	25.50 to 26.50
Grate bars, Buffalo.....	24.00
Grate bars, Cleveland.....	25.50 to 26.00
Grate bars, N. J. points....	23.75
Iron axles, Pittsburgh.....	46.50
Iron axles, Cincinnati.....	43.00 to 43.50
Iron axles, Cleveland.....	46.50
Iron axles, eastern Pa.....	46.50
Iron axles, Chicago.....	46.50
Iron axles, St. Louis.....	46.00 to 46.50
Iron axles, Buffalo.....	45.00 to 47.00
Iron rails, Chicago.....	38.00 to 39.00
Iron rails, Buffalo.....	36.00 to 37.00
Iron rails, Cincinnati.....	32.00 to 32.50
Iron rails, St. Louis.....	34.00 to 35.00
Iron rails, Cleveland.....	34.00
Machine turnings, Cincinnati.	16.00 to 16.50
Machine turnings, Cleve.....	19.00
Machine turnings, Buffalo...	17.00 to 17.50
Machine turnings, N. Y.....	15.50
Machine turnings, Pitts.....	19.00
Machine turnings, east. Pa..	17.50 to 18.50
Machine turnings, Birming..	17.00 to 18.00
Machine turnings, Chicago..	18.00 to 18.50
Machine shop turnings, St. L.	18.50 to 19.00
Pipes and flues, Cleveland...	24.50 to 25.50
Pipes and flues, Chicago....	26.00 to 27.00
Pipes and flues, St. Louis...	27.50 to 28.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo..	34.00
R. R. wrgt., No. 1, east. Pa.	34.00
Railroad wrgt. No. 1 Cinci..	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
Railroad wr'ght, No. 2, Chgo.	32.00 to 32.50
R. R. wrgt. No. 1, Birming.	26.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	32.00
Sheet wrought, Pittsburgh..	34.00
Railroad wrgt., No. 1, St. L.	34.00
Railroad wrgt. No. 2.....	33.50 to 34.00
Wrought pipe, Buffalo.....	27.00 to 28.00
Wrought pipe, eastern Pa...	31.00 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland....	$24.00
Axle turnings, Buffalo.....	24.00
Heavy axle turn'gs, E. Pa..	23.00
Heavy axle turnings, Pitts..	25.00
Shafting, New York.....	36.00
Shafting, eastern Pa.....	39.00
Steel car axles, Pittsburgh..	46.50
Steel car axles, Birmingham.	31.00 to 32.00
Steel car axles, New York..	43.00
Steel car axles, Buffalo.....	44.00 to 46.00
Steel car axles, Cleveland...	44.00
Steel car axles, eastern Pa..	46.50
Steel car axles, Chgo.....	46.50
Shafting, St. Louis.....	37.50 to 38.00
Steel car axles, St. Louis....	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts....	$29.00
Car wheels, (steel), Pitts....	34.00 to 35.00
Car wheels, eastern Pa.....	29.00
Car wheels, Buffalo.....	29.00
Car wheels, Chicago.....	29.00
Car wheels, St. Louis.....	28.50 to 29.00
Car wheels, Birmingham.....	25.00 to 28.00
Car wheels, Cleveland.....	30.00
Tram car wheels, Birming...	21.00 to 24.00
Cast, No. 1 cupola east. Pa.	32.00
Cast, No. 1, Birmingham....	24.00 to 25.00
Cast, No. 1, Cleveland.....	31.00 to 31.50
Cast No. 1, Cincinnati.....	29.00 to 29.50
Cast, 1, heavy, N. J. points.	32.25 to 32.75
Cast, 1, machy., N. J. points	32.25 to 32.75
Cast No. 1, Chicago.....	33.00 to 34.00
Cast, No. 1, Pittsburgh.....	34.00
Cast No. 1 St. Louis.....	27.50 to 28.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.....	29.00
Malleable, cupola, East Pa..	32.00
Malleable railroad, Chgo.....	32.00 to 33.00
Malleable, agricultural, Chgo.	33.00 to 34.00
Malleable railroad, St. Louis	28.00 to 28.50
Mailleabel agricultural, St. L.	27.25 to 27.75
Cast, No. 1, Cincinnati.....	26.00 to 26.50

MISCELLANEOUS USES.

Boiler punchings, Chgo.....	35.50 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.....	44.00 to 45.00
Locomotive tires, St. Louis..	37.50 to 38.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, April 18, 1918 No. 16

Tighten Rein on Steel Consumption

Leading Mills Adopt Stringent Policies of Distribution to Concentrate on Absolute War Requirements—100 Per Cent Output Being Supplied in Some Cases—Enormous Military Needs Continue to be Shown

SHARP concentration of production upon immediate war demands to the exclusion of all other business, is the prompt response of the mills to the more clearly defined magnitude of the government's requirements in iron and steel. New policies put in effect this week by the leading producers in the Pittsburgh district and elsewhere represent actually the setting aside of all private obligations, temporarily at least. The largest of these interests now has closed its rolling schedules to everything but Class A tonnage. Even indirect war needs are being disregarded. Another large independent company formally has denied itself to open market inquiries and has notified the trade that promises of delivery hereafter are not to be expected. In this turn of affairs is to be seen the most rigid barrier to nonwar consumption that yet has been raised. In the east the government has been insisting that practically 100 per cent of production shall be applied to its requirements and severe rebukes have been administered to mills which have shipped even small tonnages elsewhere.

War Needs Still Grow

Why such sweeping measures are being brought to bear continues to be drawn from the freshly presented details of the government needs. The mills are being squared away to supply the enormous quantity of shell steel wanted for this year which, as stated last week, is estimated to exceed 4,000,000 tons. The statement of the steel director to the senate committee on commerce shows that in plates alone there is now on order for the government and its allies a total of 2,374,711 tons. Much more tonnage for ships to be built this year is in sight, as it is figured it will require approximately 175,000 tons monthly to take care of a shipbuilding output of 500,000 tons deadweight. Makers feel that notwithstanding the tremendous plate requirements, capacity will be adequate, but the steel director has questioned whether sufficient rolling capacity now is being devoted to this product.

The steel director has made clear that much of the heavy tonnage of plates and other forms which the mills have been asked to rush to England is to replace 750,000 tons previously borrowed by General Pershing for American overseas requirements. Obviously this process of substitution was adopted to save valuable time and shipping space. It offers an interesting commentary on the large capacity of the British industry for meeting war demands.

Apprehensive at Delays

As the government delays action on its car and locomotive orders, some apprehension is being expressed that this equipment may not be completed in time to serve as a safeguard against recurring freight congestion next winter. Some charges have been made that the government is delaying action needlessly in endeavoring to strike a closer bargain with the builders. The question of available steel supply in the end apparently is to determine the manner in which the order is to be executed. If it is decided the shipping program must have the first claim on steel, the number of cars is likely to be reduced and wooden types largely adopted. The importance of the matter from the standpoint of material, may be measured from the 575,000 tons of plates which will be needed for the government equipment plan, as originally laid out.

The proposed plan of making pig iron allocation through formal government requisition instead of by mere request is to be followed. It is felt the furnaces must have such a safeguard against the possibility of civil action by consumers whose purchases are being conscripted. The week's story of the market is a repetition of the futile efforts of consumers to buy iron. The best furnaces will do in the east is to make indefinite reservations. Furnace operations continue to improve under better coke supply, due to more adequate car service. The opening of lake navigation, however, again directs attention to the probable needs of car supply for the coal movement to the northwest. The upper lake district is calling for 27,000,000 tons of coal, or 1,000,000 tons weekly.

The Iron Trade Review.

EDITORIAL

Business Back of the War

BUSINESS men have found lack of efficiency in government circles as regards the war. Business men have supplied the solution of the difficulty. It has been to enlist business men as actual buyers of materials and as directors of activities of manufacturing in behalf of the government. It has been to bring to the problems of the government the experience and knowledge of large affairs which those already in office do not possess, because they have not needed to be so equipped in times of peace when quantity and speed were not essential.

Discussions at the recent gathering of the Chamber of Commerce of the United States in Chicago bristled with patriotism and full realization of the urgent necessities facing this government; with the desire to put a shoulder to the wheel and to push hard and effectively. A sudden awakening on the part of the nation as a whole is giving force to the ideas that have been held and advocated for months by far-sighted leaders of business who have seen the needs and have urged measures to meet the situation.

Much information of a reassuring nature was presented, constructive criticism and valuable suggestions came from the various papers and the pervading spirit was of the greatest helpfulness. No more patriotic gathering has been assembled in years and the advice developed will go far toward aiding the government in its efforts. The best and highest trained business brains of the country are needed for prosecuting the greatest business the country ever has engaged in—the business of war for the preservation of liberty. And business is proving that it stands ready to supply a 100 per cent service.

Tin Shortage at Serious Stage

STEPS now being taken by the government to conserve supplies of pig tin emphasize the seriousness of the tin situation. Manufacturers of solder, white metals and bearing metal were summoned by the raw tin division of the war industries board to Washington this week to discuss tin conservation. In March, the war trade board imposed an embargo on exports of tin plate and other articles containing tin, except where destined to be of direct assistance to the allies. The mobilization of our army and the maintenance of our expeditionary forces are increasing the need for tin plate for food containers and other purposes to an extent not generally appreciated, while other classes of war work are increasing their requirements. Nearly all our supplies of pig tin must be brought from the East Indies, which means a long ocean voyage, involving both time and vessel tonnage.

The following table shows the imports of tin in gross tons into the United States during the past few years, the approximate consumption of tin in tin plate manufacture, the ratio of such consumption to tin imports, and the exports of tin contained in tin plate:

	Pig Tin Imports.	†Tin used for tin plate.	Percentage tin imports thus used.	Exports of tin in tin plate.
1918.....	‡51,312	*33,000	*64	††
1917.....	64,146	*30,000	*47	4400
1916.....	61,636	24,700	40	4548
1915.....	51,623	21,118	41	3092
1914.....	42,433	18,624	44	1191
1913.....	46,554	16,474	31	1056
1912.....	51,787	19,259	37	1633

‡On the basis of first quarter imports of 12,828 gross tons.
†On the basis of 2 pounds of tin per 100 pounds of tin plate.
*Estimated.
††Embargo imposed by war trade board effective March 8, 1918.

Necessarily, some of the figures in the above table for 1917 and 1918 are estimates, but they clearly show the tendency. Either imports of tin must be largely increased during the remainder of the current year or consumption materially reduced. That the government is undertaking to increase supplies is indicated by recent reports that it has been a large buyer of Straits tin in the primary market at Singapore. That it is endeavoring to curtail consumption is shown by the current meetings of consumers in Washington. Stocks of the white metal in the United States had dwindled to 134 tons on April 1, as compared with a daily consumption of about 174 tons, and as against stocks in other years of from 3000 to 4000 tons. Such spot tin as can be picked up is selling at about 90 cents a pound and up, as compared with 51½ cents a pound a year ago. Imports of tin in 1918 undoubtedly will be increased to a volume considerably above the indicated figure of 51,312 gross tons which is based on first quarter imports. Accordingly, the percentage of tin supplies consumed in the tin plate industry will be reduced considerably below 64 per cent. But immediate and effective

action is imperative if essential industry is not to be handicapped by a shortage or a famine of tin.

Helping the Foreign Born

HOW to get in close touch with the foreign-born workman is one of the greatest of all labor problems today. There is one method which has met with marked success which involves no complex organization or expenditure of money. It is the teaching of the English language. The foreigner comes to this country expecting to work. He wants to work, but his ignorance of the language greatly handicaps him.

At various iron and steel plants in this country the teaching of English to the foreign employes is being attempted on a large scale. The work has passed the experimental stage. The experience of several years has helped to put such work on a practical basis and to reduce the plans and methods to a system which shows wonderful returns. The welfare department at one plant has set aside a room in the recreation building where classes in English are held twice a week in the evenings for the foreign employes. If the employe is on night duty at the plant, he is relieved by another workman and permitted to attend the class. The course consists of 30 lessons. These are printed in leaflet form and are designed to give foreigners a knowledge of English for daily use in the home, in work and in business. Ten are known as the domestic series and include words and phrases which pertain to the home.

The second series of lessons deals with experiences which are common in the plant and are appropriated for all groups of works in the blast furnace, coke oven, bessemer, open-hearth and rolling mill departments. These lessons include tapping the furnace, opening the cinder notch, patching converter bottoms, and the names of the various tools and appliances used in the departments.

Those who have been putting the plan into practice with success assert that when the lessons have been mastered, the foreigner will have a good vocabulary of simple words and phrases which are descriptive of his daily vocation. His work will also show a marked improvement. He will be able to read intelligently, to speak fluently and to write accurately. When this is done he can more readily absorb the ideals of America and be a real citizen.

We Shall Use Our Waterways

AFTER 50 years of log rolling and pork barrel appropriations the United States at last is to have a comprehensive, constructive policy governing the development of its internal waterways. At least such will be the case if plans now well under way are matured along the lines already laid down. Under the pressure of war necessity, which demands an efficient, smooth-working transportation system extending all the way from the interior of the country to the front line trenches in France, the shipping board and railroad administration have joined hands to bring about the actual use of our waterways. Heretofore we have spent millions for so-called waterway development without increasing the freight carrying capacity of the country's transportation system to any measurable degree. Now it appears we are to have results. Traffic will begin to move by water.

The shipping board, through the Emergency Fleet corporation, has appropriated $3,360,000 for the construction of towboats and barges. Contracts for twenty-four 2500-ton steel barges and four powerful towboats for Mississippi river service are to be let at once. Other plans are maturing for a fleet of barges for the New York barge canal which will be finished through from Buffalo to Albany this year. A committee of practical transportation experts, including such men as G. A. Tomlinson of Duluth, has been appointed by the railroad administration to work out a comprehensive plan and to see to it that the freight moves.

The importance of these developments to the iron and steel industry is almost self-evident. Already on the Great Lakes, the iron and steel interests are the largest users of water transportation in the country. Also on the Mississippi and other connecting rivers such companies as the Mississippi Valley Iron Co., St. Louis, and the Keystone Steel & Wire Co., Peoria, Ill., have conducted extensive experiments on handling pig iron, iron ore and coal by water.

Heavy bulk products, such as the raw materials used in the iron and steel industry, it has been thoroughly demonstrated can be moved with maximum economy and dispatch by water, provided adequate, modern equipment and terminal facilities are available. The facilities are being provided and as they are brought into use the strain on the railroads will be lessened. In this new departure in American freight traffic experience, the iron, steel and allied industries through experience will assume a prominent position.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1020

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$275.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur.	70.00
Spiegel, contracts, furnace.	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	170.00 to 185.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ¾ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, April, per bundle	$1.90

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ⅜ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products April 17, average for March, 1918, average for January, 1918, and average for April, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices April 17, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Bessemer pig iron, Pittsburgh..	$36.15	$37.25	$37.25	$42.20
Basic pig iron, Pittsburgh.....	32.95	33.95	33.95	39.20
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	39.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	39.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	42.25
Malleable, valley	33.50	33.50	33.50	36.00
Malleable, Chicago	33.50	33.50	33.50	39.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.79
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	33.00	33.00	38.25
**No. 2X Virginia, furnace....	33.50	33.50	33.50	38.25
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	41.50
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	360.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	72.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	72.50
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	72.50
Open-hearth billets, Pitts.....	47.50	47.50	47.50	72.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.38
Steel bars, Chicago.....	2.90	2.90	2.90	3.54
Iron bars, Philadelphia.....	3.50	3.50	3.648	3.659

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices April 17, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	3.50	$3.50	$3.50	$3.19
Beams, Chicago	3.00	3.00	3.00	3.79
Beams, Pittsburgh	3.00	3.00	3.00	3.70
Beams, Philadelphia	3.185	3.185	3.185	4.159
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	4.69
Tank plates, Philadelphia.....	3.435	3.435	3.435	6.909
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	5.75
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	3.75
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	3.75
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.20
Connellsville furnace coke.....	6.00	6.00	6.00	7.25
Connellsville foundry coke.....	7.00	7.00	7.00	7.87
Heavy melting steel, Pitts.....	29.00	30.00	30.00	28.12
Heavy melting steel, eastern Pa.	28.00	29.50	29.80	25.15
Heavy melting steel, Chicago..	29.00	30.00	29.70	26.63
No. 1 wrought, eastern Pa.....	34.00	35.00	35.00	38.50
No. 1 wrought, Chicago.....	33.50	35.00	35.00	33.30
Rerolling rails, Chicago.....	34.00	35.00	35.30	31.90

(For Additional Prices See Page 1020)

Iron Shortage Remains Unrelieved

Consumers Still Search Market for Metal With Small Results—Eastern Makers Accepting Only Reservations—Allocation Method Revised—Some Minor Modification of Differentials May Be Recommended

Chicago, April 16.—Inquiry for pig iron is being received by local makers in large tonnage, one interest this morning receiving in excess of 10,000 tons which had not appeared on the market previously. An East St. Louis interest which has been seeking basic iron for some time and has managed to cover partially, is still inquiring for 10,000 tons of that grade. In fact, almost all the large basic users in that section are seeking additional tonnage. Malleable iron is also in heavy demand and any analysis that resembles malleable and can be worked into the mixture is sure of ready sale if offered. Foundry iron is also in demand but not quite to the extent as other grades. Occasional offerings by furnaces at a distance through local brokers are taken up as soon as offered. High silicon iron is scarce and silveries are practically unobtainable, though Jackson county makers who have been busy on bessemer ferrosilicon have turned to silveries again to fill former contracts. Lake Superior charcoal iron is well sold for the remainder of the year and it is practically impossible to place more tonnage of that grade. Just what the outcome of the present shortage will be is not clear. That some users will be short before the close of the year is the only conclusion possible at present. However, every effort is being made to avoid as far as possible the effects of such a condition.

Parcel Out Small Lots

Boston, April 15.—A large electrical company is in the market for 4400 tons of high silicon iron for its three New England plants for fourth quarter delivery. A northern furnace has authorized its local agents to book 600 tons for May and June delivery which has been parcelled out in lots of one and two cars to those customers of the seller that stand badly in need of nearby iron. These are the outstanding features of an otherwise quiet and uninteresting week in the local market. Deliveries are fairly good from all points of production, but they are confined largely to those plants engaged on Emergency Fleet corporation work or to concerns which can accept deliveries to a government official. Inquiries are fewer rather than more numerous than they have been, for melters realize the futility of trying to secure something that is not available. Most of the furnaces represented in this territory have not a pound of iron to sell for prompt delivery, and there are not a few who have no iron for sale for the year. No complaint is heard about the delivery of Alabama iron but those who handle this product feel that larger shipments could be made in view of the report that boats bringing cotton north are coming in with water for ballast. An effort is being made to get the southern steamship lines to substitute iron for the water. Shipments of Connellsville coke into this territory are practically negligible and New England wants continue to be supplied largely by the local makers.

Tonnages Are Reserved

New York, April 15.—Reservation of tonnages by furnace representatives for regular customers now constitutes the principal activity in the pig iron market in this district. Furnaces generally are unwilling at this time to take on any

additional forward commitments for various reasons, such as the uncertainty of their future coke supply and a desire to work off some of the large orders on their books before undertaking new ones. The tonnages now being reserved probably will be accepted later by the furnaces in accordance with their ability to handle them. Practically the only second half iron sold during the past week, was southern foundry, of which several thousand tons went to consumers in this district. As a result of the situation described, the volume of inquiry is more restricted. The largest requirements now open are those of the General Electric Co. for 10,000 to 11,000 tons of foundry and malleable, of the New York Airbrake Co. for 10,000 to 20,000 tons of foundry, of the American Locomotive Co. for considerable basic and foundry, of the J. L. Mott Co., Trenton, N. J., for several thousand tons of foundry, for second, third and fourth quarters, of the Essex Foundry, Newark, N. J., for 4000 tons of foundry, etc. The Pennsylvania railroad's second half inquiry has not yet been closed. The shortage of malleable iron is most acute, and the Eastern Malleable Iron Co., the Crane Co., and other users, eagerly are snapping up carloads which occasionally are offered by furnaces producing the grade incidentally. Occasional sales of off iron continue to be made for prompt shipment but they involve very little tonnage in the aggregate. Sales are reported here of several hundred tons of southern foundry for shipment to the Pacific coast for export to the Orient.

Some Sizable Sales Made

Philadelphia, April 16.—A fair number of important sales of pig iron was made in this district during the past week, but generally inquiries far exceed the ability or the willingness of the furnaces to sell. The Lukens Steel Co. placed 15,000 to 16,000 tons of second quarter basic with Schuylkill valley furnaces. Several thousand tons of copper low phosphorus iron for second quarter and second half also were sold. Other sales involve a small tonnage of prompt foundry and off irons. Practically the only activity for the second half is represented by reservations which some furnaces now are making. New inquiries are numerous. The General Electric inquiry reported last week has been increased and now calls for 15,000 to 20,000 tons of various grades, principally for last quarter. The Niles-Bement-Pond Co. has asked for 2500 tons of foundry iron. The Bethlehem Shipbuilding Corp. wants 1500 tons of foundry iron for immediate shipment at Elizabethport, N. J., and San Francisco. The eastern Pennsylvania steelmaker who is behind on its deliveries of merchant iron has put one steelmaking furnace on foundry pig iron temporarily to help out. Several furnaces continue to suffer from lack of coke.

Good Inquiry, Little Iron

Buffalo, April 16.—There have been several sizable inquiries of about 1000 tons before the Buffalo market but the greater portion of the demand is for smaller lots. One of the features of the market is the demand for carload lots or thereabouts sent in by users who have been given extra government orders and must have small additional tonnages. The amount of placement is exceedingly small though local interests take up the inquiries with every furnace connection they have. Negotiations are opened as far west as St. Louis, throughout eastern Pennsylvania and as far south as Birmingham in an effort to assuage the demand in some small way, but little success is reported. It is very difficult at this time to place a pound of iron with Buffalo makers. Every effort now is made by makers to ship against former bookings, but there is not a furnace in the district that is not behind in its deliveries. Furnacemen appear to think that users will get along fairly well this summer, but that a poignant shortage will make itself felt some time next winter. Most of the furnaces are short of coke which militates against free bookings, and the root of this evil appears to be shortage of cars. The same difficulty hampers the shipments of iron.

Change Allocation Method

Cleveland, April 16.—Modification of the method of allocating pig iron by the committee on pig iron, ore and lake transportation has been adopted along the lines reported last week as being under advisement. Under this plan, the committee will continue to make the allocations, but it will be required that the particular department of the government in whose behalf the iron is to be used shall furnish the furnace a formal order or some form of communication. This is to protect the producer against the liability of civil action for violation of contract by some customer whose position on the order book had been displaced. Allocations have reached the point, as previously explained, where they represent the commandeering of tonnage already sold. One producer declined to accept an order without formal requisition to make a test case. A new government lot of 200 tons of foundry iron for Allentown, Pa., has been sought. Part of the 1000-ton low phosphorus inquiry for the Watertown, N. Y., arsenal has been placed. An allocation of 875 tons of foundry and high silicon for Kalamazoo, Mich., has been held up temporarily. Open inquiry from general buyers continues active. Sales are almost entirely lacking. A local producer continues to take some last half foundry business from regular customers. The General Electric Co. wants about 10,000 tons of foundry, malleable and bessemer for Erie, Pa. for fourth quarter in addition to approximately an equal amount for eastern plants. Normal furnace operations have about been restored in this and nearby districts. The railroads are beginning to bring out new tariffs for a 15 per cent increase on pig iron as per recent government authorization. These are going into effect five days after issuance. The new rate from Cleveland to Detroit, for instance, now in use, is 90 cents against 79 cents formerly.

Basic Supply Wanting

Cincinnati, April 15.—All embargoes against the shipment of southern iron to northern consuming points have been lifted. This action has facilitated the movement of iron from that section in a marked degree. Complaint is made that cars are scarce, as a large number were recently sent to railroad lines in the northwest. Motive power is also lacking and when cars are loaded there is considerable delay in getting them to destinations. A great deal of gossip has gone the rounds that basic iron is practically unobtainable. These rumors have practically been confirmed, and with the exception of small tonnages in the south, reliable authorities state that they do not know where steelmakers can turn for an adequate supply for this year. The foundry iron situation is not quite as bad, as many furnaces in the Birmingham district have held back disposing of their entire tonnage for the last half, and these will have some metal to offer before the beginning of the third quarter. Reliable reports from the Virginia district are not encouraging, and melters cannot rely upon furnaces there to relieve the shortage. In southern Ohio there will be some foundry iron for sale later, and probably a very little basic and malleable, but this is not yet on the market.

Available Metal Very Scant

St. Louis, April 13.—The demand for pig iron shows no signs of easing down and available material this week has been the lightest since the present scarcity commenced. Agents and

dealers report a scattering inquiry for small tonnages, most of them of an urgent character, in addition to the great unsatisfied demand which has underlaid the market for more than a month past. Larger consumers are pressing for deliveries, which have been rather unsatisfactory. This is true of iron from all directions. The south, which had been holding its own fairly well up to about April 1, has fallen back. One large user in this district purchased 3000 and 3500 tons for fourth quarter, but is short for immediate use, and only partially covered for third quarter. This interest has been absolutely unable to get metal to fill in the gap. It has important war work and has applied to Washington for assistance..

Production is Increased

Pittsburgh, April 16.—Production of pig iron in this district is continually increasing and is estimated at approximately 90 per cent of capacity. The Carnegie Steel Co. added another furnace to its active list during the past week and now has 49 of its 59 in operation. The scarcity of steelmaking grades has not been relieved to any extent and many consumers urgently have been seeking tonnages through different channels, some of them appealing to the war industries board. The shortage of basic iron is especially acute and some users seeking tonnages of this grade have abandoned their efforts and have sought bessemer iron instead. They have met with only limited success in their attempt. A valley maker has sold 2500 tons of bessemer iron to a manufacturer of high-grade steel for special purposes. It is learned that recent sales of bessemer iron which was stored along the Atlantic seaboard have cleaned up all of the available tonnages held there. Inquiry for foundry grades is not so pressing. One nearby furnace found it had about 15,000 tons on hand above obligations and sold the iron almost immediately, 4000 tons going to a consumer in this district. The committee on pig iron of the institute is considering differentials.

Selling is Restricted

Birmingham, Ala., April 16.—There is no free selling of pig iron in southern territory. The producers are not in a position to dispose of much iron for the second quarter and are not anxious to sell freely for the last half. Many orders already are on the books for the balance of the year. Even figuring on an increased production in this section, it is not believed that a great portion of the business to be offered can be accepted here.

Coke Car Supply is Good

Movement from Connellsville Region Well Maintained—Fuel Administrator Rules Against Renewal of Long Term Contracts

Pittsburgh, April 16.—The supply of cars in the Connellsville coke region continues to be large and was 100 per cent on the Monongahela railroad yesterday, while for the entire region it was approximately 90 per cent. A 70 per cent supply is promised for tomorrow on the Monongahela. The average of 100 per cent, however, is based on operations and not on the actual rating and inasmuch as operations are at the rate of about 75 per cent of capacity, the supply when given as 100 per cent really represents about 25 per cent under the total rating. Shipments are moving much more freely and practically no complaints now are being heard from furnaces because of a shortage of fuel. The output of coke will be greatly increased soon, provided the supply of cars is regular and adequate. This improvement will be made possible by reason of the fact that the first battery consisting of 640 ovens of the by-product coke of the Carnegie Steel Co., Clairton, Pa., probably will be in operation in about a month or six weeks. The 640 ovens, it is estimated, will produce approximately 50,000 tons of coke weekly, thus decreasing the demand on the Connellsville region that much and at the same time release 1000 cars each week, inasmuch as the coal for the Clairton plant will be transported by river. Operation of this plant also will make available a greater supply of laborers for other ovens in the Connellsville region. It may be that a number of ovens there will go out of blast when the Carnegie by-product plant begins to operate. Some consumers are of the opinion that free coke for both furnace and foundry grades will be available after the increased output has been brought about. Jobbers and dealers in coke in this district have received their licenses from the fuel administration. Production during the week ended April 6 totaled 333,065 tons as compared with 352,435 tons during the proceeding week, according to *The Connellsville Courier.*

Can't Renew Contracts

New York, April 15.—Permission to renew coke contracts for the usual 5-year period has been denied to eastern blast furnaces by Dr. Harry A. Garfield, federal fuel administrator. The furnaces were desirous of renewing these contracts on the customary sliding scale based upon the price of pig iron. The ruling of the fuel administrator, however, provides that coke contracts may be made only at or under the government maximum prices. It also provides that contracts may be made only for deliveries within a 12-month period and also that no contract will be allowed which is scheduled to expire later than 18 months from the date on which the contract is made. Sales of coke in the east have been small during the past week.

Shipments Moving Better

Cincinnati, April 15.—Shipments of both foundry and furnace coke from the Connellsville district are moving more freely. Cars are in better supply and they are handled more promptly by the railroads. This cannot be said about either the Pocahontas or Wise County districts, although considerable improvement is reported on shipments from those fields. New River appears to be also lagging behind on foundry coke shipments. New business is light, and with the exception of a few foundry coke contracts there is very little to report. Some coke for domestic purposes is being sold but the tonnage is insignificant.

Shipments Again Slump

St. Louis, April 13.—According to dealers here shipments of coke from the east, which loosened up rather promisingly during the latter part of March, have dropped off again, and during the past week hardly exceeded 50 per cent. In the St. Louis district proper there has been less inconvenience than elsewhere, due to the fact that the leading by-product plant here has been producing at the rate of from 700 to 800 tons daily, and most of this tonnage is being applied to local consumption. The principal furnace has been drawing 200 tons daily from this source. To the west there is a growing scarcity. Points in Iowa, which have not concerned themselves with the St. Louis market in years, have had inquiries here this month.

Inquiries Are Persistent

Birmingham, Ala., April 16.—Inquiries are numerous for coke and even small contracts, involving a few cars a week, cannot be accepted in the southern territory. Hope is expressed that some relief may be brought about shortly by a greater output at the coal mines.

Scrap Market is Waiting

Commission Question Still Dominates Situation—Washington Conference Slated for Next Week—Some Weakness Shown

FOR COMPLETE SCRAP PRICES SEE PAGE 1020

Pittsburgh, April 16.—Developments have taken place during the past week which leads the trade in this district to believe that the war industries board will grant scrap dealers and brokers a commission of 3½ per cent. Most consumers are in favor of this commission being allowed and they brought considerable pressure to bear on the board to this end. The committee on steel and steel products of the American Iron and Steel institute apparently desired that this question should be left to the government body for determination when it decided recently that it would not recommend the payment of a commission on the ground that such action might be interpreted as permitting sales above the government maximums. In the meantime the market in this district is extremely dull but if a commission is allowed activity is expected to develop.

Foundries Buying Cast

Boston, April 15.—There is quite a fair movement in the local scrap market, with all New England foundries busy and buying cast scrap of all sorts, but especially stove plate. The railroad situation is less of an obstacle to shipments to points outside of New England than it was a short time ago and since a fair number of cars became available last week, a goodly quantity of material was moved to Pennsylvania. At the same time the transportation situation is far from normal and the fact that the trade in general is waiting for a decision in the matter of commissions also tends to restrict business. Prices do not change much, but the tone of the market can be said to be firm. Wholesale dealers' paying prices per gross ton, f.o.b. cars, shipping points, follow: Wrought No. 1 yard long, $29 to $29.50; horseshoes, $29 to $29.50; cotton ties, $21 to $22; stove plate, $19 to $19.50; No. 1 machinery, $31 to 32; No. 2 machinery, $27 to $28; car axles, iron, $42 to $43; steel, $42 to $43; rerolling rails, $30 to $31; iron boiler plate, $33 to $34; bundled barrel hoops, $16.50 to $17.50; wrought iron pipe, new specifications, $28 to $29; steel rails, $25.50; No. 1 railroad steel, $25.50; heavy melting steel, $24.50 to $25; axle turnings, $20 to $21; machine shop turnings, $14 to $15; cast borings, $15 to $16; drop forge trimmings, $22 to $23; cast iron car wheels, whole, $27, broken, $31.

Market is Listless

New York, April 15.—Listlessness characterized business in the New York iron and steel scrap market during the past week. With the exception of cast scrap, which continues in fairly good demand, few grades were sought. The question as to whether or not commissions will be granted to dealers is as yet undecided. In the meantime the original ruling of the subcommittee of the Iron and Steel association is being observed. Despite the dullness of the market, prices on all descriptions are unchanged.

Market is Balanced

Philadelphia, April 16.—Mills in this district are receiving as much scrap as their requirements call for, while their buying is equal to the supply being offered. The market therefore is practically stationary, being neither strong nor weak. Heavy melting steel is a trifle stronger and is quoted at $28 to $29, delivered. Other grades are unchanged. The American Board of Scrap Iron Dealers, together with the subcommittee on scrap and the general steel committee of the American Iron and Steel institute, will go to Washington next week to take up with the price-fixing committee of the war industries board the question of dealer's commission and price revision on unshipped contracts of April 1.

Conditions Are Unchanged

Buffalo, April 16.—There is no change in the general scrap market here. A strong unsatisfied demand for cast scrap, steel scrap, stove plate and low phosphorus. Some foundries, short of pig iron are substituting case scrap as far as possible. Prices remain unchanged.

Consumers Cancel Contracts

Cleveland, April 16.—Cancellation of scrap iron and steel contracts by consumers in cases where dealers show a tendency to hold out for the price in effect prior to the $1 reduction ordered by the President for the second quarter is the present feature of the local market. Consumers reason that they can abrogate contracts without loss because they can go out into the market and buy at the new lowered maximums. Dealers, however, complain against this action and believe they are entitled to the old price, at least in instances where they were ready to make shipment before April 1 and were prevented by railroad transportation difficulties or some other cause beyond their control. Despite numerous cancellation, scrap iron and steel dealers here are more optimistic and believe a turn for the better is due. Dealers would not be at all surprised were their 3½ per cent commission reinstated shortly. They do not expect the price-fixing committee of the war industries board voluntarily to take this action, but are confident that if the American Iron and Steel institute recommends it Washington will accede.

Dealers Are Indifferent

Cincinnati, April 15.—The indifferent attitude of scrap dealers is being reflected generally in the trade. The foundries are content to purchase only enough scrap to carry them through to July 1. Sales to the rolling mills are also very much curtailed. The new price reduction now is generally understood both by sellers and buyers. The clearing away of this confusion has not contributed to any increase in business. The most important and most encouraging feature is the better movement of scrap to the large consuming centers. Buying prices are weak and it is reported that selling figures are frequently revised downward on desirable business.

Chicago Market Weakens

Chicago, April 16.—Decidedly weaker conditions prevail in the Chicago scrap iron and steel market, largely due to lack of demand, but in a measure also reflecting somewhat larger supply in some grades. The decline in prices is most marked in rolling mill and foundry grades while steel scrap is in good demand at practically the maximum. The leading independent steel manufacturer recently bought a round tonnage of heavy melting, said to be about 20,000 tons, and there is considerable demand for this grade for shipment to the Pittsburgh market where scarcity seems to exist. Railroads appear to be marketing more scrap than has been the case in recent months and a total of about 7500 tons is now current. While this is not a large tonnage under ordinary conditions, it is larger than has been available for some time. The Chicago, Milwaukee & St. Paul offers 1800 tons, the Wabash 1800 tons, the Monon 1500 tons,

including 250 tons of steel rails, the Chicago, St. Paul, Minneapolis & Omaha 670 tons, the Chicago Great Western 500 tons, the Chicago & Eastern Illinois 350 tons and George W. Jennings 780 tons, including 100 tons of car wheels. The latter is one of few lots of car wheels which have appeared on the market in recent months.

Buyers Holding Off

St. Louis, April 13.—The scrap market throughout the week has been dull and uneventful. Both buyers and sellers are disposed to hold off awaiting developments. Actual sales were light, with prices showing little change. There has been some trading between dealers.

Lake Season

Will Open Soon as Ice Conditions Improve—Committees Organize

Cleveland, April 16.—Iron ore carriers of the Great Lakes will begin their 1918 navigation season within a few days. Ice reports are favorable and indicate that boats will be able shortly to reach the head of the lakes. Vessels will start next week if ice conditions continue favorable.

Organization of the work of handling the ore trade this year is being perfected by the various supervising committees. The mobilization committee will meet next week when complete records of the minimum ore requirements of each blast furnace are expected to be available. The vessel operating committee has been appointed and includes the three members who handled this work last year. They are W. H. McGean, Hutchinson & Co.; John T. Kelly, W. C. Richardson & Co., and A. W. Thomson, Wilson Transit Co., Cleveland.

Ore-carrying rates up to June 30 will be the same as last year. These rates are $1 net from the head of the lakes; 90 cents from Marquette, and 75 cents from Escanaba. From Escanaba to Chicago the rate is 60 cents. The rates cover the period up until third quarter iron and steel prices are fixed, but will probably continue throughout the year.

More manganiferous ore probably will be shipped this year. One estimate places the increased shipments of such ore from the Cuyuna range at 200,000 tons, or 33 per cent. Increased efforts to utilize domestic reserves and thus conserve ocean tonnage have brought about a greater demand for such ores to replace foreign manganese ores.

Great Plate Demands Grow

Car Program Needs Placed at 575,000 Tons—Mills Break Output Records and Makers Believe Capacity Adequate

Pittsburgh, April 16.—For reasons not made known here, the government's carbuilding program has been delayed. A meeting to be held in Washington tomorrow between government authorities and car builders may pave the way to the distribution of orders. Tremendous demands are being made and are to be made upon plate mills in connection with the carbuilding and shipbuilding programs, and also for the allies. England alone has asked for 300,000 tons for delivery as quickly as possible and it is reported the tonnage has been allocated among various mills. Japan, it is understood, is to get 200,000 tons of plates in return for the use of its ships by the United States. Of this quantity, 100,000 tons, it is reported, will apply on an old contract which had been canceled and it is assumed that prices in the original contract was made will be paid to the mills. On the other 100,000 tons, however, regular government prices will apply. The plate production of the Homestead works of the Carnegie Steel Co. in March broke all previous records and totaled 106,213 tons, mostly ship plates. The Liberty mill, which started operations early in October, 1917, turned out 17,240 tons, as compared with the estimated capacity of 12,000 tons. The best previous record of the Homestead mills was 90,960 tons. Exclusive of light and universal plates, it is estimated that the capacity in the United States is 300,000 tons a month and that it will require approximately 175,000 tons a month to take care of a shipbuilding output of 500,000 tons, deadweight. It is pointed out, therefore, that the mills will be able to take care of requirements both of this country and the allies. The domestic market is extremely dull. The only offerings reported are small tonnages of light plates.

More English Tonnage Placed

Philadelphia, April 16. — Further large orders for plates for delivery to England have been placed with eastern mills and call for the quickest possible shipment. It is understood th tathis tonnage is a part of that which the government is returning to England to replace 750,000 tons of various forms previously borrowed by General Pershing in order to save time and shipping space. A large part of this tonnage is being accumulated at eastern seaboard for shipment abroad. The Emergency Fleet corporation has placed additional plate tonnage with eastern makers. Some of the railroads have ben the buyers of several thousand tons for repairs.

Ship Tonnage Heavy

Chicago, April 16.—Allocation of ship steel, which is largely plates, continues active and in large tonnages. Constant addition of further shipyards which are completed and made ready for active service from month to month is adding to the demand for ship material. Orders are being booked much in excess of shipments, especially in plates, and every effort is being made to push through as heavy production as possible. Effort is also being made successfully to keep all shipbuilding activities supplied that no delay may be met from lack of material. Aside from shipbuilding necessities, comparatively little plate business is being taken.

Heavy Demand

Made Upon Mills For Rolled Pipe—Cost Needs Small

Pittsburgh, April 16.—Demand for tonnages coming to makers of iron and steel lap weld pipe from oil country interests is heavy and while some makers are taking additional business after scrutinizing their books, others are entirely out of the market for this class of pipe. Government orders are only moderate in size. The market for butt weld pipe is someare in a position to make shipments what more active and most producers in from one to two months on this kind of goods.

Western Demand Absent

Chicago, April 16.—Demand for cast iron pipe in the west, even though this is the season when summer activity is provided for, is practically absent and producers are finding almost nothing for their shops in this line. The inquiry from Twin Falls, Idaho, for 900 tons on which bids will be opened April 18, is about the only live inquiry now current. The United States Cast Iron Pipe & Foundry Co. is low bidder on 1500 tons at Springfield, Ill., and probably will be awarded the tonnage this week.

Clamp Lid on Deliveries

Only Essential War Material Now Gets on Bar Rolling Schedules —Makers Deluged With Specifications

Cleveland, April 16.—Consumers of steel bars in this district find it is practically impossible to place new orders with the mills except for Class A war work, in view of the more stringent policies as to new business just adopted by the leading producers. Consumers have been advised by some mills that it is useless to send in inquiry, for local representatives have been instructed not even to submit these to the works for a period of 30 days. No new promises of delivery whatever will be made by certain mills. Curiosity has been aroused as to how this new policy will affect the needs of the implement makers, which are of a class B rating. Some of the mills have been supplying these consumers only on the condition that they take a portion of their needs in bars rolled from discard steel. Mill orders to be accepted from nut and boltmakers are to be regulated by the average of straight war requirements which these users will be able to show from past records. For adaptors for shells to be made by a plant in this district, from 800 to 1000 tons of 3-inch cold rolled steel has been allocated to two makers. There is an active unfilled demand for large rounds and squares.

Bar Specifications Heavy

Chicago, April 16.—With considerable secrecy constantly surrounding placing of bar and other finished steel orders for government use, it is difficult to separate them and determine what tonnage is devoted to each product. However, bar tonnage is all that mills can accommodate, both for shell rounds and for bars going into ships, wagon equipment and a score of other uses. Agricultural implement makers have been active for some time and, as they take additional contracts for government work, especially for tractors, their needs have multiplied. Specifications are heavy and sales are in excess of shipments, with most new business for the government. Demand for bars to be used in nonwar material is less week by week as various manufacturers are filling their order books with government work. Railroads are not buying at present but the expected order for freight cars to be placed by the government hangs over the market with a heavy tonnage. Bar iron is quiet and mills are not anxious to book business except for spot delivery, while every producer is hanging back to be able to care for the demand which will come when the government places the expected order for freight cars. Each car will require about 2500 pounds of bar iron, which will give 125,000 tons if 100,000 cars are bought.

Manufacturers of hard steel bars dependent on old rails for their raw material are having hard sledding as practically no rails are coming out and the heavy demand from other quarters makes the market active without their being able to take on much of the business. A rerolling mill in this district has been fairly busy using discards from shell steel billets and rounds when it has not had sufficient rails to meet demands.

New Business is Light

Pittsburgh, April 16.—New business taken by makers of iron and steel bars involves only small tonnages. Makers are well booked, a good portion of their tonnage being for the government and some of them are not quoting on additional tonnages but are keeping the mills in a position to take more requirements that may be placed by the government from time to time. Practically all of the new business being accepted is for shipment at the convenience of makers.

Baldwin Buys Tonnage

Philadelphia, April 16.—An order for 4000 tons of iron bars, an unusual large order, has been placed with the eastern mills by the Baldwin Locomotive Works. This material will be used in the building of 1200 locomotives which the Baldwin works have slated to receive from the large government order. Included in the specifications are bars up to 3 and 4 inches. The order was placed under 3.50c, eastern mills. Otherwise the eastern bar iron market is quiet. Bar iron costs are rising and makers say there is very little profit for them in present government prices since most of the margin will be wiped out by the advances in puddling rates which the mills are about to put in effect. Practically no steel bars are being sold except reinforcing material, rolled from shell discards.

Shafting Market Dull

Pittsburgh, April 16.—The market for cold rolled shafting is dull. A large portion of the bookings are for the government which it is understood will come into the market soon for a large tonnage of small sizes. Deliveries have been deferred somewhat on account of heavy commitments but production has increased and makers are beginning to catch up on orders.

Government Business Prevails

Pittsburgh, April 16.—Makers of nuts, bolts and rivets in this district report that considerable business is being taken but it is chiefly for the government. Shipments are now being made satisfactorily and operations are proceeding almost at capacity. It is believed that the recommendation of producers that there be no change in prices during the second half will be acted on favorably by the war industries board.

New Standards

For Manganese Alloys Generally are Acceptable—Prices Vary

New York, April 15.—Expressions from consumers to the proposal by the subcommittee on ferroalloys of the American Iron and Steel institute, to lower the standards of ferromanganese and spiegeleisen to 70 per cent and 16 per cent, respectively, indicate that the new specifications are being adopted pretty generally. Sellers of ferromanganese say that new inquiries from some consumers during the past week stipulated 70 per cent metal. In one case, a consumer refused to buy ferromanganese slightly higher than 70 per cent though he was in urgent need. Indications are that only a few consumers will hold to the old standards. These include principally the tool and crucible steel manufacturers, whose practice necessitates the use of 80 per cent ferromanganese.

On several sales of 70 per cent domestic ferromanganese during week, some makers obtained a flat price of $250, delivered, while others sold at $3.50 per unit, making the delivered price for 70 per cent metal $245. On 80 per cent, the asking price generally is no lower than $275, delivered. Several hundred tons of English 78 to 82 per cent metal were made during the week for second half. Current inquiries call for about 1000 tons in the aggregate.

Fifty per cent ferrosilicon is slightly easier. Sales for second quarter were made at $170, delivered, during the past week. The market on prompt and second quarter is $170 to $180.

Future contracts continue at $155, delivered.

On spiegeleisen the market is quiet. The prevailing price is firm at $70, furnace, for 16 per cent.

Demand for ferrotungsten has improved considerably. The market on 70 per cent metal is firm at $2.30 per pound, furnace.

Alloy Prices Firm

Pittsburgh, April 16.—While demand for 50 per cent ferrosilicon is not heavy, it appears to exceed the supply. Consumers who have not covered for the last half appear to be withholding inquiries in the hope that there will be a reduction in prices. The quotation for this shipment ranges from $155 to $160, delivered, and that for prompt shipment from $180 to $190, delivered. One interest in the Pittsburgh district has sold a small lot of 20 to 25 per cent ferrosilicon on a basis of $100 a ton for 20 per cent and $3 per unit over that analysis. The market for spiegeleisen is firm and inquiry is fairly active. Makers say there is a scarcity of this alloy. Sixteen to 18 per cent is quoted at $70, furnace. Only fair demand exists for ferromanganese, but it is understood that a number of consumers have not covered their requirements. Hesitancy is being shown by some in accepting 70 per cent ferromanganese, the new standard, which is being quoted at $250, delivered, by most makers with a charge of $4 per unit over that base. One consumer in the Pittsburgh district has bought approximately 2000 tons of 78 to 82 per cent ferromanganese, shipment to be spread over five months, and it is understood that the tonnage was obtained before the new standard was fixed at around $250, delivered.

Ore Situation is Acute

Chicago, April 16.—Consumers of ferromanganese have come to the conclusion that the change of grade from 80 to 70 per cent is dictated by necessity and not by caprice and are coming into the market for their supply. Conditions as to ore supply are such that it would not be surprising if the standard were reduced later to even 60 per cent. Though the local producer has little tonnage remaining for the last half buying is active and the market is strong. The quotation is $250 per ton for 70 per cent ferro, with $4 per unit additional for manganese above the standard.

The Lackawanna Steel Co., Buffalo, blew in its new stack on March 27. The company now has eight stacks in blast.

Priority to Govern Cars

If Preference for Steel is Given Ships, Government Equipment Order May Be Modified—Price Question Unsettled

New York, April 15.—A reduction in the number of steel cars to be purchased by the railway administration may follow a series of conferences now being held with the war industries board relative to the question of priorities. In the possible event it is ruled that the shipping board shall continue to have first call, for all materials needed in carrying out its work, the railway administration may decide to build a number of cars of wood instead of steel as was originally intended.

Under the present program of the government, it is expected that at least 575,000 tons of plates will be needed in the construction of cars, in addition to a heavy tonnage of shapes, bars, etc. Due to the large quantity of material required for this work, the war industries board is said to be having difficulty at this time in coordinating the demands of the railway administration and the shipping board. To this difficulty is attributed much of the delay now being experienced in the allotment of car orders.

The question of prices also is understood to be a deterring factor in the purchase of railroad equipment. Although several conferences have been held between builders and government officials since specifications were issued several weeks ago, no definite understanding in this matter, so far as can be learned, has yet been reached. It is apparent from reports out of Washington that the government is intent upon driving a close bargain. The car and locomotive builders proposed to do the work on a basis of cost plus 10 per cent, but this proved unsatisfactory to government officials who, in one of their counter proposals, suggested 6 per cent as being a fairer profit. Manufacturers of specialties have been asked to pool their patents and allow various plants to produce their appliances without royalties. This proposal also is meeting with opposition on the part of manufacturers. Bids on refrigerator, flat and general cars will be asked later.

The bulk of demand in the present car market is for tank cars. Recent inquiries include 100 to 200 for the Great Western Contracting Co., Kansas City; 25 to 50 for the Houston Railway Car Co.; 25 to 50 for the Acme Petroleum Co., Tulsa, Okla.; 18 for the New Orleans Industrial Alcohol Co., Houston, Tex.; eight to 10 for the American Nitrogen Product Co., Seattle, Wash.; five for the Finkbine Lumber Co., Wiggins, Miss.; three to four for the Hazel Atlas Glass Co., Washington, D. C.

Cotton Tie Price

Fixed at $1.90 Per Bundle, or Reduction of $8.80 Per Ton

Pittsburgh, April 16.—The price of $1.90 a bundle of 45 pounds, mill, April basis, at which the cotton tie market was opened by makers on Monday of the present week compares with a price of $2.10 per bundle at which the market was opened on May 17 of last year, the highest level ever quoted. Steel bars last year at the opening of the cotton tie market were selling as high as 5.25c a pound, while the prevailing government price is 2.90c and the reduced price of cotton ties amounting to $8.80 a ton as compared with last year's price is due to the sharp cut in the price of steel bars. The market has been opened unusually early this year, largely because of pressure brought to bear by consumers. Mills are promising delivery at their own convenience. The price of $1.90 applies to the April basis for lots of 3000 bundles or more, while a price of $1.92 is quoted on lots of 1000 up to 3000 bundles. A carrying charge of 1c a bundle is provided for May and of 2c a bundle for June, and no quotations are being made after the latter month.

While no official estimate has been made it is believed that this year's cotton crop will total about 15,000,000 bales. It is not possible to estimate accurately the tonnage of cotton ties that will be required. Southern warehouses are said not to have large stocks on hand.

The following table shows the season's prices per bundle of 45 pounds since 1901:

1902	$0.80
1903	.85
1904	.75
1905	.85
1906	.85
1907	.95
1908	.85
1909	.70
1910	.75
1911	.75
1912	.70
1913	.80
1914	.65
1915	.85
1916	1.35
1917	2.10

New Lettings Show Loss

March Awards Are Rated at 47 Per Cent of Capacity— 156,000 Tons Wanted for More Ships

New York, April 15.—The American International Shipbuilding Corp. has taken a contract for 60 additional 7500-ton steel freighters for the government, instead of 16 as reported last week. Including these, this interest now has orders for 180 government vessels, including one hundred and ten 7500-ton freighters and seventy 8000-ton combined troop and cargo carriers. For the 60 new vessels. about 156,000 tons of fabricated steel will be required. Bids for this steel will be requested shortly. The only structural work of note to come up during the week involves 9500 tons for extensions for the Crucible Steel Co. of America at Harrison, N. J., and Syracuse, N. Y., awarded to the American Bridge Co. Demand for plain shapes is at a minimum. Due to government lettings lately, however, the best mill deliveries now to be had are four to five months on standard sections and eight to 10 weeks on special sections.

The report of the Bridge Builders and Structural society shows that during March, 47 per cent of the country's shop capacity was contracted for. This is equivalent to 84,600 tons and compares with 55½ per cent or 99,950 tons in February. The drop was due to a falling off in government requirements and to the decreased demand for general building work. The report of lettings by recent months is as follows:

Month	Per cent	Approx. tonnage
March, 1918	47	84,600
February	55½	99,900
January	53	95,400
December, 1917	121	205,200
November	77	138,600
October	61½	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Volume is Considerable

Philadelphia, April 16.—Practically nothing but government work is included in current shape bookings by eastern mills. The largest single order placed in the week called for 500 tons. Most of the business has been under 25 tons. The total volume, however, has been considerable and as a result the mills again are unable to take business under three to five months in standard sections. A fabricator needing 500 tons urgently was forced to buy from a warehouse.

Only Small Lots Taken

Pittsburgh, April 16.—Fabricators in this district are taking only small tonnages from commercial buyers, their operations being devoted principally to government requirements. Some of the business taken for domestic use involves small sizes which are taken from stocks.

All Tonnage for War

Cleveland, April 16.—Without exception, all the new requirements for structural shapes coming into the market are for war purposes. New inquiries include 1500 to 1600 tons for a dry dock at Galveston, Tex., a tonnage of railroad bridge work and material for 30 shipyard cranes of the modified hammerhead type for eastern yards, being figured upon by local builders. None of the sellers in this district have been able to quote on an inquiry for approximately 500,000 1¾-inch angles for wire entanglement supports which came out last week.

Government Takes Most

Chicago, April 16.—Fabricators find that government needs, principally for shipbuilding, are absorbing most of the output of structural mills. While it has been possible in recent weeks to book some tonnage and obtain deliveries from time to time between government shipments, it is noticed that such material is being shipped less frequently as shipbuilding needs are increasing. At present many fabricators are not able to take anything, even subject to delay, as they are far behind already. To make up for lack of ordinary construction, bridge shops and structural shops are increasing their output of ship parts and for the most part are busy.

CONTRACTS AWARDED

Factory building for Kilby Mfg. Co., Cleveland, 140 tons, to T. H. Brooks & Co., Cleveland.

Boiler house, for the Pillsbury Flour Mills Co., Minneapolis, Minn., 134 tons, to American Bridge Co.

Extension to plant of Edge Moor Iron Co., Edge Moor, Del., 250 tons, to Morris Wheeler Company.

Government chemical plant at Sautville, Va., 800 tons to McClintic-Marshall Co.

Buildings for Crucible Steel Co. of America at Harrison, N. J., and Syracuse, N. Y., 9500 tons to American Bridge Co.

New foundry building for Pratt & Letchworth Co., Buffalo, 1000 tons, to Buffalo Structural Steel Co.

Addition to Mills building, San Francisco, to California Steel Co.

CONTRACTS PENDING

Extension to refinery of California Hawaiian Sugar Co., Crockett, Cal., steel bids about to be taken; general contract expected to be awarded to Lindgren Co., Monadnock building, San Francisco.

Dry dock at Galveston, Tex., 1500 to 1600 tons, bids being taken.

Reduce Stocks

Of Tin Plate Considerably and Mill Operations Are Better

Pittsburgh, April 16.—Tin plate mills of the country during the past week operated at about 93 per cent of capacity and during the past three weeks stocks have been reduced by at least 300,000 boxes. Improvement is shown in the supply of cars but it still is inadequate in the Wheeling district. Tin plate makers expect to open their books for the last half early in May. The opening will be a more or less formal proceeding, inasmuch as no prices will be carried in contracts but will be left subject to the determination of the government and business will be allotted to regular customers only insofar as this is possible over and above requirements made by the food administration. The McKeesport Tin Plate Co. has purchased seven acres of Youghiogheny river frontage adjoining its present plant for the purpose of taking care of any future necessities that may arise.

Navy Nails

Largely Go to Pittsburgh Steel Co.— Sold on Fixed Base

Pittsburgh, April 16.—Most makers of wire and wire products in this district are confining sales to their regular customers and are cutting down on their requirements where possible. Operations of mills and the supply of cars have increased. Producers complain that they are suffering from a shortage of labor. The Pittsburgh Steel Co. received the bulk of the 40,000 kegs of nails placed by the navy department for shipment to its various yards. Some of the miscellaneous tonnage is understood to

have gone to the American Steel & Wire Co. Bids on these nails were made on a delivered basis and were calculated on the recommended level of $3.50 per 100 pounds, plus the freight rates to the points of delivery together with the freight war tax. Provision was made for any increase in freight rates so that the added charge would not fall upon the producers.

Chicago Market Quiet

Chicago, April 16.—Conditions in the market for wire and wire products are quiet and there is comparatively little demand. Jobbers continue to take nails in fair volume, though building operations have been suspended to a degree that has cut this demand somewhat. Annealed wire for bale ties is also in demand and the export tonnage asked is not lessening.

Sheet Output

Checked by Lack of Steel—Corrugated Discrepancy Adjusted

Youngstown, O., April 17.—Lack of steel, together with the shortage of box cars greatly has curtailed the production of sheets in this district. While the box car situation is better than it has been for several weeks, there is still room for improvement. The leading sheetmaker has several mills idle on account of a shortage of sheet bars. Another maker in the upper part of the valley also has several mills idle for the same cause. The latter maker has bar mills under construction, but these will not be completed until July. This maker, however, is producing open-hearth ingots and expects to overcome his shortage of semifinished steel by having them converted into sheet bars by an outside mill. The government has been having trouble with the corrugated sheets rolled in this district. When the sheets were used for roofing and siding, the corrugation on some would not overlap the corrugations on others. It was found that sheets 29 inches wide were being corrugated by some mills, while others used sheets 30 inches wide. To overcome the trouble experienced in assembling the sheets, representatives of the mills in question met in Washington recently with government officials and came to a definite conclusion concerning the width of the sheets before passing them through the forming rolls.

Want to Ship Customers

Philadelphia, April 16.—Sheet makers have brought to the attention of the government that unless they are able to produce simultaneously with war orders, some material for regular customers, the latter may have to go for months without receiving steel. In the meantime, the government is about to place large additional orders for blue annealed sheets for trench covers. The leading eastern maker is out of the market. Western makers are offering only high carbon sheets rolled from shell discards.

Steel Shortage Acute

Pittsburgh, April 16.—Operations of sheet mills in this district are proceeding at a low rate, due to an acute shortage of sheet bars. The supply of cars also is inadequate. The situation is serious in view of the extremely heavy tonnages that have been and are being placed by the government. Producers are being called upon to supply large tonnages within short and specified periods and it is difficult to see how the severe schedules laid out can be made. The American Sheet & Tin Plate Co. will open its books for last half requirements early in May. The allotting of tonnages to regular customers will be made and the company will enter blanket contracts for so much tonnage at prices to be named by the government.

Operation is Curtailed

Chicago, April 16.—Sheet mills as a general rule are out of the market, from half to two-thirds of producers not being able to take on further business. This results from lack of sheet bars, which are unusually scarce, and this has caused mill operation to be somewhat curtailed. Demand for steel sheets would be strong if producers allowed it to come to the surface and most consumers are in need. Some customers have recently been able to place contracts for third quarter delivery to about half of their requirements.

Steel Buyers Go Begging

Shortage of Marketable Semifinished Material More Severe—Bethlehem Wants Sheet Bars—Shell Tonnage Allotted

Philadelphia, April 16.—An inquiry for 10,000 tons of sheet bars for delivery at the rate of 2000 tons monthly has been put out by the Bethlehem Steel Co. for shipment to Sparrows Point. A Philadelphia mill continues unable to locate 2000 tons of billets for rolling into large rounds. Small inquiries are numerous. Semifinished material is harder to get on account of the improvement in traffic conditions. The finishing mills are using up more steel due to less congestion and makers as a result have less material to market.

Anxiously Seek Tonnages

Pittsburgh, April 16.—Insistent inquiries for tonnages of sheet bars continue to come to makers and brokers, but despite the somewhat increased production the shortage is extremely acute. The difficulty of the situation is heightened by reason of the enormous demands that are to be made by the government for shell steel, which make it necessary for some producers to divert their capacity to its needs instead of devoting them to commercial requirements. Sheet mills especially are short of bars. While tin-plate makers are also in need of tonnages, they are being supplied much better than other consumers. Miscellaneous inquiries are being made for billets but no tonnages are being offered. There appears to be somewhat freer offerings of discard billets and the market for this grade is slightly easier. Some makers continue to hold 4 x 4 discards at the government price of $47.50, Pittsburgh, fixed for the regular product, but others are offering tonnages at $45. Demand for forging billets is active, but no sizable lots are being offered. Limited tonnages are reported to have been sold during the past week at $60, Pittsburgh. There is also a shortage of slabs for which some platemakers are inquiring. No offerings of wire rods are being made in this district.

Nothing for Open Market

Cleveland, April 16.—Makers of semifinished steel in this territory are being kept filled up by government work and they have nothing to offer in the open market. Practically no sheet bars or other forms except for strictly government requirements are being shipped to finishing mills. Users in northern Ohio have been besieging producers, but have received no encouragement. Large orders for semifinished steel are being filled for the government. A new one of this character just received calls for 20,000 to 25,000 tons of square billets for British delivery. A Canton mill which recently has been offering open rolling space for large rounds and squares has inquired for 1500 tons of rerolling billets, but has been unable to locate this material.

Mills Supply Great Tonnage for Ships

Steel Director Replogle Before Senate Committee Shows 2,374,711 Tons of Plates Under Order for War Purposes—750,000 Tons Borrowed of England, Being Returned—Questions Adequacy of Plate Rolling

WASHINGTON, April 16.—The testimony of J. Leonard Replogle, director of the steel division of the war industries board, before the senate committee on commerce April 5, has been released for publication and discloses in detail the tonnages of steel production for shipyards week by week from Jan. 5 to March 30.—It also discloses that Mr. Replogle contends there is "a decided and very acute shortage" of plates, a view opposite to that held by Judge E. H. Gary and other officials and members of the American Iron and Steel institute.

The actual shipments of steel on Emergency Fleet corporation orders, during the first quarter this year, aggregated 618,177 tons, as against actual requirements of 590,428 tons. Of the total ship steel tonnage rolled by the mills, 374,741 tons represent the quantity of plates produced for the yards during the quarter. Mr. Replogle did not show what the plate requirements were during that period but he declared the steel furnished in the first three months was at a rate of 550,000 tons of ships per month.

Shipments Exceed Requirements

The steel director, in his letter to Charles Piez, general manager of the Fleet corporation, which was introduced in Mr. Replogle's testimony, declared that in the "five weeks ending Feb. 2, which would really be January delivery, 106,594 tons of plates and 175,943 tons of all kinds of steel, including plates, shapes and bars, were shipped to you. In the four weeks ending March 2, which would cover February shipments, 125,526 tons of plates were shipped and 209,383 tons total steel. In the four weeks ending March 30, 142,261 tons of plates were shipped and 282,851 tons total steel." These shipments compare with the January requirements of 180,761 tons, February 181,694 and March 227,973. The net surplus of shipments over requirements was 27,749 tons.

Some idea of the ship steel ordered was given by Mr. Replogle when, in response to a question by Chairman Fletcher of the senate committee, he declared that "there are 2,374,711 tons (of plates) on order." This he divided as follows: "Sixty-two thousand tons of that is for the army; 182,000 tons of it is for the navy; 831,018 tons is for the Emergency Fleet corporation. The total orders for plates for the United States government are 1,203,000 tons. Canada has 700,000 tons, England 53,000; France 39,800 tons; Italy, 43,000 tons, and the balance is domestic, non-government commerce, for the locomotive builders, the car builders, the builders of tanks for oil refineries and work of that character."

Concerning the railroad program, Mr. Replogle told the committee Director General McAdoo will require 575,000 tons of plates. In addition to this demand, there are 300,000 tons due England as the plate portion of 750,000 tons of steel General Pershing obtained from France and England to meet urgent needs of the American forces. England wants this tonnage now and Mr. Replogle told the committee he had been instructed to furnish her with 5000 tons a week. The shipping board, he said had approved the arrangements. Nothing was said concerning the war trade and shipping boards' arrangements with Japan for the exchange of steel for ships.

As pointed out in THE IRON TRADE REVIEW last week, Mr. Replogle told the committee the shipyards' claim of steel shortage has been due to lack of definite information of each yard's requirements. Transportation has figured prominently as a cause of nondelivery, it was shown. Of 63 per cent of the steel which had left the mills for Hog Island, on March 16 the receipts at that yard amount to about 3 or 4 per cent, Mr. Replogle said. Blame was also placed on the shipping board's early arrangement of having eastern steel fabricated in western plants and then shipped back to eastern yards. Replying to Senator Fletcher's statement that "the Hog Island people claim that they got better prices from western mills than they could get from the eastern mills," Mr. Replogle replied:

"Well, I think that the United States government has sufficient power, in war time, to compel eastern fabricators to come down to a fair and reasonable price; and I think that could have been done."

Shops Without Drawings

He added that "a number of the fabricators have reported that they have a very large tonnage of steel on hand and were unable to work it up on account of not having detailed drawings."

E. N. Hurley, chairman of the shipping board, was present when Mr. Replogle testified and the committee arranged that the shipbuilding chief should interrogate the steel director. During this questioning Mr. Hurley brought out the fact that Mr. Replogle disagrees with Judge Gary, James A. Farrell, and other steel producers on the question of whether there are sufficient plates being rolled. Mr. Replogle said he told Judge Gary that the institute's committee was creating an entirely wrong impression and that contrary to the opinion that there is a surplus there is a serious shortage. On Mr. Hurley's insistance that Judge Gary should know what he is talking about, Mr. Replogle replied:

"Mr. Hurley, I do not mean to dispute Judge Gary's knowledge of the situation; but he is not in a position to know the requirements of the united governments. There is only one place that that information can be obtained, and that is down in our office."

Mr. Replogle admitted some of the steel plants were behind in furnishing material to the fabricators. He said

Mills' Ship Steel Record for First Quarter

Week Ended	Tons Needed	Tons Shipped	Plates
Jan. 5		41,622	28,668
Jan. 12		32,616	19,339
Jan. 19		26,194	13,164
Jan. 26		31,647	19,565
Feb. 2		43,864	25,858
Total Jan.—180,761		175,943	106,954
Feb. 9		33,317	20,005
Feb. 16		56,957	37,026
Feb. 23		53,823	30,685
March 2		65,286	37,808
Total Feb.—181,694		209,383	125,586
March 9		52,261	34,282
March 16		63,422	34,874
March 23		55,304	33,488
March 30		61,864	39,617
Total Mar.—227,973		232,851	142,261
Grand total—590,428		618,177	374,741

the Midvale Steel & Ordnance Co., the Nagel Steel Co., and the Allegheny Steel Co. were among them, but denied any were giving preference to private orders over the government's. He emphasized the fuel shortage as a factor entering into the nondelivery of steel, declaring that the Midvale company's mill at Coatesville, Pa., had been idle from Jan. 17 to Feb. 20 because it had been unable to obtain fuel. He said that at the time the Garfield fuel order was issued, merchant bar production dropped from 137,000 tons a week to 55,000; plates dropped from 90,000 tons to 45,000; projectile steel fell from 67,000 tons to 37,000. He said even today pig iron production was at a rate of only 27,000,000 tons annually.

Corporation Loses Big Profit

Further denying that the steel industry is producing steel for orders on which higher prices are to be realized, he cited the instance of the United States Steel Corp. which has an order for 25,000 tons of plates for the Cunard Steamship Co. at 8c per pound and said that the Cunard company had been unable to get them because the Steel corporation is rolling plates for the government at the government price of 3.25c per pound. He said the same thing is true of all the other mills.

Replying to Mr. Hurley's criticism that the steel division was not following up its allocated orders, Mr. Replogle said that was not the function of the division; that that particular job belongs to the government's production departments. Mr. Replogle's statement was formally upheld by the war industries board a few days later when it announced its plan for reorganization.

Trade Leaders

Discuss Topics of Importance at Foreign Council Meeting

The fifth annual foreign trade convention opening April 18 at the Hotel Gibson, Cincinnati, is probably to be the most significant conference yet held under the auspices of the National Foreign Trade Council. Manufacturers, merchants and shippers will discuss the unprecedented world trade situation arising from America's intervention in the war and will take up the various problems which have accompanied the country's sudden rise in international commerce. Encouragement of foreign trade, safeguarding sources of supply, the merchant marine, foreign credits, trade education, trade extension in the Pacific, the small manufacturers, Latin-American trade, co-operation, and after war problems are among the topics to be dealt with by leading trade experts.

The underlying theme of the convention will be the part of foreign trade in winning the war. James A. Farrell, chairman of the council and president of the United States Steel Corp., in the call to this convention, emphasizes the new obligation which participation in the war has laid upon the foreign trade enterprise of the country. Our overseas commerce must proceed uninterruptedly and in the largest possible volume if we would win the war, he says, thus "steadily bringing to us the products necessary to the life of the enterprise on which we are embarked and steadily carrying to our allies and to our neutral sources of supply, the materials and manufactures that will enable them to maintain their efforts in the field or to continue to produce the food and raw materials so essential to our military success. More than ever the foreign trade of the nation serves a vital national purpose in maintaining the gold reserve and sustaining the huge bulk of national credit."

The secretary of state has assigned to the convention several consul generals and consuls from Europe, Latin-America and the Far East. The secretary of commerce has assigned experts of the bureau of foreign and domestic commerce who will be available for individual consultation. A representative of the Pan-American Union will give information concerning commerce with Latin-American countries.

Iron Sellers Organize

Philadelphia, April 16.—Merchant pig iron sellers met in this city today and organizd the Merchant Pig Iron Distributors' association, which is to handle matters of interest to sellers. W. S. Pilling, of Pilling & Crane, Philadelphia, was elected president, and W. W. Hearne, of the Matthew Addy Co., Philadelphia, secretary. Today's meeting was devoted entirely to the election of officers and the perfecting of an organization. Meetings are to be called as desired. The next meeting is scheduled for May 14.

Takes Over Furnace

The Princess Iron Corp. has been organized under the laws of Virginia to take over the Princess Furnace Co., the Callie Mining Co., the Circle Ore Co., all at Glen Wilton, Botetourt county, Va. Organization of the company has not yet been completed nor officers been elected.

Shell Turnings

May be Reconsidered for Classification as Low Phosphorus Scrap

New York, April 15.—Some users of low phosphorus scrap are hoping that the question as to whether shell turnings are to be sold as ordinary machine shop turnings, or whether they will command the low phosphorus scrap price again will come up for consideration. This question definitely was settled by a recent ruling of the subcommittee on iron and steel scrap of the American Iron and Steel institute. It having come to the attention of the subcommittee that the maximum price for guaranteed low phosphorus scrap was being offered for shell turnings, the subcommittee decided that shell turnings should command no higher a price than any other turnings. In view of the subcommittee's ruling, shell turnings now cannot be sold any higher than $19, delivered, which is the maximum on machine shop turnings.

Under the maximum price schedule, dealers and producers of scrap naturally find it to their advantage to sell to plants taking the lowest freight rate, so that in many cases low phosphorus scrap users are said to be prohibited by the disadvantages of their location from obtaining shell turnings. Since shell turnings range under 0.04 per cent in phosphorus and sulphur, it is held by some interests in the scrap trade that they belong in the low phosphorus classification.

Buffalo Consumers Opposed

Buffalo, April 16—Consumers of low phosphorus scrap in this district unite in saying that they will not be benefited in the slightest if the agitation now under way to have shell turnings put under the classification of low phos scrap results in action along those lines by the government. The agitation is made on the grounds that users are unable to obtain heavy low phosphorus turnings, and that they want to use turnings.

The representation is being made that users will be more than glad to pay $36.50 for turnings as a substitute for the heavier grade. Statements of consumers in this territory fail to bear this out. Not only are very small tonnages of turnings being consumed in this market, but consumers do not want them at the lower price. The territory now is producing more tonnage of shell turnings than can be consumed here, and the output will be greatly increased within the next six months or six weeks. This condition is expected to proceed throughout the entire country.

Schwab in Charge

Of the Ship Construction in All American Yards

Charles M. Schwab, chairman of the Bethlehem Steel Corp., has been called by the government to speed up the shipbuilding program. President Wilson announced April 16, after a conference with Mr. Schwab, Chairman Hurley of the shipping board, Vice President Piez of the Emergency Fleet corporation, and Bainbridge Colby of the shipping board, that Mr. Schwab had accepted the position of director general of the Emergency Fleet corporation.

Mr. Schwab's wide experience in the shipbuilding field as well as the executive talents which have built up the Bethlehem Steel Corp. were desired by Chairman Hurley, who suggested his appointment. The March record of ship construction fell behind the anticipated total and during the past few weeks the shipping board has been endeavoring to bring construction up to the minimum estimates. Mr. Schwab will have direct supervision over actual ship construction and will be responsible for hurrying the work at all of the shipyards of the country.

He is the fifth to assume this work, his predecessors being Major General Goethals, Rear Admiral Capps, Rear Admiral Harris and Mr. Piez. The latter voluntarily relinquished the post of general manager in order to give Mr. Schwab a free hand. Mr. Piez continues as vice president in charge of administrative matters, while Chairman Hurley will direct the board's policies, including the placing of contracts.

Immediate Action

On Equipment Orders Urged Upon Government—Fear Delay's Effect

New York, April 16.—Are the same disastrous methods of procrastination which delayed the execution of the shipbuilding program last summer also going to delay the government car building program is a question now agitating the minds of car builders. After having been originally called to Washington March 25, the builders have been put off on several occasions, and a meeting scheduled for yesterday has been postponed until tomorrow by the government. The builders are waiting only for the word to proceed with the execution of the contract.

It is claimed that the main reason for the delay is the government's intention to get the lowest possible prices. Car builders say the prices are secondary matter and that the primary consideration is to get the cars built. It is pointed out that five months will be required from the date of the order to deliver the first car because new plate forming dies must be made and specialties manufactured. Immediate placing of the business is being urged upon the government committee headed by John Skelton Williams, with a request that the question of prices be threshed out later. Already one month has gone by without action. The cars, it is believed, must be delivered early in the fall if they are to serve as a means of protection against a reptition of last winter's freight congestion. The government locomotive orders also are being delayed.

Wants Full Outputs

Philadelphia, April 16. (By wire.)—The government now is insisting that practically 100 per cent of steel produced shall be applied to its requirements. Severe rebukes have been administered on eastern mills for shipping even small tonnages elsewhere. This attitude of the government effects all finished products. Several mills now have representatives at Washington in an attempt to show the output for the government will not be reduced by producing simultaneously some tonnage at least for regular customers. One of the lines particularly affected is sheets.

Quotations Corrected

In the April 4 number of The Iron Trade Review on page 833 the price of bessemer pig iron, Pittsburgh, was quoted at $37.25. This quotation should have read $36.15, Pittsburgh, in accordance with the reduction made by the war industries board on April 1. The basic quotation also should have been $32.95, Pittsburgh. The correct quotations appear on page 832 of the April 4 issue.

Plan Big Terminal

New York, April 17. (By wire.)—General Goethals has announced the government will build a $20,000,000 embarkation terminal at Philadelphia similar to the terminals to be built at five other Atlantic ports.

Propose Stock Increase

A meeting of the stockholders of the Trumbull Steel Co., Warren, O., will be held May 17 in which action will be taken on the proposed increase in its capital stock. The board of directors recommends that $8,000,000 in common be added to the capital stock of $12,000,000.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, April 16.—A meeting of the solder, white metal and bearing metal trades was held at Washington this week to discuss means of conserving tin. A government expert explained to representatives of the trades various ways by which they might save a few per cent of tin here and there in their mixtures. This meeting emphasizes the shortage of tin which the country has been facing, due to the shifting of American buying from London to the Far East and the increased consumption in tin plate manufacture and other essential industry. Practically no prices are heard for spot tin, except that odd lots of 99 per cent grades are offered at prices of 88c to 99c. It was reported during the week that the United States government has bought 1000 tons of tin in the Singapore market and that this metal now is afloat.

The spelter market continues to decline. Offering of prime western spelter for prompt shipment from the West were reported this week at 6.75c, St. Louis, a new low price for the present movement. Future positions are commanding a slight premium over prompt, but as far ahead as July and August can be bought at around 7c, St. Louis. The government is taking considerable high grade spelter at the fixed price of 12c, St. Louis.

The American Smelting & Refining Co. last week reduced its lead quotation from 7.25c to 7c, New York, owing to underselling in the outside market, but this reduction did not take up all the slack, and outside sellers now are quoting 6.85c to 6.90c, New York, for prompt, April and May shipment. The outside market is quiet.

Some reports are current that copper producers are going to endeavor to attempt to obtain a higher price for their product at the termination of the present agreement June 1, 25c being mentioned as against the present fixed price of 23.50c. In general no developments are reported in copper, the supplies being apparently sufficient to fill the demand. Less than carload lots of lake, electrolytic and casting continue to be turned over at 23.50c plus the 5 per cent commission which brings the quotation to 24.67½c.

The antimony market is lifeless. Spot metal has been offered at 12.50c, duty paid, without interesting buyers. However, the metal seems to be in strong hands, for no further shading is reported.

The aluminum market is quiet at the fixed price of 32c for 98 to 99 per cent ingot in 50-ton lots, with extras for smaller quantities.

Trumbull Steel Co.'s Strip Mills

Both Hot and Cold Rolled Strip Steel is Now Being Made—Mills Are Gear-Driven by Variable Speed Motors Equipped With Push Button Controls

TRENCH mirrors, which are one of the requisites found in nearly every Sammy's comfort kit reflect the image that comes in their pathway just as efficiently as glass mirrors. When they fall they do not break into a thousand pieces and if they are given reasonable care there is always part of the surface available for the reflection of a Sammy's determined expression. Thousands of these mirrors are used to a good advantage both in this country and in France. Whether hung in a dugout or carried in a soldier's pocket, they are always ready for service.

The Uses of Strip Steel

It is interesting to know that trench mirrors are manufactured from strip steel. Steel billets are heated and passed through rolls, the final pass disposing of them in strips. As these issue from the hot mill they have a dull black color. The scale is removed from the surface of the strips by submerging them in a solution of dilute sulphuric acid after which they are annealed and passed in a cold state through other rolls. The strips attain a smooth finish while passing through these rolls and finally after a further buffing, they find their way to France in one of the pockets of the comfort kit.

Strip steel is used to manufacture other commodities such as bedsteads, cornices, locks and keys, hinges and other hardware supplies. It is also extensively used in building Pullman cars and for making automobile brake bands, fenders and windshield frames.

The officials of the Trumbull Steel Co., Warren, O., recognizing the huge demand which the future holds for strip steel, authorized the construction of hot and cold strip mills some time ago. They were designed by the company's engineers. The cold-strip mills were placed in operation May 15, 1917. Strip steel was purchased from outside sources in order to operate the cold-strip department until the hot-strip units were completed. This was only a matter of a few months, for on Dec. 1, 1917, the first billet was rolled on the 16 and 20-inch hot-strip mills which were built by the United Engineering & Foundry Co., Pittsburgh. The roll trains, tables, shears, reels and other auxiliaries are all electrically driven. The motors were built by the General Electric Co., Schenectady, N. Y., and are said to constitute one of the most complete rolling mill drives in the country.

The hot strip mill is housed in a building 100 x 1000 feet, which was erected by the Riter-Conley Co., Pittsburgh. The mill consists of three stands of 20-inch rolls with three edger rolls all arranged in tandem and five stands of 16-inch rolls. Billets and slabs from 4 to 18 inches wide and from 3 to 10 feet long are used in rolling the hot strip steel. At present these are purchased from an outside mill and brought to the hot strip department in gondola railroad cars. However, the Trumbull Steel Co. has completed five 100-ton open hearths and has two others under construction, besides a 36-inch blooming mill and a sheet bar mill. When these units are placed in operation, the company will not be dependent on outside mills but will be self-contained as far as billets and slabs are concerned.

Handling Raw Material

As previously mentioned, the billets and slabs are received in railroad cars which are switched inside the hot-strip mill building, at the south end. Here the stock is unloaded and



FIG. 1—GENERAL VIEW OF THE HOT STRIP MILL SHOWING THE 200-FOOT COOLING BED, THE ELECTRICALLY DRIVEN REEL AND SHEAR AND NARROW GAGE SERVICE TRACK



FIG. 2—VIEW OF PART OF THE 20-INCH MILL WHICH IS EQUIPPED WITH MANUAL SCREW-DOWNS—THE 16-INCH MILL IS SHOWN IMMEDIATELY AHEAD

piled by an electric magnet attached to one of the 15-ton cranes which serves the mill. Two cranes are provided. They were built by the Pawling & Harnischfeger Co., Milwaukee. The billets and slabs are heated previous to being rolled in an automatic gravity discharge furnace designed by Alex Laughlin & Co., Pittsburgh, and rated at 300 tons per 24 hours. Two furnaces are provided, each equipped with water-cooled skid plates at the discharge end. The furnaces are shown in Fig. 3. They are heated with producer gas, two Morgan producer gas machines being provided for this purpose. These are housed in a building near the hot strip mill. Before the gas is passed into the furnace it is mixed with air supplied by a centrifugal fan. The latter is driven at 975 revolutions per minute by a 30-horsepower Westinghouse motor.

The billets are transferred from the stock pile onto a rail-type table located between the heating furnace and the pusher. The latter is driven by a 40-horsepower motor and is equipped with a double arm ram which pushes the billets into the furnace. When the billets have attained the desired heat for rolling, they are pushed out of the furnace and deposited on the shear approach table, 60 feet long. After having the ends cropped by means of a shear, the billets are delivered to the first edger rolls where most of the scale is squeezed off and then to the first pass of the 20-inch flat mill. This mill, shown in Fig. 3, consists of three stands of two-high rolls and three stands of edger rolls all arranged in tandem. This mill operates in conjunction with the 16-inch flat mill which consists of five stands. Nos. 1 and 2 stands of the 16-inch mill are arranged in tandem to the 20-inch mill; No. 3 stand is arranged parallel to No. 2 stand, and Nos. 4 and 5 stands are arranged parallel to No. 1 stand. The 16-inch mill is shown in Fig. 2 opposite the operator's pulpit.

In the 20-inch mill, the distance



FIG. 3—VIEW OF THE AUTOMATIC GRAVITY DISCHARGE FURNACES AND ROLL TRAIN OF THE 20-INCH MILL THE MILL DRIVE IS SHOWN TO THE LEFT

between No. 1 edger and the first pass is 15 feet; that between the first and second passes is 13 feet; between the second pass and No. 2 edger is 33 feet; between No. 2 edger and the third pass is 32 feet; and between the third pass and No. 3 edger the distance is 9 feet. After the drawn-out billets pass through No. 3 edger they are delivered 36 feet ahead to the first pass of the 16-inch flat mill. Then if a light gage is going through the mill the strips are delivered 55 feet ahead to the second pass and thence to a runout table 76 feet long. The strips are then transferred at right angles across a chute-type transfer table and deposited on an approach table which first delivers the rear end of the strips to the third and fourth passes. As the strips issue from the fourth pass the ends are caught by a pair of tongs and guided into the fifth stand of rolls where they receive the finishing pass. This last set of rolls delivers the strips onto a 200-foot runout table which moves them straight ahead toward a vertical shear installed at the end of the table. This shear, trims the ends of the strips before they are attached to the motor-driven reel which is installed 5 feet ahead. This reel is shown in Fig. 1.

The coiled strips measure from 200 to 250 feet in length depending, of course, upon the gage rolled. If for any reason the strips become crinkled while in transit, the corrugated sections are eliminated by means of the shears and the remaining sections are wound into coils.

When the mill is rolling heavy-gage strips, the billets are roughed on the 20-inch flat mill, and instead of being given five passes on the 16-inch mill they are given three or even two, depending upon the gage desired. Issuing from the last edger rolls, the drawn-out billets pass through No. 1 stand of rolls of the 16-inch mill onto a 55-foot runout table. The strips are then transferred across a chute-type transfer table to a table which serves the No. 4 stand of rolls of the 16-inch mill. After the strips pass through this stand of rolls they are received by a runout table and transferred up a chute-type transfer to the No. 5 stand approach table. Here again the finishing pass is given and the strips are delivered to the runout table directly ahead. They are then transferred at right angles across a cooling bed of the grate bar type to a 262-foot table which conveys the strips forward to a vertical shear. The cooling bed and table are shown in Fig. 1. The shear is installed at the discharge end of the table and cuts the heavy-gage strips into multiples.

The 20-inch flat mill is driven by a 1500-horsepower, adjustable speed induction motor and the 16-inch flat mill by three 20-pole, 1200-horsepower, induction motors. The larger one and two of the smaller ones are housed in a leanto, 30 x 240 feet. The motors which are of the wound rotor induction type, use 3-phase current at 2300 volts and are of a heavy, rugged construction, especially designed for rolling mill service. Each motor is provided with a double range Scherbius speed regulating equipment to give a speed range from 450 to 270 revolutions per minute. The larger motor has a continuous rating of 1500 horsepower from 450 revolutions per minute to synchronous speed and 1200 horsepower at 270 revolutions per minute. The three motors which drive the 16-inch flat mill have a continuous rating of 1200 horsepower each at all speeds from maximum to minimum.

For regulating the speed of the motors, a 360-kilovolt-ampere, commutator-type, alternating-current motor direct connected to a 275-kilowatt, 2300-volt, induction generator, which operates at 514 revolutions per minute, is provided. This equipment provides practically continuous speed range from maximum to mimimum speeds. The commutator motor impresses a voltage on the secondary or rotor of the main motor of such value as to give the desired speed regardless of variations in the load; the main motor, however, retains all the normal characteristics of an induction motor which runs without speed regulating equipment.

When the main motor is running below synchronism the commutator motor, which is connected to the slip rings of the main motor, operates as a motor, and the slip energy of the main motor, less the transformation losses, is returned to the source of supply through the induction generator. When running above synchronism energy is supplied to the secondary of the main motor from the commutator motor which operates as a generator; this energy is obtained from the source of supply through the induction generator which operates as a motor. The speed adjustment is obtained by means of a motor-operated field regular.

This field regulator is operated from a control switch of the push button type, located at the operator's pulpit. An eight-panel switchboard for the control of the mill motors, regulating sets, auxiliary motors and tables is housed in the building opposite the 16-inch mill.

After the strips of steel are coiled, they are transferred from the reel onto a two-wheel hand truck in which they are hauled toward the north side of the building and piled on the brick floor. A magnet suspended from one of the cranes transfers them to the west end of the building where they are stored. Officials of the Trumbull Steel Co. are planning to install an automatic conveying system in the near future, which will handle the coiled strips in a more convenient manner. Along the south side of the building a narrow-gage industrial track is installed, as shown in Fig. 1. This track connects with one on the opposite side of the building and is used for hauling the heavy-gage strip steel from the mill to the pickling department. The trucks are drawn by an electric locomotive. This means of transportation relieves the cranes for other service in the mill.

The pickling department is housed in a leanto, 48 x 96 feet, at the west



FIG. 4—VIEW OF THE 12-INCH MILL IN THE COLD ROLL DEPARTMENT

end of the hot strip mill building. It is equipped with two revolving type, four-arm pickling machines built by the Mesta Machine Co., Pittsburgh. They are steam operated. In order to remove the scale which adheres to the surface of the steel, the strips and coils are submerged for a short time in dilute sulphuric acid and then washed. The strip steel is now in condition to be annealed and shipped or rolled further in the cold-roll strip department.

In the latter case the coils are piled on a four-wheel truck and hauled to the cold-rolling department by means of an electric tractor. This department is housed in a building, 100 x 320 feet, which is south of and parallel to the hot-strip mill building. To make it as comfortable as possible for the workmen in the winter, the building is heated with hot air distributed through a centrally located main. This main, shown in Fig. 5, is connected to a heater fitted with vertical steam coils around which the air is forced by means of a multivane fan. This fan is directly connected to a continuous running motor. The heater is installed in the powerhouse located in the southwest corner of the building. In this department two motor-generator sets are also installed. The generator of one set is driven by a 1080-horsepower motor built by the Westinghouse Electric & Mfg. Co., Pittsburgh. The motor which operates at 514 revolutions per minute, uses alternating current at 2200 volts and is rated at 1058 kilovolt-amperes. The generator produces direct current at 750 kilowatts and 250 volts. The other generator set was furnished by the General Electric Co., Schenectady, N. Y. This motor rated at 1400 horsepower and 1400 kilovolt amperes uses current at 2300 volts. It is directly connected to a generator which operates at 720 revolutions per minute and produces direct current at 250 volts and 4000 amperes. The alternating current is purchased from the Trumbull Public Service Co., Warren, O.

Capacity of the Cold Strip Mills

The cold-strip mills have a monthly capacity of 3000 tons and will roll strips of steel from ½ to 16 inches wide and from 0.006 to ½ inch thick in lengths up to 300 feet. The 8-inch, 12-inch and 16-inch mills consist of four stands each of two-high rolls. They were built by the Waterbury Foundry & Machine Co., Waterbury, Conn. The stands of each mill are arranged in tandem and are fitted with individual controls of the push-button type, which when pressed stop or start the rolls as the case may be. A close-up view of the 12-inch mill is shown in Fig. 4. All stands are also equipped with speed change panels which control the speed of the rolls. Each set of rolls is connected through reduction gears to individual Westinghouse motors which use direct current supplied by the motor-generator sets previously described. This mill has a capacity of approximately 45,000 pounds per 10 hours.

The 12-inch mill is rated at approximately 60,000 pounds per 10 hours. It is fitted with 12 x 16-inch rolls. The 16-inch mill located on the north side of the building has a capacity of approximately 120,000 pounds per 10 hours.

The strips of steel are placed on a horizontal reel about 10 feet in front of the No. 1 stand of either of the three mills. One end of the strip is guided into the first set of rolls, then to the second and so on until it passes through the last set. It is then attached to an electrically driven vertical reel which coils the strip as it issues from the final pass. The coil is tied so that it will not unravel, removed from the reel and placed on a wooden skid, as shown in Fig. 4.

Between 75 and 80 per cent of the cold-rolled strips are trimmed before being shipped. For trimming the edges of the coiled strips two pairs each of single and combination gang slitters have been installed. The strips are passed through these slitters and then given another finishing pass, two sets each of 8 x 10 and 12 x 16-inch single rolls being installed for this purpose. If the steel is sold in strips instead of coils it is passed through leveling and cutting machines where it is cut into the desired multiples. The loose scrap which collects around the cutting and slitting machines is compressed in an electrically driven bailing machine and taken to the open-hearth furnaces where it is re-melted. A general view of the cold-strip department is shown in Fig. 5.



FIG. 5—GENERAL VIEW OF THE COLD-ROLL STRIP DEPARTMENT SHOWING THE LEVELING AND CUTTING MACHINES THE ROLL STANDS ARE LOCATED IN THE FAR END OF THE BUILDING

Coiled stock from the cold rolling mill is piled on skids and transferred to the annealing department. This department is located in the south side of the building and is separated from the cold-strip department by a wall built endwise through the center of the building. The department is served by two 25-ton Morgan cranes. The strips from the cold mills are delivered to the annealing department

on four-wheel trucks drawn by electric tractors. Six furnaces are provided for annealing the stock. They are hand fired and have a capacity of approximately 80,000 pounds per 12 hours. The strips are piled in boxes fitted with covers and placed in the annealing furnaces, the temperature of which is held between 1400 and 16 degrees Fahr. After the strips are thoroughly annealed they are withdrawn from the furnaces and passed through an oiling machine which applies a coat of oil to the surface. This tends to prevent oxidation. The material is then transferred to the shipping department which adjoins the annealing department.

Products of the Mill

Besides strip steel, the Trumbull Steel Co. manufactures blue annealed, black and galvanized sheets, terne and tin plate, and formed roofing products. The sheet and tin mills were described in the Sept. 11, 1913, issue of THE IRON TRADE REVIEW. Within the next few months the Trumbull company will also manufacture ingots, blooms, billets, slabs and sheet bars. The officers of the company are: Jonathan Warner, president; W. H. B. Ward, first vice president; A. N. Flora, second vice president; W. M. McFate, secretary; Lloyd Booth treasurer; T. P. Draper, general manager; E. T. Sproull, general sales manager; and S. L. McCormick, general manager of the strip mills.

New Skip-Type Ladle Tilter

ONE of the most important blast furnace auxiliaries is the pig casting machine. This apparatus must be held in readiness to dispose of any molten metal which may be sent from the furnaces. Any lengthy delay in pouring the iron from the ladles increases the cost of production, in that all or part of the metal freezes in the ladle and forms a skull. Frequently in loosening the skull the bricks are damaged which necessitates relining the ladle.

Probably the first piece of apparatus called upon for service when a ladle of iron is brought to the pig machine is the tilting equipment. At some of the older plants this equipment consists of a hook, chain and davit which are operated hydraulically; at other plants a traveling crane is used. Recently, an improved ladle tilter has been designed by the Pennsylvania Engineering Works, New Castle, Pa. The tilter is electrically driven and similar in appearance to a blast-furnace skip incline. Three units are installed at the New Castle works of the Carnegie Steel Co.

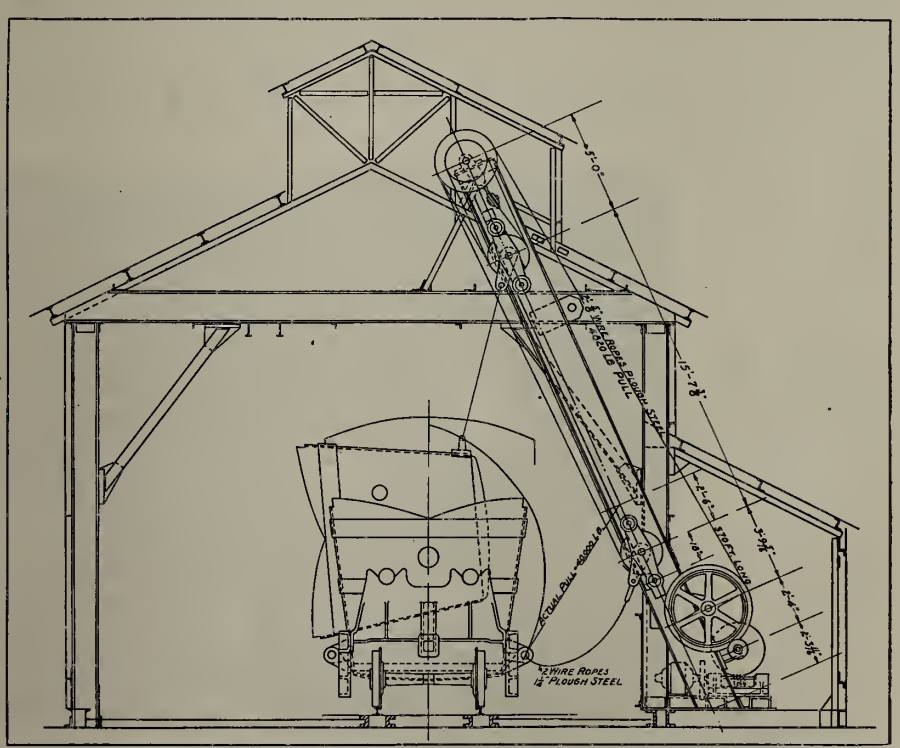
Method of Operation

The 50-ton ladle is placed in position for pouring so that when it is tilted the metal will flow into the master trough and thence into the distributing trough which is placed at right angles and feeds the two strands of pig molds. Two 1¼-inch, plow-steel wire ropes, with one end of each attached to a hook and the other securely anchored in a socket carried by a movable sheave block, are used for tilting the ladles. The actual pull required to tilt the ladle is 40,000 pounds. The movable sheave block contains six sheaves. They are arranged parallel on a common shaft, the ends of which are journaled to side frames. These frames are fitted at both ends with flanged wheels which operate on two parallel I-beams. The beams are equipped with bumping blocks near the ends, between which the movable sheave block operates. The operating distance is 15 feet 7⅜ inches. The beams are inclined at an angle of 24 degrees and support a shaft at the upper end. Six sheaves are mounted on this shaft and arranged in line with those on the movable block.

The sheave blocks are connected with a 2⅝-inch wire rope which passes around No. 1 sheave of the movable block then over the No. 1 sheave of the stationary block at the top and so on until all sheaves are brought into service. This rope, 370 feet long, is made of plow steel, the driving end being attached to a drum near the base of the inclined I-beams. The drum is driven by a 5-horsepower motor although only 2½ horsepower is required to move the rope 6 feet per minute.

The motor is directly connected to a worm driving shaft which transmits the power through a worm wheel to the drum bull-gear. The latter is attached to one end of a shaft which is free to move inside the drum collar. The other end of this shaft is fitted with the male section of a cone clutch, the female section being attached nearby on the end of the drum. By means of connecting arms the control of the clutch is brought over to a centrally located control lever which is installed near the motor control box. When the ladle is to be tilted the operator engages the clutch and starts the motor gradually. The maximum tilting position is shown in the accompanying diagram. To bring the tilting hook to the starting position, the clutch is disengaged and the weight of the ladle pulls the lower sheave block down the incline.

The Hession Tiller & Tractor Co. has leased the plant formerly occupied by the Chase & Baker Co., Buffalo, for the manufacture of pianos and will install equipment to manufacture tractors.



TILTER SHOWING POSITION OF LADLE AND SHEAVE BLOCKS



Curbing Waste in Motor Trucking

Train Dispatching Methods Proved Effective in Reducing Waste in the Transportation and Delivery Departments of the Youngstown Sheet & Tube Co.—Supervision is Effective

THE greatest source of loss in motor-truck operation lies in the idle truck miles, and next in order come loss of time in loading and delays due to poor routing. To reduce these factors of waste to a minimum, a comprehensive system for keeping in touch with a large fleet of motor trucks has been adopted by the Youngstown Sheet & Tube Co., Youngstown, O. This company, which has developed a plan similar in character to a train dispatching system, keeps in continuous service the following trucks:

Kind of truck	Capacity in tons
1 Pierce Arrow	2
2 Pierce Arrow	5
1 White	3
1 Gramm	3
3 Nash Quad	2
6 Ford delivery cars	½

When the company installed the present system of dispatching motor trucks, the first step was the selection of definite delivery stations. With the co-operation of the different foremen throughout the plant, points were selected best reached by the trucks, and whenever possible, under a crane where heavy loads could easily be handled. These points were each given a station number and a sign put up at each one. A road map was made of the plant and the location of each station shown so that no matter how little the driver knew of the plant, he would have little trouble in making deliveries to the proper places. This map is shown in Fig. 5.

There are at present about 75 established delivery stations at the main plant, five at the coke plant and 12 at the rod and wire branch of the Youngstown Sheet & Tube Co. The stations are numbered in order along the length of the plant, allowing for the possible addition of one number in five. The numbers for the plants are assigned, divided in series and 200 stations allowed for each.

A truck dispatcher has been appointed with headquarters in the receiving department. Immediately after he commenced work, a list of delivery stations was sent out to each foreman with notice that the trucks would handle deliveries of material for any department in the plant when the order was properly placed with the dispatcher. The station list was in constant use so that it was found advisable to have it printed in booklet form, vest pocket size, for the convenience of the foremen.

The receiving department record is utilized in making deliveries of incoming material. The foreman in writing out his requisition on the purchasing department designates the desired delivery station. This is put on the purchase order, a copy of which is sent to the receiving department. It is therefore a simple matter to mark the delivery station number on the receiving record when checking from the order. The serial number of the receiving record is marked in red crayon on every box, package or piece after being checked. Two copies of the record are then turned over to the dispatcher. All other orders for truck service are made out in duplicate by the dispatcher on the record of deliveries form, Fig. 4. This is filled out in in detail at the time the order is placed. As a rule the orders are taken by telephone which is better than waiting until a written order can arrive by mail. The delivery orders are padded



FIG. 1—THE TRUCK DISPATCHER, SHOWN AT THE RIGHT, CONTROLS ALL TRUCK MOVEMENTS FROM THIS DESK

in triplicate, so that a foreman may keep a copy of each order for his own information. In every instance the dispatcher is supplied with two copies of every request for truck service.

Truck Dispatching

As soon as delivery orders are received the dispatcher files them in labeled pigeon-holes according to the direction in which the load is to go, or according to the route the truck will take in reaching a certain terminal station. The first trip of the day for each truck is planned the evening before and placed in an appropriately labeled pigeon-hole. As soon as the orders for one load are given a driver, the next load for the same truck is planned and filed.

When the orders for a load have been grouped, the dispatcher notes if there are receiving department orders on the list, and sees that the different items, according to the serial numbers marked on the parcels are located and grouped for loading When the truck arrives the orders are given to the driver who checks the items by number as they are loaded.

The drivers have strict orders to leave no material unless they can get the signature of some responsible party on the file copy of the order. If possible, the signature of the one who placed the order originally is obtained. This feature practically eliminates misdeliveries.

The Truck Train Sheet

Before him on his desk the dispatcher has a sheet, ruled up in columns representing each half hour of the working day. The horizontal ruling allows a given number of lines for each truck. When a truck leaves the dispatcher enters the exact time in the column of the nearest half hour Then, gaging by his knowledge of the time he thinks it will take to complete the trip, the dispatcher draws a line to the column in which

FIG. 2

No.

GATEMAN WILL STAMP IN AND OUT IN THIS SPACE

THE YOUNGSTOWN SHEET & TUBE CO.
TIME RECORD OF FOREIGN TRUCKS RENTED BY COMPANY

Truck Driver will call for this ticket on entering Mill Gate, have same stamped at gate and keep it until his *final* trip out that day. On leaving mill on his last trip out he will have it stamped at gate and leave it with gateman. Be sure and comply with this rule as this ticket properly stamped verifies your claim for truck hire.

Gateman will comply with above requirements and forward this ticket on the following morning to Superintendent of Stores.

Truck Dispatcher will provide one ticket for *each* foreign truck hired and leave at gate sufficiently early to insure against delay. Send first copy of this ticket to Superintendent of Stores daily; keep second copy for record.

Truck Dispatcher fills in the following:

Safety Dep't.—Allow entry and exit for foreign truck of

CAPACITY LICENSE DATE

MAKE TRUCK DISPATCHER

Truck Driver fills in the following:

MAKE OF TRUCK CAPACITY LICENSE NUMBER

NAME OF LICENSE TIME CLAIMED

SIGNATURE OF DRIVER

Above named operators will not write below this line.

Audit Clerk—If record is not clear or does not check, mark square at right with an "X" and attach memo. explaining.

To Sup't. of Stores—Allow ..... hrs. @ ..... $.....

AUDIT CLERK

THIS TICKET DOES NOT TAKE THE PLACE OF THE REGULAR COMPANY PASS NOR CONFLICT WITH ANY REGULATIONS OF THE GENERAL SUPERINTENDENT'S OFFICE OR OF THE SAFETY DEPARTMENT.

FIG. 3

W 470 Y. & T. Co

MOTOR DELIVERY SERVICE CARD

TRUCK NO.	CAPACITY	DATE
DRIVER'S NAME		CHECK NO.
HELPER'S NAME		CHECK NO.

SPEEDOMETER

IN	OUT	Miles Traveled	Av. Time Per Mile

TIME

IN	OUT	ELAPSED TIME	IDLE TIME

INTERMILL TRIPS

No. Trip	FROM	LEFT	TO	LOAD	WEIGHT

FIG. 4

W 820

SERVICE CARD RECORD OF DELIVERIES No.

DATE	REQUISITION NUMBER	SHOP ORDER NUMBER	CHARGE ACCT.
ORDER NUMBER	JOB NUMBER		WANTED DATE / A. M / P. M

QUANTITY	DESCRIPTION	WEIGHT
	THIS COPY TO BE SIGNED BY [illegible] AND RETURNED BY [illegible] FOR DISPATCHER'S FILE.	

MOVE		NOTIFY	
FROM STA. NO.	TO STA. NO.	NAME	DEPARTMENT

REQUESTED BY	DEPARTMENT	PHONE NUMBER

DELIVERED BY	DATE	TRUCK OR ENGINE NO.	RECEIVED BY	DATE

FIG. 2—TIME RECORD FOR RENTED TRUCKS FIG. 3—DRIVER'S REPORT CARD FORM
FIG. 4—SERVICE RECORD OF DELIVERIES, MADE IN TRIPLICATE

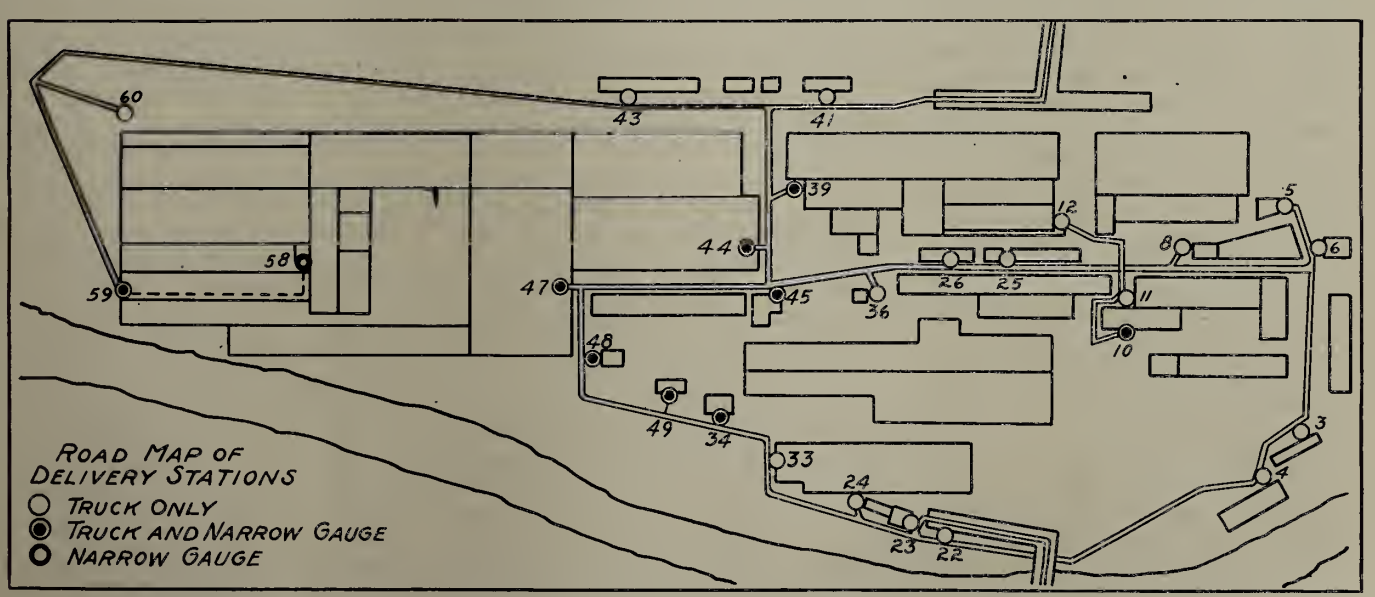


FIG. 5—MAP SHOWING DELIVERY STATIONS, WHICH TAKEN WITH THE STATION NUMBERS, FURNISHES AN EASY GUIDE FOR THE DRIVERS

the time of return would fall. Above this line he enters, in order, the station numbers of the various stops with any information he may think necessary. When the truck returns the time is entered in the correct column and if any difference between the estimated time and the actual time is noted an explanation is asked.

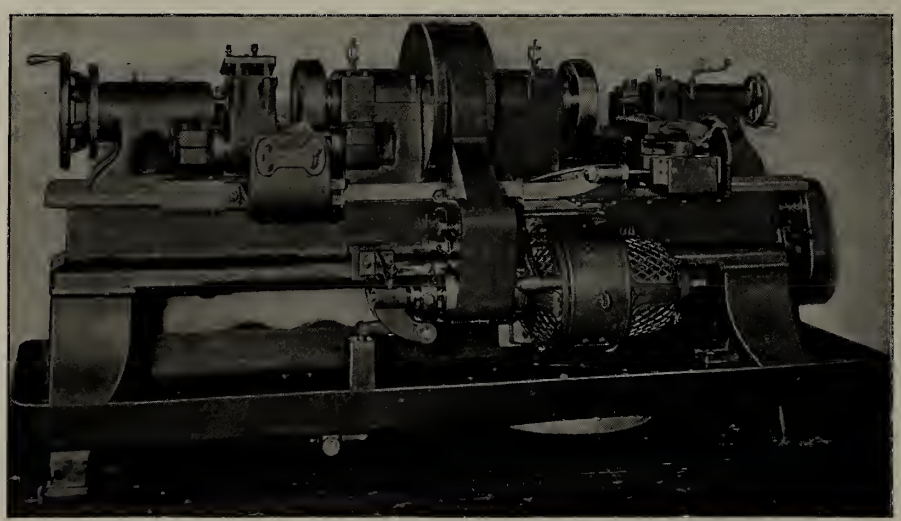
As there is a telephone at almost every delivery station it is possible to reach the driver at any point along his route. Drivers have instructions to take orders from no one but the dispatcher and if any dispute arises the dispatcher is called upon for a decision.

Each driver fills out a trip card, shown in Fig. 3, which he leaves with the dispatcher at the close of the day's work. This gives the record of mileage and tonnage for the day, the number of trips made, the time of arrival and leaving each station and reports of any delays or accidents during the day. This card and the tape from the recordograf, which is used to check up the driver's entries, make a complete and accurate record.

Among the most valuable features that have been found to aid in truck operation is a freight checker who is kept in the city to plan and supervise the loading at the freight and express stations. Shortages are checked and the freight bills grouped so as to make up a load for each truck expected at the transfer point The checker keeps in close touch with the dispatcher and advises how many trucks are needed and is told when to expect them.

The receiving warehouse checking floor was built at the level of the trucks. A stall for one truck is so arranged that the truck may back into the building and the steel doors let down. This provides a sheltered place to unload in cold weather. A 5-ton monorail crane directly over the stall quickly moves heavy pieces to another part of the floor. Directly in front of the warehouse is a large truck scale. Inbound and outbound tonnages are weighed and recorded here. Facilities for prompt unloading have been arranged for wherever possible and platforms the height of the trucks have been built at the most important stations.

It has been possible through proper supervision to obtain great flexibility in the service. A complete record is kept of all work done and through the efforts of the dispatcher, loads are kept at a maximum, and the idle truck miles and time of delivery are reduced, with a great saving in costs.



CENTER DRIVE LATHE

Center Drive Lathe

The center drive lathe, shown in the accompanying illustration, was originally designed for use by the Ford Motor Co. in turning both ends of driving shafts simultaneously. The work is passed through an opening in the left-hand tailstock, the opening being brought into position by indexing the barrel of the tailstock 180 degrees, at which position the work passes directly into the spindle in the headstock. After the work has been passed through the tailstock, the tail spindle is again indexed at 180 degrees bringing the center into position. The work is then mounted on the centers, after which the floating-type chucks are clamped to the work. The chucks are then secured to the driving plate.

When the machine is started, two carriages feed toward the center of the headstock and turn the various diameters at each end of the work. While this diameter turning is in process, the back arm tools are simultaneously squaring down the shoulders necessary on the shaft. The action of the carriage transmits radial motion to the back arm block. This motion is obtained through the medium of the cam slot which is secured to a bracket fastened to the rear of the carriage.

An extension arm having a roller in contact with the path cam, is secured to the back-arm bar and block. By this arrangement, the cam in its longitudinal travel along the bed necessarily imparts a rocking or radial action to the back arm block and tools, which perform the squaring operation.

This machine is driven by a 5-horsepower motor running at 1100 revolutions per minute. The stopping and starting of the spindle is controlled by an internal expanding clutch provided on an extension of the motor shaft. The drive from the motor to the head spindle is through a set of sprockets, a chain and an idler pulley being provided to take up the slack. These machines have been designed by the Reed-Prentice Co., Worcester, Mass.

Attack Fire Losses

To awake "the fire conscience of the people of Ohio," the industrial fire prevention committee of the Industrial Commission of Ohio, will hold a fire congress in Memorial hall, Columbus, during the week of May 27. Delegates from various state and city organizations, numbering approximately 1500 will attend and addresses will be delivered by the foremost fire prevention experts in the country. In calling attention to the special need for fire prevention in war times, this commission states that fire losses in the United States during 1917 are reported at $268,000,000, an increase of $68,000,000 over 1916. In the state of Ohio, the gain was $1,500,000, with losses in 1917 totaling $8,490,031.

Director of Safety Victor T. Noonan of the Industrial Commission, states: "During the war every fire is a calamity which delays the world's peace. President Wilson recently declared, 'a preventable fire is more than a private misfortune, it is a public dereliction.' This congress is being called to obtain data and information and as a result, the fire prevention committee will be in a position to recommend such rules and practices that will minimize fire losses."

J. W. Richards, professor of metallurgy, Lehigh university, has reported to the American Electro-Chemical Society that the use of electric furnaces for producing steel is increasing. This statement is based on returns from a questionnaire sent to about 50 engineers in the steel business to secure information for the naval consulting board. It is reported that electric furnace steel is particularly adaptable for castings.

Viscosity of Blast Furnace Slag

The Application of Viscosity Data to Show the Relation Between Composition and Softening Temperatures of Slags Gives an Insight Into the Effects of Sulphur Distribution in the Stack

BY ALEXANDER L. FEILD

THE bureau of mines is investigating the problem of slag viscosity, in variation with the temperature and with the composition of the slag, and its effect upon the distribution of the sulphur between molten iron and slag, as introductory to a series of contributions to the theory of the metallurgical processes. The method of measurement, viscosity apparatus, furnace and other accessories mentioned in this paper have been described fully in a bureau of mines report. The viscosity of blast furnace slag had not been measured previous to the investigation described in this report. A number of investigators have determined the "fusibility", or softening temperature, of slags by means of the cone method or other deformation method, but these methods supply only limited information regarding the temperature-viscosity relations of the slag in question. Any deformation method that may be employed indicates only the temperature at which the slag attains a more or less definite viscosity, the magnitude of the value obtained depending on the method used. An isolated measurement by Doelter on a single mixture at 1300 degrees Cent. represents the highest temperature reached in the various viscosity investigations previous to those described in this report, in which results have been referred to absolute units. Arbitrary deformation tests have of course been made at much higher temperatures.

Theory of the Method Employed

In these investigations the author has used a modification of the method originated by Margules in 1881. In this method the liquid is confined between two concentric cylinders. The outer cylinder is rotated at a constant speed and the torque exerted upon the inner cylinder is measured. The method is applicable to liquids of a wide range of viscosity. The principle of the method employed by the author is therefore not a new one. The torsion method, however, had not hitherto been employed at all for measurements of viscosity at temperatures higher than are generally used in testing oils, etc., that is, about 250 degrees Cent. Quite paradoxically it appears to be the only method of measurement which is possible experimentally over a large range of temperature and of viscosity, and for this reason may be called a quite universal method. In applying the method to temperatures as high as 1600 degrees Cent., which is about 400 degrees Cent higher than the property of viscosity had been hitherto measured by means of any method, certain modifications in the construction of the apparatus were necessary and which alone made possible the attainment of a relatively great accuracy under the rather severe experimental conditions. These modifications consisted in the use of Acheson graphite in the construction of all parts of the apparatus subjected to high temperatures, and in the use of a system of damping the suspended system so as to give to it the stability and aperiodicity characteristic of the familiar damped D'Arsonval galvanometer.

The present modification of the method of Margules has been applied without difficulty to measurements on slags over a range of viscosity from 200 to 3000 (H_2O at 20° Cent. = 1). This range of viscosity was considered sufficient for the purposes of the investigation. It is certain, however, that the method is applicable over a much wider range of viscosity than this.

For a full discussion of the theory of the method the reader is referred to the *Bureau of Mines Technical Paper* 157. It is sufficient here to say that the viscosity of the substance under examination is proportional to the torsion couple exerted on the inner concentric cylinder and inversely proportional to the speed of rotation in revolutions per second; while, conversely the torsion couple is proportional to the viscosity and to the speed of rotation. With cylinders of fixed dimensions, therefore, and with the inner cylinder suspended by means of a calibrated steel ribbon, the viscosity of the slag melt is directly proportional to the product of the angular velocity of the outer cylinder and the deflection produced by means of the confined slag melt upon the inner cylinder.

Application of Viscosity Data to Metallurgical Operations

Before taking up the description of the viscosity apparatus, furnace and accessories, the tabulation of the experimental results obtained, it is advisable to consider briefly the application of accurate viscosity determinations on metallurgical slags to manufacturing processes, and also to related research in this field. Particular attention must be given in the present paper to a consideration of the principles of the metallurgy of iron, although in many other metallurgical operations, such as the smelting of copper for instance, a knowledge of the temperature-viscosity relations of different types of slag is of great importance.

Apart from the question of mining cost and freightage, the value of an iron ore sufficiently rich in iron to be considered marketable is largely dependent upon whether it can be made to yield economically a slag of desirable viscosity and desulphurizing power. A casual glance at the slag analyses in Table I shows at once the comparatively wide range of slag composition that has been found practicable by different manufacturers. In each case the particular slag composition was undoubtedly determined in a large measure by the composition of the ore mixture and fuel which it was deemed expedient to use and also by the grade of iron produced. However, it is entirely probable that in certain cases the slag composition was not the optimum one from the standpoint of economy and excellence of product. It is one of the purposes of these investigations to determine what are the optimum conditions.

In spite of the lack of scientific research on the physical and chemical properties of slags at high temperatures, it is quite well understood what functions the slag must perform in the blast furnace. In the first place, it must be sufficiently fluid to flow from the cinder notch at the tempera-

The author of this paper, Alexander L. Feild, is assistant metallurgist, U. S. bureau of mines. This paper was presented at a meeting of the American Institute of Mining Engineers.

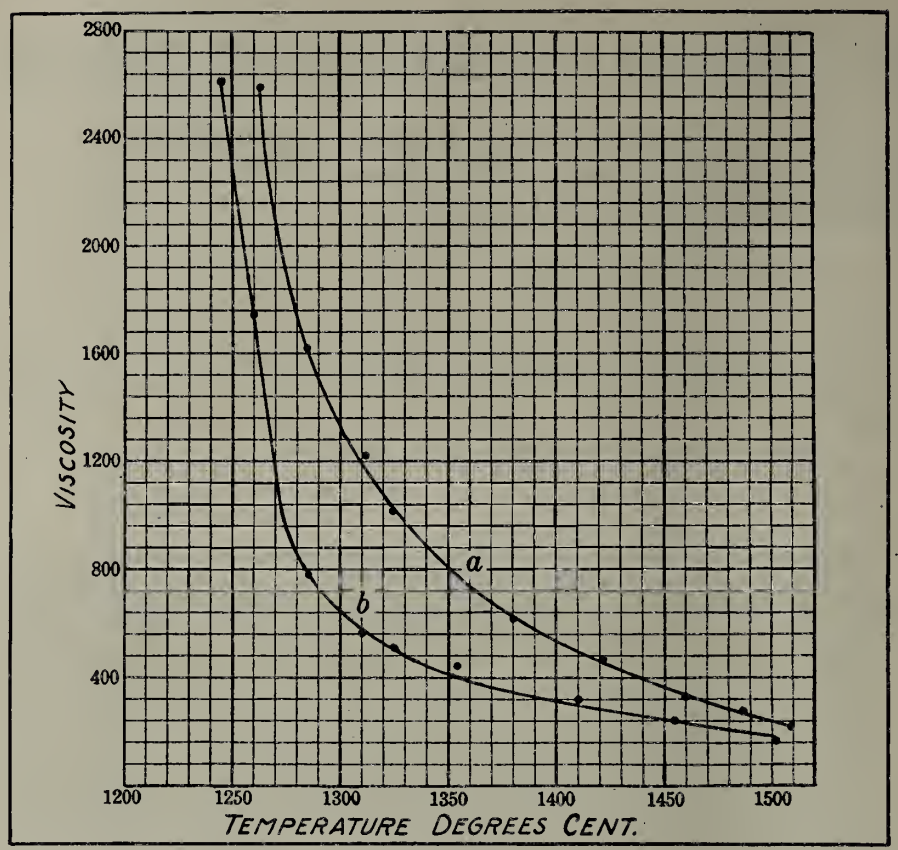


FIG. 1—(a) TEMPERATURE VISCOSITY CURVE OF SYNTHETIC SLAG CONTAINING 48 PER CENT CAO. (b) SAME SLAG IN WHICH 20 PER CENT CAO HAS BEEN REPLACED BY 20 PER CENT MGO

ture which exists in the hearth. In the case of charcoal practice where desulphurization is a minor item the viscosity of the slag at flush is a primary consideration. If, for instance, it is found that a siliceous charcoal slag possesses a viscosity of 800 at the temperature of the hearth, the question arises whether a limey slag would perform its functions properly if it possessed an equal viscosity. The limey slag may be prevented from performing these functions for one or both of the following reasons. In the first place, the limey slag with a viscosity of 800 might have an extremely high rate of change of viscosity with temperature, that is, this particular point on the temperature-viscosity curve might occur at a temperature where the slag underwent rapid softening or hardening with small changes of temperature. In the second place, it might not be at a sufficiently high temperature properly to desulphurize the pig iron.

Desulphurization and Slag Viscosity

The greater portion of the sulphur enters the furnace in the coke, in which it is present as ferrous sulphide to the extent of from 0.5 to 2 per cent sulphur. The total quantity of sulphur is for practical purposes entirely distributed between the molten iron and slag. It may be assumed quite safely that the sulphur which is dissolved by the pig iron exists as ferrous sulphide, FeS. On the other hand, it is necessary to assume in the case of the sulphur dissolved in the slag that it exists for the most part in normal slags as calcium sulphide, CaS. In high manganese slags, however, it is probable that a portion of the sulphur exists as manganese sulphide.

Ratio of Concentration

According to the well-known distribution law of Nernst, when a substance is distributed between two immiscible solvents, such as molten iron and slag, the ratio of the concentrations of the given substance in the two solvents, when the condition of equilibrium is reached, is constant for any given temperature, *provided* the dissolved substance has the same molecular weight in the two solvents. Moreover, in the case of several dissolved substances each substance distributed itself as though the others were not present.

Let us consider an ideal case where manganese is entirely absent from the slag and iron. Since calcium sulphide is insoluble in molten iron, the distribution effect must be that of ferrous sulphide between molten iron and slag. The ferrous sulphide present in the slag undergoes the following reaction:

$$FeS + CaO = CaS + FeO$$

Since the concentration of lime, CaO, is very large in comparison with the concentrations of the other reacting substances, it may be considered to be a constant; wherefore, it would follow, from the general law of chemical equilibrium, that the concentration of the ferrous sulphide in the slag is proportional to the product of the concentrations of the calcium sulphide, CaS, and the ferrous oxide, FeO.

Assuming ferrous sulphide to be distributed according to Nernst's distribution law, the concentration of the ferrous sulphide, and, therefore, of the sulphur, in the pig iron would be proportional to the product of the calcium sulphide and ferrous oxide concentrations in the slag layer, provided no other side reactions occurred.

However, there is a side reaction which must inevitably occur since ferrous oxide is not stable at high temperatures in the presence of carbon. This reaction is as follows:

$$FeO + C = CO + Fe$$

On combining the first two equations, the net effect is seen to be:

$$FeS + CaO + C = CO + Fe + CaS$$

This equation is the usual one given by most authorities to illustrate the course of the desulphurization process.

In the course of the chemical reaction represented by this equation, it is necessary that FeS diffuse from the iron into the slag and also that the CaS, which is a product of the reac-

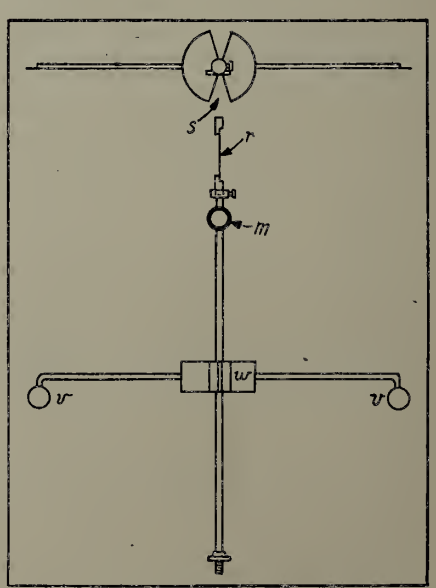


FIG. 2—UPPER PART OF SUSPENSION SYSTEM; *m*, MIRROR; *r*, STEEL SUSPENSION RIBBON; *s*, OPEN SECTOR; *w*, WEIGHT; *vv*, VANES

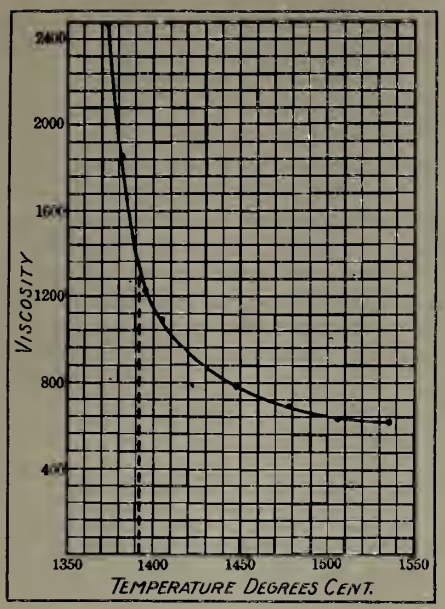


FIG. 3 — TEMPERATURE-VISCOSITY CURVE OF AN ARTIFICIAL DIOPSIDE

tion, diffuse with sufficient rapidity to prevent the reversible reaction from coming to a standstill prematurely. For this reason the desulphurization reaction is conditioned largely so far as its speed is concerned by the viscosity of the slag, and resolves itself into a reaction confined to a great extent to the boundary plane between molten iron and slag. This boundary plane exists around the molten iron globules previous to their fall to the bottom of the hearth and between the contiguous layers of iron and slag in the hearth. To what extent desulphurization is completed previous to and during the fall of the iron globules through the slag layer is not known.

If it is true that during the smelting process equilibrium is reached under normal conditions in the case of the partition of sulphur between iron and slag, then the desulphurizing power of any given slag is independent of the viscosity of the slag, as such. In such a case the distribution of the sulphur would be a function only of the composition of the iron and slag and of the temperature of the hearth. However, if equilibrium is not reached under normal conditions, there cannot be in the strict sense of the word a distribution of sulphur, since the laws of distribution refer only to equilibrium conditions. In this case, the amount of sulphur absorbed by the slag depends on the speed of the raction of desulphurization, which as has been noted above, is conditioned by the viscosity of the slag, as well as by the temperature and composition of molten iron and slag.

With the help of the temperature-viscosity data of a number of different slags, obtained by means of the method which is described in this report, the bureau of mines is undertaking research investigations to determine the following facts: (1) By determining the speed of sulphide absorption by different slags at such temperatures as to possess identical viscosities to deduce the effect due simply to differences of temperature and composition; (2) by determining the speed of sulphide absorption by same slag at different temperatures, to deduce the effect due to changes in viscosity and temperature; (3) and by determining the speed of sulphide absorption by different slags at the same temperature, to deduce the effect due to changes in slag composition and in viscosity. Also, in each case, the final conditions of equilibrium are to be determined.

This work when completed should give a clear insight into the mechanism of the desulphurization process, and should be a test of the validity of the theory of Turner and of Schafer, that the silicate of the slag acts as a comparatively inert solvent for the spinels (aluminates) which alone are capable of reacting with the sulphide sulphur in the pig iron. According to this theory a slag low in alumina should possess a relatively weak desulphurizing power; and there should exist a lower limit of alumina content below which a slag could not be made to act satisfactorily in the blast furnace.

Relation Between Composition and Softening Temperature

In the absence of any method of viscosity measurement at the extreme temperatures of the blast furnace hearth, it has been customary for investigators to obtain an idea of the softening temperature or deformation temperature of slags by means of the familiar cone tests, in which test pieces similar to Seger cones are made from the slag and the temperature noted at which these test pieces bend over, melt to a ball, or otherwise show signs of incipient fusion.

In the ceramic industries and also in determinations of the fusibility of coal ash, cone tests furnish valuable information, since in these cases the important point in view is to determine the minimum temperature at which deformation or softening occurs. If, for instance, a firebrick softens appreciably at 1600 degrees Cent., it is not a matter of technical interest to know how this brick would behave at 1800 degrees Cent., nor would a cone test give any information in regard to this question.

Mellor has defined the softening temperature concisely, as, "The softening temperature measures the temperature at which the inward surface pressure of the substance becomes greater than those intermolecular forces which hinder the molecule taking up a position of stable equilibrium-minimum surface area."

It is undoubtedly true that silicate mixtures at temperatures at or near their softening point possess a surface tension of considerable magnitude, as may be shown by the rounding off at the end of a glass rod when held in the flame of a Bunsen burner. What is observed actually is the resultant effect of decrease of viscosity and action of surface forces upon the softened body.

There is given in Table I the softening temperatures and analyses of 18 commercial slags. These determinations were made in a platinum-wire resistance furnace in an atmosphere of air, temperatures being measured by a platinum-rhodium thermocouple. The sulphur content of the slag is accordingly entirely converted to the sulphate by the oxygen of the atmosphere, and possibly a portion was volatilized. The measurements cannot, therefore, be considered as rep-

Table I

Softening Temperatures of Slags by the Cone Test

Slag Lab. No.	Percentage of SiO_2	Al_2O_3	CaO	MgO	CaS	MnO	Softening temperature, degrees Cent.
22,967	48	8	32	5	2.0	0.1	1244–1254
22,965	38	10	40	4	3.1	1.2	1262–1264
22,964	38	9	43	2	2.4	0.2	1263–1266
22,968	44	9	40	2	2.7	0.2	1279–1279
22,960	37	11	25	20	3.5	2.2	1297–1300
22,958	34	27	27	6	4.9	0.3	1342–1342
22,953	36	12	41	6	3.1	0.7	1331–1346
22,956	35	11	42	7	3.6	0.5	1352–1357
22,963	34	14	41	6	3.4	0.6	1343–1360
22,969	34	12	43	6	3.2	0.5	1358–1364
22,961	34	15	38	10	2.9	0.3	1365–1368
22,955	32	16	44	1	4.4	0.1	1356–1390
22,952	32	12	45	6	3.4	0.5	1383–1391
22,957	31	15	36	10	5.5	0.2	1388–1398
22,954	18	35	31	10	4.1	0.3	1410–1410
22,966	33	11	44	4	5.9	0.5	1425–1441
22,962	32	15	48	2	3.5	0.2	1403–1443

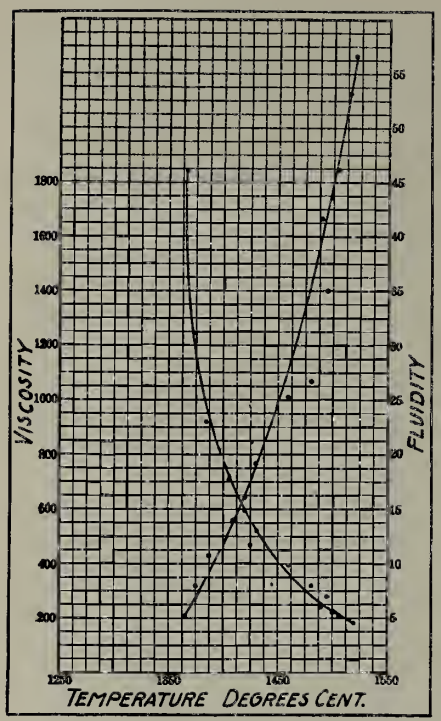


FIG. 4—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 22,954

resenting entirely the conditions within the blast furnace with its atmosphere of carbon monoxide and nitrogen. The slags are arranged in the table in the order of increasing refractoriness.

While it is impossible to draw any definite conclusions as to the variation of the softening temperature with the composition from these measurements, it is at once evident that, in so far as the effect of silica is concerned, low softening temperatures are in general associated with high silica content in the slag. In regard to the effect of lime or of alumina the data in the table yield nothing conclusive.

The Influence of Eutectics

As is well known, the softening of a silicate mixture such as blast furnace slag depends upon the amount of eutectic which is formed during incipient fusion and upon the viscosity of this eutectic. It is obvious that, given a sufficient amount of this eutectic to overcome the rigidity imparted to the test piece by the unfused portion, deformation will occur even though the eutectic possesses an extremely high viscosity. This softening may require time on account of the high viscosity of the eutectic mixture, but in cone tests sufficient time is usually furnished for this slow deformation.

Reference to the work of Rankin and Wright at the geophysical laboratory on the system lime-alumina-silica, shows that the minimum ternary eutectic of this system is composed of CaO 23.25 per cent, Al_2O_3 14.75 per cent, and SiO_2 62 per cent, which melts at a temperature of 1170 degrees Cent. Further examination shows that in all cases low-melting binary or ternary eutectics in the system lime-alumina-silica correspond to a higher silica content than is usually found in blast furnace slags. Therefore, in all blast furnace slags which possess more than the usual amount of silica there is formed on incipient fusion a large amount of a low-melting eutectic, which when it attains a sufficiently low viscosity, causes the test piece to soften and deform visibly.

It follows that high-silica slags, which are known to be more viscous furnace temperatures than more basic slags, possess quite paradoxically a very low softening temperature. One might attempt to explain the high viscosity of siliceous slags in practice by claiming that such slags produce a low hearth temperature, and that

Table II
Analyses of Slags

	Furnace No. 2, per cent	Furnace No. 3, per cent
SiO	35.18	37.60
Al_2O_3	12.08	12.46
CaO	43.73	40.80
MgO	4.23	3.66
CaS	4.21	3.65
MnO	0.39	0.55
	99.82	98.72

the high viscosity is due to the low temperature of the slag. Whether this be true or not, the measurements which have been made in these investigations show conclusively that at all practicable hearth temperatures a siliceous slag is much more viscous than a normal slag at the same temperature.

If, therefore, one should assume that the slags given in Table I required the same amount of superheating above the softening temperatures there given, 200 degrees Cent., for instance, no importance could be attached to subsequent deductions, because actual measurements of viscosity and temperature show that during a range of 200 degrees of superheating certain slags attain a fluidity three times as great as others.

Emphasis should be placed upon the distinction between the physical melting point and the softening temperature of silicate mixtures, which latter is often loosely referred to as the "melting point". The former refers to a temperature which is perfectly definite in the case of the majority of silicate mixtures, viz., the temperature at which the *last* crystalline phase disappears upon slowly raising the temperature of the melt. Only in the case of silica itself and certain alkaline feldspars does the physical melting point appear to be a rather uncertain point. The softening temperature may differ enormously from the physical melting temperature, nor can deductions be made simply on the basis of melting-point determinations as to the relative positions of the softening and melting points, with respect to each other.

Temperature Measurements

In the course of the investigations a number of attempts were made by the author, with the co-operation of Dr. J. K. Clement, physicist of the bureau of mines, to determine slag temperatures by means of a Holborn-Kurlbaum optical pyrometer. The conclusion reached in the course of these observations was that, due to the impossibility of obtaining a clean surface on the outflowing slag and of obtaining a slag which was entirely free from fumes, such measurements, at the best, were liable to a very large error. Accordingly a special type of platinum-rhodium thermocouple was constructed, the inner mechanism of the couple being protected by a sheath of Acheson graphite where subjected to the action of the molten slag.

For the sake of comparison, a number of simultaneous measurements of temperature by means of the optical pyrometer and thermocouple were

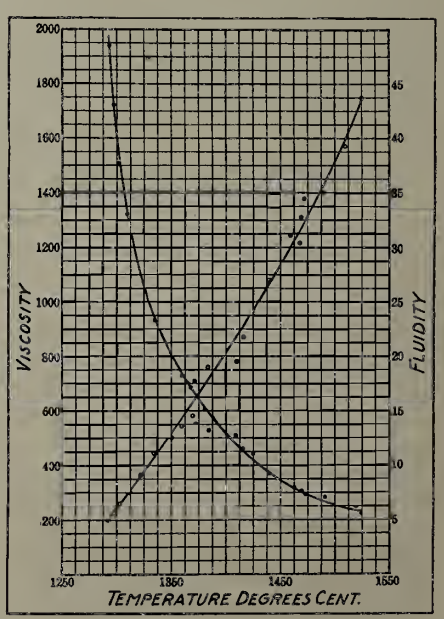


FIG. 5—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 22,958

Table III

Viscosity of Typical Blast Furnace Slags

[H_2O at 20 degrees Cent. = 1]

Temperature, degrees Cent.	Viscosity of Slag, Lab. No.							
	22,954	22,962	22,958	22,963	24,016	23,663	22,960	22,968
1275	....	....	....	1400	2600	....	....	....
1300	....	....	1700	1000	1500	....	1900	....
1325	....	....	1060	820	1080	2000	1100	3000
1350	2600	....	800	680	800	740	840	1800
1375	1150	....	640	540	620	560	640	1220
1400	750	3000	510	460	500	480	510	1000
1425	540	580	420	400	420	410	440	820
1450	410	480	350	350	350	360	380	680
1475	320	415	300	310	290	300	320	580
1500	230	380	260	280	250	250	280	480
1525	160	340	225	250	230	200	240	400
1550	....	290	....	220	205	....	....	340
1575	....	....	....	....	....	....	....	310

made at two separate furnaces of a large Pittsburgh steel company.

The average temperature at flush by means of the thermocouple was equal to 1500 degrees Cent. for furnace No. 2, and 1485 degrees Cent. for furnace No. 3, with a variation in temperature at flush during the day of 108 degrees Cent. in the former case, and of 85 degrees Cent. in the second case. Both furnaces appeared to be working perfectly normally, so far as could be judged from the behavior of the slag at flush.

Table II gives the analysis of the slag from both furnaces on the day upon which the temperature readings were taken.

An examination of what Johnson calls the curve of free-running temperature shows a decided minimum at a silica content of approximately 44 per cent, this minimum free-running temperature corresponding to 2450 degrees Fahr. or 1339 degrees Cent.

The results of the investigations of the author demonstrate conclusively that, for alumina content approximately 12 per cent, the slags of minimum free-running temperature correspond with a certain degree of approximation to a silica content of 36 per cent, rather than 44 per cent.

It is of interest to note that such a silica content (36 per cent) corresponds to average blast furnace practice using coke as fuel.

Of course, in charcoal practice using high-silica slags, it is possible to work with a more viscous slag than is the case in coke practice. However, in constructing such a curve as given by Johnson, the term "free-running temperature" necessarily refers to a temperature corresponding to a definite and constant viscosity.

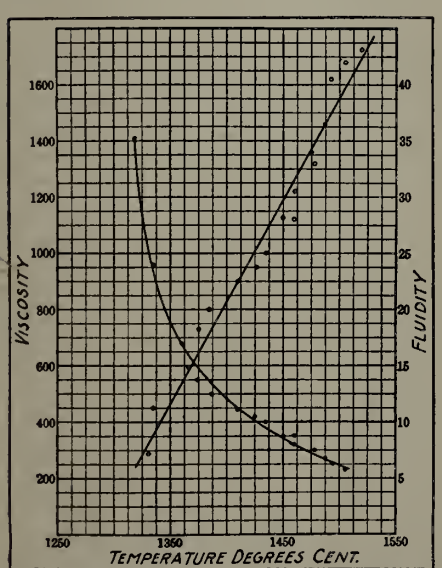


FIG. 6—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 23,663

Temperature-Viscosity Relations of Snythetic Slags

The only satisfactory method of studying the temperature-viscosity relations of blast-furnace slags and the effect of the different constituents on the viscosity is the determination of such relations for a graded series of synthetic slags in which one constituent is gradually replaced by another. Such investigations are now in progress in these laboratories.

To illustrate the experimental results which are being obtained, there is shown in Fig. 1 the temperature-viscosity relations of a synthetic slag containing 48 per cent lime (curve *a*) and of a synthetic slag of the same composition except that 20 per cent of the lime has been replaced by an equal percentage by weight of magnesia.

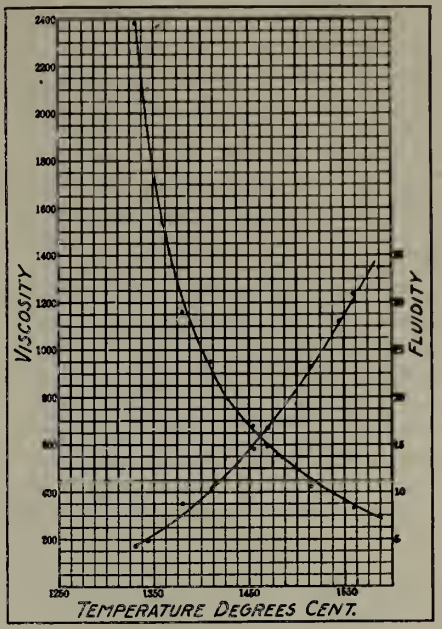


FIG. 7—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 22,968

Description of Furnace and Accessories

The electric furnace used in the experiments of the author is of the granular carbon, resistance type, and is similar as regards the arrangement of resistor and supporting refractories to the one described by Jeffries.

A ¾-inch steel shaft, by means of which the cylindrical crucible containing the slag is rotated, projects up into the furnace through a stuffing box placed centrally in the base of the sheet-iron shell. The lower end of the shaft is supported on a bearing fixed to the tripod. The steel shaft extends only a short distance beyond the bottom of the furnace shell, and is bored for the reception of a slightly smaller supporting rod of Acheson graphite. This supporting rod is threaded at its upper end for the reception of the graphite slag crucible, the graphite

Table IV

Results of Analyses of Eight Slags

Lab. No.	Composition of slag, per cent												Total, per cent
	SiO_2	Al_2O_3	Fe_2O_3	FeO	Fe	TiO_2	CaO	MgO	MnO	CaS	Alkalies	Moisture	
22,954	18.30	35.30	0.00	0.47	0.05	0.58	31.24	9.69	0.35	4.07	0.50	0.02	100.57
22,962	31.54	14.79	0.00	0.07	0.22	0.29	47.65	1.80	0.21	3.56	....	0.10	100.23
22,958	33.67	26.62	0.00	0.28	0.51	0.28	25.67	6.43	0.33	4.86	....	0.12	99.77
22,963	34.27	13.78	0.00	0.07	0.28	0.56	41.30	6.39	0.55	3.35	....	0.04	100.59
24,016	35.76	*13.36	....	....	....	....	42.11	3.94	0.49	3.70	....	....	99.36
23,663	36.04	*12.10	....	....	....	....	42.04	4.03	0.35	3.92	....	....	98.48
22,960	37.18	11.46	0.00	0.31	0.11	0.52	25.33	19.58	2.21	3.51	....	0.04	100.25
22,968	43.56	9.48	0.00	0.21	0.38	0.19	40.18	2.08	0.21	2.75	0.50	0.05	99.59

*Includes Fe_2O_3.

rod being tapered at its upper end to a diameter of ⅜-inch in order to eliminate, as far as possible, conduction of heat from the crucible. The crucible possesses an inside diameter of ¾-inch and an inside depth of 3 inches, with a thickness of wall of ¼-inch. The bottom of the crucible is ½-inch thick, so that the rod may be firmly threaded into it. The supporting rod fits snugly into the hole in the axis of the steel shaft to a depth of 2½ inches, and its length between the top of the steel shaft and the bottom of the crucible is about 6 inches. In the earlier experiments with the method it was thought necessary to introduce a Marquardt porcelain rod between the crucible and the steel shaft to prevent excessive heat conduction. By using a graphite rod tapered down to a diameter of only ⅜-inch, no excessive heat conduction has been noted; and besides eliminates the undesirable experimental features of using a brittle porcelain part in the supporting system.

The normal atmosphere of the furnace is a mixture of carbon monoxide and nitrogen, corresponding to that in the hearth of the blast furnace.

Viscosity Apparatus

Acheson graphite seems to be the only refractory available for such use as that of the high-temperature viscosity measurements on blast-furnace slag. This possesses the advantages of having a very low coefficient of expansion, a relatively great mechanical strength at high temperatures, desirable working properties, and shows inappreciable alteration on being kept for long periods at high temperatures.

The action of the molten slag on the viscosity spindle immersed in it is so small that the radius of the spindle decreases only approximately 0.005 centimeter during a viscosity determination. The action of the slag is perfectly uniform over the surface of the spindle, so that the spindle may be used repeatedly, due allowance being made for the slight change in its radius.

The distance from the surface of the slag to the bottom of the steel suspension, *r*, Fig. 2, is approximately 21 inches. Such a system would not in itself be at all stable under the conditions of measurement. It was therefore necessary to place a weight of about 200 grams between the suspension ribbon and the spindle at a point just outside the furnace shell and about 4½ inches below the suspension. This weight gives stability to the system, decreases the effect of vibrations upon the mirror, and holds the spindle in its position in the slag mass. Moreover, in order to further increase the inertia of the system about its longitudinal axis and to render the system aperiodic and practically nonsusceptible to disturbing influences of short duration, the 200-gram weight, *w*, Fig. 2, is furnished with two diametrically opposite vanes, *v* and *v*, which dip into cups filled with a viscous fluid, such as castor oil, at a distance of about 4 inches from the axis of the system. The mirror deflection is measured in the usual way by means of a telescope and scale.

The entire suspension system is fixed to a rod that projects horizontally from an apparatus support, firmly fixed to a heavy table and provided with a millimeter scale for precise vertical adjustment of the apparatus. The furnace itself is first adjusted so that the steel shaft is in a vertical position, which insures the alignment of the crucible also. The point to which the suspension system is fixed is then aligned by means of a plumb bob with the axis of the shaft and crucible. In this manner the viscosity spindle is suspended centrally within the crucible.

The fluctuation of the scale reading rarely amounts to more than 1 per cent of the scale reading. It is probable that the mirror reading which is a measure of the viscosity of the slag is more precise than the reading of temperature in certain cases, although not so accurate.

Measurement of Temperature

The temperature of the slag was measured by means of an optical pyrometer of the Holborn-Kurlbaum type. The pyrometer is sighted directly upon the surface of the rotating slag through an open sector in the 200-gram weight, as shown in Fig. 2.

As a check on the black-body conditions of the furnace used in the viscosity measurements, a sample of artificial diopside, $CaO.MgO.2SiO_2$, was prepared, and its temperature-viscosity relations determined in the same manner as adopted in the case of slags. This compound has a physical melting point at 1392 degrees Cent. and is converted, coincidently with its melting, from a crystalline substance to a fairly fluid liquid.

The results of these measurements are given in Fig. 3. The viscosity curve bends quite sharply upward in the neighborhood of the theoretical melting point, the observed difference of about 20 degrees Cent. being probably due to the fact that the artificial diopside did not have exactly the theoretically correct composition. Analysis of the artificial diopside gave the following composition: CaO 25.98 per cent, MgO 19.48 per cent, SiO_2 55.08 per cent. The correct composition is: CaO 25.84 per cent, MgO 18.58 per cent, SiO_2 55.58 per cent.

Manipulation of Apparatus

The method of using the apparatus is as follows: 175 grams of slag are placed in the graphite crucible. This quantity of slag, when ground to 100 mesh, approximately fills the crucible. Although the height of the crucible internally is 3 inches the slag after having been melted and cooled forms a cylinder only about 1⅝ inches in length. The crucible, containing the slag, is properly placed, and the upper removable part of the furnace is fixed in position. The crucible is then rotated and the furnace is heated at such a rate that at the end of about 1½ hours the slag reaches a temperature of 1200 degrees Cent. The rate of heating is then decreased in order that the large mass of slag may acquire the temperature of the heating tube and diminish the lag effect. When the slag has become sufficiently fluid, as determined by the several tentative lowerings of the viscosity spindle, the suspension system is carefully lowered until the

Table V

Viscosity Values With Rising and Falling Temperatures

[Results obtained in experiments with slag designated Lab. No. 22,958]

Rising temperature		Falling temperature*			
Temperature, degrees Cent.	Viscosity	Temperature, degrees Cent.	Viscosity	Temperature, degrees Cent.	Viscosity
1382	605	1292	1940	1382	611
1410	513	1297	1707	1387	524
1415	460	1302	1505	1425	446
1425	442	1312	1319	1440	375
....	....	1322	1074	1466	323
1463	320	1337	922	1470	304
....	...	1350	805	1488	285
1473	291	1359	728	1525	228
1510	255	1368	689	....	...

*Results are given in reverse order, for easy comparison with results under "Rising Temperature."

viscosity spindle rests on the bottom of the crucible. During this operation the rotation of the crucible is stopped in order to avoid the possibility of breaking the graphite spindle while it is being introduced into the viscous slag. The spindle is then raised exactly 0.5-centimeter above the bottom of the crucible, the adjustment being made by means of the scale in the apparatus support.

After the suspension system has been lowered and the depth of the viscosity spindle adjusted, the temperature of the slag is slowly raised at a rate of 2 to 5 degrees Cent. per minute, the temperature and scale deflection being noted at approximately regular intervals. When the highest temperature desired, usually 1500 to 1600 degrees Cent., is reached, the heating current is so adjusted that the furnace cools at approximately the same rate that it was heated. Readings of deflection and temperature are taken, until the maximum deflection (corresponding to a viscosity of 2000 to 3000) is reached. The spindle is then raised out of the slag before the latter becomes hard enough to prevent withdrawal.

Results of Viscosity Measurements

The results of viscosity measurements on eight different commercial slag samples are given in Table III for the temperature range 1275 to 1575 degrees Cent. The compositions of the slags are shown by the results of chemical analyses given in Table IV.

Temperature-viscosity curves were plotted, as shown in Figs. 4 to 7, for slags Nos. 22,954, 22,958, 23,663 and 22,968. The curves closely approximate in form a rectangular hyperbola. These figures contain all the experimentally determined points obtained in the heating and cooling of the sample, so that a smooth curve drawn through all the points must represent very closely the ideal conditions desired, the deviations tending to neutralize one another.

The temperature-fluidity curves are also given in Figs. 4 to 7 for the four slags mentioned above. The values are calculated by means of the familiar relation, Fluidity = 1/Viscosity. As was to have been expected from the general shape of the viscosity curves, the curves representing fluidity at various temperatures approximate in form a straight line. The actual experimental data obtained in the case of slag No. 22,958 are given in Table V, which contains results obtained with rising and falling temperatures.

Duplicate determinations on separate samples of the same slag gave results which agreed well within the known errors of measurement.

Appearance of Slag Melts

When cold the slag was easily removed from the graphite crucible by pressing on the bottom of the melt through the hole into which the graphite crucible support is threaded. The slag on cooling shrinks away from the graphite crucible wall sufficiently to prevent objectionable binding and sticking. The melt as taken from the crucible is cylindrical with an upper surface which is almost flat, as the viscosity at the moment when the spindle was withdrawn was not great enough to prevent the slag from flowing into the space previously occupied by the graphite spindle.

The measurements here described give for the first time an accurate idea of the actual magnitude of the viscosity of blast furnace slags in units which are capable of a physical interpretation, as well as of the rate of change of viscosity of different slags with temperature over a wide range of temperature and viscosity.

If an average slag temperature of 1500 degrees Cent. is assumed, an examination of the data given in Table III discloses the fact that the viscosity of the normal blast furnace slag as it flows from the cinder notch approximates 250 (H_2O at 20 degrees Cent. = 1). This represents a viscosity less than that of castor oil at room temperature but greater than that of olive oil.

The viscosity of the eight slags, considered in Table III, at a temperature of 1500 degrees Cent. varied from 230 to 480. A synthetic slag upon which measurements have been recently made showed a viscosity of 770 at 1500 degrees Cent., this slag containing 48 per cent silica; while reference to Fig. 3 shows that at this temperature the artificial diopside containing 55 per cent silica had a viscosity of 640. The effect of silica in such amounts upon the viscosity of silicates at temperatures above their melting points is thus clearly demonstrated, the increase in viscosity over that of normal slags being marked even in the case of diopside which contains no alumina and a high percentage of magnesia.

It would seem that even such high percentages of alumina as are present in the slag designated Lab. No. 22,954, although causing a high initial softening temperature, do not have a very noticeable effect in increasing the viscosity of the melt at high temperatures. This peculiar property of alumina, which may be a quite general characteristic, is probably associated in some manner with the uncertainty of its action within the furnace.

Comparison of Viscosity Measurements With Cone Tests

It was thought a matter of interest to compare the results of viscosity measurements with cone tests made with corresponding slags. The cone tests were made, as has been previously described under conditions which converted the sulphide content of the slag to the state of the sulphate. For this reason the comparison is not a strict one. In Table VI is given in relative order the softening temperature of six slags and their viscosities at 1400, 1450 and 1500 degrees Cent.

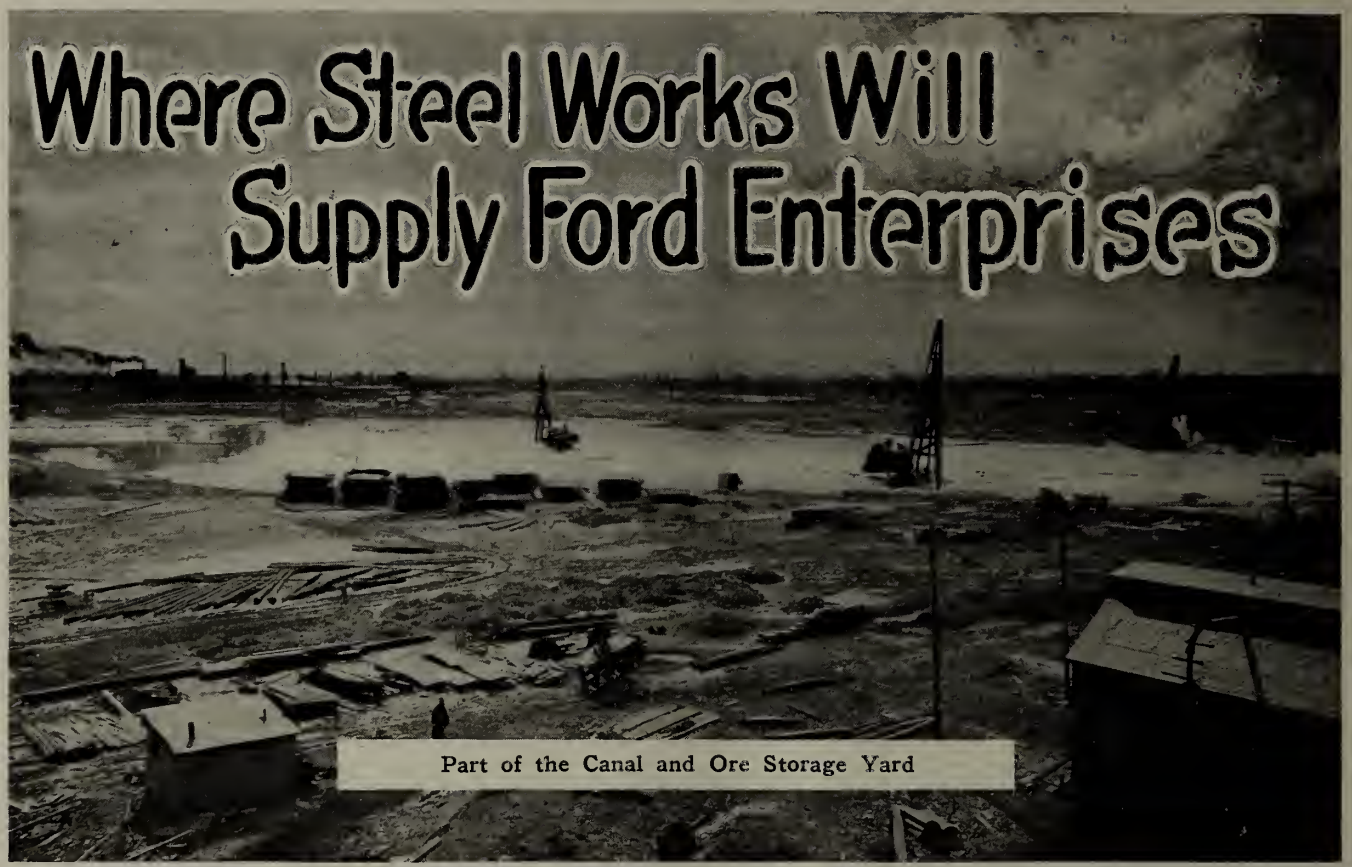
Table VI

Cone Measurements of Softening Temperatures of Slags

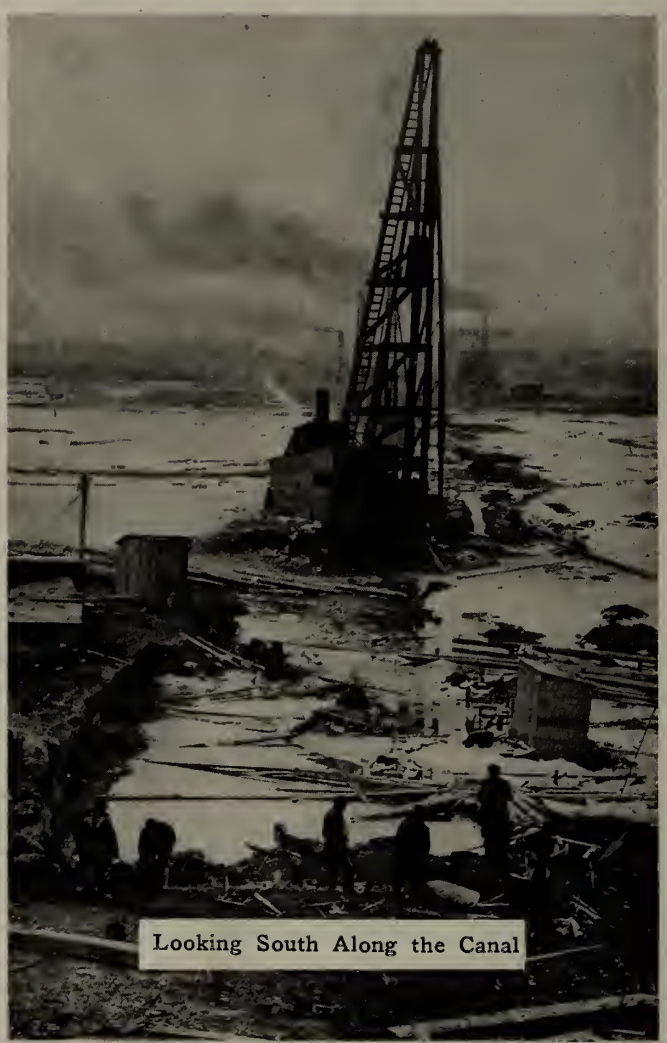
Slab Lab. No.	Softening temperature, degrees Cent.	Viscosity at 1400 degrees Cent.	Viscosity at 1450 degrees Cent.	Viscosity at 1500 degrees Cent.
22,968	1279–1279	1000	680	480
22,960	1297–1300	510	380	280
22,958	1342–1342	510	350	260
22,963	1343–1360	460	350	280
22,954	1410–1410	750	410	230
22,962	1403–1443	3000	480	380

Bulletin No. 99 of the University of Illinois Engineering Experiment Station contains the results of a series of experiments on the collapse of short thin tubes, made by Prof. A. P. Carman of the department of physics. The purpose of these tests was to find an equation by the application of which the pressure required to collapse a tube can be calculated when the dimensions of the tube and the elastic properties of the material are known. Copies of this bulletin may be obtained gratis by addressing the Engineering Experiment Station, Urbana, Ill.

Where Steel Works Will Supply Ford Enterprises



Part of the Canal and Ore Storage Yard



Looking South Along the Canal

SUB-FOUNDATION work has been completed and the construction of the steel works to supply the varied industries of the Ford Motor Co., at Detroit, is taking tangible form. An idea of the magnitude of this undertaking may be gained from the accompanying illustrations. The very conception of a steel plant to handle and develop raw material from its native state and to prepare an element through the initial processes to the complete finished product is unique. True, many industries are devoting attention in this direction, but no plant is in existence at the present time which performs all the operations which convert crude ore into a finished machine.

The principles of progressive manufacture involving a steady forward movement of the product through the various operations of manufacture has governed the layout of the new steel plant. The ore will be handled by cars from the docks into the storage yard or to the furnaces. The direct furnace ore will be delivered to a bin system which will serve the skip hoists to the blast furnaces. Iron will be tapped from the blast furnaces into ladles and transferred to the open-hearth furnaces in a molten state. From the open-hearths, the metal will be conveyed directly to the foundry. From this point conveyors will come into operation and remove the castings to the cleaning department and from thence to the machine shops.

The plant site includes over 4000 acres on the River Rouge, just outside the city limits of Detroit. Four blast furnaces are to be constructed. These will require extensive ore-handling equipment, and facilities for the production of coke to prevent delays incident to a shortage such as existed last winter. The first of the permanent construction which has been completed is the ore unloader shown at the top of the opposite page. This equipment was built

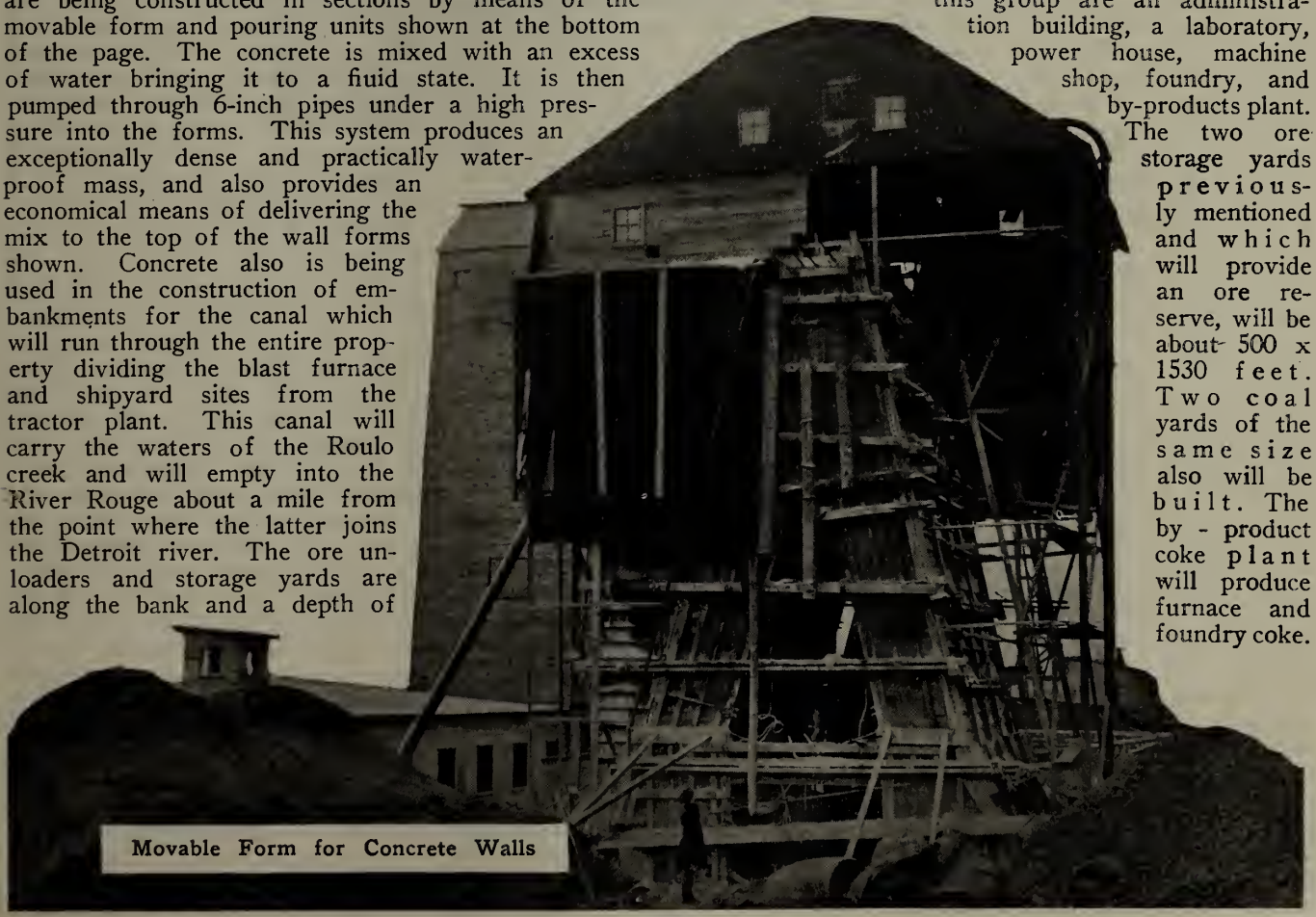


Ore Unloader Nears Completion



Foundations for Storage Yard

by the Wellman - Seaver - Morgan Co., Cleveland. A duplicate unloader is now under construction. Extensive piling has been necessary to secure a solid sub-foundation, owing to the character of the sub-soil. Even the storage yards have been started upon a base of piles, which were driven four feet apart over the entire area. These storage yards and the docks will be of reinforced concrete construction, and much of the foundation work already has been completed, as will be noted from the illustration shown at the top of this page. About 700 cubic yards of gravel is transported by boats every day for the concrete work. The yards will be divided into two section which distribute the load of the ore uniformly over the entire area. The retaining walls of reinforced concrete are being constructed in sections by means of the movable form and pouring units shown at the bottom of the page. The concrete is mixed with an excess of water bringing it to a fiuid state. It is then pumped through 6-inch pipes under a high pressure into the forms. This system produces an exceptionally dense and practically waterproof mass, and also provides an economical means of delivering the mix to the top of the wall forms shown. Concrete also is being used in the construction of embankments for the canal which will run through the entire property dividing the blast furnace and shipyard sites from the tractor plant. This canal will carry the waters of the Roulo creek and will empty into the River Rouge about a mile from the point where the latter joins the Detroit river. The ore unloaders and storage yards are along the bank and a depth of 20 feet will permit the lake ore carriers to come up for unloading. A turning basin for lake freighters will be constructed under government supervision at the junction of the canal with the River Rouge. This basin will be a semi-circular bay dredged to a depth of 25 feet, and with an area of 989,100 square feet. Incoming freighters will turn in this basin and back up the canal to the storage yards. The dredging operations are being carried on by suction dredges and the fill is distributed in a semifluid state through pressure pipes to raise the level of surrounding land. The steel plant proper will cover about 350 acres and will include seven buildings, four blast furnaces and four storage yards. Two of these furnaces will be completed this year. Among the buildings comprising this group are an administration building, a laboratory, power house, machine shop, foundry, and by-products plant. The two ore storage yards previously mentioned and which will provide an ore reserve, will be about 500 x 1530 feet. Two coal yards of the same size also will be built. The by - product coke plant will produce furnace and foundry coke.



Movable Form for Concrete Walls

Build Huge Crane for Shipyard Use

Mammoth Hoisting Unit Now Under Construction Will Have Lifting Capacity of 392 Net Tons—Unusual Size of This Shipbuilding Crane Necessitated Radical Changes in Design

SUCCESSFUL prosecution of modern warfare requires almost day to day progress in military science. Racing alongside of development in the military arts comes the advance in mechanical science. Probably the most graphic illustration of this necessary and parallel development of these sciences is the stride made in the last four years in aviation. Military reasons necessitated this development while progress in mechanical knowledge made it possible.

A long list of less absorbing but equally important developments can be traced in the mechanical arts during the past four years, most of which owe their growth directly to war's needs. One illustration of this is the steady increase in the sizes and weights of the guns employed both in land and naval warfare. The huge gun with which the Germans have been bombarding Paris is the most striking illustration of this growth but it marks merely a great forward step in the steady march toward larger guns. With this enlargement has come a great increase in weight and, as a corollary, heavier hoisting units. In naval construction particularly, the problem of handling these huge guns during their installation or while undergoing repairs, has led to rapid progress in the design of cranes of great capacity.

Work is now proceeding at Bedford, O., in the plant of the McMyler-Interstate Co., on the construction of the largest crane of its type ever built in the world. This crane will have a hoisting capacity of 392 net tons, the crane itself towering 230 feet above the ground. The crane will be installed at the Brooklyn navy yard primarily for handling heavy guns into and out of warships.

The design of this crane necessitated a departure from the established lines and the completed machine will differ radically from any hoisting unit previously built.

The crane is of the stationary, electrically operated, hammerhead type. The huge size necessary to secure a lifting capacity of 350 gross tons or 392 net tons, is revealed graphically in the smaller of the accompanying illustrations. The crane is shown in comparison with similar cranes of smaller size and also ranged alongside a modern office building. The maximum height of the new crane from the base to the top of the machinery house, is 230 feet. The Rockefeller building, at Cleveland, illustrated in the drawing, is 16 stories high, or practically 200 feet. The maximum load of 392 net tons carried by the new navy crane at a 115-foot radius, compares with a maximum of 5 tons carried by a small shipbuilding crane at 95-foot radius, or with a 120-ton weight carried by a shipbuilding crane of that capacity, at a maximum radius of 60 feet. The drawing also shows on the same scale, the ordinary locomotive type crane as well as a modern freight locomotive, three of which could be picked up at one time by the new navy crane.

In constructing this crane, approximately 3340 net tons of steel will be required. This includes 2500 tons of structural steel, 375 tons of machinery 35 tons of electrical apparatus, 100 tons of miscellaneous parts and 330 tons in the counterweight.

In calling for bids for this crane, the navy department had under consideration the construction of three machines of the same size and design. Up to this time only one has been contracted for.

The crane will be installed at the Brooklyn navy yard, the contract calling for completion by June 1, 1919. The machine will be erected for the first time upon its permanent site at the navy yard. This site is a pier which gives only a 20-foot clearance at each side of the crane. Present plans call for the use of a 275-foot derrick boom in handling the erection work.

The arrangement of the crane is shown clearly in the general plan. The dock is 100 feet wide giving a clearance of 20 feet on each side of the 60-foot portal. The illustration shows the manner in which the crane will command slips on both sides of the pier.

The crane will have a capacity for hoisting and slewing a load of 350 gross tons at a maximum of 115 feet, and a load of 50 tons at a maximum radius of 190 feet. The main hoist is divided into two duplicate units, each of 175 gross tons capacity. Special provision has been made for coupling these units when the full capacity of the huge crane is desired.

The crane is a specially designed type. The steel tower mounted on the main portal, converges at the top and carries a roller bearing which supports the boom. In addition to this weight, the bearing carries a revolving steel frame structure which is guided by rollers carried in a path just above the main portal. This design was chosen to insure stability and to facilitate control while slewing. The revolving structure carries none of the weight of the boom. The roller bearing will be furnished by the Hydraulic Tool Co., Philadelphia.

A machinery house is carried at the rear of the boom, a cross section of this house being shown in the larger illustration. The number and size of the electric units used in operating the crane necessitated provision for a traveling crane in this machinery house to handle the machinery while being installed or repaired. This small crane is of the electric, overhead traveling type and has a capacity of 35 tons. The crane runway extends beyond the machinery house to permit hoisting the machinery direct from the ground. An electrically operated vertical sliding door weighing 10 tons is provided in the rear of the machinery house.

A study of the principal dimensions of the main crane gives a clearer index to its immense size. The distance from the top of the foundation to the bottom of the main and auxiliary hoist hooks in their highest positions is 141 feet. The maximum radius from the center of rotation of the main hoist is 115 feet, with a minimum radius of 41 feet. The maximum radius from the center of rotation of the auxiliary hoist is 190 feet with a minimum radius of 41 feet. The clearance under the portal is 25 feet. The clearance between the portal legs is 50 feet. The main hoist blocks and the auxiliary hoist block will descend 29 feet below the dock level. The maximum radius of the main hoists, with a maximum load, is 115 feet when operated either separately or jointly. The auxiliary hoist has a maximum radius of 190 feet with a maximum load.

The operating speeds call for the rapid handling of loads. Each main

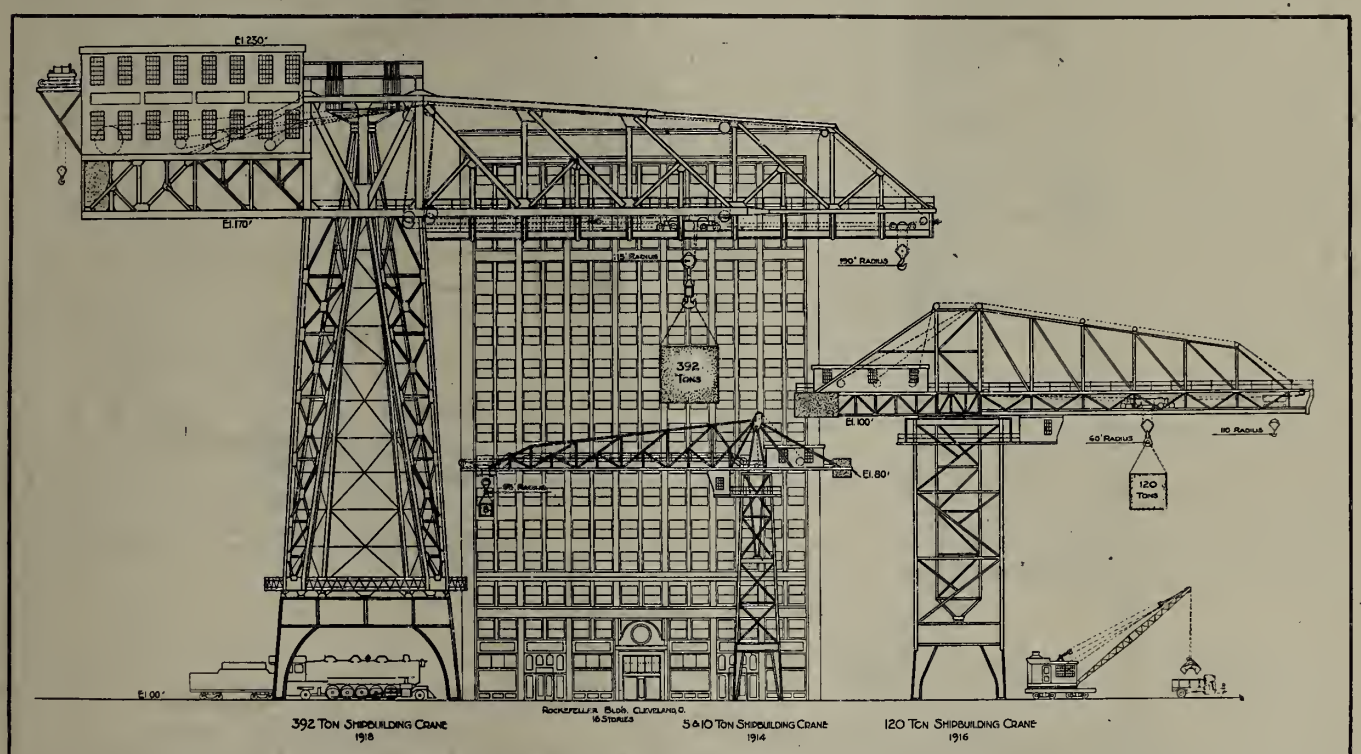
hoist, with a maximum load, operating either independently or jointly will have a speed of 2.5 feet per minute. With no load, each main hoist will have a speed of 10 feet per minute. The auxiliary main hoist with a maximum load will have a speed of 12 feet per minute and with no load, 30 feet per minute. The speed of the trolley travel of each main hoist with a maximum load will be 12 feet per minute, and with no load, 100 feet per minute. The speed of the trolley travel of the auxiliary hoist with a maximum load will be 100 feet per minute, and with no load, 150 feet per minute.

The operating mechanism consists of an electric motor driving through from steel castings, the face of the drums being machine scored.

In order to operate the two main hoists in unison so as to insure equal hoisting speed when hoisting loads in excess of 175 tons the maximum capacity of each individual hoist—one of the intermediate shafts on each hoist is arranged for coupling so that the two motors drive through these coupled shafts. Change gears are provided on each hoist to permit variation in the speed of hoisting.

The first intermediate shaft on each hoist is equipped with a brake, 54 inches in diameter and with a 10-inch face. The object of this brake is to provide mechanical means of braking in addition to the electric brake trolley. A mill type hoist motor of 87 horsepower is used. The hoisting drum on the auxiliary hoist is 84 inches in diameter with a 102-inch face, machine scored. A mechanical emergency brake is provided as well as a solenoid brake on the motor. The variations in hoisting speed with a maximum load and with no load is obtained by means of an electric speed control.

The auxiliary hoist racking or traversing mechanism follows the general design of that employed with the main hoist. A mill type motor of 27½ horsepower is used. The drum is cast iron, 36 inches in diameter and 54-inch face. The motor is provided with a solenoid brake. The required



GRAPHIC COMPARISON OF SHIPBUILDING CRANE WITH MODERN BUILDING AND WITH TYPICAL HOISTING UNITS

properly connected gears and shaftings, four vertical pinions meshing with a circular rack. The transmission mechanism is interposed with three compensating gears so as to compensate the duty on the four slewing pinions. The controller is of the magnetic type.

Two separate hoisting units are provided in duplicate. The design calls for a double lead from each hoisting drum to the trolley in order to reduce the rope strains by one-half as compared with the single lead. Each main cable will be equalized on a sheave at the outward end of the jib.

A mill-type motor of 87 horsepower will be used for each hoisting unit. The hoisting drums are 10 feet in diameter and 14 feet 4 inches long. The drums are built up in sections The mechanical brake will be used in emergencies.

The main hoist racking or traversing mechanism for the main hoist trolley which travels back and forth on the jib, consists of two duplicate rope drives, each unit operating one of the 175-ton hoists. A mill type motor of 27½ horsepower is used for each racking unit. The racking drums are 48 inches in diameter with a 54-inch space. The intermediate shafts of the racking or traversing mechanism are arranged to couple together to insure trolley movements in unison when hoisting maximum loads.

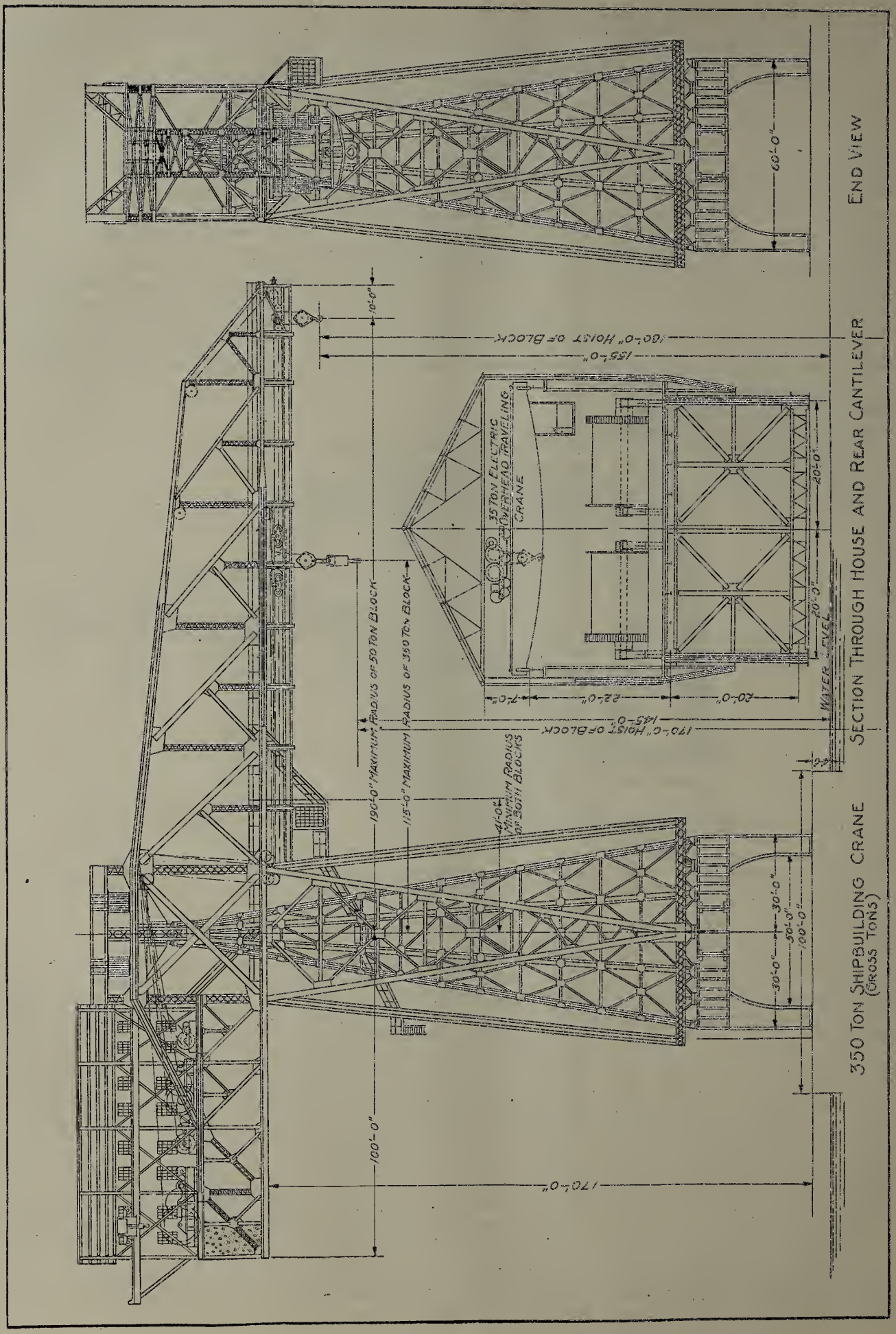
Change gears for securing speed changes are provided on the traversing mechanism. The motors have solenoid brakes.

On the auxiliary hoist, double rope lead from the hoisting drum to the speed variations are electrically controlled.

Slewing mechanism comprises an annular rack mounted on the rear of the roller path at the base of the revolving structure. The rack is cast steel with cast teeth.

The motor equipment includes two motors for the main hoist; two motors for the main hoist trolley; one motor for the auxiliary hoist; one motor for the auxiliary hoist trolley; three motors for the overhead crane operating over the machinery floor, one motor for slewing and one for operating the vertical sliding door in the rear of the machinery house.

The auxiliary hoist trolley operates the full length of the travel independent of the main hoist trolleys. The trackway for the auxiliary trolley is located between the main hoist


END VIEW
60'-0"
SECTION THROUGH HOUSE AND REAR CANTILEVER
35 TON ELECTRIC OVERHEAD TRAVELING CRANE
100'-0" HOIST OF BLOCK
185'-0"
170'-0" HOIST OF BLOCK
145'-0"
190'-0" MAXIMUM RADIUS OF 50 TON BLOCK
115'-0" MAXIMUM RADIUS OF 350 TON BLOCK
41'-0" MINIMUM RADIUS OF 350 TON BLOCKS
100'-0"
170'-0"
350 TON SHIPBUILDING CRANE
(GROSS TONS)
HUGE SHIPBUILDING CRANE DESIGNED FOR SERVICE AT BROOKLYN NAVY YARD

trolley trackways. The main hoist trolley is mounted on eight rolled steel double flanged wheels, 30 inches in diameter. The wheels are mounted in pairs in equalizer trucks. The auxiliary hoist trolley is mounted on four rolled steel, double-flanged wheels, 24 inches in diameter.

Each main hoist will be reeved for two 8-parts hoist lines. These lines will be 1⅝ inches in diameter. Each hoist line is a single cable, each end of which is attached to opposite sides of the hoist drum. The auxiliary hoist will be reeved for two 4-parts line, 1⅜ inches in diameter, and the main hoist trolley reeved for single line operation, the lines being 1⅝ inches in diameter. The reeving of this line is in effect that of an endless cable, one end of the cable being attached to the drum and the opposite end to the inboard side of the trolley. The other cable is connected to the opposite end of the drum for winding in the opposite direction. The auxiliary hoist trolley will be reeved in the same way as the main hoist trolley, a ⅞-inch diameter line being employed.

An equalizing bar fitted with suitable shackle is arranged for connecting with the two main hoist fall blocks permitting the lifting of the maximum joint loads of the two main hoists.

Four 500-watt, 110-volt searchlights with reflectors are provided on the main trusses for illuminating the working area covered by the crane. A 500-watt flood light will be used in the operator's house.

The crane for handling machinery parts is carried on a crane runway in the machinery house where the operating mechanism is mounted. From center to center of the crane runway rails will be 43 feet. This runway will carry a 35-ton capacity, 3-motor electrically operated traveling overhead crane.

All operating levers for controlling the motions of the crane are located in the operator's cab in front and to one side of the revolving structure. The clutches for coupling the main hoist mechanism, and the two main hoist racking mechanisms, are operated by the attendant in the machinery house. Electric bell signals in the operator's cab, machinery house and at the base of the crane are to be employed for controlling the operations of the crane.

To Electrify Mine

The Scrub Oak mine of the Wharton Steel Co., which is located about a mile distant from the company's blast furnace plant at Wharton, N. J., is to be provided with electric power by the New Jersey Electric Lighting & Power Co. It is expected to utilize about 2000 horsepower. The ore vein which now is being worked is 27 feet wide, 650 feet deep and about one mile long. It is estimated that the mine can be worked at the present rate for at least 10 years. The ore averages about 45 per cent in metallic content in its natural state and 65 per cent after being concentrated. The ore is brought to the Wharton Steel Co.'s blast furnaces over a railroad owned by the company.

Steel Corporation's Order Book Again Drops

A further reduction in the unfilled tonnage of the United States Steel Corp. was made in March, according to the regular monthly report recently issued. Orders going over at the end of the month aggregated 9,056,404 tons, a decline of 232,049 tons, or 2.49 per cent. These orders, as shown in the report, involved the smallest tonnage since Oct. 31, 1917, at which time 9,009,675 tons were on the books. The largest amount left over in recent months was on April 30, 1917, when the unfilled orders aggregated 12,183,063 tons. The reduction last month is attributed chiefly to the further improvement in shipping facilities. Following is a comparative statement:

Date	Total	Change, tonnage	Change, per cent
Mar. 31, 1918..	9,009,675	232,049—	2.49—
Feb. 28, 1918..	9,288,453	189,400—	1.99—
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937.798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

War Increases Building

War activity in New Jersey received considerable impetus in the four months preceding March 1, according to the records of the structural bureau of the department of labor at Trenton, N. J. Chemicals are being produced in eight new buildings; munitions, of which New Jersey already produced a heavy percentage, will be made in 14 plants instead of one; in connection with shipbuilding, plans for no less than 10 buildings have been filed. Forge shops have been expanded; new boiler shops, iron foundries and wire works have been erected; increased wireless facilities have been provided and many buildings erected for the manufacture of foodstuffs, handling of meats and by-products and several mills have been built to turn out silks, woolens, etc.

Elects New Members

Sixteen new members were added to the roll of the American Iron & Steel institute at the last directors' meeting. These are as follows:

Archer M. Campbell, Glamorgan Pipe & Foundry Co., Lynchburg, Va.

Francis H. Hardy, South Eastern Iron Corp., Chicago.

John J. Howard, Lavino Furnace Co., Lebanon, Pa.

William H. Hulick, Warren Foundry & Machine Co., New York.

E. George Lavino, E. J. Lavino Co., Philadelphia.

William J. McCurdy, Manufacturers Iron & Steel Co., Catasauqua, Pa.

Theodore E. Moritz, American Steel Foundries, Chicago.

W. W. Pettis, Cincinnati.

George W. Ramey, Atlantic Steel Co., Atlanta, Ga.

Charles J. Stark, THE IRON TRADE REVIEW, Cleveland.

James H. Walsh, Illinois Steel Co., South Chicago, Ill.

Charles H. Williams, American Iron Products Co., Inc., New York.

M. H. Broderick, Muncie, Ind.

George Frank Konold, Warren Tool & Forge Co., Warren, O.

William Sigler Jones, Vanadium-Alloys Steel Co, Latrobe, Pa.

George Coffin Warren, Fulton Steel Co., New York.

Discuss Core Problems

The monthly meeting of the New England Foundrymen's association at the Exchange club, Boston, on Wednesday evening, April 10, was largely attended and developed into one of the most interesting ever held. C. S. Cleland, sales manager of the Black Products Co., New York City, spoke on "Cores and Corebinders". A brisk discussion of the merits of compound and oil binders followed the talk, to which, in addition to Mr. Cleland, Mr. Alborn, of the Builders Iron Foundry, Providence, T. R. Scott, of Brown & Sharpe, Providence; Dennis Eagan, New England agent of the Pridmore Molding Machine Co., Mr. Harrington and Mr. Kehoe, of the Hunt, Spiller Co., and Werner G. Smith, of the Werner G. Smith Co., Cleveland, contributed. The discussion indicated that for some purposes oil binders are best while for others the compound or dry binder is to be preferred. President George P. Aborn, of the association, presided.

Calls For Industrial Peace

President Wilson Accepts Report of National War Labor Board and Reappoints Members to Carry Out Principles Proposed

WASHINGTON, April 16.—Appeal was made last week by the President, in formally accepting the report of the national war labor board appointed by Secretary Wilson, in which he urged "upon all employers and employes within the United States the necessity of utilizing the means and methods thus provided for the adjustment of all industrial disputes" and requesting "during the pendency of mediation or arbitration through the said means and methods there shall be no discontinuance of industrial operations which would result in curtailment of the production of war necessities."

This statement by the President was in a proclamation formally accepting the report of the board which was submitted March 29. He immediately renamed the board to the work suggested and outlined in the report, the principles and methods to be those contained in the report which had for its keynote the slogan, "There should be no strikes or lockouts during the war."

The members of the board are: Former president William H. Taft representing the public on behalf of the employers; Frank P. Walsh representing the public on behalf of the employes; L. A. Osborn, New York, vice president of the Westinghouse Electric & Mfg. Co.; H. B. Worden, Newark, N. J., president of the Submarine Boat Corp.; W. H. Van Dervoort, East Moline, Ill., president of the National Metal Trades association; L. F. Loree, New York, president of the Delaware & Hudson railroad; and C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge & Iron Co., representing employers; Frank J. Hayes, Indianapolis, president of the United Mine Workers; William L. Hutcheson, Indianapolis, president of the Brotherhood of Carpenters; Victor Olander, Chicago, representative of the Seamen's Union; T. A. Ricket, Chicago, president of the United Garment Workers; and William H. Johnson, Washington, D. C., president of the Machinists' International Union, representing employes.

Fix Mill Day Rate

Under the recent 15 per cent wage increase, effective April 15, the day labor rate in the Youngstown, O., district will be 38 cents an hour, according to an announcement by the Carnegie Steel Co. Since independent companies have always followed the Steel corporation's lead in such advances, it is anticipated this will be the universal rate. When the increase was announced, it was a question whether the rate would be 37½ or 38 cents, since a 15 per cent increase on 33 cents would make the rate a fraction below 38 cents. Other wage rates are being adjusted accordingly, machinists receiving around $7.50 per day.

Request Increased Wages

Fully 5000 men are affected by the recent request of the machinists' union for a 20 per cent wage increase effective May 6, made to 38 manufacturers of Springfield, West Springfield and Chicopee Falls. Nearly all of these plants are engaged in subcontract work on government war orders and the present average wage rate for machinists is about 45 cents an hour. Toolmakers are paid between 40 and 50 cents. That no thought of a strike exists is the statement made by officials of the union who claim that rates paid in that territory are lower than in other eastern sections. They are anxious to arrange conferences with manufacturers and in these conciliatory overtures, believe they are actuated by patriotic motives.

Will Erect Dwellings

Negotiations are being carried on between the Clairton Land Co., Pittsburgh, a subsidiary of the Carnegie Steel Co., and the Worthington Detchon Co., for the purchase of 11 blocks of building lots. It is proposed to erect modern brick dwellings on the site and sell them on an easy payment plan to workers who will be employed at the by-product coke plant of the Carnegie Steel Co. at Clairton, Pa. The by-product plant with the Union railroad connections and the gas lines to the other towns along the river represent an expenditure of approximately $40,000,000. The plant will produce coke and gas for most of the plants in the Monongahela valley.

Labor Notes

With a demand for a blanket increase of 25 per cent in wages, 500 workmen at the implement plant of B. F. Avery & Sons, Louisville, Ky., including blacksmiths, molders, piece workers, machine operators, polishers, foremen, trip hammer operators, etc., have gone on a strike. Vice president William Black states that some additional men have been secured and with certain loyal workmen several departments have been operated about one-half time.

The Oakville Co., Watertown, Conn., manufacturer of pins, will build 20 reinforced concrete 2-story industrial houses for its employes. The contract has been awarded the Aberthaw Construction Co., Boston.

Approximately 1000 Canadian girls now are at work upon Liberty motors at the plant of the Union Switch & Signal Co., Swissvale, Pa., subsidiary of the Westinghouse Airbrake Co., Wilmerding, Pa. It is expected that the monthly production will be 600 motors.

The Emerson-Brantingham Co., Chicago, has granted a 10 per cent wage increase to the Rockford plant. This last affects about 2000 men and carries with it a war bonus of 1 to 5 per cent for each six months of service. Some such action was made necessary by the attractive high wages offered for skilled work at Camp Grant.

The Alan Wood Iron & Steel Co. has announced a 15 per cent increase in the wages of the employes at its Swedeland and Ivy Rock, Pa., plants. This is the third increase in six months, making the wages of the company's employes about 40 per cent higher than they were a year ago.

In an opinion handed down to the Pennsylvania state department of labor and industry, Deputy Attorney General Collins holds that the state industrial board of Pennsylvania may determine the minimum age at which minors can be employed in foundries, and that if it sees fit, this body may fix 18 years as such a limit.

To increase their employes' efficiency and earning capacity, the Gilbert & Barker Mfg. Co., West Springfield, Mass., now grants a 5 per cent bonus to all who report on time every day. To come one minute late means the forfeiture of one week's bonus. Since government contracts furnish the company's work at present, speed is the chief requirement.

Five hundred New Haven, Conn., school teachers have agreed to enter the factories during the summer vacation if necessary to maintain a high level of war-time production. This is one of the developments of the recent campaign to increase the number of women in industry. The registration was made under the direction of the Connecticut state council of defense.

Business Pledges Its Might to War

Chicago Meeting of Chamber of Commerce of United States Dedicated to More Effective Utilization of Nation's Resources—Progress of Government Work to Date Shown—Improved Plan of Centralized Authority Outlined

TIDINGS of close co-operation of business with the government in the country's greatest present industry, war, and pledges of fullest support in every department—this was the keynote of the sixth annual meeting of the Chamber of Commerce of the United States held in Chicago April 10 to 12. No hesitating note was heard, no criticism of past mistakes; only the fullest assurances of aid and complete confidence in the outcome were expressed.

Significant information as to the preparatory progress of the nation's war development was given, with facts showing that results of this work will be apparent in large degree within the next few months. Broadly considered, the meeting presented the needs of the government, expressed by representatives of the various departments, the progress that has been made and the plans yet under way, all to the same end, of concentrating the country's resources most effectively upon the one vast enterprise.

Greetings were given by the Earl of Reading, British ambassador extraordinary and plenipotentiary on special mission, from England and the allies, by Josephus Daniels, secretary of the navy, and by Franklin K. Lane, secretary of the interior, the latter representing President Wilson. The program suffered some curtailment of an important character in the enforced absence of E. N. Hurley, chairman of the United States shipping board, and Charles Piez, vice president and general manager of the Emergency Fleet corporation, both of whom were detained in Washington by imperative business.

Four general subjects deemed of the greatest importance in the effort to place the resources of the nation behind the war were taken up in separate conferences. Shipping easily took precedence as the necessary link to make available and useful the results of the others, yet dependent in some measure on the others, as the warp and woof of all efforts are woven into the vast fabric of accomplishment. Government organization in relation to business in war, finance and railroads and highway transportation are the remaining three general subjects.

Business' Part in Getting Needed Ships

THAT tremendous efforts are being made to provide an increasing number of ships, with the warning that this is the crucial factor in our contribution to the war, that the government is obtaining an organization to work smoothly with production and distribution of materials and that financing and transportation are being made effective were the messages borne by government representatives and others.

"The most urgent problem before American business men today is this: What can business men do through their organizations to help get ships through to insure victory—and to get them in time?" This was the keynote of the shipping situation, expressed by Edward A. Filene, chairman of the war shipping committee of the chamber. He continued: "In my judgment the American people are more responsible for delays in ship construction than is the government. I have no desire to gloss over any responsibility that may rest on the government, but it should be clearly understood that even though the government does its work perfectly, so far as its administrative functions go, still there will be delays until the people in general, and we business men in particular, accept and discharge our full share of the responsibility."

George J. Baldwin, senior vice president of the American International Corp. and chairman of the American International Shipbuilding Corp., stated the problem and the solution as it is being worked out.

"Large wooden vessels are experimental and have so far not been very satisfactory. Concrete ships are an untried experiment. Steel vessels built on well-tried principles but by new methods are our only sure and definite reliance and it is on the construction of these that we must concentrate our efforts.

"The problem then presented was the production of the largest possible number of first class ships in the shortest possible time. They must be cargo ships of ample carrying capacity and satisfactory speed and in answer to this problem three entirely new ideas were carefully worked out:

"First, the designing of a vessel radically simplified and standardized, not as a whole but in each of its parts, a vessel that could be speedily constructed in large numbers, eliminating every possible variation in size and shape of material and the parts of which could be built in the manufacturing plants now existing to avoid building new ones.

"Second, the mobilization throughout the country of industries germane in any way to ship production, bridge and structural steel industry, builders of engines and boilers, steel fabricators, forges, machine shops and factories capable of producing any equipment going into a ship from propeller shaft to anchor chain.

"Third, the production of vessels in large numbers, every one of exactly the same construction, thus permitting the use of factory methods in which America is pre-eminent. The new shipyard was to become the assembling floor of a colossal ship factory whose

machinery was already operating in a thousand cities, whose employes were the entire body of American labor and whose conveyor belts were the American railways."

Mr. Baldwin then described the making of drawings for parts and equipment and the distribution to shops all over the nation, the assembling of the parts and the value of quantity production as an efficient plan that removes much of the usual cost and delay. Problems now presenting are an adequate supply of steel and workmen, both of which are being solved.

Patriotic labor was paid a tribute by Dr. Charles A. Eaton, head of the national service department of the Emergency Fleet corporation. He set forth the difficulties met by shipbuilders and the government in the lack of shipyards and experienced labor. "They had to have more ships than was ever demanded in the history of the world at any time and to have them quickly. Consequently our government organized the greatest shipbuilding program since the dawn of time and put it into practice with men without experience.

"Now, with reference to labor. Some months ago we were face to face with a situation in the shipyards that was somewhat difficult, if not actually appalling. But all the men needed was to be shown and I have been amazed and delighted at the splendid response they have given to our appeal. We have gone to and fro among the shipyards, preaching the gospel of consecration, of patriotism and of dedication to this great service and you would be surprised at the magnificent response. My staff and myself have spoken to around a million men and have yet to receive the first discourtesy and I have seen the tide rising until I tell you that when this war is over, the men of the shipyards will furnish one of the strongest forces in our civilization for democracy.

Pinnacle of Production Soon

"We have got to stand up and take our medicine for several months more, until we have the equipment for producing the ships and are ready to produce, and then, suddenly, when the last moment seems to have come, that we can hold out under these conditions, you will see break out from our shipyards a tremendous output of ships the like of which never has been seen in the world."

Meyer Bloomfield, head of the industrial service department of the Emergency Fleet corporation, spoke on the reduction of ship-labor turnover. He has just returned from a tour of Pacific coast shipyards and found ships are being built fast and well. The most inspiring fact he noted was the splendid spirit of labor in the coast yards. Labor trouble there has been largely eliminated. Frank and honest co-operation between managers and men is doing it. Both have come to realize they are working for themselves, to win the war and slacking is a thing of the past.

A most interesting description of what has been done to place an entire city at the disposal of the workers to get best results was told by James T. Hutchings, general manager and vice president of the Rochester Railway & Light Co. The Rochester plan is a wide development of the idea of giving the workers every facility for comfort and speed. It was the suggestion of the mayor and his wisdom is well evidenced by results. Women have been utilized in the production of munitions to a point where it is no longer a problem. First the problem was to find the right ones for the several places. Now it is fitting them for any job that presents. The problem now is to obtain skilled men to operate the tools shortly to be ready for use. The plan is to draft them equally from all Rochester industries to fill the gun and shell factory. They will not all be taken at once but in relays, so that other industries will not be crippled. It is hard for a plant to give up its best men but Rochester has decided to do that for the general good.

War Calls to Country's Best Ability

WADDILL CATCHINGS, chairman of the war service executive committee of the chamber, presided over the section devoted to the organization of the government with relation to business in the war. He said: "The war has brought great industrial problems to the government and to industry. In their solution there is needed the best judgment and training, the soundest thought that business men have and the organization of industry during the war has for is prime purpose the focusing of the best ability and experience of business men in the solution of these problems for on their solution hangs the winning of the war.

"To a great degree there is needed at this time the experience and training of the business man who is accustomed to getting results, who is familiar with the facilities and equipment of the country. It is needed both on the part of the government and of industry, because there are great problems in procuring war materials and in maintaining industry in strong condition. Business men, therefore, have a strong responsibility to make effective use at this time for the common good and in the interest of all of the training and experience they have acquired in the past.

"Business exists for profit but in this time of the national emergency when business men are seeking to serve the country and not themselves it is necessary to create a condition under which they will not be open to suspicion of self-interest or of profit-seeking in this public service.

"You must apply your knowledge and experience to bringing about a condition under which there will be no profit interest in war. We all know of cases where important business men of the greatest experience, whose services were urgently needed, have been found unavailable because of the distrust which would exist throughout the country at the appointment of such men in business to handle industrial problems. It is with the gradual realization of the splendid underlying spirit of business men that they are being appointed from time to time to positions of the highest importance in connection with these industrial problems.

"It is not alone during the war we have this work to do. There are great problems in connection with these industries which have been supplying huge quantities of materials. What is to be done with their output after the war? There are great problems with respect to the return of millions of men to industry. What is to be done with them after the war? The English government has been studying this matter for some time. They have created a ministry of reconstruction. No time must be lost in starting similar work in this country."

One of the most important papers from a definite and constructive point of view was presented by George M. Peek, industrial representative of the war industries board of the council of national defense. He showed a diagram of the organization of the

war industries board under the chairmanship of B. M. Baruch. In this the effort has been to obtain the most complete co-operation between the various purchasing departments of the government and the various industries of the country. His outline of the plan is as follows:

"The fundamental necessity for intelligent action by the board is a knowledge of the government's requirements as far in advance as possible, and in order to acquire this knowledge there has been formed a requirements division of the war industries board, into which the various departments of the government and the allies purchasing commission bring their requirements as soon as they are known.

"These requirements are briefly considered by the requirements division and passed directly to the commodity sections of the war industries board interested in the particular requirements. These sections are created to handle raw materials and finished products of which there is an unusual or threatened shortage or the price and production of which should be controlled, in order that the United States government, its allies and the civilian population may be protected as far as possible.

"When the requirements deal with the commodity listed where a shortage exists, or where an allocation seems desirable, but for which no regular section has been established, such requirements will be considered by a special section erected for such purpose by the requirements division and this special section shall perform the same functions as are performed ordinarily by the regular commodity section.

"Each section chief is charged with the responsibility of collecting from the several departments of the government, from the manufacturers and from committees representing them, and especially from the war service committees created under the supervision of the chamber of commerce of the United States, and from any and all other reliable and available sources —information concerning the production of the particular commodity or commodities with which his section has to deal, including available supplies, new sources of supply, methods for increasing production, etc.

"Each commodity section shall consider market conditions pertaining to the material or commodity over which it has jurisdiction, and shall, where deemed advisable, recommend purchase plans to the several purchasing departments. Where it becomes necessary to control orders in whole or in part by means of allotments, this section will determine the allotment of materials, commodities and facilities to the several departments of the government and its allies, and also the extent to which manufacturers and others, whether serving the civilian population or engaged in the manufacture of war supplies, shall be rationed. The various government purchasing agencies will continue to make the contracts and place orders as heretofore."

Reconstruction in foreign trading was treated by Dr. Frank W. Taussig, chairman of the United States tariff board.

Finance of War Raises Big Problems

A SESSION was devoted to finance in the war with special attention to the trade acceptance. Charles A. Hinsch, president of the American Bankers' association, presided. Lewis E. Pierson, of the Irving National bank, New York, opened the discussion. He outlined the workings of this new form of commercial paper and its advantages, as well as the efforts that have been made to obtain its larger use as an aid to business. Some of these have been effective and some have failed. Some objections have been overcome and more prejudice still remains to be removed before ideal conditions exist.

"We must realize," said Mr. Pierson, "that however well-intentioned the average banker may be toward the trade acceptance, he, with other properly cautious business men, will not assume unduly concerning conditions the future may bring and will not

Business is Awakening to the Pressing Problems of the War

A Record in Rivets

The following telegram was read at the shipping meeting Thursday by Meyer Bloomfield, head of industrial service department of Emergency Fleet corporation, Baltimore, Md., April 9, 1918.:

Holden A. Evans, Chicago:

New York papers Sunday made much of what was called a record rivet drive at Port Newark yards, stating that Eckstein with extra heater boy and extra passer boy drove 1967 rivets in nine hours. We believe we have the fastest riveting gangs in the world and stand ready to prove it. On April 9, Charles Schock and his gang with extra heater boy and extra passer boy drove in nine hours 2720 three-quarter snap rivets in floors of 8800 tonners. This report has been verified by Fleet Corporation representative.

The Baltimore Dry Dock & Shipbuilding Co.

Must Bridge Seas

By Edward A. Filene

If

THERE is one chance in a hundred that we shall be short of ships in the next six months, then—

All our country's resources in men;
All our country's resources in material;
All our country's resources in aiding—

Must go first of all to helping turn out more ships.

Because

SHIPS are the bridge over which every soldier we train, every gun we make, every bit of food we save, every supply needed to win the war must go before they can be used. If the bridge is broken, if there are so few ships that there are gaps in the bridge, then we cannot win.

Americanizing Aliens

Forty-three dialects are used in conversation by our foreign-born groups.

Nearly 50 per cent of the more than 13,000,000 foreign-born persons are males of voting age.

Only four out of every 1000 attend school to learn our language.

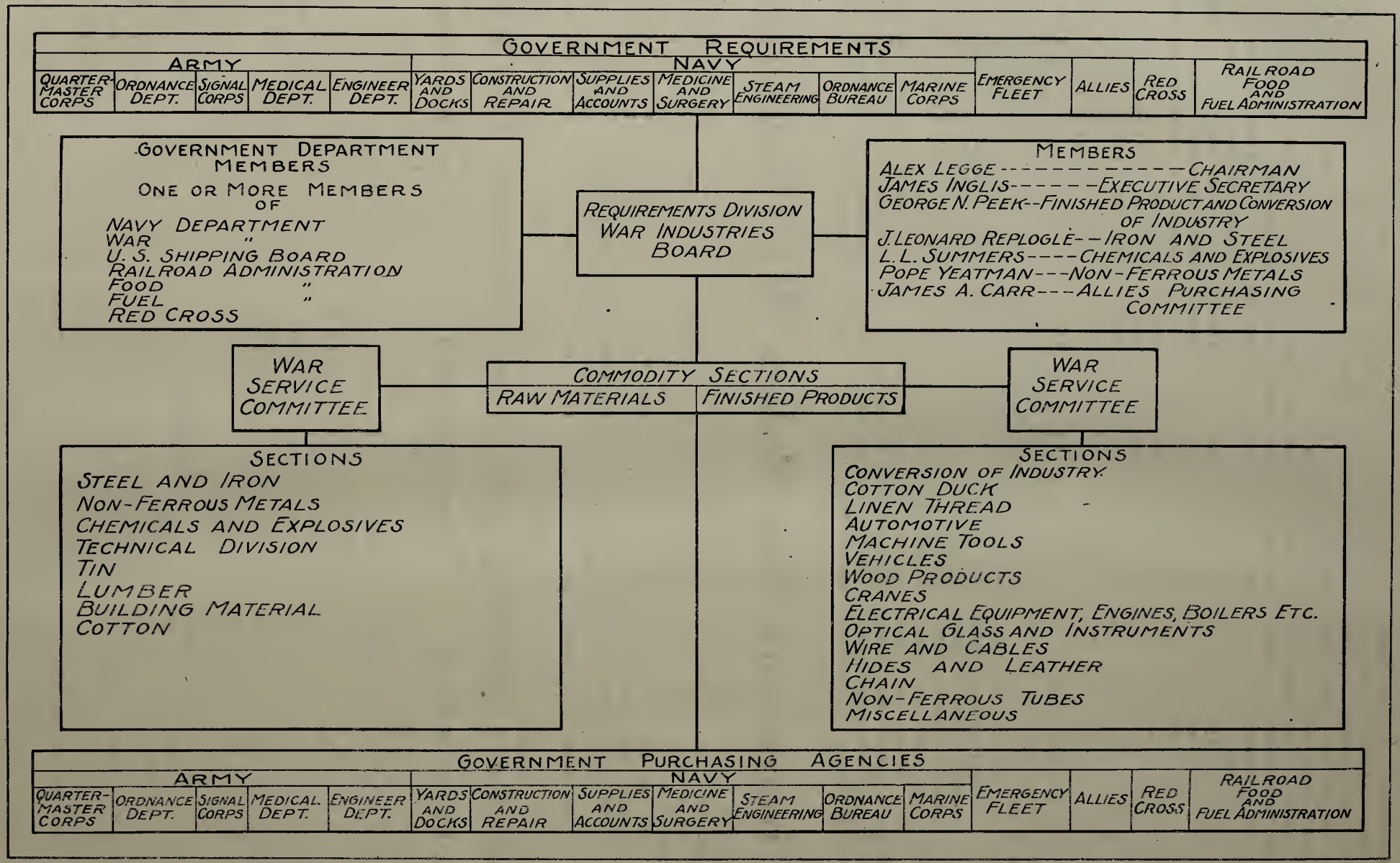
One-third of our foreign-born population, or nearly 5,000,000, were born in Germany or in countries allied with Germany.

That our basic war industries depend to a considerable degree on foreign-born persons for their labor supply, most of whom do not speak or read our language and to whom the acid test of loyalty has not been applied.

Our foreign-born are organized in societies throughout the country, to promote their racial solidarity or the political autonomy of their native lands and their first interests are not always for America.

—Immigration Committee Report.

Knowledge of Government's Needs Basis of New War Organization



Revised plan of meeting tremendous war requirements through war industries board was outlined for the first time publicly by George W. Peek, industrial representative of the board before the chamber of commerce meeting at Chicago. The accompanying chart shows how the war industries board through its various sections effectively acts as intermediary between regular government departments and general industry, co-ordinating and adjusting all demands to conditions of production and supply.

seriously modify the working plans or facilities of his bank until the reason for so doing becomes a tangible one. This attitude of undue caution also finds expression in this question: 'What are the great industries of the country doing in this connection—oil, steel, tobacco, rubber and the like?' Nothing at all, probably, continuing to do business as in the past, on a cash basis, discounting their bills and not worrying in the least about the question until their own need for commercial credit presents itself as an important business problem.

"When that time comes these industries will meet and solve that problem as they have solved other problems which have come to them in their business operations. The fact that they have risen to the position of great industries justifies the assumption that neither the trade acceptance method nor any other method possessing substantial merit will escape their attention. These industries have been so well provided with cash as to remove from their operations the problem of utilizing their own credit. In advance of the time when it will be needed to meet demands of war, these great industries are studying the trade acceptance in a way to prove conclusively they fully appreciate its merits for general purposes."

Lake Yards Set Record in Rapid Shipbuilding

SHIPBUILDING on the Great Lakes is now one of the country's largest industries. Facts brought out at the convention of the Chamber of Commerce of the United States at Chicago last week reveal more clearly than is generally appreciated the importance of the work which lake shipyards are now doing. The important facts regarding shipbuilding on the Great Lakes are summarized below.

The lake territory is now the ninth district of the shipping board, being the largest in point of territory.

When the district was created on Aug. 24, 1917, *the yards had under contract* 102 *ships,* 98 *being for ocean service. All but two of these* 98 *vessels were of canal size, about* 3400 *tons deadweight capacity. The two exceptions were of* 5500 *tons deadweight capacity and were cut in two and assembled at Montreal. All contracts were requisitioned by the Emergency Fleet corporation, three ships later being released to lake owners.*

Of the 98 *ships,* 27 *reached the ocean before ice stopped operations at Montreal, Dec.* 3. *A bitter fight with ice in the lower St. Lawrence canals and river was waged before the boats reached open water.*

Work has been rushed all winter. By May 1, *when navigation along the St. Lawrence will open, at least* 35 *ships completed during the winter will be ready to enter ocean trade. Of these,* 20 *ships are defensively armed.*

While this new construction was under way the usual winter overhaul and repair of the enormous iron ore fleet of the lakes has been carried on, these repairs being unusually heavy this year.

At the present time, the Emergency Fleet corporation has under construction or contract in the lake district 297 *cargo ships, of which about* 130 *must be completed and delivered between May* 1 *and Dec.* 1, 1918—*two ships every three days. All of the contracts must be completed before Dec.* 1, 1919.

The average tonnage of these lake ships has been increased somewhat and now stands at about 3700 *tons deadweight. The value of all of the ships is about* $200,000,000.

If all of these new ships were placed end to end, the fleet would extend about 14½ *miles. The total deadweight or cargo capacity, including fuel, would be more than* 1,100,000 *gross tons.*

In the lake district are seven shipbuilding companies operating 13 *yards, all building steel ships. Another yard is building one wooden ship and two new yards just beginning operations have contracts for a number of large seagoing tugs.*

In all lake yards at one time, 64 *canal-size cargo ships can be laid down. With normal conditions of material supply, these yards could now deliver more than* 200 *ships a year.*

The present building program of the Emergency Fleet corporation on the Great Lakes calls for 400,000 *tons of ship steel; about* 30,000 *tons of boiler steel; and about* 80,000 *tons of miscellaneous castings, forgings, pipe, plates, shapes and sheets.*

In actual deliveries the lake district has steadily been ahead of schedule. In February, for instance, 27 *per cent of all of the ships actually delivered in the United States were delivered in the lake district alone. Every ship was completed either on time or ahead of schedule—in some cases several months before the contract date.*

Last fall the shipping board requisitioned 16 *ships which had to be cut in two before being taken to the Atlantic, and also five old ships of canal size. These latter were all bulk freighters. Of the* 16 *larger ships, four were bulk freighters,* 11 *were package freighters and one, the* MINNESOTA, *was a passenger and package freighter.*

The work of getting these boats to the Atlantic was carried on in the face of great difficulties. The early and unusually severe winter blocked the work not only during the joining of the severed halves of the ships but in their journey down the St. Lawrence river.

The problem of removing these ships to salt water was taken up late in August, the first vessel being requisitioned in the middle of September. The work was speeded up and the last of the ships, after being cut in two, left Buffalo on Nov. 16.

A small American shipbuilding plant was built at Montreal, Que., other vessels being rejoined at Quebec and the bulk of the ships being designed for putting together afloat. The stern of one ship sank in Lake Ontario, but was refloated and joined to its bow at Montreal. The last ship after battling the ice in the St. Lawrence river for many days, reached the ocean on Jan. 13.

Pacific Coast Plants at Top Speed

San Francisco District Turning Out Great Tonnage of Steel Ships—Concrete Steamer Being Completed—Los Angeles Another Active Center—Local Iron and Steel Market Reflects Uncertainty

(Staff Correspondence)

SAN FRANCISCO, Cal., April 11.—Increased government requirements for men and materials have resulted in the practical elimination of unemployment in this district and in important advances in wages. The greatest factor contributing to this result is shipbuilding which is proceeding upon a scale that seems vast when measured by any standard other than the critically vital need for vessels to transport troops, food and war materials. In the vicinity of San Francisco steel construction is predominant. Of 106 vessels for which contracts have been, or are about to be closed, only 12 call for wooden vessels. In southern California, however, there is a larger proportion of wooden construction under way. According to the latest available figures, one-third of the total tonnage launched or under construction in the Los Angeles harbor district was of the wooden types.

A South Carolina shipbuilding company estimated that their output should average 25 tons per man. Under conditions of forced development, it is thought that 20 tons per man would be a more accurate estimate at the Pacific coast yards. With this as a basis, government agencies are endeavoring to develop a systematic and dependable method of estimation so that a poll of the trades of the operatives employed, would determine the number of men needed to secure a desired output.

Although the government expects the Pacific coast section to turn out not less than 30 per cent of all ships required, this vicinity is far ahead of its schedule, according to officials of the Emergency Fleet corporation's office here. The volume of construction at San Francisco and other California yards is shown by the following:

	No.	Tonnage	Cost
Steel vessels for which contracts have been closed.	73	700,000	$105,000,000
Steel vessels for which contracts are about to be closed	21	150,000	30,000,000
Wooden vessels for which contracts have been closed	12	50,000	6,000,000
Total	106	900,000	$141,000,000

In addition it is estimated that there are United States warships costing over $200,000,000 also under construction at Pacific coast yards.

With government orders at hand for 10 steel steamers of 9500 tons each, construction of the Pacific Coast Shipbuilding Co.'s plant on the upper Suisun bay is being rapidly rushed to completion. An extensive spur track system connecting the various portions of the 247-acre plant with the three railroads which traverse the company's property is nearly completed. Excavation work is 75 per cent done. A 400-foot machine shop and the plate shop were recently finished. Machinery was installed in the latter and tested two months and three days after ground had been broken for its construction. Work on the launching ways and the 700-foot fitting-out wharf will soon be completed.

The 5000-ton, reinforced concrete steamer FAITH was successfully launched near San Francisco on March 14. This experimental concrete ship was built at a cost of $125 per ton compared with the government price of $210 per ton for steel ships and in a period of four months as compared with a period of from six and a half to nine months for steel vessels of similar tonnage. A plant for building steel ships of the same size would cost $1,000,000, as against $75,000 for concrete construction. Considerable pressure is being brought to bear to secure a capacity order of 50 concrete vessels from the government for the San Francisco Shipbuilding Co. which built the FAITH, but no decisive action is anticipated until the vessel completes her trial trip to Honolulu and return.

The Alameda plant of the Union Iron Works, with facilities for fabricating four vessels at once, will be tied up with contracts with the federal government for months to come. An 11,700-ton freighter was launched from the yards recently and another of like size will leave the ways in the middle of April. An average of 600 men are employed daily on each vessel under construction.

In southern California, the Pacific Electric Co.'s construction of new lines, or the improvement of existing service conditions, are being deferred until after the war. The necessity for carrying out these deferred improvements later is expected to assist in the readjustment of labor to peace conditions by providing many opportunities for labor for men now either in the army or engaged in war occupations. This announced policy is not to be permitted to interfere with the development of the shipbuilding industry.

The most recent figures available on ship construction in the Los Angeles district are:

	No.	Tonnage	Cost
Steel vessels launched and under construction..	24	84,600	
Wooden vessels launched and under construction..	8	28,000	
Total	32	112,600	$34,500,000

Government contracts awarded the shipyards in that district for submarines, two of which have been launched, are estimated at $2,730,000. Of the six shipbuilding plants, four are using steel construction. It is estimated that 8500 men are employed.

The newly incorporated Southwestern Shipbuilding Co. is about to begin the construction of a plant on the east side of the main Los Angeles harbor channel and at the southern end of Terminal island. Each of the 10 steel ships to be built will have a capacity of 8800 tons. It is understood that the plant will be fully as large as that of the Los Angeles Shipbuilding & Drydock Co. and that an investment of $1,000,000 will be made the first year. Marco H. Hellman is reported to be virtually the leading spirit in the project, together with the Western Pipe & Steel Co., of San Francisco. The latter company has contracts from the government for 18 steel vessels to be built at its plant in the north.

Another shipbuilding industry was added to the Los Angeles harbor district recently when the harbor commission granted permission to the National Engineering Co. to utilize a municipal pier at Wilmington for fitting wooden ships with engines and boilers for the government. Four vessels are to be fitted at once and others will be received as rapidly as they can be turned out in the northern shipyards. About 1700 men will be employed.

Officials of the Emergency Fleet corporation are attempting to adjust labor conditions in the Los Angeles district and see that the shipyard owners meet the wage scale established by the federal wage adjustment board. Conferences are being held at which the workers and owners are represented. A summary discharge of 30 boilermak-

ers recently from the Craig shipbuilding plant at Long Beach led to dissension with labor union officials.

War has given so great an impetus to chromite mining that 18 men and firms are now operating, constructing or preparing to build concentrating mills to treat the California ore. Asia Minor and Africa, the former sources of the ore, have been cut off from this country by the lack of ocean carriers. When was was declared, State Mineralogist Fletcher Hamilton directed a survey to locate all deposits within the state. The price was increased with the shortage and the value of the state's production in 1917 was well over $1,000,000. The industry is now advancing at a still greater pace and inferior ores are being treated in concentration mills to replace the exhausted supplies of higher grades.

So far as the Pacific coast states are concerned, the mining of manganese is mainly an emergency measure. As a result of the war production has risen from nothing in 1913 to 13,404 tons in 1916. There has been an enormous increase since that time. The difficulties in promoting manganese production in California lie in the small size of many of the deposits and their broad distribution. There are numerous bodies that would yield from one to a hundred tons, many that contain from 100 to 1000 tons and a moderate number containing up to 10,000 tons or over. There is some agitation for the organization of the industry by the government as a war-emergency measure to increase the total output.

The steel market in the vicinity of San Francisco is in an uncertain condition owing to the postponement of much construction classified as non-essential to the successful prosecution of the war. The mills' capacities are based on about 50 per cent certainty. This condition is further complicated by the delay in the issuance of export licenses, causing congestion and uncertainty in rollings. Mixed conditions of transportation further complicate the export situation. Many inquiries as to capacity and facilities are being received by the local mills in connection with work indirectly related to war orders, but shopping and price soliciting on the part of those holding war contracts is said to be delaying matters. The labor situation remains cloudy due to isolated agitation rather than general dissatisfaction. Government prices prevail generally on steel products and the premium for prompt delivery is small. First grade scrap is selling at $37.50; carwheels at $40.

Northwest Builds Ships at Record Rate

(Staff Correspondence.)

SEATTLE, April 11.—The outstanding feature of northwest industry is the tonnage of ships, both steel and wood, that is under contract. Contracts have been awarded by the shipping board for 78 wooden ships of 318,000 tonnage and 61 steel ships of 492,000 tonnage in Oregon, or a total of 139 ships of 810,800; to Washington yards have been awarded contracts for 81 wooden vessels of 291,650 tons and 85 steel ships of 728,100 tons, a total of 166 ships of 1,035,660 tons. The total tonnage of ships launched during the first quarter of 1918 for Oregon, Washington and British Columbia aggregated a total in deadweight tons of 290,600. Of this, Washington launched 149,700, Oregon 107,300 and British Columbia 33,700 tons. Segregating these vessels as to steel and wood, Washington launched in steel ships 111,800 tons, wood 37,900 tons; Oregon, steel 74,200, wood 33,000 tons; British Columbia, steel 17,600 tons, wood 16,100 tons. The northwest during the month of March turned out 46 per cent of the vessels constructed for the United States government turning over 10 of the 21 vessels delivered to the shipping board during the month. Of the 10 ships delivered, Seattle constructed five 8800-ton vessels and one of 7500 tons, while the Columbia river section of the eighth shipping board district delivered two 8800-ton and two 3500-ton steel ships. It is probable that northwest plants will deliver five more 8800-ton vessels during April and two of 7500 tons capacity. The Skinner & Eddy Corp., Seattle, leads in these deliveries with three 8800-ton vessels; Ames Shipbuilding & Drydock Co., Seattle, is second in amount of tonnage with two 8800-ton vessels, and the Albina Engineering & Shipbuilding Co., of Portland, contributed two steel ships of 3500 tons each.

Caulkers Supply Inadequate

Industry promises to keep going at a good rate of speed, although there are occasional jars which disturb the surface of things. The caulkers' union was the head and front of one of these disturbances in the Seattle district recently. There were not enough caulkers to supply the demand and apprentices were not allowed. Consequently, wages mounted until men were receiving from $12 to $14 per day, and it became necessary for employers to take action. Taking counsel among themselves and the government stepping in, the Macy or government scale of $7.20 a day was adopted. The workers are proceeding under this scale and apprentices are now being employed.

Seattle is the center of industrial activity in Washington, and the contract shops there employ about 5000 men. Practically every foundry and machine shop is assisting in the government shipbuilding program, but they are paying much in excess of the government award for wages in the shipyards. The contract shops recently adopted a wage scale of $6.60 for molders on the 8-hour-day basis for 65 per cent of the molders, and others can receive increases over that up to $7.25. The Macy award, which applies to the shipyards, now calls for $5.77 a day. There is a shortage of molders at Seattle, and at least 100 molders and coremakers could be placed at the present time. There is also a shortage of skilled mechanics and an acute shortage of coppersmiths.

The foundries of the Puget Sound district are finding the coke situation considerably improved and the probability of any of them being compelled to shut down on account of shortage is remote, although shipments from the east are not entirely satisfactory. The local fields of Wilkeson and Carbonado are being heavily drawn upon and two plants at Tacoma are getting their supplies from the Crows Nest field in British Columbia. Enough is coming through from the east to enable the foundries to secure the desired results by having a plentiful supply of the domestic output.

Increased freight rates have not as yet added to the market price of No. 1 pig iron, which holds as it has for some time at $50. An increase in freight rates has brought the price of southern No. 2 foundry up to $45.68. The freight rate now is $12.68 per gross ton. The market is not very strong. Tank plates in carload lots from the fabricating shops based on the government price of $3.25, Pittsburgh, are selling at $4.65 per 100 pounds in the Seattle market with four to six weeks' delivery from the mill, and are hard to get. Structural shapes from stock, Pittsburgh base, $4.50, are selling at $5.40. Cast iron pipe is $64 a ton, which includes $19 freight from Pittsburgh, and the market is very weak. On account of the

high prices prevailing, municipalities have been using large amounts of wood pipe. The only recent sale recorded in the section was at Spokane, Wash., where a sale of 175 tons of 6-inch pipe, the lowest offer on which was $67.60, was made to the city. Copper tubes are used in large quantities by the shipyards and the price on Puget sound is 49c, or 37c base, Baltimore.

In the matter of steel bars for export, the price is very firm. Considerable tonnage is being contracted for export through northwest ports each month, particularly from Seattle. These are going mostly to Japan. Prices have gone up due largely to increased freight rates, taking effect the middle of March, and now run from 3.95c to 4.05c on steel bars, Seattle, for export. One local mill has orders for several thousand tons for export placed at 3.95c to 4c.

Export Shipments Fall Back

Export shipments have fallen off materially since the embargo went into effect, and the authorities are much behind in issuing licenses. Anyone who undertakes to export steel or iron products must know where he is going to get them and must make sure where the tonnage is coming from for his accommodation. Ship space is very scarce. Prices have gone up from $20 to $25 a ton during the past month and space is hard to get. This situation is due to clear considerably under the agreement between the United States and Japan whereby the latter turns over 150,000 tons of carriers and receives in return 300,000 tons of shipbuilding materials, including steel plates and pig iron, 40,000 tons of which already are at the port of Seattle awaiting shipment. The steel plates and pig iron have been accumulating in Seattle since last fall when the ban went on exports of shipbuilding materials. The idea prevails that the government will not give Japan any new business through the mills, but will release the tonnage under contract in the east that now is lying in port. Japan is expected to present an increased demand for other materials going into ships such as steel bars and space will be scarce because of the vessels withdrawn. In the consignments at Seattle for shipment are 227 cars of pig iron and 410 cars of steel plates, aside from some pig iron, steel plates and other shipbuilding materials contained in 253,000 tons of Oriental freight.

The price of steel scrap is showing a tendency to rise above the $25 mark at which it has been selling for some time. Sales are being recorded at $27.50 for good grades, and some dealers are quoting $30.

The inclination of Seattle foundrymen is not to raise the prices of steel castings which have been running from 10 to 45 cents depending on the nature of the casting, although labor and transportation have both increased. All the foundries, both steel and iron, complain of a shortage of molders. The market price of gray iron machinery castings remains about the same as for the past four months, or from 7 to 8 cents a pound, and into higher figures, depending on the nature of the work. The iron scrap market in the Puget Sound section, particularly at Seattle, is showing a decidedly uncertain trend, the government price of $34 being overtopped by the demands of the junk dealers. They are asking as high as $42.50 for No. 1 foundry scrap and as high as $38 was recently paid. The dealers have been talking of sending their scrap to San Francisco, claiming an offer of $38 from that point.

The full effect of the 8-hour day upon the logging camps and lumber mills of Washington and Oregon, which went into effect March 1, has not yet been ascertained. The big question before the industry at the present time is to overcome the car shortage, which is very acute both as to government and commercial delivery. Concentration is being made upon this point with the hope of a solution in the near future. Many obstacles have been overcome, however, and the car shortage question is one that is being handled with intelligence. Strikes apparently are a thing of the past and the I. W. W. organization is not nearly so dangerous as it would have the world believe. Any trouble from that source will be promptly nipped in the bud by determined officials. As indicative of the awakened interest in the industry, one Seattle firm alone reports the sale of 16 locomotives of from 42 to 80 tons weight for delivery in the northwest, most of the sales being to logging railroads. The demand of the government and the fact that all possible effort is being made to utilize these vast resources of timber for both war and commercial purposes are other phases that undoubtedly mean a prolonged period of activity.

The greatest concentration of shipyard workers in the northwest is at Seattle, where approximately 25,000 are now employed. The question of transportation to and from their employment has been a serious one for some time and now seems on the point of solution. Those having the problem in charge have reached the conclusion that the use of steam trains offers a practical way out of the difficulty. The mayor has telegraphed Director General McAdoo for authority to use steam trains. In the meantime the city is to hasten the construction of an overhead electric line into the heart of the industrial district, and the local traction company is improving its transportation facilities.

As soon as these industrial workers began to arrive in considerable numbers, the housing question presented itself in a forcible manner. This is being largely met by citizens who have since the first of the year taken out permits for the erection of 769 homes at a cost of $1,155,795. Much remodeling and enlarging have been done and it is estimated that no further pressure of unsupplied demands will be felt until October. According to the number and value of building permits issued to date the balance of the year will be unprecedented in the matter of home building and the issue will be met for the workers yet to arrive. Other cities of the northwest are solving similar problems, but on a smaller scale.

Active preparations are being made for starting construction work on the extensive steel plant that is to be erected on Puget sound by B. L. Thane, manager of the Alaska-Gastineau mine, and others. Smaller plants are springing up, including a plant for smelting manganese ore, another for making high grade tool steel at Seattle and similar industries at the chief centers throughout the northwest.

Takes No New Charter

The Union Drawn Steel Co., Beaver Falls, Pa., recently received from the state department of New Jersey a certificate of authority to transact business in this state and precedent to this action, filed on March 4, 1918, with the secretary of state of New Jersey, a statement and designation, together with a copy of its Pennsylvania certificate of incorporation. This is a procedure required of foreign corporations under the laws of New Jersey. This matter represents a legal detail and not an incorporation or reincorporation of the company in New Jersey, as recently published.

Has No Building Plans

McKeesport Tin Plate Co. advises that it has purchased about 7½ acres of ground adjoining its present property, but up to this time have made no definite plans for making use of this land. The purchase represents a protection for the future and does not signify any early construction.

Confer on Canadian Merger

Representatives of Dominion Steel Corp. and Nova Scotia Iron & Steel Co. Consider Plan—Locate Nickel Plant

TORONTO, April 11.—Negotiations in connection with the proposed merger of the Dominion Steel Corp. and the Nova Scotia Steel & Coal Co. resulted in a formal conference between representatives of the two companies at Montreal, April 8. The Dominion Steel Corp. was represented by Mark Workman, president; William McMaster, vice president; Hector McInnes and George Caverhill, and the Nova Scotia company by Colonel Cantley, chairman of the board of directors; W. D. Ross, vice president, and N. B. McKelvie. The result of the conference is not known, but the general impression in commercial circles is that no material advance toward the realization of the project has been made.

The output of the Nova Scotia Steel & Coal Co. for the first quarter of the present year was as follows in tons: Coal, 133,466; iron ore, 59,150; limestone, 22,500; coke, 27,744; pig iron, 18,724; steel ingots, 26,555; finished steel and forgings, 19,859.

The British America Nickel Corp., which abandoned its former plan of erecting a refinery near its mines in the Sudbury district on account of the heavy cost involved in obtaining a supply of power, and has since been looking for a site, has decided to locate near Hull, Que. A site has been purchased at Deschanes upon which a refining plant will be erected at a cost of approximately $1,000,000. Construction will be started as soon as the frost is out of the ground.

The Canadian government has taken an option on six large ocean-going vessels, three of which are now under construction and the others shortly to be built at the plant of the Dominion Shipbuilding Co., Toronto. The ships now being built are of the improved Cunard type of 3550 tons each, and the others of the Friederichstadt type of 4300 tons each.

The boilermakers and iron shipbuilders employed by the Collingwood Shipbuilding Co., of Collingwood, Ont., have effected an agreement with the company giving them an increase in wages averaging from 25 to 30 per cent, a 9-hour in place of a 10-hour day, and recognition of a grievance committee of the men. The agreement is for one year from April 9.

The Canadian government has appropriated $50,000,000 for the purchase of railway rolling stock equipment and materials during the present year. Hon. Dr. Reid, minister of railways, stated that the total cost of the equipment so far ordered amounted to $32,966,515, not including the price to be paid for 100,000 tons of rails ordered from the Dominion Steel Co. for track renewals. With the additional amounts voted for loans to railway companies and for the purchase of Canadian Northern railway stock, the total expenditure this year on the railway transportation system will exceed $80,000,000.

Obituaries

RUFUS F. EMERY, aged 48, secretary and treasurer of the Westinghouse Airbrake Co., Wilmerding, Pa., and an officer and director of several other important corporations, died suddenly, April 11, when he was stricken with heart failure while seated at a desk in his office at the plant. Mr. Emery was assistant secretary of the American Brake Co., assistant secretary and a director of the National Brake & Electric Co., a director of the Vulcan Crucible Steel Co., secretary and treasurer and a director of the Westinghouse Friction Draft Gear Co., and a director of the Westinghouse Traction Brake Co. He was born near Boston and came to the Pittsburgh district in 1891, later became affiliated with the Westinghouse interests and played a prominent part in their upbuilding.



RUFUS FRANKLIN EMERY

Otto Moor, who was works manager of the Wood Newspaper Machinery Co., Plainfield, N. J., died recently at the age of 47.

Frederick Emmerich, president of the Emmerich Machine Mfg. Co., Brooklyn, died in New York on Wednesday, April 10, aged 71.

William A. Ridge, superintendent of the Gem Mfg. Co., Pittsburgh, died at his home in that city, April 7. He was 44 years of age.

J. Taylor Boyd, who for a period in excess of 50 years, has been superintendent and treasurer of the Cornwall Iron Co., Lebanon, Pa., died in that city recently aged 90.

George F. Riemann, senior member of the hardware manufacturing firm of Riemann & Seabury, died April 13, at his home in Brooklyn, aged 53 years.

Thomas Walker, aged 73, treasurer and director of the Columbia Steel & Shafting Co., Pittsburgh, died April 9 at his home in that city. In 1862 he formed a partnership with Thomas McVay under the name of McVay & Walker and operated a foundry in Braddock, Pa. Subsequently, Mr. Walker bought the interest of Mr. McVay and became the sole owner of the foundry and it was operated until one year ago. He became associated with the Columbia Steel & Shafting Co. in 1900. Mr. Walker had been connected with the Pittsburgh Wire Co., which operated a mill in Braddock until it was sold to the American Steel & Wire Co., in 1898. He then became president and treasurer of the Griswold Wire Co., which also was sold to the American Steel & Wire Co. In January, 1905, Mr. Walker was elected president of the Merchants Savings & Trust Co., Pittsburgh, a position he held up until his death. Besides his widow, Mr. Walker is survived by his brothers, Thomas A. Walker, secretary and director of the Columbia Steel & Shafting Co., and Alexander C. Walker.

Draw Line On Essential Industries

Preferred List of Those Branches of Manufacture Which Shall Receive Coal, Coke and Raw Materials Announced by War Industries Board—Iron and Steel Plants Receive High Rating

WASHINGTON, April 16—The first clear cut line of definite policy in distinguishing essential from nonessential industries of the United States was drawn by the war industries board's priorities committee last week and formally accepted by the fuel administration. The list shows which industries shall receive coal, coke and raw materials in preference to others and, despite the government's disavowal of any distinction between the two classes, is taken to indicate the most comprehensive compilation of preferred consumers.

List Iron and Steel Plants

All steel mills, blast furnaces and foundries engaged in war work, whose war production represents a substantial percentage of the entire output, are in the preferred class, along with many allied and related plants. The committee declared no distinction is made between any industries represented in the list which includes steel plants and rolling mills, manufacturers of wire rope, tin plate, machine tools, rails, locomotives, cars, railway supplies, aircraft, their parts and supplies, all kinds of coke ferro-alloys, guns, explosives, small arms, chemicals, mining tools and machinery, and fire brick and plants producing electrical equipment, ships and ship material and equipment, electrodes, oil well equipment, gas and gas producing machinery.

Then the list takes in the army and navy camps and cantonments, domestic consumers of coal and coke, plants producing feed, those manufacturing fertilizers, plants engaged in preparing food for human consumption, manufacturers of food containers, laundries, mines, newspapers and periodicals, oil refineries, public institutions and buildings, public utilities, railroads, ships, soap manufacturers, tanning plants, manufacturers of tanning extracts, manufacturers of twine and rope, plants manufacturing hemp, jute and cotton bags and those engaged in the production of insecticides and fungicides.

The priority to be given fuel and raw materials for these consumers is not only to be followed by the agencies supplying and distributing them, but by the rail and water transportation systems carrying them, the war board's committee has ruled. Additional classes of industries and special individual plants may be added to the preferential list. The committee will issue certificates to plants on the list in order that proof of their war importance may be given without delay.

The action of the committee, which was formally announced by Judge E. B. Parker, chairman, is indicative of the general impression prevailing here that there is to be a very serious coal shortage next winter, possibly a recurrence of that of last, unless there is a marked increase in production and conservation. A meeting of state administrators here last week emphasized that point clearly. It is reported that many mines have been closed because of a car shortage and that even now there is danger of the demand getting ahead of the supply.

Voluntary Reduction Expected

Further emphasizing the government's intention to curtail nonessential industries and nonessential production in industries, the fuel administration has announced that representatives of the Automatic Machine Bottle Manufacturers' association have agreed to curtail production 15 per cent where the output is not entirely of food or medicine containers. In view of the arrangements the week before for a big reduction in the manufacture of musical instruments and the pressure being brought to bear by both the fuel and war industries boards, it is regarded here that attempts to deny distinctions are being made between industries are absurd. Other industries have agreed to reduce production in order to release fuel, materials and men.

Shaping Distribution of Coke by Zones

WASHINGTON, April 16.—The zone plan for distributing coke with a view to minimizing crosshauling by the railroads is gradually being whipped into shape by the coke division of the fuel administration and likely will be in full operation by July 1 when many of the present contracts expire. This was learned here last week following a conference of coke division officials and representatives of coke producers who took up the question of eliminating part of the crosshauling between Cleveland and Connellsville producers and consumers. The coke division expects to fully establish the zoning system through consideration of individual cases and is not devising a general blanket plan like the one made effective April 1 by the coal division of the fuel administration. Eventually the coke plan will become general and many thousands of miles of unnecessary hauling will be eliminated. Already several individual arrangements have been made and others are under consideration.

Switch McKinney Output

The latest readjustment contemplates the going into operation of the American Steel & Wire Co.'s new by-product ovens of Cleveland. It involves the McKinney Steel Co. and the Upson Nut Co., both of Cleveland, and the Taylor Coal & Coke Co.'s ovens in the Connellsville region. The transaction has not been completed but is expected to be shortly. Some time ago the coke division arranged that the by-product coke surplus of the McKinney plant be sold the American Steel & Wire Co., and the coke furnished the steel and wire company by the H. C. Frick Coke Co. should be sold to the McKinney furnaces at Scottdale and Josephine, Pa. Under the new plan, the McKinney plant, which is preparing to make foundry coke, will sell to the Upson Nut Co. and the Upson supply, now furnished from the Taylor ovens will be delivered to the two McKinney furnaces. It is said the plan involves the consumption of more than 10,000 tons of coke monthly.

Attending the conference last week were Price McKinney, president of the McKinney Steel Co.; R. F. Hall,

the Upson Nut Co.; H. Wilson, Rogers, Brown & Co.; L. E. Walters, the Clare Coke Co.; O. Mauser, the Stonega Coal & Coke Co.; C. E. Lenhart, district coke representative for the fuel administration, Connellsville regions; J. A. Galligan, district representative, Chicago; J. A. Ballard, district representative, Detroit; W. S. Blauvelt, coke director, and F. J. Herman, assistant to Director Blauvelt.

A few days before the conference the coke director, J. Leonard Replogle, director of steel supply, and Jay C. MacLauchlan, assistant to Replogle in charge of pig iron, met with railroad traffic men in the office of Carl R. Gray, director of transportation, under the railroad administration, and went over the coke and pig iron situation with the result that today it is reported that the movement of coke from ovens to eastern furnaces is much improved.

While this arrangement was being made, new coke prices were announced for certain districts in Alabama, West Virginia and Washington. These prices are:

Alabama: Black Creek, Brookwood and Blue Creek districts: coke made from coal mined in these regions, $8 for furnace and $8.75 for 72-hour selected foundry, except coke made from coal by the Empire Coal Co., at Empire, at $8.25.

West Virginia: Kanawha district, beehive ovens, Fayette county, $6.50 furnace and $7.50 for 72-hour selected foundry; Preston county, $6.75 and $7.75; and Nicholas county, all grades, $7.75.

Washington: Gas coke, $7.50; furnace, beehive or by-product, $10; and 72-hour selected foundry, beehive or by-product, $11.

Revised Conservation List on Exports Announced

Washington, April 16.—The war trade board has announced a revised export conservation list containing modifications and reclassifications of the one which was in existence prior to yesterday when the new list became effective. The new list contains few if any additional items affecting the iron and steel industry and such as they are have been announced from time to time since the first general conservation list was promulgated.

The most prominent change in the revision is the removal of the obligation requiring individual export licenses on the following, when consigned to Canada and Newfoundland: Aluminum and all articles containing aluminum; brass and articles containing brass except brass pipes, plates sheet and tubes; copper and articles containing copper except copper pipes, plates, sheets, tubes, sulphate and chemical compounds; nickel and articles containing nickel except chemical compounds and alloys; and manufactured rubber articles.

Contract Form is Ratified For War Buildings

Washington, April 16.—With the creation of the new construction division of the war department preparations were made to handle a building program aggregating $1,084,000,000. A board was appointed at once to examine the standard form of contract to make it "profiteer proof". This board which has just made its report consisted of A. N. Talbot, chairman, University of Illinois, president American Society of Civil Engineers; John Lawrence Mauran, St. Louis, president, American Institute of Architects; Charles L. Main, Boston, president, American Society of Mechanical Engineers; John R. Alpine, representing American Federation of Labor; R. Goodwyn Rhett, Charleston, S. C., president, Chamber of Commerce of the United States; E. W. Rich, Schenectady, N. Y., president, American Institute of Electrical Engineers; Frederick L. Cranford, Brooklyn, president, General Contractors Association of New York; Oscar Rheum, Chicago, representing the Building Construction Employers' association.

The contract form which was approved by this board is known as the cost plus sliding scale or fixed fee, in which fixed fees to the contractors range from 7 down to as low as 1¼ per cent on the largest sums. The fee according to this form is fixed when the contract is let and if the fixed cost exceeds the estimate, because of higher labor and material prices, the contractor receives no additional compensation. Labor and material prices will be subject to approval by the government.

Makes Freight Rulings on Billets and Iron Ore

Washington, April 16. — Class rates on billets, iron and steel articles taking billet rates, and iron and steel articles rated fourth, fifth and sixth class in official classification, in domestic shipments from Chicago, Cincinnati, Ashland, Ky., and Portsmouth and Ironton, O., to Boston, New York, Philadelphia and Baltimore, have been declared prejudicial in favor of Pittsburgh, Cleveland, the valleys and related points, by the interstate commerce commission. The complaint was filed by the Pollak Steel Co. Under the commission's ruling, the rate from Chicago, beginning July 1, must be no higher than 100/60ths, from Cincinnati 87/60ths and from Portsmouth, Ironton and Ashland 77/60ths of the rates contemporaneously maintained from Pittsburgh to seaboard.

In deciding the questions involved in an application filed by Joseph E. Thropp, owner and operator of two blast furnaces producing foundry pig iron, one at Saxton and the other at Earlston, Pa., the commission has ruled that carriers hauling iron ore from Conneaut Harbor, O., to these furnaces must not charge more than $1.37½ per gross ton beginning July. They will be allowed a 6 cents transfer charge if the haul is over other routes or from other lake points. The present combination rates run as high as $3.85. From Buffalo and Erie the rate is $1.54 plus the 6 cents transfer charge.

Capital Committee Passes on Many New Issues

Washington, April 16.—The capital issues committee of the federal reserve board has announced that in the future it will be guided as nearly as possible by the provisions of the war finance corporation bill so that the operations of the subsequent committee and the present committee will be as consistent as possible.

Last week the committee approved $33,023,000 in new issues, $25,000,000 of which was in a single issue of common stock. The aggregate compares with $18,894,000 in the same week a year ago. In addition to the new issues approved, sanction was also given for $864,000 for refunding purposes. Issues aggregating $21,049,000 were disapproved.

The present committee will continue until the one to be nominated by the President under the recent act has been confirmed by congress and formally organized. The President's action is expected momentarily.

Form Aircraft Companies

Four new companies were incorporated in the east during March for the manufacture of airplanes and accessories. These companies have a total capital stock of $6,250,000, and are as follows: The Columbia Aircraft Corp., Delaware, $150,000; the Liberty Aircraft Corp., New Jersey, $1,000,000; Murray-Willat Motor & Airplane Corp., Delaware, $5,000,000; the Williams Aircraft Corp., New York, $100,000. So far as can be learned, the formation of war companies was confined solely to those manufacturing aircraft.

Capital Odds and Ends

WASHINGTON, April 16.—President Wilson last week added four ocean transportation companies to the railroad systems now under control of Director General McAdoo. They are the Clyde, Mallory and Southern steamship companies and the Merchants & Miners Transportation Co. and the commandeering includes all of their property for the use of the government to the exclusion of any or all but war traffic. Director McAdoo is authorized to enter negotiations for the companies' just compensation.

* * *

Frederick J. Horne, vice president of the New York Trust Co., has been made director of the bureau of trusts in the office of Alien Property Custodian Palmer, succeeding Ralph Stone, president of the Detroit Trust Co., resigned.

* * *

Establishment of the following drayage charges at Coin, Iowa, are sought by the Chicago, Burlington & Quincy railroad: metal culverts weighing 20,000 pounds or less 11 cents per 100 pounds, over 20,000 pounds 10 cents per 100 pounds.

* * *

A special inspection division, with Charles M. Means, Pittsburgh, mining engineer, as chief, has been formed by the fuel administration. Mr. Means will have a large staff of assistants in the coal fields to check the output of the mines before it is shipped to consumers.

* * *

Establishment of a charge of $7.50 per hour for use of locomotive and switching crew in handling cars for loading iron ore from stock piles or shafts or otherwise serving iron mining companies, is sought by the Munsing, Marquette & Southern railroad.

* * *

The United States civil service commission has announced examinations for associate physicist and laboratory assistant; ship draftsman, architectural, mechanical, and structural draftsman; open to women who are subjects of countries allied with the United States in the war.

* * *

An increase of from $1.75 to $2.24 per gross ton in carload commodity rates on iron and steel scrap from Mondobi, Plebo, Spaum, Linderman, Requa, Price, and Osseo, Wis., to Chicago, Milwaukee, Racine, Wis., and related points is asked by the Chicago & Northwestern railroad.

* * *

Increase in rates on pig iron, cast iron pipe and other commodities between points in Indiana, and cancellation of rates from Louisville, Ky., to certain points in West Virginia and Kentucky is asked of the interstate commerce commission by several railroads.

* * *

Operators of wagon mines will not be permitted to add the cost of hauling to the government price, except for coal purchased by a railroad for its own use, because the demand for open top cars by mines that can load only into that type still exceeds the supply, the fuel administration has again ruled.

* * *

A fire protection section to co-operate with war manufacturers, and fire insurance officials in protecting war plants from fire and explosion dangers has been created by the war industries board. It's executive committee is headed by W. H. Merrill, Chicago, president of the Underwriters' Laboratories.

* * *

To prevent the removal of employes from their important duties, handicapping the railroad's part in war work, legal proceedings against the railroads while under federal control must be brought in the locality where cause of action arose or where the plaintiff resides, according to a ruling announced by Director General McAdoo.

* * *

The interstate commerce commission has found unjustified the Baltimore & Ohio railroad's proposed cancellation of arrangements for fabrication in transit of iron and steel articles at Baltimore and Washington, which would have resulted in increased rates on structural iron and steel from points in Pennsylvania, Ohio and West Virginia to points served by the Southern railway.

* * *

Director General McAdoo has notified railroads not to negotiate contracts of fire insurance covering a longer period than customary, or at most not longer than one year, without special authority from the railroad administration. This order was issued pending a decision on the question of insurance against loss or damage by fire to railroad property or property in the custody of railroads.

* * *

Senator Lewis of Illinois, often regarded as one of the President's mouthpieces in congress, last week in debate on the Overman bill declared the consolidation of the interstate commerce and federal trade commissions and the federal reserve board probably would be effected by the President if the bill becomes law. Opponents of the measure have declared such mergers entirely too radical.

* * *

An increase from 9 cents to 11 cents per 100 pounds in the carload rate on scrap iron and steel is sought by the Chicago, Milwaukee & St. Paul railroad between Chicago and stations taking the same rates, and Easton, Delavan and Winnebago City, Minn. An increase of from 15.2 cents to 15.8 cents per 100 pounds in the carload rates on stoves, ranges and heating apparatus between Chicago, points taking the same rates and Galesburg, Ill., is also sought.

* * *

Carriers seek establishment of the carload rate of 35 cents per 100 pounds on scrap iron from Kingman, Tapock, and Seligman, Ariz., to Pueblo, Colo., by way of the Atchinson, Topeka & Santa Fe, and Minnequa, Colo., by way of Pueblo and the Colorado & Western railroad. An increase of from 30 to 40 cents per 100 pounds from Pacific coast terminals to points in Colorado, New Mexico, Texas and Wyoming, is also asked on scrap iron carload rates.

* * *

The Pennsylvania railroad asks of the interstate commerce commission an increase of approximately 90 per cent of the current fifth class rates, and cancellation of carload rates from points on its line and the Pittsburgh & Lake Erie railroad to short haul points west of Pittsburgh, on acids except muriatic, sulphuric, and sulphuric and nitric acids, mixed. They also ask cancellation of carload rates on acids with the same exceptions, from points on their lines to certain points on the Baltimore & Ohio and the Pittsburgh & Lake Erie railroad.

Prepare Texas Stack For Early Operations

Rusk, Tex., April 18.—The 100-ton blast furnace here, recently purchased from the state of Texas by the Texas Steel Co., of Beaumont, is being overhauled preparatory to being placed in operation. The ore supply for the furnace will be obtained from the state-owned beds, situated adjacent to Rusk, for which the Texas Steel Co. is to pay a royalty of 50 cents per ton. The pipe-making plant here which the company has also purchased will be placed in operation soon. C. T. Heisig, of Beaumont, vice president of the Texas Steel Co., said that the construction of a large iron and steel plant at Beaumont will be started soon after the furnace here is put in running order.

"It is to be distinctly understood," said Mr. Heisig, "that we intend to built a plant in Beaumont. We are simply going into the Rusk proposition as the most available means of assuring the larger plant there. We want to get on a producing basis as quickly as possible, and once we do that, we shall have no trouble in securing the co-operation of the United States Emergency Fleet corporation in the matter of producing ship steel. We are not touching our main ore supply for use at Rusk. We have at Rusk in the state-owned ore beds enough good ore to last that plant for 40 or 50 years. We have in addition 16,000,000 tons of higher grade ore for use in the larger furnace to be built at Beaumont."

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

COL. RAYNAL C. BOLLING, of New York City, general solicitor and assistant general counsel of the United States Steel Corp., who has been in France for the past year as representative of the aircraft production board and recently was assigned other duties by General Pershing, which took him to the front, is reported captured or missing in official advices from the war department. Several years ago, Col. Bolling became interested in aviation and long before the United States entered the war, he offered his services in that branch of the army. He was granted a major's commission in the reserve corps in charge of organizing an air squadron from New York. When the government experienced difficulty in securing adequate training field space, Major Bolling paid out a substantial sum and leased one in his own name, where he remained until ordered to France about a year ago. At the war department, it was thought most probable that Col. Bolling was either shot down or forced to descend in enemy territory while engaged in a flight. He was born in Hot Springs, Ark., and is 41 years old. He is a Harvard man.

Eugene V. E. Thayer, president of the Chase National bank, and Thomas L. Chadbourne were recently elected directors of the Otis Elevator Co.

John W. Golden has severed his connection with the Keith Car & Mfg. Co., Sagamore, Mass., to accept a war position in Washington.

Joseph Risney, formerly superintendent of the foundry operated by the Iowa Valve Co., Oskaloosa, Iowa, has been appointed foundry superintendent of the new plant operated by the Davis Mfg. Co., Milwaukee, builder of tractor engines. F. N. Davis is president of this company and W. I. Denny, purchasing agent.

J. S. Gillespie has been made president of the American Hollow Boring Co., Erie, Pa. He formerly was shop superintendent of the National Forge & Tool Co. there.

R. E. Blazo is now affiliated with Reed, Fears & Miller, Inc., Boston, pig iron, having recently resigned his connection with the Philadelphia office of Rogers, Brown & Co., where he has been for the past year. Prior to locating in Philadelphia, Mr. Blazo was attached to Rogers, Brown & Co.'s Boston office.

A. W. Henn, formerly secretary and treasurer of the National Acme Co., Cleveland, was recently elected president to succeed W. D. B. Alexander,



RAYNAL CAWTHORNE BOLLING

who was made chairman of the board. Mr Henn will continue to discharge the duties of treasurer and as secretary he has been succeeded by N. S. Rathburn.

Robert J. Carroll has been elected president and treasurer of the Carroll Foundry & Machine Co., Bucyrus, O. He is a son of the late P. J. Carroll, who owned the Carroll company.

Sidney Diamant, 60 West 129th street, New York, has withdrawn his financial and other interests from the DeMant Tool & Machine Co., 79 East 130th street, that city.

H. M. Jerome became chief engineer of the Chalkis Mfg. Co., recently, upon his resignation as assistant chief engineer of the Chalmers Motor Co., Detroit.

W. E. Perrine, formerly director of production for the Standard Parts Co., Cleveland, has been promoted to the position of assistant general manager.

R. H. Shaw, formerly connected with the West Michigan Steel Foundry Co., Muskegon, Mich., has been appointed foundry foreman of the Acme Steel Co., Akron, O.

Dr. Ira N. Hollis, president of the Worcester Polytechnic institute, Worcester, Mass., and former president of the American Society of Mechanical Engineers, has been nominated as a candidate for overseer of Harvard college. He was a professor at the college before going to Worcester and an honorary member of the class of 1875.

A. E. Ward has been appointed sales manager of the International Oxygen Co., 115 Broadway, New York. Mr. Ward formerly was affiliated with the Prest-O-Lite Co., Indianapolis.

J. O. Osgood, vice president in charge of sales of the Chicago Pneumatic Tool Co., Chicago, will act as president until a successor is appointed to W. O. Duntley, who resigned recently from that position.

W. L. Byers and Julian B. Huff have been appointed district representatives of the fuel administration by Fuel Administrator Garfield, with headquarters at Uniontown and at Greensburg, Pa., respectively.

E. C. Angell, vice president of the William F. Davis Machine Tool Co., 149 Broadway, New York, is in charge of the recently established branch office at 945 Pennsylvania avenue, Washington.

Fred M. Shaw has been elected president of the Alfred L. Brown associates, Worcester, Mass., 17 Federal street, electric motors, of which Alfred L. Brown is treasurer and manager.

Donald W. Douglas has assumed the duties of chief engineer of the Glen L. Martin Co., Cleveland. He was formerly aeronautical engineer in the aviation section of the United States army signal corps.

C. M. Robertson is now affiliated with the Dale-Brewster Machinery Co., Chicago, as manager of the ma-

chinery sales department. He formerly was employed by the E. L. Essley Machinery Co., of that city.

F. R. Gilpatric has been promoted from having charge of the box-strapping department at the Stanley Works, New Britain, Conn., which he has occupied for some time, to the position of office manager.

Lieut. A. F. Winslow, son of W. H. Winslow, president of Winslow Bros., Chicago, architectural iron manufacturers, who are now at work upon a large government contract, shot down a German airplane inside the American lines recently and was awarded the war cross. He is 21 years old and enlisted with the Lafaytte escradrille last June but was later transferred to the American forces. He has been in six air battles.

J. W. Leers was recently appointed eastern manager for the Peerless Machine Co., Racine, Wis., manufacturer of hacksaws. His headquarters will be at 50 Church street where a stock of hacksaws will be maintained.

W. J. Gilmore, formerly foundry superintendent of the plant of the American Steel Foundries, Indiana Harbor, Ind., has been appointed works manager of the Hubbard Steel Foundry Co., East Chicago, Ind.

C. Smith, formerly production clerk of the foundry operated by the J. I. Case Threshing Machine Co., Racine, Wis., has been appointed foundry superintendent to succeed R. LaPoint who resigned recently.

Paul M. King upon his resignation from the Philadelphia district sales office of the Midvale Steel & Ordnance Co., became associated with the sales department of the Worth Steel Co., at Claymont, Del.

George J. Thust, general superintendent of the Globe Seamless Steel Tubes Co., Milwaukee, has with his son, Ray J. Thust, organized the Tire Recruiting Machine Co., Milwaukee.

E. J. Morrow has resigned as superintendent of the foundry operated by the Metals Production Equipment Co., Springfield, Mass., and has accepted a position as manager of the Mansfield Foundry Co., Mansfield, Mass.

Edward Mauer has been made superintendent of Detroit shops for the Solvay Process Co., having recently severed his connection as chief engineer with the Monroe Motor Co., Pontiac, Mich.

Walter J. Mahoney, labor statistician for the Reed-Prentice Co., Worcester, Mass., has been appointed a statistician in the ordnance division of the war department of the United States army and has reported to Washington for duty.

Louis N. Moore resigned recently as assistant to O. D. McClure, general master mechanic for the Cleveland-Cliffs Iron Co., at Marquette, Mich., and now has charge as master mechanic of an extensive mining group on the Gogebic range.

J. G. Shaw, formerly affiliated with the Milwaukee Steel Foundry Co., Milwaukee, is president of the recently organized Shaw Foundry Co. of that city. The plant produces gray iron castings. Mr. Shaw also is president of the Acme Steel Co., Akron, O.

F. J. Herman has severed his connection with the estate of W. J. Rainey in order to devote his full attention to his duties as chief assistant to W. S. Blauvelt, director of the coke division of the fuel administration.

A. H. Willey is now affiliated with the sales force of the Reliance Steel & Tool Co., New York City, with headquarters in Philadelphia, and will cover the Pennsylvania territory. He formerly was connected with Boker & Co., Inc., New York.

D. B. Clark, formerly shell department superintendent of the American Brake Shoe & Foundry Co., Erie, Pa., has been appointed general superintendent of the Watervliet arsenal, Watervliet, N. Y., in charge of the plant's entire production.

Frank Haber has been elected a director of the Central Foundry Co. to fill the vacancy caused by the retirement of Waddill Catchings from the board. DeCourcey Cleveland and S. J. Leonard have been elected directors for the three-year term.

E. M. Kilby, vice president of the Kilby Frog & Switch Co., Birmingham, Ala., was recently elected to the office of president of the National Steel Products Co., which plans the establishment of a plant at Birmingham.

Maj. Edgar Allen Custer addressed the Pittsburgh Foundrymen's association, April 15, on "The Manufacture of Semisteel Projectiles". He is chief in charge of inspection of all ordnance material produced in the Pittsburgh district.

L. C. Wilson has been appointed assistant to President Frey, of the Chain Belt Co., Milwaukee, and W. T. Hersher, for many years assistant superintendent of the Bridgeport Malleable Iron Works, Bridgeport, Conn., has been named superintendent of the malleable plant. Clifford Merwin of Holyoke, Mass., is in charge of factory production, and E. C. Wilson, formerly with the Foos Gas Engine Co., Springfield, O., has been appointed purchasing agent.

Frank F. Rowell resigned recently as secretary and sales manager of the I. B. Rowell Co., Waukesha, Wis., manufacturer of farm implements and machinery. He will assume the managership of the Independent Silo Co., St. Paul, Minn., immediately.

Robert C. Moeller, for 18 years connected with the American Steel & Wire Co., the last five of which as sales agent for the Worcester, Mass., district, has resigned to accept the position of general manager of the Collyer Insulated Wire Co., Pawtucket, R. I.

Francis E. Norris resigned recently as superintendent of the Sharon and Farrell, Pa., plants of the Carnegie Steel Co. He has taken a three-year contract with Berliet, an automobile manufacturer of France, for whom he will erect a steel plant at Lyons, France.

F. T. Whitcomb, who resigned recently as signal engineer of the Boston & Albany railroad, Boston, is now affiliated with the Federal Signal Co., in an important capacity. His former assistant, George A. Kirley, succeeds him and E. I. Gardiner becomes assistant engineer.

F. G. Peterson has been appointed foundry foreman of the casting plant operated by the Bucyrus Co., South Milwaukee, Wis. For many years he was connected with the Pratt & Letchworth Co., Buffalo, and subsequently he was with the Stock Steel Process Co., Detroit.

P. W. Dillon, who for seven years has been secretary and general sales agent for the Northwestern Barb Wire Co., Sterling, Ill., recently volunteered his services to the government and has received a captain's commission in the quartermaster's department, Washington, D. C.

Henry Brewer, Beloit, Wis., recently resigned as assistant chief engineer of the oil engine development department of the Beloit works, Fairbanks, Morse & Co., to accept a position as chief engineer of the combustion engine department of the Worthington Pump & Machinery Corp., at Cudahy, Wis.

Henry Bruere, vice president, and J. B. Beaty, treasurer of the American Metal Co., New York, have sailed for Switzerland, with the sanction of Washington authorities, to negotiate with German capitalists for the elimination of German ownership of mining interests in Mexico allied with the American Metal Co.

Iron and Steel Men in War Machine

Wallace D. Simmons, Member of Excess Profits Tax Advisory Board

WALLACE DELEFIELD SIMMONS in November, 1917, by appointment of Secretary of Treasury McAdoo, became a member of the President's "dollar-a-year" business battalion. He with eight others, comprise what is now known as the excess profits advisory board. This committee of nine was named to assist Commissioner of Internal Revenue Roper in the administration of the excess profits tax law. Meetings have been held continuously and the thousand and one questions which have arisen have been amicably adjusted. The board's rulings and interpretations have been accepted by Secretary McAdoo and published as practically the law. Original estimates of total returns from this one tax were placed at $1,226,000,000 but calculations made recently in Washington double that figure and it is stated that 6,000,000 returns will be made by June 1. This suggests something of the problems which the advisory board faced especially in view of the uncertain language of the tax law.

Since 1896 Mr. Simmons has been president of the Simmons Hardware Co., St. Louis, founded by his father, E. C.. Simmons. This business now has a total capitalization of $4,500,000. The son entered the business as a clerk shortly after being graduated from college in 1890. He was made a member of the board of directors two years later and his rise to the presidency through successive promotions in various departments brought him in contact with hard work and gave him a wide grasp of broad commercial questions which has made him a national figure in the world of business. His broad experience has enabled him with others, to handle from a business man's view point the many perplexing matters presented to the advisory board. This perhaps is the secret of the general satisfaction with which the findings of the board have been received.

Immediately upon President Wilson's declaration of war against Germany. Mr. Simmons voluntecred for service under the government, believing that in a business way, his aid best could be given the nation. He has been a valuable aid to both Secretary of War Baker and to Secretary McAdoo. In addition to his duties on the excess profits advisory board, he is a member of the commercial economy board of the council of national defense. In this capacity he has helped to effect extensive economies in the conduct of the nation's affairs.

In speaking of the effort of the advisory board in connection with the excess profits tax, he said: "As originally interpreted, the law would have forced many concerns out of business. Since the government has no desire to injure any business, the advisory board's interpretation was accepted and now American industry is able to live up to the law's regulations and continue to transact business."

Mr. Simmons was born in St. Louis 51 years ago and was educated at Smith academy in that city and at Yale university, from which he graduated to enter his father's employ.



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WALLACE D. SIMMONS

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Battle Interrupts After-War Trade Talk

FROM a commercial standpoint, the signing by President Wilson of the Webb Pomerene bill permitting combinations for export trade, is the most important of recent developments. After the war, American manufacturers will have to face the unified tactics of European buying in their most acute form. Unquestionably, while the Webb-Pomerene law properly safeguards against abuse, it permits a freedom of action in the foreign markets to which the American export trade heretofore has been a stranger.

However, with the German hordes battering against the allied wall in France, the significance of this enactment is diminished for the time. As a London contemporary says, "it is the common remark here today that even such questions as economic conditions and financial supremacy after the war, about which the business instinct both of England and America has prompted constant consideration, are out of touch with the spirit of the moment; all such matters may, in fact, be settled on the battlefield." He further suggests the German offensive may have been stimulated, in part, by a desire to achieve victory before too much American blood had been shed, with the inevitable consequences in future relations.

In this connection the threat of economic pressure to be applied to Germany after the war is being heard more frequently. The expedient has been proposed that if the German government does not agree to suspend hostilities within a fixed period, for every week that the war is prolonged, no German vessel shall enter or leave any American port, including the Panama canal, for one year.

The confused military situation has had a disquieting influence on the security market, yet the feeling thus far has not been one of serious apprehension. Shares of iron and steel producers declined fractionally last week. Shares of railroad equipment generally declined from two to three points, but these decreases were due to a specific cause. Equipment manufacturers have been in Washington discussing the situation with regard to distribution of contracts for cars. In their conference with the government, it is understood the manufacturers offered to take the business at a cost plus 10 per cent basis. On the other hand, some government authorities opposed this plan, holding that a percentage on the invested capital as a profit would be fairer. The manufacturers are emphatically against this plan and will oppose it to the last step.

Approve Frick's Purchase of Thompson Lands

The purchase of the J. V. Thompson coal lands by the H. C. Frick interests, involving $6,000,000 has been confirmed by J. G. Carroll, referee in bankruptcy of the Tompson estate. He dismissed all exceptions to the sale and directed that all mortgage creditors involved in the 12,000-acre deal be paid in full with interest. He directed that none of the costs should be borne by the mortgagees. Mr. Carroll directed that $3,200,000 of the purchase price should be paid to the Thompson estate. The decision will be forwarded to the district court of western Pennsylvania for final confirmation.

Lackawanna Steel's First Quarter Encouraging

As the first of the leading steel companies to return a financial report covering its first quarter operations, the presentment of the Lackawanna Steel Co. for the three months ending March 31, 1918, is regarded as highly encouraging. In the face of the extraordinary traffic and weather conditions in January and February, which held back shipments, and the lower prices fixed by the government, the profit for the quarter was $2,996,747, or only $460,253 less than for the corresponding period in 1917. This is equivalent to 34.15 per cent earned on the outstanding common stock as against 39.40 per cent. The bonded obligations in 1917 and royalties for the first quarter were $96,501 less than for a similar period last year. Unfilled orders as on March 31 were 781,199 tons against 992,096 tons March 31, 1917.

The comparative income account in which the 1917 figures have been adjusted to include proper proportions of the provision for war excess profit tax is as follows:

	1918	1917
Total net earnings....	$3,759,987	$4,369,649
Lackaw. Steel bds. int.	233,156	311,293
Subsid. bond int.....	44,261	54,083
Rentals and royalties..	.....	8,542
	277,418	373,919
Balance	3,482,569	3,995,729
Extinguish. mines.....	87,904	101,685
Deprec., renewals.....	397,917	437,042
	485,821	538,728
Profit	2,996,747	3,457,000

Almost Doubles Gain

Gross income of the Central Foundry Co., New York City, for 1917, totaled $2,203,911, exceeding 1916 by $1,232,805. Federal war taxes absorbed $558,562 and the sinking fund and depreciation account was more than doubled, as compared with 1916, being $286,289 against $112,403. Net profits in 1917 were $1,228,441 as against $675,709 the previous year. "These excellent results," said President de Courcey Cleveland, "were largely brought about the demand for the output of the Central Iron & Coal Co., a subsidiary, and for special castings made by the steel plants. Assets as of Dec. 31 totaled $10,995,021 while in 1916 they stood at $11,094,855, investments in subsidiaries falling off from $1,441,575 to $1,296,025, and notes and accounts receivable being reduced to $561,465 from $609,654. Liberty bond holdings total $161,908.

Inventory Runs High

Net income of the Otis Elevator Co. during 1917 amounted to $799,263, an increase of $62,675 over 1916. After all charges and preferred dividends, the balance for the common stock was equal to $6.42 a share, compared with $5.44 in 1916. President W. B. Baldwin said in part:

"The volume of business for 1917

was the largest in the company's history as well as the most profitable. The proper execution of this work has necessitated the carrying of large inventories, abnormally so owing to the high prices of labor and material and the unusual difficulties in obtaining them when needed. These conditions are reflected in our bills payable account, the high point of which was reached in November last. Since that time there has been a steady and substantial reduction in this account, and this liquidation will continue during this year as contracts in hand are completed."

The comparative income account is as follows:

	1917	1916
Net earnings	$1,788,577	$1,036,588
Depreciation, res.	889,304	250,000
Pension fund	100,010	50,000
Net income	799,263	733,588
Preferred dividends	390,000	390,000
Common dividends	318,575	318,575
Balance	3,482,569	3,995,729

Almost Triples Profits

Net profits of the Haskell-Barker Co. in the fiscal year ending Jan. 31, 1918, were almost triple those of the preceding comparative period. The profits were equivalent to $9.27 a share on 220,000 shares of capital stock of no par value as compared with $3.15 in the preceding fiscal year. The comparative income account is as follows:

	1918	1917
Gross earnings	2,634,192	1,135,367
Repairs, renewals	293,333	305,749
Ext. renew.	300,000	135,000
Net profit	2,040,839	694,618
Dividends	660,000	165,000
Surplus	1,380,859	529,618

Coke Companies Merge

A charter for the merger of four coal and coke companies into the Hecla Coal & Coke Co. has been filed at Greensburg, Pa. The new organization is made up of the Hecla Coal & Coke Co., the United-Connellsville Coke Co., the Hillman-Neff Coke Co. and the Bessemer Coke Co. The new corporation is capitalized at $5,975,000. The stock is divided into 59,750 shares, of a par value of $100 each. The directors of the consolidated company are: John H. Hillman Jr., Ernest Hillman, Arthur B. Sheets, Thomas Watson and John C. Neff of Pittsburgh, James C. Choplin of Sewickley and George S. Harsh of Uniontown. J. H. Hillman is president, Mr. Sheets vice president, Thomas Watson secretary and Robert W. Flemiken of Pittsburgh, treasurer.

Had Satisfactory Year

The Barrett Co., New York, last year sold $34,297,371 worth of goods, an increase of $6,497,185 over 1916. Expenses absorbed $27,193,090, an increase of $7,160,988, including depreciation, and presumably, federal taxes. Net income before charges and dividends was $3,673,244, a decline of $1,492,042. The balance available for common stock was equal to $21 a share. President William H. Childs, in the annual report to stockholders, said that considering the high cost of labor and material, and the unusual outlay of earnings in taxes, the result of the year was considered satisfactory. The income account compares as follows:

	1917	1916
Net sales	$34,297,371	$27,800,186
Cost of goods	27,173,090	20,012,102
Gross profit	$7,124,281	$7,788,084
Other income	2,111,590	1,759,521
Total income	$9,235,871	$9,547,604
General expense	5,562,626	4,382,317
Net income	$3,673,244	$5,165,286
Interest	211,855	158,656
	.....	750,000
General res.*	.....	.....
Adjust.	268,055	.....
Net profit	$3,729,444	$4,256,630
Other profit	1,142	8,771
Net profit	$3,728,302	$4,247,858
Preferred dividend	425,265	333,249
Common dividend	1,034,542	2,817,325
Surplus	$2,268,494	$1,097,283

*Represents depreciation treated this year as a manufacturing expense and included in "cost of goods sold."

Steel Holdings Grow

Common stock of the United States Steel Corp. was more widely distributed on March 1 than ever before. The total number of stockholders on that date was 61,044, giving each shareholder an average of slightly more than 83 shares. The previous high record was 56,825 shares on March 1, 1915. Holders of preferred stock numbered 80,863 on Feb. 1 last, an aggregate about 5600 smaller than on the same day in 1915. Foreign holdings of both preferred and common changed little in the quarter ending March 31; the common held abroad amounted to 485,706 shares, an increase of 1516 shares over Dec. 31.

Had Best Year

Another company to join those which enjoyed the best year in their respective histories in 1917 is the Sullivan Machinery Co., Chicago. Its net earnings for 1917 were $2,413,876 as against $1,313,906 the previous year. The company's authorized capital is $4,000,000, of which $3,846,800 is outstanding, and the net income, after reserving $800,000, or 20 per cent, for income and excess profits taxes with $242,794 deducted for depreciation, of $1,371,081 is equal to 35.6 per cent on the capital, as against 26.5 per cent in 1916. The 1917 surplus after all deductions of $986,401 compared with $403,558, brought the company's entire surplus up to $2,188,404.

Toluol Released

For Private Purposes by Government —Solvent Naphtha More Active

New York, April 13.—The government committee in charge of the distribution of toluol acted favorably this week upon numerous additional applications for the product for commercial use. So far, the toluol released has been for pharmaceutical and dyestuffs manufacture. The policy of the committee is to release toluol for necessary purposes but as sparingly as possible. Applications must be accompanied by full supporting data regarding the requirements and for what purpose the toluol is to be used. The toluol being released is going from $1.75 to $2 per gallon.

Although demand for benzol has not fallen off, production has increased until it is in excess of consumption and stocks again are accumulating. The market on pure benzol is at 30 to 35 cents per gallon. A bigger business was transacted in solvent naphtha. Numerous good-sized inquiries are pending. Demand has expanded to such an extent that stocks have shrunk materially. The market is strong at 18 to 22 cents per gallon. Large sales of crude naphtha were made at an average of about 15 cents per gallon.

Sales of phenol continue only for spot requirements, at 52 to 55 cents per pound. The output is sold up for some time and very little spot is available. Although inquiries for naphthalin are not especially active, unfilled requirements are exceedingly large. Naphthalin continues nominally at 10 to 12 cents per pound.

Sales of spot sulphate of ammonia were made this week on the basis of $5.55 to $5.60 per 100 pounds at tidewater, an advance of 10 to 15 cents.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.30 to .35
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.55 to 5.60

Contract

Pure benzol	$0.30 to .35
Pure benzol	.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	nominal.
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Limited Lists Characterize Market

Small Demands for Machine Tools Continue to Furnish Main Volume of Business—New Shell Steel Placed is Expected to Require Quantity of New Machines—Crane Demand More Brisk

LIGHT inquiries from scattered sources characterize the eastern machine tool situation while western districts report a more active market similarly composed of small-lot demands. Shipbuilding and aircraft work have received an impetus in the east and the condition is reflected in increased tool requirements. The crane market in particular has felt the effect of the ship situation and a reviving tendency has been noted. The largest single order of the week was for 28 cranes placed with the McMyler Interstate Co., Cleveland, by the American International Shipbuilding Corp., Philadelphia. A number of important airplane motor contracts about to be consummated will furnish some tool demand in the central west, but as the contracts will be placed with companies already equipped to manufacture motors, the machines required will be principally those necessary to the highly accurate operations required by the rigid specifications. A large gun carriage order, said to have been placed with the Willys-Overland Co., Toledo, will require a number of planers and drilling machines. The huge tonnage of shell steel now being placed with the various mills will furnish a heavy demand for tools. Forging presses, it is understood, are already being sought in some districts in anticipation of this work. As this work is handled on through to the machine shops, added equipment will be required in large quantities. The normal inquiries from the railroads, usually experienced at this season, are lacking. Mechanical engineers for some roads report that new equipment is badly needed in their shops, but that deliveries are secured with difficulty on even the most needed tools, so that the futility of a large list is appreciated at this time. A growth is noted in the tractor business and some tool demand is coming from the navy department, bureau of supplies.

Diversified War Work Demands Added Tools

WHILE considerable delay apparently is being experienced by the government in getting its heavy ordnance program under way, it is believed now that this work will go forward shortly. Until something further develops, however, the present comparative lull in the eastern machine tool market may be expected to continue. At present, demand is made of small, scattered lots. The Plymouth Cordage Co., Plymouth, Mass., is buying some shellmaking equipment. Fred T. Ley & Co., New York, are in the market for several pipe machines for the plant of the Atlas Power Co. now under construction at Perrytown, Md. The Braden Copper Co., 165 Broadway, New York City, is inquiring for some casting machinery for shipment to South America. The British American Metal Co., New York, recently purchased the 10-acre plant of the Manganese Steel Safe Co., at Plainfield, N. J., for the manufacture of marine hardware and other specialties, and is buying some new equipment. The New York Shipbuilding Co., New York, is in the market for some plate and angle shop equipment.

Among recent buyers of punching and shearing machinery are the Hedden Iron & Construction Co., New York City, the Virginia Shipbuilding Co., Alexandria, Va., and Babcock & Wilcox, New York City. Considerable machinery is expected to be purchased soon by the Carolina Aircraft Co., which recently was organized at Raleigh, N. C., with $500,000 capital stock, to build a plant in that city. Harry N. Atwood, aeronautical engineer, is directing head of the company. Included in other prospective business is that of the Delaney Forge & Iron Co., Buffalo, which is soon to start on a new forge and machine shop. The Morgan Machine Co., Rochester, N. Y., is building a $25,000 addition to its machine shop. C. W. Clark, architect, Cortland, N. Y., is completing plans for a $20,000 machine shop, in that city, for a company whose name is to be announced later. Work on additions, costing about $60,000, will be started shortly by the Cattaragus Cutlery Co., Little Valley, N. Y. The Foster Machine Co. contemplates the erection of a new machine shop at Westfield, Mass.

Crane Inquiries Pick Up

Crane business shows a marked increase over the past weeks. A 10-ton electric crane, with 50-foot span, is being sought by the Bethlehem Steel Co. for its plant at South Bethlehem, Pa. The Gilbert & Barker Mfg. Co., Springfield, Mass., is inquiring for a 5-ton electric crane. An electric crane of similar capacity is soon to be purchased by the Lundin Steel Castings Co., Neponset, Mass. The British-American Metal Co., New York, will purchase two 3-ton electric cranes. The government is negotiating for a 5-ton and 30-ton electric crane for the naval base store in Brooklyn. Four 2-ton cranes will also be purchased for the Brooklyn navy yard. The Merrill-Stevens Shipbuilding Corp., Jacksonville, Fla., is asking bids on one 50-ton and two 25-ton cranes. The Cambria Steel Co. is inquiring for 22 hoists, of 1½ tons capacity each. The American International Shipbuilding Corp., Philadelphia, has ordered a large number of additional cranes for the plant at Hog Island. It is understood the McMyler Interstate Co., Bedford, O., has taken the major portion of this business, including twenty-four 10-ton and four 35-ton locomotive type gantries.

Market is Active on Small Lots

AN UNDER current of strong activity is apparent in the machine tool market throughout the Cleveland district. Contracts pending, in the process of being closed, and work recently allotted furnish a steady



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Cleveland Office: Hickox Bldg.
The Hamill-Hickox Co., District Representatives.

Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd.
C. H. Beach, District Representative.

Philadelphia Office: 603 Widener Bldg.
Frank Wallace, District Sales Mgr.

Syracuse Office: 621 University Block
T. B. Davies, District Sales Mgr.

J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.

demand. Small-lot buying, however, predominates as previously, and with one or two exceptions, large lists are not extant. The Willys-Overland Co., Toledo, have closed for a number of cutting-off machines for shell work, but are still in the market for turret lathes and other miscellaneous tools. It is said that an order for gun carriages has been placed with this company which will require added equipment for its completion. The placing of contracts for a quantity of highly specialized airplane motors is expected to create new business within the next few weeks. The character of the work on these motors will require special tools and gages. The Cleveland Frog & Crossing Co., Cleveland, is inquiring for a 48 x 48-inch by 12-foot planer. The E. F. Hauserman Co., Cleveland, is in the market for a 24 x 24-inch 8-foot planer and a 16-inch shaper. Ohio State university, Columbus, O., will purchase a turret lathe and a stationary head drill. The United States Metal Goods Co., Cleveland, has issued a list for miscellaneous tools. The Falls Rubber Co., Cuyahoga Falls, O., is inquiring for a 16-inch shaper. The Keystone Brass Co., Erie, Pa., will purchase a No. 2 universal milling machine. The Shuler Axle Mfg. Co., Detroit, is inquiring for a vertical miller and a cylindrical grinder. Construction has been started on a factory building for the Automobile Screw Products Co., Cleveland.

Forging Press Demand in Pittsburgh District

MAKERS and dealers in the Pittsburgh district report that the government is buying certain kinds of machinery and machine tools in greater quantities. Forging presses are in better demand and it is believed that the government is preparing to hurry the building up of capacity for the production of shells in connection with its numerous requirements for shell steel for last half delivery. The domestic market for machinery and machine tools is extremely dull, buyers withholding purchases on account of the high prices and long deliveries. Car supplies are much better and shipments on government work have improved considerably as a result.

Requirements Light in Chicago

WHILE the absence of large requirements from the Chicago market is still noticeable, there is some increased activity offering a possibility of larger business. The Chicago, Burlington & Quincy railroad is an exception to the rule in that industry of not buying now because of government control, and is inquiring for considerable equipment. The Standard Steel Car Co., a large buyer for its new munitions plant at Hammond, Ind., has been buying steadily and is still in the market for additional tools. Among the concerns buying to fill out requirements is the Inland Steel Co., which is completing the equipment of its new machine shop at Indiana Harbor, Mich. Buying by small shops to equip for subcontracts on war work continues to make up the bulk of business. Tractor manufacturers are active and are taking on much work which requires additional equipment. W. J. Dennis & Co., manufacturers of metal specialties, is building a plant in Chicago. The Liberty Car & Equipment Co. has bought a plant from the Central Locomotive & Car Works, involving 33 acres and buildings, in Chicago. The American Equipment Co., Bucyrus, O., manufacturer of brickmaking machinery, has bought a plant from the Illinois Brick Co., in the Calumet district, Chicago.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The New England Violano Co. has been incorporated to manufacture musical instruments, with $170,000 capital by E. M. Leavitt and Ernest L. McLean.

BATH, ME.—The plant of the Watson Frye Co., engaged in the manufacture of bronze castings for the Emergency Fleet corporation and machinery for paper and pulp mills, was damaged by fire Saturday, with a loss of $75,000. The fire, which is beliefed to have been due to spontaneous combustion, started in the foundry, which is of concrete construction, and spread rapidly to the rest of the structure, which is wooden.

BIDDEFORD, ME. — The Saco-Lowell Shops will build a brick, 1 and 2-story factory, from plans of Lockwood, Greene & Co., Boston, engineers.

EAST DEERING, ME.—The United States shipping board has selected the plant of the Portland Ship Ceiling Co. as the site for a government dry dock to cost between $400,000 and $500,000.

PORTLAND, ME.—The Chicago Coke & Chemical Co., the purpose of which is to acquire and operate patents, has been incorporated here with a capital of $100,000 by Clarence G. Trott, P. B. Drew, David F. Drew, Charles W. Hamilton, J. W. Cady, L. W. Merritt and James G. Doyle, all of this city.

PORTLAND, ME.—The Nassau Co., which proposes to do a general shipbuilding business has been incorporated here with a capital of $5000 by George T. Spear, South Portland and Elmer Perry and E. Sawyer, of Portland.

SPRINGFIELD, VT.—The Colonial Light & Power Co. will build a brick and concrete, 1, and 2-story, 100 x 75-foot sub-station on Clinton street.

SUNAPEE, N. H.—The Brampton Woolen Co. will equip the plant formerly owned by the U. S. Hame Co., which it is renovating, with entirely new machinery, to include 48 new looms.

BOSTON.—Fire in the 5-story building at Beverly and Causeway streets, occupied by Richards & Co., Inc., dealer in metals, the Eastern Metal & Refining Co., and the American Glue Co., caused $100,000 damage, April 1.

BOSTON.—Bids will be received soon by Engineer George P. Carver for the construction of a coal pocket, with 1200 tons capacity for the Mattatan Coal Co.

BOSTON.—The B. F. Sturtevant Co. will build a 1-story, 86 x 228-foot addition to its plant for the manufacture of airplanes. J. Nickelson & Sons have received the general contract.

CAMBRIDGE, MASS. — A foundry yard craneway will be erected by the Aberthaw Construction Co. for the Worthington Pump & Machinery Corp. on Fifth street near Bent street. It will be built of structural steel, 60 x 60 x 300 feet, and will cost $25,000. Plans are by the company's engineers.

CHERRY VALLEY, MASS. — The Olney Woolen Mills Co. has awarded the contract for the erection of an addition to its picker house.

FITCHSBURG, MASS.—Plans are being drawn by Architect John O. DeWolfe for a 3-story, 50 x 140-foot addition to the plant of the Simons Mfg. Co.

MAYNARD, MASS.—Construction work has begun on the addition to the Assabet Mills

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of the American Woolen Co., which are located here. The building is to be 510 x 80 feet and 5 stories high.

SOMMERVILLE, MASS.—George P. Carver, engineer, Boston, is drawing plans for an addition to the coal handing plant of the Shawmut Coal Co.

SPRINGFIELD, MASS.—A hearing was held at the city hall here recently by the legislative committee on cities on a bill to permit Springfield to develop power from its Little River system. There was no real opposition to the bill and most of those who attended the hearing spoke heartily in favor of it. It would give the city the right to develop a plant giving 4000 horsepower, which might be used for municipal lighting or be sold.

SPRINGFIELD, MASS.—The government has let the contract for a brick extension to the administration building at the United States arsenal, to cost $45,000.

SPRINGFIELD, MASS. — The Stone & Webster Corp., Boston, has been given the contract by the United Electric Light Co. for extensive improvements at its State street plant to cost $300,000. A 25,000-horsepower steam turbine and new switchboard equipment will be installed.

UXBRIDGE, MASS.—Samuel F. Scott has let the contract for a brick, mill construction, 2-story, 62 x 42-foot picker house at his Elmdale mill.

WORCESTER, MASS.—C. E. Sandberg, sheet metal manufacturer, has had plans made for a brick and reinforced concrete, fireproof, 4-story factory building to contain 13,000 square feet and to cost $50,000, at Thomas and Commercial streets.

WORCESTER, MASS.—Fire in the Day building annex, rear of 274 Main street, occupied by the New England Steel Roofing Co. and others, caused $150,000 damage, April 4.

WORCESTER, MASS. — The William H. Sawyer Lumber Co. has let the contract for two brick and wooden storage buildings to cost $21,000. Plans for a power house, office building and other buildings are being made.

WORCESTER, MASS.—The R. B. Phillips Mfg. Co. has let the contract for two 1-story, 40 x 30-foot and 40 x 42-foot storage buildings at its Grand street plant.

EAST GREENWICH, R. I.—The Greenwich Mill has let the contract for a brick, mill construction, 1-story, 94 x 50-foot addition to its mill on Division street.

NEWPORT, R. I.—The government will build a brick, reinforced concrete, and steel, fireproof, storehouse to cost $80,000 at the naval training station.

PAWTUCKET, R. I.—The plant of the Narragansett Machine Co., making steel lockers and gymnasium apparatus, was damaged $150,000 by fire April 4.

PAWTUCKET, R. I.—The Cruise & Smiley Construction Co. has been awarded the general contract for a $300,000, 2-story, 50 x 150-foot warehouse by J. & P. Coates, Inc.

PROVIDENCE, R. I.—The Jenkinson Machine & Tool Co. has been incorporated with $30,000 capital by Robert Jenkinson, Mansfield, Mass., Robert S. Ortoleva and Sebastian H. di Jester.

PROVIDENCE, R. I.—The Temple Mfg. Co. has been incorporated to make tools and machinery with $5000 capital by John M. Gibb, Carl A. Tingler and Joseph C. Condon.

BRISTOL, CONN.—The factory of the Munroe Muzzy Pen Co. in Edgewood was destroyed by fire April 1, with a loss of $30,000.

CHESHIRE, CONN. — The Connecticut Brass & Mfg. Co. has awarded a general contract to T. J. Pardy Construction Co., Bridgeport, Conn., for the construction of a plant addition. The new building will cost $15,000, and will be 1-story, 56 x 65 feet.

DERBY, CONN.—The Acme Tool & Machine Co. has been incorporated with $100,000 capital by Albert K. Kennedy, Harry G. Williams, Shelton, Conn., and Harold E. Drew, Ansonia, Conn.

HARTFORD, CONN.—The Arrow Electric Co., manufacturer of electrical specialties, will build a brick, mill construction, 3-story, 80 x 125-foot factory building and a reinforced concrete coal pocket on Hawthorne street.

MERIDEN, CONN.—The Malleable Iron Fittings Co. has let the contract for a concrete and stone, 2-story, 61 x 121-foot building and a 1-story, 40 x 50-foot building for the storage of patterns.

NEW BRITAIN, CONN. — The Skinner Chuck Co. will build a brick and reinforced concrete, 1-story, 28 x 51-foot addition to its plant on Church street, to be used as a hardening room.

NORTH GROSVENOR DALE, CONN.—The Grosvenor Dale Co. has let the contract for an addition to its hydro-electric plant, to cost $30,000. C. W. Praray, New Bedford, Mass., is the engineer.

SHELTON, CONN.—The D. N. Clark Co. has been incorporated to manufacture hardware, with $100,000 capital, by Daniel N. Clark, W. Kneen and Dudley W. Stratton.

SOUTHINGTON, CONN. — The Miller Metal Works Co., Jersey City, N. J., has purchased the plant of the Brass Fixtures Co., to which it will remove its business. Edmund L. Curtis, formerly of Southington, is treasurer of the company.

STAMFORD, CONN.—Baer Bros. are replacing their factory buildings which were recently destroyed by fire with three, 3-story, 75 x 300-foot buildings, standing parallel with each other.

Along the Middle Atlantic Seaboard

BROADALBIN, N. Y.—Architect H. S. Moul, Gloversville, N. Y., is drawing plans for a 3-story addition to the mill of the Broadalbin Knitting Co.

BROOKLYN, N. Y. — Westinghouse, Church, Kerr Co., 37 Wall street, New York city, has received the general contract for the construction of a power plant at the Brooklyn navy yard.

BROOKLYN, N. Y.—Plans for a $90,000 plant addition are being drawn by Architect W. B. Wills, 1181 Myrtle avenue. The name of the owner is being withheld.

BROOKLYN, N. Y.—Ira S. Bushey & Sons have purchased 495 feet frontage on the Gowanus canal for the establishment of a shipyard. The purchasers now have a large shipyard at the foot of Twentieth street, Brooklyn, N. Y.

BROOKLYN, N. Y.—The Hauck Mfg. Co. has purchased property on the south side of Tenth street, near Second avenue, and contemplates the immediate erection of a factory building.

BUFFALO.—Plans have been drawn for a $20,000 factory for the Standard Mirror Co. It will be one story, 82 x 119 feet.

BUFFALO.—The South Buffalo Terminals Co. is said to be preparing plans for a 1-story factory, 60 x 96 feet, to cost $28,000.

COXSAKIE, N. Y.—Bids will be received shortly by this village for the construction of a $37,000 filtration plant.

DUNKIRK, N. Y.—The United States Radiator Co. contemplates erecting an addition to its storehouse.

HALL, N. Y.—The plant of Libbey, McNiell & Libbey will be remodeled at a cost of $200,000.

LONG ISLAND CITY, L. I., N. Y.—Bids were received April 4 by Bollinder & Perrot, 1328 Broadway, New York city, for the construction of a $350,000 plant for S. Karpen & Bros., Brooklyn. The proposed building will be 6 stories high, 80 x 488 feet.

NEW YORK.—Levering & Garrigues have the general contract to build 1 and 2-story concrete factory buildings for the Pittsburgh Plate & Glass Co. in Long Island City. The buildings are estimated to cost $200,000.

NEW YORK.—Frank E. Allen, 607 West Forty-third street, representing the New York Manufacturers Co., has awarded the general contract to H. H. Vought Co., Grand Central Terminal building, for the construction of a 4-story, 100 x 120-foot warehouse.

ONEONTA, N. Y. — The Kayser Mills, Windsor avenue, will build a large addition to its plant.

ROCHESTER, N. Y.—The Wollensak Optical Co., 1415 Clinton avenue, let a contract to A. Friedericks & Son, 712 Lake avenue, for a 4-story factory 100 x 75 feet, $100,000.

ROCHESTER, N. Y.—The board of contract and supply has arranged to build a power house here costing $20,000.

SOUTH SCHENECTADY, N. Y. — The general contract for a $1,000,000 government warehouse in this city has been awarded to Feeney & Sheehan, Albany, N. Y.

BLOOMFIELD, PA.—Hoffman & McClure of this city have bought the planing mill of Fiessler brothers and will refit it for a bending works.

CONNELLSVILLE, PA.—The Stahl Plumbing Co. will rebuild its plant here soon.

CORRY, PA.—The Howard Tanning Co., East Main street, has plans for a 2-story addition 71 x 276 feet to its factory, to cost $50,000. W. J. Howard is general manager.

CORRY, PA.—J. W. and A. P. Howard Co. will build another tannery here in the near future.

ELK LICK, PA.—The Birdsboro Steel Foundry & Machine Co. has let the contract for an addition to its foundry, 135 x 40 feet.

INDIANA, PA.—The Consolidated Lumber & Supply Co. will build three tile and con-

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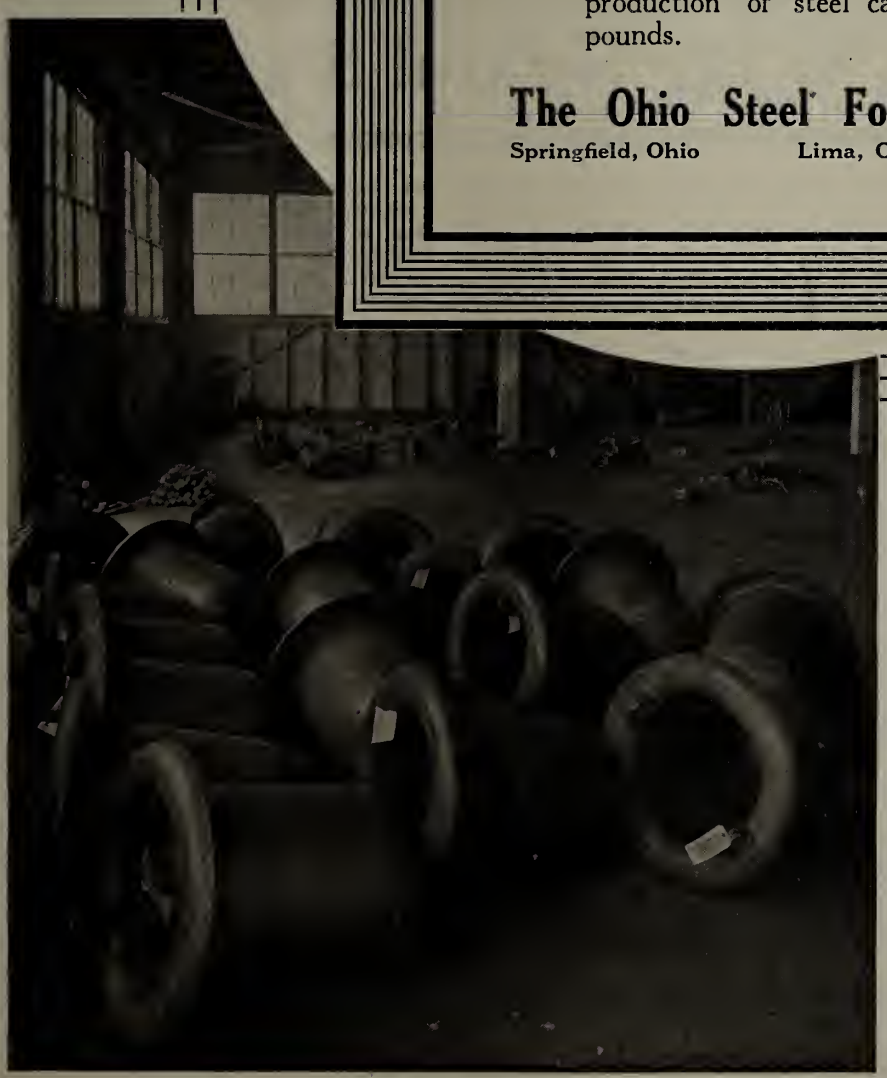
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crete factory buildings, each 60 x 150 feet, to manufacture mine cars. It will also build a planing mill and garage.

KENNETT SQUARE, PA.—The Fibre Specialty Co. will build a plant 60 x 160 feet.

MIDDLETOWN, PA. — The government will rush work upon depot buildings here.

MOUNT UNION, PA. — The Gray Iron Castings Co. will fit up a plant on East Donegal street.

PARKERSBURG, PA. — The Parkersburg Iron Co. has let a contract to the Rust Engineering Co., Penn building, Philadelphia, for a $35,000 boiler house.

PHILADELPHIA. — Charles Lenning & Co. have awarded the contract for an $11,000 machine shop to Charles Harbinson.

PHILADELPHIA.—An $8000, 1-story, 40 x 68-foot repair shop will be constructed by the Gulf Refining Co.

PITTSBURGH.—The Keystone Bronze Co. let a contract to the Lawrence Steel Products Co. for an addition 86 x 148 feet to its foundry on Thirty-ninth street.

PHILADELPHIA.—The Philadelphia Roll & Machine Co. has awarded the Belmont Iron Works a $15,000 contract for crane runways.

SCRANTON, PA.—The Sall Mountain Asbestos Co. has purchased land and will enlarge its plant by an addition costing $15,000.

SHARON, PA. — The Sharon Water Co. will add an 8,000,000-gallon water pump and other improvements to its plant.

ST. CLAIR, PA.—The Bob & Baskind Co. has let a contract for an addition to its factory.

WAYNESBORO, PA.—The E. B. Co. will build another addition, 75 x 115 feet, to its plant on Second street and will let the contract to A. R. Warner of this city.

WEST CHESTER, PA.—Officials of the West Chester and Philadelphia Traction Co. are laying out plans for the new freight and passenger station to be erected at the corner of Gay and Walnut streets.

CAMDEN, N. J.—Erwin & Leighton, Philadelphia, have received the general contract for the construction of a $60,000 addition to the plant of the Howard Croft Sons Co.

EAST ORANGE, N. J. — Massey-Harris Harvester Co., Inc., has been incorporated with $3,000,000 capital to manufacture and deal in agricultural implements. The incorporators are J. N. Shenstone, Thomas Findley and Charles L. Wisner, all of East Orange.

ELIZABETHPORT, N. J. — The Singer Mfg. Co. has awarded to the Austin Co., Philadelphia, a contract for the construction of a $300,000 plant addition. The new building will be 1-story high, 200 x 600 feet.

MORRISTOWN, N. J.—Augustus H. Bartley has sold his interest in William Bartley & Sons, Inc., of Bartley, to the Richardson Scale Co. The latter company will use the Bartley foundry and also continue the general foundry work.

NEWARK, N. J.—Hurley & Johnson have contracted with Harvey Johnson for a 1-story forge factory on Thomas street, 50 x 50 feet in size, to cost $3000.

NEWARK, N. J.—American Can Co., 312 Elizabeth avenue, will erect 1-story steel and concrete factory to cost $13,800.

NEWARK, N. J.—B. F. Sturtevant Co. has been incorporated with $3,700,000 capital to manufacture machinery. Eugene N. Foss, E. B. Freeman and William V. Kellam, all of Boston, are the incorporators.

PATTERSON, N. J.—The American Locomotive Works, East Jersey Pipe Corp. and the Passaic Steel Co. have asked the city authorities to erect several hundred dwelling houses for their employes.

RAHWAY, N. J.—The Pneumatic Tool Supply Co. has awarded the contract for the construction of a one and two-story, 200 x 300-foot machine shop and factory building to John N. Gill & Co., Philadelphia.

WILMINGTON, DEL.—Bids will be received about April 15 by Architect R. C. Tindle on a 3-story, 90 x 135-foot warehouse. The name of the owner is being withheld.

BALTIMORE.—The plant of the Kennedy Foundry Co. recently suffered $200,000 damage by fire. A number of valuable patterns were destroyed.

OELLA, MD.—A $500,000 cotton mill will be erected here by the Oella Cotton Mills Co. William Dickey & Sons, Ellicott City, Md., are representing the company. The general contract will be let on percentage basis without competition.

Activities in the Central States

BEAVER DAM, WIS.—The J. S. Rowell Mfg. Co. has sold its plant to E. Herzberg and O. E. Klatt who will establish a machine shop.

BLACK CREEK, WIS. — August Brandt, automobile and implement dealer, is about to award contracts for the erection and equipment of a public garage, warehouse and service shop building, costing about $18,000.

FOND DU LAC, WIS. — The Boggess Mfg. Co., maker of mop wringers and similar specialties, has opened its new plant in the Haas building, Second and Macy streets. A complete galvanizing plant will be installed during the summer and estimates are now being received. J. J. Carberry is secretary and treasurer.

GREEN BAY, WIS.—D. G. Meyer, owner of the Reo Garage, 132 South Adams street, will build a fireproof addition, 25 x 100 feet, for machine shop purposes. P. T. Benton is architect.

MADISON, WIS.—The Madison-Kipp Lubricator Co., manufacturing oiling units and systems for lathes and other tools, tractors, gas engines, etc., will add a full second story to the machine shop erected during the summer and fall of 1917 to provide much-needed facilities for light machine operations and assembling. A second story also will be added to the office building. The work will cost about $35,000 and is being done under contract by George C. Crane & Son, Madison.

MADISON, WIS.—A loss of $15,000 was caused by fire in the emergency machine shop, boiler house and roundhouse of the Chicago & North-Western Railroad Co. in West Madison. The blaze originated in the machine shop, which was totally destroyed together with equipment. It will be rebuilt at once.

MILWAUKEE. — At the spring election on April 2 the voters adopted bond issues as follows: For rebuilding Sixteenth street viaduct, $200,000; for a new bascule bridge over Milwaukee river at State street, $250,000; for a new bridge at North avenue, $200,000; for a new central police station, $250,000. Plans for practically all of the work have been completed under the direction of Percy Braman, commissioner of public works. Bids probably will be taken at various times during the early summer.

MILWAUKEE. — Articles of incorporation have been filed by the Jonas Lalley Light Co., Milwaukee. The capital stock is $25,000 and the incorporators are August A. Jonas, Gustav Jonas and John P. Peterson. The company will manufacture, deal in and install electric light plants for farms and similarly isolated purposes.

MILWAUKEE. — The Interstate Iron & Steel Co., First National Bank building, Chicago, has been awarded the contract for furnishing all reinforcing bars and similar material, amounting to 810 tons, required for the new $250,000 elevator and warehouse to be erected at Oregon and Hanover streets, Milwaukee, by the L. Teweles Seed Co., 113 Clybourn street.

MILWAUKEE.—Reports that the Pelton Steel Co. is intending to erect a large addition to its foundry are explained as premature by T. H. Harvey, general manager of the company. Mr. Harvey said that the company merely is getting estimates on several new buildings and equipment and will make a decision on the basis of these figures when they become available. Tentative plans for a one-story foundry, 84 x 160 feet, with a wing, 65 x 85 feet, are being drawn by Architects Schuchardt & Judell, 508-510 First National Bank building, Milwaukee.

MILWAUKEE.—The Hercules Steel Castings Co. will build a 1-story steel foundry, 80 x 300 feet, costing $100,000. E. B. Generich, 1102 Wells building, is secretary.

NEENAH, WIS.—The Bruce Boiler Works has bought the plant of the Pomeroy Mills Co. and will equip it for boiler, structural and ornamental iron work.

RACINE, WIS.—The Hamilton-Beach Mfg. Co. will let a contract soon for a warehouse and factory addition costing $80,000. The A. L. Flegel Co. is the architect.

WEST ALLIS, WIS.—The Allis Chalmers Mfg. Co., Otto Falk, president, will build a foundry, 150 x 200 feet, costing $30,000.

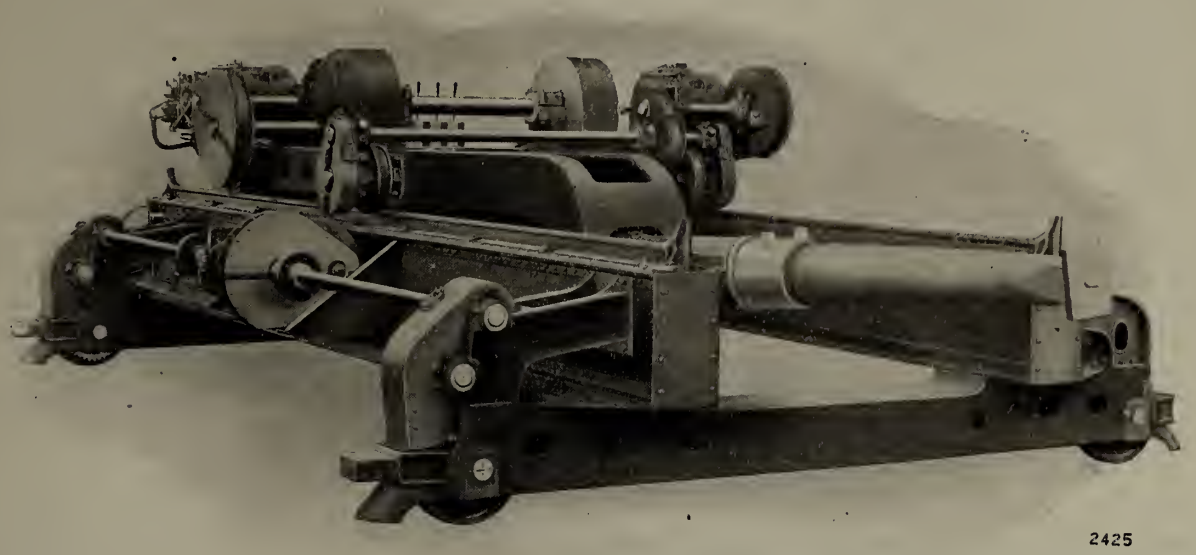
ADRIAN, MICH. — The Adrian Knitting Co. is building an addition to its Michigan avenue plant 60 x 130 feet. Work is now underway.

ANN ARBOR, MICH.—An election will be held soon on issuing $200,000 in bonds for a pumping station and water mains. M. Osgood is city engineer.

ANN ARBOR, MICH.—The Forge Products Corp., capitalized at $150,000, has been chartered under the New York laws to manufacture high speed steel forgings and gasoline engine valves. L. J. Hoover is president.

DETROIT.—The C. Kline Forge Co., St. Aubin avenue, will build a 1-story forge shop to cost $25,000.

DETROIT.—Fire has severely damaged the warehouse on the Armstrong & Graham lea-



Low Type Charger Designed and Built for Republic Iron and Steel Co., Youngstown, Ohio

CHARGING MACHINES AND MANIPULATORS

A New W-S-M Bulletin

Of interest to users of charging and manipulating equipment is our new Bulletin A-7. It describes our various standard type Open Hearth chargers, also special machines for charging Heating Furnaces, for handling slabs, ingots, blooms, billets, wheels, tires, etc. We are prepared to build a special machine for your particular requirements.

Write for Bulletin A-7

The Wellman-Seaver-Morgan Co.

Cleveland, Ohio, U. S. A.

ther firm. Loss amounted to $300,000. Members of the firm are Edwin E. and Henry I. Armstrong and Burk M. Graham.

STURGIS, MICH.—The Berridge Shear Co. will build a 1-story forge shop 20 x 30 feet.

CHARLESTON, ILL.—A bond issue of $20,000 is planned to provide for improvements to the waterworks and electric light plants. T. T. Schumaker is superintendent.

CHICAGO.—The Chicago Shipbuilding Co. is building a 2-story addition, 20 x 65 feet, to cost $25,000.

CHICAGO.—J. L. Sparks, 320 West Grand avenue, is building a 1-story foundry 50 x 75 feet at 1723 Carroll avenue, to cost $10,000.

CHICAGO. — The Garden City Spring Works, 2300 Archer avenue, is building an addition to cost $60,000. Frank D. Chase, 122 South Michigan avenue, is architect.

CHICAGO.—Frank I. Bennett, commissioner of public works, is asking an appropriation of $4,855,000 for the construction of bridges Madison street, Twelfth street, Kimball avenue, Wells street and Franklin-Orleans streets.

CHICAGO.—The Chicago Galvanizing Co., capitalized at $10,000 has been chartered by Frank W. Black, W. T. Jones and Charles B. Cone, 332 South Michigan avenue.

CHICAGO.—The Joslyn Mfg. & Supply Co., M. L. Joslyn, president, 133 West Washington street, is building additions 90 x 90 feet, and 90 x 180 feet, at Thirty-seventh and Morgan streets.

MADISON, ILL.—The Tri-City Steel Co., manufacturer of railroad equipment, S. E. Camp, president, 20-21 Railway Exchange building, St. Louis, will build a steel rolling mill, 100 x 390 feet, to cost $100,000.

ST. CHARLES, ILL.—The Faultless Iron Works will rebuild its burned plant. H. Janes is manager.

ANDERSON, IND.—The Hill Pump Co. will build a plant 100 x 200 feet at Twenty- over the Chicago river including structures at third and St. Charles streets.

EAST CHICAGO, IND. — The Hubbard Steel Co. is building a steel foundry 200 x 600 feet.

EAST GARY, IND.—The Gary Foundry & Machine Co. is building an addition 24 x 86 feet to its foundry and two pattern storage buildings. W. H. Kleppinger is president.

INDIANAPOLIS.—The Patrick Lock Co., capitalized at $20,000, has been chartered to manufacture locks and machinery by T. F., F. M. and L. Patrick.

INDIANAPOLIS.— The Clarence Angster Mfg. Co., capitalized at $20,000, has been chartered to manufacture machinery by Frank W., Clarence and Carl Angster.

MICHIGAN CITY, IND.—The Joseph W. Hays Corp., capitalized at $275,000, has been chartered to manufacture machinery by Frank R. Warren, Floyd A. Deale, and B. A. Tuttle.

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts, Washington:

Power press, die sinking machine, turret machine and lathes, 3937½, May 3, Newport.

Lathes, 3947½, May 29, Washington.

One 200-ton overhead traveling crane, 4001½, May 3, Washington.

Drilling machine, 4016½, April 22, Washington.

Two drilling machines, 4022½, April 22, Washington.

Twenty motor driven lathes, 4023½, Washington.

Twenty electric driven winches, 4027½, Brooklyn.

Three grinding machines, 4031½, April 22, Washington.

Three milling machines, 4036½, April 22, Washington.

Two engine lathes, pipe threading machine, 4037½, Mare Island.

Thirty-five milling machine, 4052½, May 3, Washington.

Four electric centrifugal machines, 4098½, May 3, Washington.

The schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

CINCINNATI.—Incorporation papers have been filed for a new coal company. E. W. Tildesly, vice president of the Tildesly Coal Co. is one of the incorporators. The company will be located at 2311 Union Central building.

MANNINGTON, KY.—The Memphis Coal & Mining Co., Memphis, Tenn., will build a $40,000 steel tipple here.

NORTONVILLE, KY.—The Norton Coal Mining Co. has let a contract to the Ruby Lumber Co., Jadisonville, Ky., for an addition to its power house and supply house, from plans by Architect Ben Price, 518 Empire building.

PRINCETON, KY.—National Oil & Refining Co. is in the market for steam pipe and oil well casing. The company has drilling machinery, and is starting operations on a 6000 acre tract of land.

WINCHESTER, KY.—Winchester Lumber & Mfg. Co. will rebuild its burned plant in the fall. It has been forced to hold up plans due to inability to obtain machinery and other equipment.

WHITESBURG, KY.—Tug River Lumber Co. will build tramway and install band mill with a daily capacity 30,000 feet of lumber.

BECKLEY, W. VA.—Cooper & Walker will build a flour and feed mill at this place.

CHARLESTON, W. VA. — The Boone Producing Co., capitalized at $25,000, has been chartered to operate for oil and gas in Sherman district, Lincoln county, by D. C. Smallridge, O. J. Anderson, Montgomery; George N. Hancock, H. H. Smallridge, Harold P. Tompkins, Charleston.

HUNTINGTON, W. VA.—The Peter Cave Coal Co., capitalized at $50,000, has been chartered to operate in coal, timber, oil and gas at Alkol, Lincoln county, by I. J. Harshbarger, J. Bruch, D. J. Pancake, L. J. Corbly, Huntington.

HUNTINGTON, W. VA.—The Huntington Lumber & Supply Co. will build an addition to its plant here soon.

MORGANTOWN, W. VA. — The Cheat Canyon Coal Co., capitalized at $10,000, was chartered to operate mines in Monongalia county, by Angeline Pollock, Robert H. Pollock Jr., Harold B. Pollock, William G. Frankenburger, Lida F. Frankenburger and John A. Purinton, Morgantown.

PARKERSBURG, W. VA.—W. Schneider has a contract for rebuilding a silk mill.

SISTERVILLE, W. VA.—The Price Construction Co. has a contract for shops for the Western Maryland railroad at Hagerstown, Md., to be 35 x 80 feet.

New Business in Eastern Canada

NEW WESTMINSTER, B. C.—The Fraser River Shipbuilding Co. has been formed to engage in the construction of wooden, steel and concrete ships, etc. The company has secured a site on the Fraser river, within the city limits and will commence at once of the erection of a plant.

VANCOUVER, B. C.—The British American Shipbuilding Co. has made arrangements with the harbor board for a site on the Kitsilano reserve, where it will construct a shipbuilding plant.

VANCOUVER, B. C.—The Western Canada Shipyards, Ltd., proposes to build a new plant on False creek.

VANCOUVER, B. C.—The Wallace Shipyards, Ltd., are making considerable extensions to their plant. Three or four new buildings will be erected and the machine shop will be enlarged for the building of engines, boilers, and other machinery.

VANCOUVER, B. C.—The Rubber Roofing Co., Ltd., which has a plant at Sydney, B. C., proposes to establish a plant in Vancouver, to cost $125,000.

VICTORIA, B. C. — The Victoria Shipbuilding Co., Ltd., will make considerable extensions to its plant and install new equipment.

JARVIS, ONT.—J. J. Parsons, is in the market for an 8 or 10-horsepower gasoline engine.

OTTAWA, ONT.—The construction of a plant for rolling steel plates, angles, etc., the output of which will be sufficient to meet the needs of the shipyards of the dominion for some years to come, will be started immediately at Sydney, B. C., as the result of an arrangement completed between C. C. Ballantyne, minister of marines and fisheries and the Dominion Iron & Steel Corp. A plant will be erected capable of turning out 150,000 tons of ship steel annually. The plant will entail an expenditure by the Dominion Iron & Steel Corp., of from $3,000,000 to $5,000,000 and will be ready for operation in from 15 to 18 months.

TORONTO, ONT.—John Price, Ltd., has been incorporated to manufacture brick, tile, terra cotta, sewer pipe, etc.; $200,000 capital stock, by George P. Price, 94 Greenwood avenue; Charles H. Price, John Price and others, all of Toronto.

TORONTO, ONT. — The Auto Electric Service Co., Ltd., has been incorporated to

manufacture electrical equipment, machinery, motors, storage batteries, etc., with $40,000 capital stock, by George J. Beattie, 72 Victoria street; Ivan R. Church, Rudolph P. Caulford and others all of Toronto.

TORONTO, ONT.—The Pioneer Collapsible Tubes, Ltd., has been incorporated to manufacture collapsible tubes, metal tubes, etc.; $50,000 capital stock. Provisional incorporators are Alfred T. Bonathan, 108 Ashburnham road; Charles W. Toms, Henry L. Crossland and others, all of Toronto.

TORONTO, ONT. — George B. Meadows Co., Ltd., is in the market for a press for sheet metal work.

TORONTO, ONT.—The plant of the Thor Iron Works, foot of Bathurst street, which is engaged in the building of steel ships for Canadian registry, was destroyed by fire, April 2, with a loss of $300,000. The loss to machinery is estimated at $100,000, which will have to be replaced immediately. The company will commence the rebuilding of its plant at once.

TORONTO, ONT. — The manufacturing plant of the Jefferson Glass Co., Ltd., 388 Carlaw avenue, was destroyed by fire April 1, with a loss of $60,000, of which $30,000 was to machinery. The company will rebuild and will require new machinery and equipment. W. A. Martin is general manager.

TORONTO, ONT. — A. H. Aunger, 759 Pape avenue, is in the market for 5 and 20-horsepower motors.

TRENTON, ONT.—The Trenton Cooperage Mills, Ltd., has been incorporated to manufacture boxes, all kinds of woodwork, etc.; $100,000 capital stock; Joseph M. Bullen, 44 King street west, Harold L. Steele, Wendell Osborne and others, all of Toronto, Ont. are the provisional directors.

MONTREAL, QUE.—The Dominion Lamp Co., Ltd., has been incorporated to manufacture electric lamps, machinery, electrical equipment, etc.; $100,000 capital stock; by Philip H. Klein, Westmount, Que.; Henry B Irving, Edson G. Place and others of Montreal.

MONTREAL, QUE. — The Interocean Transportation Co., Ltd., has been incorporated to build and operate ships, tugs, shipbuilding plants, drydocks, etc.; $1,000,000 capital stock; by Waldo W. Skinner, George G. Hyde, Ronald C. Grant and others, all of Montreal.

WINNIPEG, MAN.—The Great West Electric Co., Ltd., has been incorporated to build and operate electric light, heat and power plants, to manufacture machinery, electrical equipment, etc.; $300,000 capital stock; by Sidney T. Smith, William R. Ingram, James N. Hutchison and others, all of Winnipeg.

New Trade Publications

CONTRACTORS' SUPPLIES.—A bulletin issued by the Walter A. Zelnicker Supply Co., St. Louis, describes the company's line of contractors' supplies which include rails, both new and relaying, locomotives, tanks, cars, steel piling, compressors, wire rope, boilers and pipe.

PIPE TOOLS.—Pipe tools are described in an attractive booklet recently issued by the Greenfield Tap & Die Corp., Greenfield, Mass. The book contains 72 pages and is well illustrated. Aside from describing the company's line of pipe tools, the booklet contains a short historical sketch of the company and many tables of useful information.

MARINE BOILERS. — The Badenhausen Co., Philadelphia, has issued a booklet describing its continuous circulation marine boiler. The subject of water circulation in boilers is interestingly explained in the booklet, with the aid of illustrations. The booklet will interest engineers and others who have to deal with boilers.

COMMUNITY HOMES. — An attractive and artistic 30-page booklet issued by the Hydraulic Pressed Steel Co., Cleveland, contains valuable information regarding the erection of reinforced concrete houses for industrial workers and others. The booklet is profusely illustrated and includes many plans of standard houses.

LADLES.—The Whiting Foundry Equipment Co., Harvey, Ill., has issued a 24-page folder describing its line of ladles which includes crane, truck, bottom tap, teapot spout, shank and hand, car wheel, reservoir and trolley types. The booklet is illustrated and comprehensive descriptions of each article are included.

PIPE TOOLS.—Catalog 38 devoted to pipe tools is being distributed by the Greenfield Tap & Die Corp., Greenfield, Mass. The bulletin illustrates, describes and presents complete specifications for pipe threaders, die stocks, pipe dies, stocks and dies for brass tubing, pump makers' stocks, plumbers screw plates, taps and reamers, tap wrenches, pipe wrenches, pipe cutters, and many other tools.

MAGNESIA.—The Magnesia Association of America, Philadelphia, has recently issued an attractive 32-page booklet describing the educational publicity given its insulation material. The booklet reproduces advertisements that appeared in many technical papers during 1917. It is an interesting collection and will appeal to engineers and others who have occasion to consider insulating material.

BOLTS, NUTS, RIVETS. — An unusually attractive catalog, 120 pages long, with an index on the margin, to enable the reader to reach that part of the volume which he desires in a few moments, was recently published by the Kirk-Latty Mfg. Co., Cleveland. Size and price tables are conveniently arranged, the lengths of the bolts being placed in the first column and the prices opposite under separated diameter headings.

TIN ROOFING.—An 11-page folder issued by the N. & G. Taylor Co., Philadelphia, gives descriptions, details and other data recommended by the American Institute of Architects regarding tin roofing. These include standard specifications for tin roofs and tin roofing work, data on how a tin roof should be laid, color suggestions for tin roofing, information for architects and some tin roof "don'ts". The folder is illustrated.

MECHANICAL GAS PRODUCER. — An 8-page illustrated folder issued by the Wellman-Seaver-Morgan Co., Cleveland, contains full details of the company's mechanical gas producer. The illustrations clearly show the construction details of the device and the reading matter describes the principle and operation. Among the chief features described are a mechanical water-cooled poker and mechanical feeds.

PLANERS.—"The History of the Planer" is the title of a 32-page booklet recently issued by the Cincinnati Planer Co., Cincinnati. This interesting bulletin traces the development of the planer over the last century and illustrates some of the crude relics which mark the early practice. The material in the bulletin is prepared so as to illustrate most strikingly the difference in design of the two periods. The modern units are illustrated on the right hand page and their early prototypes are shown on the facing page.

POWER SHEARS. — A catalog describing and illustrating power shears, entitled "Gold for the Scrapheap," has been published by the Cedar Rapids Foundry & Machine Co., Cedar Rapids, Iowa. The machines are built is several sizes, the smallest being designed for country and small town scrap iron dealers. In the largest size the teeth of the bull gear are shrouded, giving them additional strength and preventing breakage. The small pinion which runs into the bull gear is of cast steel. The shear has a guide post on each side of the jaw, which is bolted together at the top to reinforce the jaw and to give it greater rigidity.

BRASS FOUNDRY SUPPLIES. — "Suggestions for Brass Foundrymen" is the title of a 96-page catalog being distributed by Frederic B. Stevens, Detroit, devoted to a complete listing of equipment and supplies used in brass foundry operations manufactured by that company. Natural draft furnaces are described in the first part of the booklet, this portion being followed by descriptions of blowers, crucible shanks, tongs, crucibles, etc. Other portions of the booklet describe and illustrate sand sifters, riddles, core making machines, core ovens, core wire straighteners, snap flasks, cast iron flasks, clamps, air and electric vibrators, tumbling barrels, sprue cutters and magnetic separators. Several pages of foundry notes and formulas also are included.

COUNTERSHAFTS.—An 8-page bulletin devoted to friction clutch type countershafts was recently published by the Foster Machine Co., Elkhart, Ind. This countershaft is of the expanding friction ring tye. The loose pulleys are equipped with roller bearings. The more prominent single features of the countershaft are said to be the gripping power and ease of expanding the friction clutch ring. To effect this operation two radially mounted fingers are pivoted to swing around a tapered stud and are provided with ears engaging the slots cut in the expansion rings. The inner ends of these fingers engage and are spread apart by the wedge-shaped part of the dog, which is pivoted on a pin mounted in the driver and is operated by a wedge mounted on the shaft. The wedge is operated longitudinally by a fork, shipper rod and lever, in the manner common with the average countershaft. The dog is counter-balanced to counteract the action of centrifugal force at high speed. The buletin is profusely illustrated, shows the action and part taken by each separate part of the complete countershaft and presents diagrammatic views to facilitate the reader to grasp the important details of the mechanism.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 hlue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 hlack sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo	7.70c
No. 28 galv. sheets, Cleve	7.635c
No. 28 galv. sheets, Cinci	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	$22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	28.00 to 29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	26.50 to 27.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melting steel, Birming.	23.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo	34.00
Knuckles, coup. St. Louis	33.75 to 34.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. steel, eastern Pa.	39.00
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	33.75 to 34.00
Steel rails, old, Birmingham	27.50 to 30.00
Stove plate, Chgo	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	25.00 to 26.00
Stove plate, eastern Pa	23.00 to 24.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis- St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo	38.50 to 39.00
Angle bars, steel, St. Louis	35.00 to 35.50
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	31.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo	28.00 to 28.50
Busheling, No. 2, Chgo	18.75 to 19.75
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	16.50 to 16.75
Cast borings, eastern Pa.	19.00
Cast borings, Cleveland	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 13.00
Cast borings, Chgo	18.00 to 18.50
Cast borings, St. Louis	17.00 to 18.00
City wrought, long, N. Y.	31.00
Cut forge, Chicago	31.00 to 32.00
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	46.50
Iron axles, eastern Pa.	46.50
Iron axles, Chicago	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	19.00
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	15.50
Machine turnings, Pitts.	19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.25 to 26.75
Pipes and flues, St. Louis	27.50 to 28.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east. Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
Railroad wr'ght, No. 2, Chgo.	32.00 to 33.00
R. R. wrgt. No. 1, Birming.	26.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	32.00 to 33.00
Railroad wrgt., No. 2	30.50 to 31.00
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	36.00
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	31.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 28.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 24.00
Cast, No. 1 cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.00 to 31.50
Cast No. 1, Cincinnati	29.00 to 29.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32 25 to 32.75
Cast, No. 1, Chicago	32.00 to 33.00
Cast, No. 1, Pittsburgh	34.00
Cast No. 1 St. Louis	27.50 to 28.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	32.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	30.50 to 31.00
Malleable railroad, St. Louis	28.00 to 28.50
Malleabel agricultural, St. L.	27.25 to 27.75
Cast, No. 1, Cincinnati	26.00 to 26.50

MISCELLANEOUS USES

Boiler punchings, Chgo	35.50 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo	43.00 to 44.00
Locomotive tires, St. Louis	37.50 to 38.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, April 25, 1918 *No. 17*

War Requirements Absorb Output

More Stringent Policies Covering Orders and Distribution Framed by Government Advance Essential Needs and Set Aside Commercial Tonnage—Shipbuilding Get Precedence Over All—Plate Demands Force Wooden Car Types

TRANSPOSITION of the iron and steel industry to a strictly war basis is proceeding rapidly. The movement in this direction, which has been assuming more positive form in recent weeks, has been accelerated through the sweeping new policies covering orders and distribution contemplated by the war industries board. These provide for both a sharper differentiation between the government's major war requirements and the establishment of much more rigorous restrictions against general commercial consumption than hitherto have been enforced. Greater insistence that the mills shall be confined to the rolling of war material has been directed upon producers. Underlying these vigorous measures is the timely recognition that more stringent conservation of various forms of steel is necessary to escape shortages where delays might entail disastrous effects. The threatening aspects of the pig iron situation and their relation to raw steel supply also are being taken into account.

Plates Are Conserved

Conditions of plate production have had much to do with shaping the new classification of essential government requirements. Washington's apprehensions in this respect have caused shipbuilding to be given precedence over all other war activities. Then in order follow naval work, needs of the war department and the railroads. Those industries identified with the conservation list are to have first call on the remaining tonnage. The result of this priority designation is that the car types originally specified by the railroad administration are to be modified and wooden construction will be used more extensively. Now that this point has been settled, it is expected the delay in the placing of the government cars which has caused much uneasiness among the builders, will be terminated.

Many large additions are being made to the ever-growing war tonnage. About 100,000 tons of steel, which will be supplied largely by Pittsburgh and Chicago mills, will be required for 66 additional boats for 1919 delivery just placed by the Fleet corporation with the leading lake builder. A total of 110,000 tons of barbed wire for needs abroad was allocated this week, but production now has been held up. An interesting new order calls for hundreds of 15-foot tanks for the American forces in France.

War Orders Fill Mills

More mills are falling in line with the policy announced by leading producers a week ago to fill rolling schedules exclusively with war orders until further notice. Many private consumers have viewed with alarm this new difficulty surrounding their supplies, but the plan is being strictly enforced. In bars, where a large nonwar tonnage now rendered inactive, is on the books, the advisability of cancellation has been raised by the producers. In some cases, in fact, these orders have been wiped off. Some sheet mills in the valleys and in the east are on 100 per cent government business and this number is expected to increase. The leading valley maker of sheet bars, owing to a scarcity of steel, has announced that this production will be discontinued indefinitely when present orders are filled unless the government may require further tonnage.

Iron Needs Guarded

As was inevitable, the government is taking more direct notice of the immediate shortage of pig iron and of the prospects that this will become intensified after the middle of the year. Such action as will insure a more balanced distribution of available tonnage to sustain present war production, especially in steelmaking iron, is being taken as circumstances require. Commandeering of surplus stocks of basic has been resorted to in some cases. Further requisition of standard low phosphorus output in the east has been made. The amount of tonnage coming before the government for allocation continues to grow. A new inquiry of importance calls for 20,000 tons of bessemer for shipment to France. Open market supplies available for general consumption remain exceedingly scant. The producers are chary in making any additions to their contract obligations.

The Iron Trade Review.

EDITORIAL

Enough Glory for All

INSTANTANEOUS applause from the hundreds of assembled business men representing widely-diversified industries greeted the casual mention of the name of Charles M. Schwab by several speakers at the annual Foreign Trade convention at Cincinnati last week. Mr. Schwab was not in attendance. The vigor and spontaneity of these demonstrations were deeply expressive. They recorded in unmistakeable fashion the immediate approval of the appointment of Mr. Schwab to direct the government shipbuilding program as voiced by those peculiarly interested in the upbuilding and preservation of the American merchant marine from a commercial as well as from a patriotic standpoint. They reflected clearly the deep confidence and respect which Mr. Schwab's career of great accomplishment has inspired in the minds of business men.

Nothing the government yet has done in elevating to positions of great trust and responsibility business men of the highly capable class, has received a more complete endorsement or has been regarded as possessing greater significance, than the selection of Mr. Schwab. He will bring to his new post a marvelous capacity not only for mass production but a genius for getting the most and best out of those who are associated with him either as advisors or as employes. How successful he will be in exercising this latter quality will, in a great measure, determine the results he will secure as chief of the government's shipbuilding operations. The government now has the yards and it is production that will count most from this time. How much labor is willing to supply toward a 100 per cent efficiency largely will regulate the amount of work turned out. It will be the main job of the new director of shipbuilding to develop the labor factor to its most productive stage.

Mr. Schwab's enlistment in the service of the government at a critical period, represents the crowning undertaking of his great career as a creator of enterprise. That he will fill it successfully and with honor to himself and to the industry of which he is a leader, may be accepted as assured.

In the gratification which the sight of the Bethlehem steelmaster, attacking his task with all his proverbial modesty, spirit and genius, brings to the country, it is well to be both generous and just in apportioning credit to those who have brought the shipbuilding program to practically sure ground after a discouraging struggle. The action of Charles M. Piez in stepping down from his position as general manager of the Fleet corporation to give complete authority to Mr. Schwab and in fact, himself suggesting the appointment of the latter, is an example of true and broad-minded patriotism. To Edward N. Hurley should rise in the hearts of his grateful countrymen a deep sense of their indebtedness for bringing the unsurpassed shipbuilding project from chaos, through organization and preliminary construction to the point where production now is the chief essential. When the shipbuilding program goes "over the top", as now seems assured, there will be and should be, ample glory for all those who have put the best that they possess into the fight.

Victory, the Big Business

AMERICAN exporters are alert to the new problems and conditions that will confront them at the conclusion of peace. At the same time they have taken a true perspective of the one big and all-absorbing undertaking that concerns all business, that of winning the war, and they are subordinating all private plans and interests to that aim. This was the slogan enunciated in clear and unmistakable fashion by the fifth annual Foreign Trades convention assembled at Cincinnati last week. The part of foreign trade in winning the war was the general theme of the convention.

The questions which absorbed the deepest thought and discussion at the meeting were those which have a peculiar bearing upon the future of the foreign trade of this country. A jealous preservation of the American merchant marine which now is being constructed at the dictates of war, was urgently demanded. Some methods toward overcoming the effects of the indefensible seaman's act and similar legislation, which promise to stifle the new merchant fleets of this country when worldwide competition again is restored after the war, were presented and discussed at length.

Probably the most significant and important phase of the convention's work, however, was the attention given to the newly-enacted Webb-Pomerene bill which by permitting combinations of competitors in export trade suspends the provisions of the Sherman antitrust act in that particular direction. No legislation put on the statute books in this country in many years possesses more possibilities for the constructive advancement of American commercial interests beyond the seas than this act and the principles which it legalizes. Already it is apparent, American exporters are alive to their opportunity and they are beginning

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to frame plans to reap the benefits, particularly after the war.

The Cincinnati Foreign Trade convention was pronounced to be the best ever held. It was largely attended and the deliberations were sober and complete. It was characterized by the patriotic spirit and resolution that testify unmistakably to the fact that business men whatever the cost to their private interests, have rallied loyally to the government's call in this time of stress and are making the winning of the war the big and only business of the hour.

Will Steel Win the War?

THE steel industry's reputation, which has come down through the years, is that it never has failed in a national crisis. But national crises, serious as they may have been, never were as critical as is the one the United States and the world now face. Will the industry fail? The answer to that question lies with the industry itself, and with each steel manufacturer individually. The tremendous demands of today more and more are requiring that practically every ton of steel be utilized for the war alone. Iron and steel production has become almost exclusively a war business, and it is a question of a few days until not a pound of any iron or steel commodity will be available unless it is for use upon war work. Each developing phase of war production brings additional demands upon the industry.

Mill, foundry and furnace capacities, with few exceptions, are equal to the demands. The question simply resolves itself into one of production. Will the plants produce? They can and they must. Presidents and managers who have directed mill operations from the front office should personally see to it that all machinery is running to its maximum efficiency. Salesmen who have been called in should be sent out immediately, this time to the shipyards, to the gun shops, to the munitions plants, to see that steel deliveries are being made as promptly as possible, to keep their mills closely advised as to what the consumer's next requirements will be and to handle all the odd details which are allowed to slip until they constitute a serious problem. Every man in the industry, from the highest salaried official to the greenest mill hand should be "on his toes" to see that there is no "shortage" and that the reputation of the industry for coping with the emergency is kept as clean as that of the army it is supporting. Steel will win the war if the mills produce the tonnage the war demands at the time it is needed.

Changes in Shipyard Practices

WAR as an industrial accelerator presents almost exclusively to the public view the side concerned with new construction. New plants, huge additions to existing factories, immense orders for new equipment and supplies, and fleets of newly built ships, furnish the tangible factors to which one clings when surveying war's part in speeding up the nation's industrial life.

Another fact, which in its ultimate effects may easily prove far more important, is the part war plays in advancing mechanical methods and designs. Measures which in normal times would fight for existence against the inertia and prejudice of established practice, are seized and tested on a wholesale scale.

Two clear illustrations of this fact are shown in action taken recently by the shipping board. At a time when the engineering fraternity as a body is unable to determine the thorough feasibility of two innovations in ship construction, the shipping board appropriates funds to make immediate and thorough tests. At various yards on the east and west coast, the largest concrete ships ever built will be carried through to completion within the shortest possible time. As a result, the country will learn within a comparatively few months whether or not the promises made for the concrete ship will stand the test of actual operating conditions.

Simultaneously another fundamental change in ship construction will be under examination by shipping board officials at several shipyards throughout the country. Particularly at the new yard of the United States Steel Corp. on Newark bay, a thorough test will be made to determine just how far welding can be carried in supplanting riveting. At several private yards, electric welding is now used for work previously done with the pneumatic riveter. As a result of the shipping board's investigation, the use of welding apparatus in American shipyards will be curtailed, continued or expanded.

Equal interest is being taken in these same problems in other shipbuilding nations. England in particular has given careful consideration for some time to the introduction of welding methods, and within the past few months has undertaken the construction of concrete barges and ships of larger size than any previously attempted in that country. Germany is understood to have taken up the concrete ship idea but is contenting herself up until the present time with constructing "stone" boats for use on her ambitious network of inland waterways where they are safe.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1088

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$275.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00
Spiegel, contracts, furnace	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	170.00 to 185.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black	Galv.
	Per cent off	
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, April, per bundle	$1.90

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. & small., Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products April 24, average for March, 1918, average for January, 1918, and average for April, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices April 24, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Bessemer pig iron, Pittsburgh..	$36.15	$37.25	$37.25	$42.20
Basic pig iron, Pittsburgh.....	32.95	33.95	33.95	39.20
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	39.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	39.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	42.25
Malleable, valley	33.50	33.50	33.50	36.00
Malleable, Chicago	33.50	33.50	33.50	39.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.79
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	33.00	33.00	38.25
**No. 2X Virginia, furnace....	33.50	33.50	33.50	38.25
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	41.50
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	360.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	72.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	72.50
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	72.50
Open-hearth billets, Pitts.....	47.50	47.50	47.50	72.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.38
Steel bars, Chicago.....	2.90	2.90	2.90	3.54
Iron bars, Philadelphia.....	3.50	3.50	3.648	3.659

*5 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices April 24, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	3.50	$3.50	$3.50	$3.19
Beams, Chicago	3.00	3.00	3.00	3.79
Beams, Pittsburgh	3.00	3.00	3.00	3.70
Beams, Philadelphia	3.185	3.185	3.185	4.159
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	4.69
Tank plates, Philadelphia.....	3.435	3.435	3.435	6.909
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	5.75
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	3.75
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	3.75
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.20
Connellsville furnace coke.....	6.00	6.00	6.00	7.25
Connellsville foundry coke.....	7.00	7.00	7.00	7.87
Heavy melting steel, Pitts.....	29.00	30.00	30.00	28.12
Heavy melting steel, eastern Pa.	28.50	29.50	29.80	25.15
Heavy melting steel, Chicago..	29.00	30.00	29.70	26.63
No. 1 wrought, eastern Pa.....	34.00	35.00	35.00	38.50
No. 1 wrought, Chicago.....	33.50	35.00	35.00	33.30
Rerolling rails, Chicago.....	34.00	35.00	35.30	31.90

(For Additional Prices See Page 1088)

Government Watching Iron Supplies

More Balanced Distribution of Available Metal to Maintain Steel Production Being Sought—Some Commandeering Results—Allocations Grow as Shortage Remains Unrelieved—Ask 20,000 Tons of Bessemer for France

Pittsburgh, April 23.—Lots of off grades of iron have been sold during the past week to consumers in this district and these involved foundry tonnages chiefly. The total aggregated approximately 20,000 tons of which about 5000 tons came from the south. A carmaker in this district is understood to have been able to get only 1000 tons of an inquiry recently put out for 10,000 tons. A Pittsburgh steelmaker who recently bought 3000 tons of basic from an Alabama furnace now is receiving this iron. It is not entirely up to standard specifications and is reported to have been sold at $31, furnace. The shortage of steelmaking grades is acute as ever and is especially emphasized in the case of basic metal. The government is giving more attention to this shortage in basic and in cases in this district where it has been thought steelmakers were carrying larger stocks than their operations required, the surplus has been commandeered. A steel foundry interest is in the market for 8000 to 10,000 tons of basic, for June-August delivery to Sharon and Alliance. Tonnages that have moved during the past week represent odd lots which the furnaces have found available and have been sold to clean up.

Bessemer Tonnage Wanted

Cleveland, April 23.—An inquiry for 20,000 tons of bessemer for the procurement division of the war department for June-September shipment to France is an example of the increasing government demands in pig iron either in behalf of consumers with war contracts or for its allies. Allocations are more numerous. The Emergency Fleet corporation wants 500 tons of No. 2 foundry for April-June shipments to a Chicago plant. The navy has requested 400 tons of Nos. 2 and 3 coke iron, 400 tons of charcoal and 600 tons of copper free low phosphorus for 60 days shipment to Mare Island. A carload each of 11 to 15 per cent of bessemer ferrosilicon also is asked for the Charleston, Washington, Mare Island and Portsmouth navy yards. Other government inquiries include 500 tons of 3 per cent silicon, high manganese foundry iron for April-August shipment to a Minneapolis plant, 100 tons of bessemer for the Watertown, Mass., arsenal and 100 tons of charcoal for Harrisonville, Mass. It is probable that 6000 tons of basic for a western Pennsylvania plant also will have to be allocated. The consumer who is a producer of the ordnance originally bought this iron from a valley furnace, but the latter working badly, now is unable to ship. A prominent steel foundry interest is in the market for 9000 tons of June-August basic for western Pennsylvania and Ohio plants. The General Electric Co. which was in the market for a large tonnage including 10,000 tons of various grades for Erie, Pa., for last half has been able to cover partially but is still in the market. General inquiry is active but sales few. Leading sellers are considering putting a clause in further orders taken to the effect that shipments are dependent upon the expected 100 per cent output being obtained.

Government Requisitions Tonnage

Philadelphia, April 23.—A slight improvement in the conditions of coke

supply has appeared in the eastern Pennsylvania pig iron district. The extent of the general improvement is reflected by the fact that the Empire Steel & Iron Co. again has four stacks in operation. There is much difficulty, however, because the Pennsylvania railroad has made a ruling that large coke cars cannot be moved off its lines. The result of this situation is that consumers located along the Pennsylvania lines have a slight excess of coke and those whose plants are reached only by connecting lines are suffering from shortages. The major sales of the week consisted of several thousand tons of copper low phosphorus iron for last half shipment. At least two makers of this grade now are out of the market for the remainder of the year. The government recently requisitioned additional tonnages of standard low phosphorus iron taking the entire output of this grade of ore. Unable to secure enough standard low phosphorus iron, a leading eastern steelmaker will produce for its own account at Coatesville, Pa., this grade from foreign ore. Many inquiries for basic continue unfilled. This grade continues scarce. Shipments against the 5000 to 6000 tons monthly of southern basic recently arranged to be shipped to the Lukens Steel Co. are coming through very slowly. It is understood the Donner Steel Co. may make basic for sale at Tonawanda, N. Y. Practically no foundry iron was sold during the week except a few hundred tons of off grades.

Deliveries Much Improved

Boston, April 22.—It has been a rather featureless week in the local pig iron market, aside from the fact that deliveries are quite a little better. The Delaware & Hudson has lifted its embargo on shipments to New England and this has resulted in the Boston & Maine, with which it connects, lifting the bars on inward freight. Furnaces located on or using the Jersey Central road are therefore able to once more make shipments into this territory without the assistance of a government or embargo committee permit. Alabama shipments also are coming through satisfactorily; it is understood that not a little iron from that point is coming in by rail, being routed from the furnaces over the Queen & Crescent to Cincinnati and thence east over the Big Four. The Pennsylvania apparently is still swamped with freight, for neither that road nor its connecting New England road, the New Haven, has yet lifted the embargo put in force some time ago. The lifting of the Boston & Maine embargo also is a help to deliveries from Buffalo furnaces, for the Boston & Maine parallels the Boston & Albany here in Massachusetts and while there are many melters who would prefer deliveries over the latter road, they are glad under the present conditions to accept Boston & Maine deliveries. In the matter of inquiries, some sellers report a fair number but others have found them few. On the whole, it is safe to say that realizing the futility of trying to secure either prompt or third quarter iron, most consumers are content to going along for the present on what supply they have or is due them.

Furnaces Behind on Deliveries

New York, April 22.—Pig-iron-hungry consumers are able to obtain very little relief. One furnace, for instance, had some 200 tons of high sulphur foundry during the past week which it divided up into carloads among a number of customers. Another maker in the same way had two carloads to offer. Iron sold for quick shipment amounted to only a few hundred tons. On the other hand, most furnaces continue behind in deliveries on first half contracts. One furnace which by government order is making basic for an eastern plate mill, now is unable to deliver on its first half foundry contracts, at least for the present. Feeling is growing in the trade that in view of the acute proportions reached by the pig iron shortage, it is only a matter of time before metal will be distributed to an increasing extent by government requisitions. One maker remarked today that since there is not enough iron to go around, it is only fair to expect that plants manufacturing non-essential products may have to be shut down to some extent so that those making war materials will be able to operate. A southern furnace which has been a seller on a small scale during the past few weeks, again sold about 3000 tons of foundry to this district last week, principally for last half. All northern furnaces are doing as to second half, is to make reservations for regular customers. They are avoiding making any more actual contracts. Among new inquiries is one for 20,000 to 25,000 tons of basic for second half delivery to plants in East St. Louis and Granite City, Ill. Numerous inquiries are out for export. Included is one for 3000 tons of basic for Japan, for which it is said an export license can be secured.

Supply Continues Limited

Buffalo, April 23.—The unprecedented demand for iron keeps up with local furnaces besieged by inquirers but unable to satisfy the demand. All makers have to make the same reply to users that there is no iron to be had. Inquiries like that of the General Electric Co. for 15,000 to 20,000 tons of foundry and malleable of the New York Airbrake Co. for 10,000 to 20,000 tons of foundry and of the Depew Coupler Co. are said to be still open, though it is understood something on each inquiry has been picked up here and there. Iron for early delivery is particularly scarce, the trading in this amounting to little or nothing. What iron has been obtained by these large inquiries is believed to be fall delivery. Some users are asking to be put on the reserve list so they may get iron as it becomes available or are asking makers to let them know when books are again opened. Some makers who have been able to pick up a little iron for customers by scouring the south, report that they are unable to move it owing to the transportation problem. One of the Donner Steel Co.'s furnaces which has been out is expected to go in this week on ferromanganese, and within a short time will be put on foundry iron. The coke situation is slightly better this week though not sufficient to inspire any great confidence in the future.

Chicago Situation Quiet

Chicago, April 23.—Conditions in the market for pig iron in the Chicago district continue unchanged, with local producers sold for the remainder of the year and most regular customers taken care of for the most part. An appearance of shortage has been created through the efforts of consumers to obtain in this market tonnages which previously they have filled from southern or other sources. Under present conditions, local producers are unable to supply iron to make up this lack and this has given an impression of shortage to a greater degree than really is the case. Basic consumers who have used iron from southern furnaces, have sought to place contracts in this market because of the more favorable freight rate and because southern sellers have been backward about taking orders. One southern maker is offering some prompt No. 3 foundry, which is not easy to move because of its low silicon. The greatest need of melters is more silicon to enrich their mixtures but in spite of heavy demand for high silicon iron, it is practically impossible to obtain it. A recent survey of foundries in northern Illinois and southern Wisconsin developed that the immediate

situation is well in hand and that on the average foundries have about three months' supply of iron in their yards with contracts for the greater part of their requirements for the remainder of the year. If production and shipment are sufficient to fill these contracts, their situation will be favorable.

South Still Needs Cars

Cincinnati, April 22.—The pressure for foundry iron is not quite as strong. The furnaces in the south have little to offer for the second quarter, and the word has gone around to this effect. Last half business is also not solicited with any degree of enthusiasm and some furnaces have not yet determined to dispose of any surplus they may have for that delivery. Shipments from the Birmingham district have improved in some instances but in others there has been considerable complaint. In some cases cars have been over a month enroute. Fortunately, these incidents now are becoming rarer, but 10 days from point of shipment is considered good time. There is no question but what the southern furnaces have the iron on hand to forward promptly if the cars could be secured. Labor scarcity also contributes to a delay in loading cars. Mention has frequently been made lately that the Virginia furnaces are practically out of this market, and latest reports are that this district will have little iron to be shipped here during the last half of the year. Ironton foundry producers are in pretty much the same shape, although some iron for last half probably will be offered quietly within the next 30 days.

Sales Still Are Few

St. Louis, April 20.—Pig iron demand continues far greater than the supply, and this applies to virtually all grades and deliveries. New inquiry this week, while of a scattering character, bulks heavily in the aggregate, and in a number of notable instances includes material urgently needed for immediate use. As has been the case since the first of the month, actual transactions have been insignificant. The movement from east and south into this district developed moderate improvement during the week. Representatives of southern iron producers say they have sold almost nothing.

Southerners Still Cautious

Birmingham, Ala., April 23.—Though inquiries and indications of a need for iron in every direction are numerous and production and deliveries picking up steadily, southern furnaces still are cautious in booking business.

Coke Car Supply Irregular

Sharp Fluctuations of Transportation Facilities Affects Quality of Output—South Near Maximum Production

Pittsburgh, April 23.—Good, but irregular supplies of cars are being furnished to the Connellsville coke region. The irregularity of the supply makes it impossible for producers to base their operations on a uniform practice and as a result overhead costs are heavy and the quality of production is not up to the standard it would be if the supply of cars were regular from day to day. Shipments are moving freely and furnaces appear to be in good shape in the way of adequate tonnages of fuel. The average car supply for the entire region yesterday was 80 per cent, but dropped to 40 per cent today. On the Monongahela railroad yesterday there was a 100 per cent supply, today it was 40 per cent and tomorrow it will be 60 per cent, according to the estimates made. The supply during the latter part of last week dropped down considerably. Production in the Connellsville for the week ending April 13 totaled 334,291 tons as compared with 333,065 tons for the preceding week, according to *The Connellsville Courier*.

Shipments Hold Interest

Cincinnati, April 22.—The principal interest in the coke market remains the same as has existed for the past four or five months, that is, shipments from the ovens. Reliable information from the Connellsville field is that the car supply is much better and the labor question also is improved. The foundries buying in the Pocahontas and Wise county districts are still making strenuous complaints as to delayed shipments. New River does not seem to be as well off, but so far no nearby foundries have been shut down recently for want of fuel.

Shortage Acute in Southwest

St. Louis, April 20.—Aside from a slightly freer movement from eastern ovens early in the week, there has been no change in the coke situation. All dealers and producers are besieged with inquiries from an ever-broadening territory. Eastern and southern ovens are offering nothing and declare they will not for some months. Regular customers are being taken care of to the extent that last year's requirements, but demands for additional tonnages are met coldly. Some sales of small accumulations were made by the producer in this district. Thus far little inconvenience has been experienced here, due chiefly to the help of this plant, but to the west and southwest as far as the now than at any time since the war Rio Grande, the scarcity is more acute started.

Maximum Production in Sight

Birmingham, Ala., April 23.—Every ton of coke that can be manufactured in the south is in demand and the maximum production is in sight. Some old ovens at Jasper, in Walker county, are being rehabilitated and the ovens at Trussville soon will be in operation. To further increase the output it will be necessary to build more ovens. The work of adding 154 ovens to the big by-product plant of the Tennessee Coal, Iron & Railroad Co. at Fairfield is to be pushed. It is to be heard that consideration is being given in another direction looking to the erection of a number of by-product coke ovens this year in this district. Revisions of coke price schedules by the government are being received with much satisfaction in this district.

Ready to Start

Lake Fleet Will Go in Commission Within Few Days

Cleveland, April 23.—Most lake vessels will be in commission within the next few days. Ice conditions on the lakes are greatly improved over those prevailing a year ago when the boats were blocked for weeks, the full fleet not being in commission until early in June. Lake Superior is open although ice is packed in near the west entrance to the Soo waterways. The only barrier to navigation today is the ice in the St. Clair river and tugs are trying to break through.

Committees having in charge the direction of lake trade this year are holding meetings at Cleveland. Preliminary details are being worked out so that the maximum capacity of the fleet can be utilized from the opening. Complete figures have not been received from ore consumers showing the minimum tonnages required up until June, 1919. Preliminary estimates, however, indicate that a movement of 60,000,000 tons of ore will be sufficient to keep all blast furnaces active until new ore begins to arrive next year. This figure is 2,500,000 tons less than the tonnage carried on the lakes last year.

Shell Turnings Marketed

Pittsburgh Consumers Get Tonnage at $24, Delivered—Rule Against Sales as Low Phosphorus to Pig Iron Makers

(FOR COMPLETE SCRAP PRICES SEE PAGE 1088)

Pittsburgh, April 23.—Dealers and brokers in scrap still are waiting for the war industries board to arrive at a conclusion as to whether or not they are to be allowed a commission. It is understood that this question will be settled within a day or two. In the meantime the market remains dull. A few direct transactions between producers and consumers, however, have been made in this district during the past week. One sale involved 4000 tons of billet and bloom crops for last half delivery. This low phosphorus material was sold at a price to be determined by the government. Sales of shell turnings, totaling about 6000 tons, have been made to three mills in this district at $24, delivered. Two consumers have taken an aggregate of 3500 tons of borings which are being substituted for heavy cast scrap. Open-hearth consumers who are not allowed to pay over $29, the price of heavy melting steel, for cast scrap, the government level for which is $34, have had to take borings, the price of which is $19, delivered. The market for cast scrap is weak at $34 and in some quarters it is believed that it may reach a level as low as that fixed by the government for heavy melting steel. In this event it is thought open-hearth operators would be allowed to take tonnages of cast scrap. In connection with the sales of borings, in which it is said there is no profit, producers required buyers to take 2000 tons of shell turnings.

Shell Turnings Are Sold

Boston, April 22.—Deliveries of scrap on old contracts are proceeding in satisfactory fashion, as the railroad situation has improved materially in the past few weeks, but new business does not amount to much, for everybody is holding off waiting a decision in the matter of commissions. There was more or less business done in shell turnings with the makers of low phosphorus iron at a higher price than these turnings would have brought if sold as machine shop turnings. But such business has been ruled against, much to the opposition of the local dealers who feel that this decision is unfair..

Few Changes in Prices

New York, April 22.—Demand for iron and steel scrap in this district continues rather quiet, although considerable interest still is being manifested in the higher grades of cast scrap. Prices have undergone little change. The only instances of fluctuation are machine shop turnings, which have advanced 25 cents to $15.50 to $16, and steel shafting which has declined to $35.50. No decision has been made relative to the question of commissions. Dealers, however, are hopeful that commissions will be allowed, and are attaching a proviso clause to all contracts, pending definite settlement of the question.

Heavy Demand at Buffalo

Buffalo, April 23.—The demand continues heavy for all grades of scrap. Heavy melting steel, low phosphorus, No. 1 wrought, cast scrap and car wheels are in particularly strong demand. Dealers' yards are bare. The offerings which would ordinarily come in from the country about this time, for one reason or another are not materializing in volume. This is due to the fact that last fall to face the heavy demand the country sources were stripped of available supplies. These with winter accumulations would ordinarily be available now. It is apparent, however, that the winter accumulations are either not up to the mark or the collections have not yet been made. The last railroad list went directly to consumers. It has been suggested that in view of the fact that the government has control of all the railroad scrap and in view of the fact, too, that no greater price would be realized by holding onto it, the railroads keep their scrap moving, instead of holding it until regular periods.

Softer Tone is Apparent

Cleveland, April 23.—A decidedly softer tone is shown by the Cleveland scrap iron and steel market. Nevertheless, prices are much firmer than is apparent. At a distance nearly every grade, with the exception of heavy melting steel, seems to be sagging badly, but when sellers are approached they stick pretty closely to the government maximums. Cast borings and turnings are down to $16 to $16.25. No. 1 busheling also is failing to show much strength despite the fact it is hovering within $2 of the high level. Not much confidence—nor hope—is expressed that the government will permit the sale of shell turnings as low phos scrap.

Steel Strong at Chicago

Chicago, April 23.—Although the market for iron and steel scrap in the Chicago district is quiet and there is little demand for most grades, steel scrap is active and can be sold in any tonnage at $29, delivered. Demand for this grade is also strong from eastern consuming points, which gives the local market its strength. Most consumers are not taking much material although consumption is at a high mark and inasmuch as a great deal of material is coming out, the general situation is easier than has been the case through the winter. Rerolling rails continue to be almost unobtainable and such small tonnages as present themselves are taken readily. Railroads have not continued offerings at the rate which prevailed during the past fortnight and lists have been scarce. The Chicago, Milwaukee & St. Paul is offering 700 tons.

Forwarding Difficulties Continue

Cincinnati, April 22.—There is hardly a ripple to disturb the present scrap market. Dealers complain that freight embargoes are giving trouble, and they have practically settled down to await several momentous decisions, including the commission question. It has been rumored from time to time lately that outbound shipments could be made to almost any point, but it now transpires that many difficulties are experienced in forwarding scrap to the largest consuming center.

Buying at Low Point

St. Louis, April 20.—The market during the past week has been dull, with actual transactions at an extremely low ebb. Neither buyers nor sellers appear anxious to press matters. Some cars of various grades changed hands to supply immediate requirements, but purchasing on a large scale or for future needs is at a standstill. The question of a commission for dealers still is an important factor in the situation. Many of the important melters in this district are more or less short of supplies. Certain grades are commanding the maximum government prices. There is some speculation concerning the price of old steel angle bars on which the trade would like to have an official ruling. Some dealers contend this grade should be classed with heavy melting steel or short steel rails, while others hold the maximum

price should be $39 per gross ton. Despite the slow market this week, the Wabash sold 2000 tons and the Missouri, Kansas & Texas 1000 tons. Fresh offerings from the carriers reported are as follows: Louisville & Nashville 1000 tons, Kansas City Southern 500 tons, and Chicago & Western Indiana 300 tons.

Southern Market is Quiet

Birmingham, Ala., April 23.—But little inquiry is being received by scrap iron and steel dealers in the south. What old material is selling is not bringing the maximum prices fixed by the government. The dealers in this section of the country do not get commission nor brokerage charges, hence when the maximum prices of the government are not obtained, it is necessary to lower the prices paid for the country scrap and that in turn reduces the incentive for gathering the latter product.

Presenting Commission Claims

Philadelphia, April 23.—Representatives of the general committee of the American Iron and Steel institute of the subcommittee on scrap and of the American Board of Scrap Iron Dealers are appearing before the price-fixing committee of the war industries board at Washington tomorrow requesting the authorization to consumers to pay dealers a commission on sales. Those dealers who several weeks ago took the large order for heavy melting steel from the Alan Wood Iron & Steel Co. are having much trouble to cover as holders of material want the full maximum price in most cases. The dealers, therefore, are tentatively placing orders at the maximum prices subject to ratification if the commission is allowed. If the commission is not allowed these orders will lapse. In case of favorable action on the commission several other mills are expected to come into the market for heavy melting steel. The pig iron shortage is causing cast scrap to be taken as fast as offered. There is a great shortage of this grade at foundries not favorably located with respect to cast iron sources of supply. The demand for wrought scrap exceeds the supply. It is learned that no action will be taken to place shell turnings in the low phosphorus classification because the production of these turnings has become so large it will be sufficient to meet all requiredistrict is a $2 reduction on borings ments.

The Link Belt Co., Chicago, recently certified to the secretary of state, a decrease of its capital stock from $5,040,000 to $4,050,000.

To End Sheet Bar Output

Leading Valley Maker Closing Up This Production Because of Steel Shortage Unless Government Requires Tonnage

Youngstown, O., April 24.—Most mills in the valley are rolling sheet bars from bessemer steel whenever it can be spared for this purpose. The leading maker is rolling limited tonnages. It is his aim to clear up all bookings for this material and when this is done, the rolling of sheet bars will be discontinued indefinitely, depending upon the government's requirements. All sheet bars being rolled on his mill at present were promised for delivery two months ago, but were held up on account of the heavy government needs. Practically all the open-hearth steel made here is going into shell bars, plates, etc., for the government so that bessemer plants are being called on to supply steel for other lines. Bessemer plants are only operating at 85 per cent capacity in the valley and makers state the demand for this grade of steel is so great that little tonnage remains available for rolling into sheet bars. The Trumbull Steel Co., Warren, O., is operating three of its new open-hearth furnaces now and expects to roll sheet bars about the middle of July, when its bar mills will be completed.

Discard Offerings Numerous

Philadelphia, April 23.—Offerings of shell steel discard in this territory are in excess of demand. Large tonnages, therefore, are being melted for scrap. These discards are the only class of semifinished material now being offered. The hunger shown by consumers for standard semifinished material continues unrelieved. An eastern plate mill is inquiring for 1000 tons of slabs. Many small new inquiries for slabs and billets have appeared and the larger lots recently noted as being sought in this territory remain unclosed.

Schedule Government Orders Only

Pittsburgh, April 23.—Government demands being made and in prospect are so tremendous that leading makers virtually have closed their rolling schedules against all commercial business. The point has been reached where private and nonwar business has been practically eliminated and to an extent that was not conceived of until recently. Production and orders are being confined by these makers to Class A tonnage or direct war needs only, except where otherwise requested by the government. Mills adopting this policy do not have a single pound of open-hearth steel to offer to any buyer except the government, and one of them does not have any bessemer tonnage whatever to offer to any other consumer. This latter producer will take business from regular consumers, but will not give any promises as to the time of delivery or what portion of the tonnage involved will be rolled. Another prominent producer is offering limited lots of bessemer tonnage only and soon may have to withdraw. Makers are waiting to learn the requirements of the government for shell steel. They are desirous of knowing how to arrange their schedules, but in order to do so must be advised as to the plan of allocation. Scarcity of sheet bars is acute and the demand is growing faster than the inquiries in output. One seller in this district says no difficulty will be experienced in disposing of 100,000 tons. Sheetmakers are particularly insistent for tonnages. Numerous inquiries also are out for billets but there are no offerings. One new inquiry involves 2000 tons of small size. Eastern platemakers continue to ask for slabs but are unable to cover.

Strip Shipments Improve

Pittsburgh, April 23.—Shipments of cold rolled strip steel from producing plants are now being made in good order. The market is dull. Stocks which were held by automobile manufacturers are understood to be almost depleted and provided government business does not interfere, they are expected to come into the market in the near future for good sized tonnages. Some automobile makers complain that while the government has advised that they can continue along the lines now existing until Sept. 1, they find that priority orders involving government tonnage make it impossible for them to cover their requirements with the mills.

The Edgewater Steel Co., Pittsburgh is now in a position to make prompt shipment of locomotive and car wheel tires as well as rolled steel wheels. Modern machinery has been installed in mills built under the supervision of Julian Kennedy, Pittsburgh, which can roll rings up to 14 feet in diameter, 30-inch face, and of such thickness as desired.

Bar Cancellation Forced

Mills Clear Books of Some of Large and Inactive Commercial Tonnage—Apportion Material to Implement Makers

Cleveland, April 23.—Consumers of steel bars in this territory have been much concerned by the general announcement made last week by leading producers that they have closed their order books and mill schedules to anything but direct government business. This policy has a sweeping effect especially on bars where a large tonnage remains on mill books covering commercial or nonwar requirements. It has been suggested by some of the producers that it would be advisable to cancel this tonnage under the circumstances. Some cancellations, in fact, have been made. The position of the implement manufacturers whose requirements are not in the direct war class continues to arouse interest. Some of these consumers in this territory, however, through negotiations instituted some time ago, have been able to cover partially by agreeing to take three-fifths of the tonnage in bessemer, one-fifth in open-hearth and one-fifth in shell discard steel. Normally, most of the steel purchased has been of open-hearth quality. Jobbers are buying hard steel bars quite freely.

Implement Makers Specify

Pittsburgh, April 23.—Implement makers are specifying rather freely for steel bars and inquiries are coming from this source, but some makers are unable to entertain this business despite its extreme importance. These producers are taking nothing but direct government business. There is considerable speculation as to whether the government will see that requirements for the implement trade shall be put in a preferential class.

Government Only Buyer

Chicago, April 23.—Practically no tonnage of steel bars is being taken by mills for other than government requirements. In addition to direct needs of the government, almost all consumers of steel bars have contracts or subcontracts for war material, and their requirements for other purposes decrease in equal degree. As a result, demands for bars for ordinary purposes are constantly becoming less and the entire demand is shifting to government business. Users of hard steel bars rerolled from rails find it difficult to obtain further tonnage on account of the shortage of rerolling rails and inquiry is being received in this district from users at a distance who are unable to obtain their supplies from usual sources. Bar iron mills expect a large tonnage to be used on freight cars which the government is expected to place shortly.

Irregularity in Bar Iron

New York, April 22.—Great price irregularity characterizes iron bar and prices range all the way from 3.30c to 3.50c, Pittsburgh, equivalent to 3.495c to 3.695c, New York. These prices are equivalent roughly, to 3.40c to 3.60c, eastern mills. While considerable attractive business is going at the outside figure, offers which have been made during the past week or two indicate that it is unnecessary to pay more than 3.50c, New York, on desirable business. The lowest price reported is 3.30c, Pittsburgh, which was done on a lot of 500 to 700 tons. It is known that the government has had no difficulty in placing numerous tonnages at 3.35c, Pittsburgh. Export restrictions are not as rigorous on iron bars as on some other products, with the result that numerous export sales have been made lately. Some of this business has been done at 3.50c, Pittsburgh, plus an extra of 10 cents for bundling, making the price at New York docks 3.795c. Large eastern buyers of mild steel bars now are almost entirely unable to place orders for such material for early delivery.

Can't Get Material

Buffalo, April 23.—There is a fair demand for bars but users are not requesting them as strongly as a few weeks back, due to the knowledge that mills are almost exclusively employed on government work and have no material to offer commercial inquirers.

Discard Bars Sold

Philadelphia, April 23.—Sales of reinforcing bars rolled from shell steel discard are quite numerous. Some of these are for export. One export inquiry for steel bars now current calls for 2500 tons. Otherwise the eastern bar market is unchanged and private consumers are having increasing difficulty to get accommodation.

Government Principal Buyer

Pittsburgh, April 23.—Bookings being made by producers of cold rolled shafting are principally for the government, either directly or indirectly. While it has not bought any large lots recently, it is understood that it will come into the market soon for good sized tonnages, mostly of the larger sizes. Domestic inquiry is light. Some producers are giving consideration to nothing but Class A tonnage.

Hoop Steel in Demand

Pittsburgh, April 23.—Demand from miscellaneous consumers is coming to makers of hoop steel who are able to book limited lots. The market for bands is dull.

Bolt Orders Not Placed

Pittsburgh, April 23.—The government has not yet placed orders against large inquiries for bolts recently put out, but is expected to do so soon. Makers report that business is being booked in good volume regularly and some are operating at 100 per cent of capacity.

Government Seeks Bolts

Chicago, April 23.—Heavy demand for nuts and bolts for army equipment continues to be entertained and some considerable orders have been booked. This department of the market is unusually active.

Wooden Types

Are Substituted for All-Steel in Government's Car Program

New York, April 22.—In order that more steel may be available for shipbuilding and other war purposes, the railroad administration has decided definitely to reduce the volume of steel, which was originally planned to go into the construction of government cars, and to substitute wood. To what extent this change will be carried out has not as yet been announced. It is understood, though, that the question will be settled before the end of this week and that an allotment of about 100,000 cars will soon follow. About $300,000,000, it is estimated, will be expended, this sum representing a profit to manufacturers of approximately 5 per cent, as against 10 per cent originally asked.

Car inquiries continue scarce, but little coming out in the way of new business. At present, the J. G. White Engineering Corp. is inquiring for 40 to 50 tank cars for the Gulf Sulphur Co.; the Mutual Sales Co., Warren, Pa., wants 10 tank cars; the government is in the market for four 75-ton steel flat cars for the navy, and for twenty 40-ton flat cars. Among orders recently placed are 500

tank cars for F. M. Pease, Philadelphia, to be built by the Cambria Steel Co. The Thompson-Starrett Co. has ordered 400 gun cotton cars from the Kilbourne & Jacobs Mfg. Co. for use at the government's explosive plant in Charleston, W. Va.

Meetings are Over

Philadelphia, April 23.—Orders for the government car and locomotive steel are held up. No more meetings are to be called by John Skelton Williams in charge of these purchases. If additional information is needed, individual builders will be sent for and consulted.

Inquiry Not Heavy

Pittsburgh, April 23. — Inquiries coming to makers in this district for standard railroad spikes are not numerous and involve only small lots. Some makers are promising delivery in four to eight weeks, while others are making prompt shipment from stocks. Inquiry for small spikes still is active, but makers are well committed and have withdrawn from the market. The market for standard rails is quiet. Mills are booked for the remainder of the year, and some up to the first half of 1919. The government is expected soon to be buying freely of both rails and spikes, and in the meantime no new business of consequence is expected to be taken for these lines.

Await Car Order

Chicago, April 23.—Most interest in the steel market as it relates to the railroad situation is found in the expected placing by the government of orders for about 100,000 coal and other types of freight cars. This has been pending for some time, but has been delayed in order to change specifications to use wood in place of steel where possible without sacrificing the value of the cars.

Shipping Improves

Boston, April 22.—Business with jobbers in steel and iron products remains in pretty much the same channels it has for some little time past, and there is little in the way of new features except that with the improvement in railroad conditions, deliveries of goods are much freer than they were earlier in the year. Plants directly or indirectly working on government orders continue the best customers for warehouse products, with the movement of purely domestic materials slow and growing slower. Production of the latter, however, is falling in keeping with the demand at the present time.

Many Lake Boats Ordered

American Shipbuilding Co. to Build 66 More Craft, Requiring 100,000 Tons of Steel—Only Priority Orders Accepted

Cleveland, April 23.—Additional contracts for ocean-going vessels for 1919 delivery now definitely awarded the American Shipbuilding Co. by the Emergency Fleet corporation call for 66 vessels. Each vessel will require about 1500 tons of steel, making the total requirement approximately 100,000 tons of material. About 8000 to 10,000 tons for six vessels already have been placed with a Pittsburgh producer. The total order for ships calls for six boats of 3500 tons deadweight and 60 of 4200 tons deadweight capacity. Both types will be of the same dimensions as to length with 261 feet and as to beam with 43 feet 6 inches. But the draft of the larger craft will be 28½ feet against 24½ feet for the smaller. All the boats will pass through the Welland canal. Delivery is to be completed by August, 1919. The American Shipbuilding Co. therefore will be in a position to take more boats later. This award is the principal development in the plate market in this district in the week. An inquiry for 350 to 400 tons of boiler steel for 50 horizontal boilers for cantonment use is current.

Accept Only Essential Orders

Philadelphia, April 23.—Only orders with priority certificates now are being placed with or are being accepted by eastern plate producers. Included in the new business of essential character just closed with eastern makers is a large tonnage for chlorine tanks for the American expeditionary forces in France. The American International Shipbuilding Corp. continues to place large orders covering its shipbuilding requirements. More tonnages of plates for shipment to England to replace steel borrowed by General Pershing has been closed. The new 204-inch plate mill of the Lukens Steel Co. at Coatesville, the largest in the world, has been turned over. This mill is expected to be on production within a short period.

Want Car Orders Placed

Pittsburgh, April 23.—Both platemakers and carbuilders are waiting for the government to place orders for cars. The former which have been requested to devote 100 per cent of their output to government requirements are anxious to learn what demands will be made upon them for tonnages in connection with the carbuilding program and the same applies to producers of shapes and bars. Carbuilders are desirous that the orders be placed at once because they have cleaned up most of their bookings and their working forces are beginning to be disorganized. Employes at car plants have been made idle and some have taken up other work. Therefore, it is believed it is extremely important that the government make a distribution at once in order to prevent further disorganization of working forces. No plates are being offered in the open market except occasional small lots of sizes such as are not used by the government.

Canada Wants Plates

Buffalo, April 23.—There is a demand for plates from Canada, but the difficulty of securing export licenses is limiting the sales to that country. Most of the mills are continuously engaged on government work.

Ships Take Most Steel

Chicago, April 23.—Requirements of the government for steel plates for shipbuilding continue heavy and all producers are constantly receiving large tonnages for this purpose. With new shipyards constantly coming into activity, the demand for steel is increasing constantly and this condition probably will become more marked through the summer.

Reduced Stocks

In Warehouses Result from Car Shortage

Pittsburgh, April 23.—Stocks of tin plate in warehouses gradually are being reduced through the increased supply of cars. The Wheeling district which is suffering the most from lack of cars is in a somewhat better shape. Embargoes in the east are being lifted. It is believed that by May 1 shipments will have been made at such a rate that stocks probably will be about normal, and will consist of approximately one week's production. Sheet bars are being received in fairly good volume. Reports coming to the trade show that the acreage planted in vegetables will be large and that the outstanding problem will be that of supplying labor.

Tanks Call For Material

Orders Now Placed Are Part of Large Number Contemplated—Government Work Monopolizes Structural Demands

Cleveland, April 24.—An interesting new government order placed with a local structural shop calls for 500 to 1000 tanks for use by the American army. Similar orders have been placed with other plants. These tanks are of a smaller type, being 15 feet in length, and their steel requirements are not in excess of 5 tons each. Production is just getting under way and it is expected that large supplementary orders will be placed later. A northern Ohio automobile builder has placed 1500 to 2000 tons of carbon and nickel steel covering an order for 3500 gun carriages.

Export Inquiries Numerous

Philadelphia, April 23.—Inquiries for structural shapes from abroad now before eastern mills are numerous. No business is resulting, however, because the extent of government bookings makes it impossible for the mills to promise any deliveries prior to three to five months, depending upon the specifications. Buyers, therefore, continue to depend increasingly on the warehouses for their materials. Requirements outside of government work are small. It is understood that 1400 tons of bridge work for the Chesapeake & Ohio railroad have gone to an independent shop.

Domestic Business Lacking

Pittsburgh, April 23.—Government demands for shapes represent practically all the business that is being taken by the mills and are heavy. Fabricators are of the opinion that while there may be a shortage of material at shipyards it is due to faulty distribution of orders and that inasmuch as the Emergency Fleet corporation is said to have remedied the situation by adopting a policy to place requirements near the yards, the problem will be solved soon.

Greater Activity in East

New York, April 22.—Greater activity characterizes the structural market in this district than for some time past. Practically all the new business is made up of direct government work, railroad bridges or extensions to plants engaged on government orders. One of the few important projects now up which is not connected with government requirements is the Culver Rapid Transit extension, Brooklyn, for which 3500 to 4000 tons are wanted. The public service commission, which opened bids on this tonnage, has received a letter from the war industries board, in which that body approves of the letting of this job. Outside of the Culver Rapid Transit extension, the largest job now up involves 3500 tons for buildings for the Atlantic Loading Co., Elwood, N. J. Among inquiries for shapes is one from the general engineering depot of the war department at Washington, for 2400 tons of 1¾ x 1¾ x 3/16-inch angles to be used as stakes for barbed wire entanglements.

Awards Are Absent

Chicago, April 23.—Except for the government's demands for structural shapes to go into shipbuilding, the market presents practically no features. No contracting for any important tonnage has been closed in the west during the past 10 days and it is not probable that much more structural material will go into construction work except where it is definitely related to war necessities.

CONTRACTS AWARDED

Boiler house for the American Ship Building Co., Lorain, O., 300 tons. To Hall-Lewis Iron Works, Detroit.

Annex to treasury building, Washington, 1500 tons to A. E. Norton Co.

Quadrangle building, Yale university, New Haven, Conn., 750 tons to Berlin Construction Co.

Building for New Britain Machine Co., New Britain Conn., 300 tons to Berlin Construction Co.

Buildings for Atlantic Shipbuilding Co., Portsmouth, N. H., 500 tons to Berlin Construction Co.

Bridge for Boston & Albany railroad, 400 tons to Boston Bridge Works.

Coal breaker, Dickson City, Pa., 2000 tons to Gerber Engineering Co.

Crane runway for Babcock & Wilcox Co., Bayonne, N. J., 300 tons to the Carnegie Steel Co., Waverly warehouse.

Bridge for Delaware, Lackawanna & Western railroad, 100 tons to American Bridge Co.

Bridges for Chesapeake & Ohio 1400 tons understood to have gone to independent fabricators.

The steel and iron contract for the 12-story merchantile building for the Newcomb-Endicott Co., Detroit, has been let to the Russel Wheel & Foundry Co.

CONTRACTS PENDING

Two buildings for the Timken Roller Bearing Co., Canton, O., 700 tons, bids being taken.

Bridges for New York Central railroad, 400 tons, bids being taken.

Bridges for Pennsylvania railroad, 550 tons, bids being taken.

Buildings for Atlantic Loading Co., Elwood, N. J., 3500 tons, bids being taken.

Power house at Langley field, Va., 300 tons, bids being taken by J. G. White Engineering Corp.

Extension to Culver Rapid Transit line, Brooklyn, 3500 to 4000 tons. Bethlehem Steel Bridge Corp. low bidder.

Taking Full Sheet Output

Government Now Gets 100 Per Cent Production From Some Mills and Number Expected to Grow—Production Irregular

Youngstown, April 24.—Sheetmakers in this district expect to have their mills on government work entirely in the near future. One mill already is on 100 per cent government business and will be until the beginning of the third quarter. No large government tonnages have come out this past week although it is estimated that 75 per cent of the sheets being rolled in this territory are for war purposes. Abundant inquiry continues to come out from the domestic trade but the best the mills can do is to promise future delivery subject to government business. Export inquiries have become exceedingly brisk the past month but they are being disregarded on account of the sold-up condition of the mills and especially on galvanized. Nearly all the sheet mills in this district are operating again after a shut-down of a few days due to a shortage of steel. While production is not up to normal, makers say they are operating as best they can in the face of the present sheet bar shortage. The leading maker of sheet bars here is rolling limited tonnages from bessemer billets whenever the latter are available.

Trench Covers Placed

Philadelphia, April 23.—Only priority orders for sheets with the exception of high carbon material rolled from shell discards now are being accepted by the mills. The Edward H. Budd Mfg. Co., Philadelphia, has taken an order from the government for 7000 tons of trench covers, which will be made from sheets.

Operations Little Improved

Pittsburgh, April 23.—Operations of sheet mills in this district continue to be made at a low rate and have not shown any substantial improvement

during the past week. The principal trouble is due to a shortage of sheet bars and of cars. In the face of this situation the government is placing large requirements for sheets and allotments that will be made to regular customers, when books are opened early in May for last half, may have to be cut down considerably in consequence.

Western Mills Lag

Chicago, April 23.—Shortage of sheet bars continues to hold back production of sheets in the face of considerable demand, which would be stronger were it possible to obtain tonnage. Government requirements in sheets are heavy and export demand also is strong, but inability to obtain sheet bars is preventing many mills from working at full capacity.

New Restrictions

Adopted on Ferro and Spiegel Imports—May Shut Off England

New York, April 22.—Announcement of the war trade board adding ferromanganese and spiegeleisen to the restricted imports' list has been received with the keenest interest. The restriction states that licenses for these metals will be granted only for shipments coming overland o by lake from Canada, or coming overland from Mexico. Before making up their minds as to just how far-reaching this restriction will be, importers will seek direct assurances from the war trade board that the ban applies to imports of ferromanganese and spiegeleisen from England. They express the opinion that if a restriction is enforced, ultimately it will result in an acute shortage of ferromanganese in this country. In addition to large tonnages of ferromanganese, considerable spiegeleisen has been imported from England during the past nine months.

A marked shortage has developed in the supply of spiegeleisen. One large consumer seeking to lay in a supply of spiegeleisen because of fears of a shortage of ferromanganese, has withdrawn his inquiry. He now is in the market for ferromanganese, having found that spiegeleisen is harder to buy than the former. Producers have had no difficulty in selling spot carloads of spiegeleisen at $75, furnace, for 16 per cent metal. Indications are that the supply is well sold up through third quarter. The market on 16 per cent for second half is $70, furnace. Considerable 30 to 35 per cent has been sold recently.

Numerous inquiries, some as much as 1000 tons, are out for ferromanganese. In most cases the consumers will take 70 per cent. Up to the last few days prices on ferromanganese have been computed in various ways. Now, however, the quotations most generally heard are $250, delivered, for 70 per cent metal, plus $4 per unit for each unit over 70, thus making $290 the delivered price on 80 per cent metal.

Spiegel Grows Scarce

Pittsburgh, April 23.—A steelmaker in this district has bought 200 tons of 70 per cent ferromanganese at $250, delivered, and 600 tons of 16 to 18 per cent spiegeleisen at $70, furnace, both for last half. A nearby consumer is in the market for 1000 tons of ferromanganese for last half and a consumer in the middle west is inquiring for 500 tons for the same delivery. Makers of spiegeleisen report there is a marked shortage of this alloy. Good demand exists for 50 per cent ferrosilicon for last half and a number of carlots have been sold at $175, delivered, for prompt shipment.

Await Action

On Large Pipe Tonnage for Waterbury, Conn.—Price Action Near

New York, April 22.—New inquiry for cast iron pipe has been of small volume in the east during the past week. However, considerable business is in prospect. The recent inquiry of Waterbury, Conn., for 32,000 tons of 42-inch pipe is receiving considerable attention and it is expected that an early award of this tonnage will be made. Allendale, N. J., closed April 18 on 1100 feet of 6-inch. No award has yet been made. Private demand is at a virtual standstill. It is expected that action will be taken shortly in establishing definite prices for the second quarter of the year. It is believed that present maximums will be allowed to remain.

Oil Fields Need Pipe

Pittsburgh, April 23.—Demand for lap weld pipe is active and comes chiefly from oil country interests. Tonnages for the government, asked for either directly or indirectly, also are sizable. Makers who are able to take bookings are considerably deferred on shipments and will entertain inquiries only for their regular customers or for the government. Others are so heavily committed that they are not taking additional bookings. Jobbers are taking heavier tonnages of butt weld iron and steel pipe which is being delivered by most makers in from six to eight weeks. Others are giving much longer deliveries.

Western Demand Less

Chicago, April 23.—Demand for cast iron pipe on the part of western cities is almost at a minimum, following the program of the government asking that extensions be kept as low as possible to conserve the iron supply for war uses. The American Cast Iron Pipe Co. has been awarded 900 tons for Twin Falls, Idaho. Bids will be opened April 24 at Hammond, Ind., on 60 tons.

Small Orders in South

Birmingham, Ala., April 23.—While a number of small orders for cast iron pipe are being received, some from the government, the aggregate is insufficient to fill the shops and to revive the lagging market in the south. Foundries and machine shops generally are active despite the strike of the metal trades craftsmen. The government labor board is to give the strike situation in Alabama a hearing Tuesday. The statement has been made that a strike among 7000 iron and steel workers was imminent.

Work Stopped

On Big Barbed Wire Contract Calling for Delivery in France

Pittsburgh, April 24. (By wire.)—After being allocated their portion of the 50,000 tons of barbed wire for France and arranging schedules to begin production at once, the various mills which were given the business today received telegraphic orders not to proceed with the work. No explanation has been made as to what prompted the sudden cancellation of the order. The inquiry came out last week and was reported to be of an urgent character. The wire committee of the American Iron and Steel institute held a meeting in New York on Monday when the tonnage was allocated and orders given that production start immediately.

Barbed Wire for Pershing

New York, April 23.—At the meeting of leading wire manufacturers in this city Monday, 110,000 tons of barbed wire for the American expeditionary forces in France were allotted among the mills. In view of the large lots for barbed wire which the allies have been seeking, including the 60,000 tons already allocated for Italy, it is probable that there will be some modification of the deliveries originally sought on these tonnages, in order that all requirements may be met.

Steel Industry Turns to War Basis

War Industries Board Formulates Policy of More Strictly Regulating Consumption of Mill Product So That Major Requirements of Government May be Supplied Promptly—Means Sharper Curtailment of Nonwar Trade

WASHINGTON, April 23.—Steel for war purposes only! This word is likely to be flashed to the steel manufacturers of the country within a very short time. The war industries board is said to have the drastic step under consideration and if the fuel, transportation and labor problems do not adjust themselves within a very short time, present unprecedented demands for steel will make the order imperative.

The warning sounded by J. Leonard Replogle, director of steel for the government, that there is an acute shortage of plates is based on present demands and present operating capacities and is said now not only to apply to the ship steel situation but to the entire steel program of the United States and its allies. It is stated that if individual manufacturers do not confine their production to strictly war steel, the war industries board's order will be issued summarily.

Capacity is Ample

No one, even Mr. Replogle, denies that the capacity of the present equipment of the steel industry is equal to the task the war has imposed upon it and only a few believe that there is a shortage at present in any mill product. But these optimistic views, according to opinion here, are likely to be worn down by the actual facts which the three main elements—men, coal and transportation—are presenting.

That the shortage in plates is already being felt may be seen in the war industries board declining to give the railroad administration an equal opportunity with other branches of the government in obtaining plates and other steel required in building its 100,000 freight cars. The board has recommended that specifications be changed to allow composite types of cars to be built which will effect a great saving in steel tonnages. The use of wood-and-steel freight cars will give the railroads all the rolling stock they require without crippling the other war demands, particularly those of the shipping board and the navy.

With the inauguration of the various fuel and car saving plans of the railroad and fuel administrations, it is generally believed these two essential factors will not adjust themselves to meet the 100 per cent demand, present conditions warrant. No hope is seen here in either Administrator Garfield or Director McAdoo bringing about the much-desired conditions which will give unhampered transportation and fuel supplies. Both men are bending every effort to gain this end, however.

Invocation of such an order as will prevent steel for other than war purposes will strike at the automobile, building construction and all other industries whose direct application, either entirely or partially, is not of war importance. Where automobiles or new buildings are to play a definite part in the carrying on of the war, then, of course, curtailment will not apply. The order under consideration, while materially affecting the fuel and transportation problems, is aimed directly at steel production.

While the war industries board is not yet prepared to announce the "steel for war work only" order, it is regarded here as significant that the board last week, after a conference with Charles M. Schwab, director general of the Emergency Fleet corporation, John Skelton Williams, purchasing director of the railroad administration, Mr. Replogle and army and navy officials, determined a general priority policy which requires that all ship steel be given preference over everything else. While this particular phase applies to the merchant shipbuilding industry, it also includes the navy's warship program—dreadnoughts, destroyers, submarines, chasers, etc.—which is second on the list but closely allied to the first position. Then following comes the war department's requirements and then the railroads. The tonnage remaining is to go to those consumers who are connected with the conservation program such as implement manufacturers, tin plate makers, pipe mills, etc.

The priority determination in itself calls upon all mills to produce only for the government, although an order of so many words has not been issued and will not, unless the elementary factors prove to be hopelessly beyond recovery. The preference list at first glance discloses no provision for the requirements of the allies, but it is stated that their needs are to be co-ordinated with those of the American government and are to have preference as their immediate demands are shown.

The shortage which is said to exist, or about to exist, as to plates, now is said to apply equally to pig iron, bars, projectile steel, shapes, rails and other steel products playing important roles in war work. Mr. Replogle is urging mills to watch their shipments to see that only war requirements are met and the American Iron and Steel institute is said to have to have made individual appeals to some producers that they must serve the government and the allies first. Already as noted in THE IRON TRADE REVIEW last week, prominent steel producers have caught step with the new policy of the board and are denying their capacity to anything but war needs. The whole demand for steel and the steps which are being taken to assure a bountiful supply against the enemy, are part of the government's program to make everything contribute to the war or to step aside and not hamper the work which will eventually lead to victory. To this end more attention is to be paid to the distribution of pig iron so that the immediate supply may be applied to the best advantage for essential production.

Schwab Promises Big Things

The advent of Director General Schwab in the shipbuilding industry is expected to yield big things in the turning out of ocean tonnage. The opinion has been voiced here, however, that too may be expected much entirely too soon, which is regarded as an unfortunate position for one of Mr. Schwab's reputation and ability.

He is popularly credited with the victory over Director Williams of the purchasing division of the railroad administration in winning first place for ship steel in the priority list. Mr. Williams undoubtedly will alter his specifications, it is believed, in order to utilize wood to effect an economy of steel. It is understood the war industries board has urged the specification of bessemer instead of open-hearth steel and the use of sheared instead of universal plates in the manufacture of cars. It was pointed out to Mr. Williams and others

running the railroads that the amount of steel to be used in the cars largely depends upon the deliveries the railroads make to other major steel-consuming branches of the government.

Schwab Gets Busy Quickly

WASHINGTON, April 23.—The appointment of Charles M. Schwab, chairman of the Bethlehem Steel Corp., as director general of all operations of the Emergency Fleet corporation is generally regarded as the most popular move by the government in its war program. The reputation Mr. Schwab has built for himself has given him a position that is said to have the President's own assurance of being absolute in carrying out the director general's plans. It is understood Mr. Schwab refused the place unless the authority went along with it.

His first move was to assure priority of steel for all shipbuilding requirements and his second was an order transferring the Fleet corporation's headquarters to Philadelphia, the shipbuilding center of the Atlantic coast, particularly close to the principal steel shipyards of the country. In this move he vindicates one of the grounds on which one of his predecessors, Admiral Harris, resigned. The admiral strongly urged shifting base to Philadelphia.

Expect Small Steel Effect

The selection of Mr. Schwab is not expected to materially affect the steel industry, according to views held here. Mr. Schwab is expected to put more "pep", as he says, in deliveries, as much of ships as in materials entering into construction of the vessels, but is not looked to as being the means of increasing orders for steel. Most of the ship steel requirements, for the program as at present contemplated, are known and are rapidly being rolled and fabricated. Expansion of the shipbuilding industry, both by the final adoption of a type of concrete ship and by ordering new yards and ways, of course would materially add to the demands now made upon the steelmakers.

The report that the shipping board is to devote its future energies to steel shipbuilding is regarded as merely a misunderstanding of the statement that in all probability only wooden shipways at present in use or contemplated will in the future be devoted to the wood type of vessels. The shipping board wants ships and as many and as speedily as possible. The main drawback in the shipbuilding program today is said to be boilers and machinery. In his testimony before the senate committee on commerce J. Leonard Replogle said boiler requirements of plates were being given equal priority rating with other shipbuilding tonnages. This is taken to be significant of the difficulties in obtaining ship equipment, in which Mr. Schwab will help out.

Metal Trades

Meet in Annual Convention and Discuss Industrial Problems

New York, April 24.—Members of the National Metal Trades association opened their twentieth annual convention at the Hotel Astor here this morning. The initial session was given over for the most part to reports of officers, and the report of the committee of the prevention of industrial accidents. Frederick Halsey led a discussion on the work of the American Institute of Weights and Measures.

This afternoon, S. K. Ratcliffe, London University lecturer, will deliver "Liberal England's Message to America"; Albert Greene Duncan, past president of the National Association of Cotton Mfrs., will speak on "National Industrial Conference Board"; Hon. Edward K. Nicholson will make an address on "Industrial Reactions"; W. A. Viall, Brown & Sharpe Mfg. Co., will speak on "The Employment of Women in an Industry"; H. E. Miles, chairman of the section on industrial training for the war emergency of the committee on welfare work, will speak on "An Abundance of Efficient, Well-Paid Labor—How to Get It?" The convention banquet will be held this evening.

The program for Thursday, the last day of the convention, will be featured by address by James A. Emery, counsel of the national council for industrial defense, on "New Lamps for Old", and by William H. Barr, president of the National Founders' Association, on "Present Socialistic Development". The election of officers will follow at the close of the meeting.

Monday and Tuesday this week were devoted to meetings of the executive committee and administrative council.

Scrap Contracts Reduced to New Price Base

New York, April 22.—The recent ruling of the committee on steel and steel products of the American Iron and Steel institute, providing that prices on all undelivered scrap called for by contracts booked prior to April 1 should be revised to accord with the reduced prices for the second quarter is being carried out by the trade so far as transactions between consumers and brokers are concerned. In a great many cases the observance of this ruling has resulted in the wiping out of profits or the incurrence of actual loss to brokers.

The feeling among the latter is that the ruling is unjust insofar as it covered scrap which was undelivered on April 1, due to inability to ship it because of railroad embargoes and other causes beyond the control of the dealers. In most cases, it has been thought wise not to attempt to extend much loss to country dealers, and therefore in practically all cases where brokers contracted to buy scrap from the former at a certain price, the brokers are paying the original contract prices. This is based upon the provision that the failure to deliver prior to April 1, was due to causes beyond the control of the country dealers. Where the brokers contracted to buy from country dealers at $29, they have preferred to sacrifice the profit of $1 where the seller was unable to make shipments. However, prices which are being paid country dealers for scrap originally scheduled for delivery after April 1 are $1 lower than those prevailing in the first quarter.

Bolling Reported Killed

Col. Raynal C. Bolling, formerly general solicitor of the United States Steel Corp., is reported killed in cable advices received at the corporation's offices in New York from Switzerland by way of governmental channels. The official casualty list carries his name among those killed. Colonel Bolling previously was named in General Pershing's casualty lists as missing. He was last seen on the morning of March 24, when he left Amiens going northeast, in his own car, with his own chauffeur. Colonel Bolling is the highest ranking United States officer to be reported killed since the American forces went into action and the first prominent member of the American iron and steel industry to give his life for his country. His home was at Greenwich, Conn.

Coke Shortage

Chief Cause of Retarded Output of Pittsburgh District Mills

Youngstown, O., April 24.—That the coke shortage is the chief cause of reduced output among the mills in this and the Greater Pittsburgh districts, is borne out by production figures. For the week ending April 20, coke plants were operating at 92 per cent, blast furnaces at 91 per cent, open hearths at 90 per cent and bessemer plants at 85 per cent. These figures are practically the same as they have been for the past month.

Bessemer operators report they are blowing all the hot metal which is furnished them and that their converters are in fit condition to handle more metal if the furnaces could supply it. A few open hearths in the valley are undergoing repairs but the chief reason for their 90 per cent showing also is the shortage of pig iron. Most operators are using cold stock for open hearths and it is hinted that even the supply of this material is becoming low. Operators of blast furnaces report a shortage of coke yet it is known that the supply of cars in the Connellsville region has been better this past week than at any time since the car shortage became prevalent. Only two stacks are out of blast in this district, one at Niles, O., and the other at Haselton, although the Republic officials announce the latter will be blown in this week.

In the Youngstown district, 4050 tons of steel are piled due to the scarcity of cars. The latter situation has improved the past three weeks. There still remain 10,843 tons piled on account of embargoes.

Engine Plant Absorbed

The Waterloo Gas Engine Co., Waterloo, Ia., manufacturer of light tractors and stationary gas and kerosene engines, has been absorbed by Derre & Co., Moline, Ill. G. Miller, formerly president, has retired, and J. E. Johnson has been appointed manager. L. W. Witry continues as general superintendent and C. C. Chapel as foundry superintendent.

New Mill to Start

Early in May, according to a statement made by President Edward F. Clark, the Liberty Steel Co. will commence to operate its new plant near Warren, O. Installation of equipment has been virtually completed. The first tryout of the 1800-horsepower motor was made this week. In addition to eight hot mills, the company will operate four stands of cold rolls, 12 annealing furnaces, two pickling vats and 14 tin pots in the tin house. The Liberty company's hot mills, however, are interchangeable and will roll either sheets or tin plate.

Plants Taken Over

The plants of the Bosch Magneto Co., Springfield, Mass., and Plainfield, N. J., have been taken over by the government on account of being entirely enemy-owned. Directors will be named by A. Mitchell Palmer, alien property custodian to conduct their operations. The company's output will be used largely by the government for airplane service, the navy and other branches. While the company is capitalized at only $75,000, its real valuation is said to be about $7,000,000. The Springfield plant is the larger of the two. The former was erected in 1911 and is one of the largest in the world devoted to the manufacture of magnetos. When war started 125 German officials resigned.

Enlarges Wire Plant

The American Steel Co., with main offices in the Park building, Pittsburgh, is erecting a building, 300 x 75 feet, adjacent to another building of the same size, recently constructed at its wire mill at Ellwood City, Pa. The new addition will be placed in operation about Aug. 1, and will have sufficient drawing equipment to produce between 250 and 300 tons of all grades of market wire, including nails and wire specialties. The plant will be electrically driven and thoroughly modern. The company has additional equipment at the Ellwood plant for rolling cold rolled strip steel and flat wire. It is assured of sufficient fuel for tin mills in Waynesburg, Pa., where a gas well producing at the rate of 2,000,000 feet a day, with 350 pounds rock pressure, has been drilled and was cased in last Thursday. The company is building six additional hot mills to its Waynesburg plant at a cost of $1,000,000 and before undertaking this new work made exploration as to obtaining adequate fuel supplies.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, April 23.—Following meetings last week with representatives of the white metals, solder and babbit metal trades with the war industries board at Washington, meetings are being held this week by tbe war board with the silk trade. All these meetings are with a view to reducing consumption of tin. The silk trade uses a large amount of tin in weighting of silks wbich probably will be reduced as nonessential. These various developments emphasize the serious shortage of tin which the country is facing.

The London tin market has advanced £20 the past six business days, equivalent to about 4c a pound. This rise is believed by the trade here to indicate the loss of tin in transit to England and a general world shortage. In February a similar rise was followed by news of a loss of 1000 tons by submarine. The United States no longer is obtaining any Straits tin direct from the United Kingdom, so sucb loss would not affect this market directly. However, British buyers would have to replace this tin at Singapore, drawing further upon supplies there and reducing the amount available for American buyers, with probable increase in tbe price in the far eastern market. No quotations on either Straits or Banca tin are heard for any position and no spot tin of any grade is obtainable. Chinese No. 1 (99 per cent) tin is offered for April shipment from China at 90c, c.i.f New York.

The speltar market continues to soften, despite the low levels already prevailing. ales of prime western for prompt sbipment have been made at 6.62½c, St. Louis, as compared with 6.80c a week ago; May sbipment can be bought at about 6.52½c, but June and July are around 6.75c to 6.87½c, St. Louis.

The lead market also continues weak. The American Smelting & Refining Co. till is quoting 7c, New York, following its recent reduction of ¼c a pound, but outside sellers are quoting around 6.80c, New York, while as low as 6.70c might be done by a consumer on a bid. Under such conditions another reduction by the leading interest is expected soon. About 80 per cent of the country's lead output is sold under sliding scale contracts, but in a market like tbe present, the surplus marketed "outside" dominates the whole situation. The big smelter of the St. Joseph Lead Co. at Herculaneum, Mo., has resumed operations.

There is some talk of a movement on tbe part of copper producers to obtain 25c for copper on the conclusion of tbe present agreement of 23.50c, June 1, next. Some producers are sold up through May and most of June, business beyond June 1 being taken subject to change in the government schedule. Less than carload lots continue available at 24.67½c.

The bulk of the aluminum output continues to absorbed by the government. Business in the outside market is practically nil. The fixed price on 50-ton lots of 98 to 99 per cent ingot is 32c a pound.

Antimony was offered exwarehouse in New York last week at 12.12½c, duty paid, but consumers would bid only 12c, with no sale resulting. The antimony market is lifeless.

Uncle Sam's Slow Pay A Factor of Business

By Guy F. Creveling



The Nation's Financial Headquarters, Where All Bills Come For Payment

GERMAN newspapers and politicians laughed scornfully at America's military power, when the United States entered the war last spring. "Anbeter des golden Kalbes," said they. "Money grabbers. The Yankees are rich, but they have been helping the entente with their money for the past two years. Fight! Pooh! They can't fire gold from their pocket books or float across the ocean on their dollar bills. Another Rumania for the Fatherland to swallow. Gott strafe Amerika!"

America was rich and it was unprepared. But in building upon this premise, Germany made another of her fatal errors of judgment. Today American guns are spitting shells within the German lines and an increasing number of steel-helmeted American soldiers is thronging first line trenches, awaiting the call to go over the top.

The United States is defenseless no longer, for its riches are being used as a means to an end—the winning of the war. The will of the American people to stamp out autocracy has made possible the application of the greatest financial resources ever possessed by any nation, to the most extensive and highest developed industrial facilities in the world, with the resultant creation of an arsenal whose like was never seen.

This process has involved a gigantic economic operation the past year, with remarkable results even this early. Our financial resources are coming to resemble a deep well, while the government is the pump. The soil about the pump is comprised of the people and plants in the government service. The money is pumped from the well into the soil, whence it gradually seeps back again into the well, through loans and taxes. Owing to friction, part of which is due to the antiquated construction of the pump, some delay is encountered before the money is returned to the well. Also, some of the money escapes from the well through the channels of nonessential industry. But the simile of the pump is becoming more and more applicable during each day the war progresses.

Vast Economic Operations

This far-reaching readjustment has had several by-products, such as transportation tangles and fuel shortage. Prices have been fixed on iron, steel and other important commodities, for the first time in the nation's history. Business men are being compelled to consider taxes as an essential part of the cost of doing business, for the first time in their recollections. The public is being encouraged to curtail its consumption of luxuries and certain essentials, to save its money for investment in Liberty bonds and war savings stamps. There has been a tendency toward the elimination of certain industries, including those producing luxuries, in order to conserve fuel, materials and labor.

How has this vast economic operation, with its by-products, affected the financial situation, from the standpoint of the iron and steel industry?

The greatest reflection is seen in the security markets, which have declined steadily to a point where there are more bargains, in view of present yield, than at any time in many years. Several steel stocks which paid 15 to 20 per cent in cash dividends last year are selling at less than par. This condition is due primarily to the financial needs of the government. In mobilizing money and credit, the government has left little buying power to the investment public.

Reflection of the readjustment also is found in the money market. The iron and steel industry usually is as sensitive to changes in the money situation as the money market is sensitive to changes in the economic and political situations. In normal times, the coming of high money rates tends to restrict new enterprises, a condition which is directly reflected in smaller demand for steel. When money is plentiful and rates are low, as in the two years prior to last April, a period of business expansion, is stimulated with consequent broadening of demand for steel products. At present this rule does not apply so strictly,

for the government is the principal buyer, and money rates do not enter into the government's calculations. The manufacturer, however, realizes that the money market is tighter, for he has to pay a higher rate for accommodation than he did a year ago.

Credit and collection conditions afford an infallible guide as to the financial health of industry. A survey of these conditions in the iron and steel industry reveals the maintenance of an exceptionally high rate, indicating that the industry's financial health is good. It is true there is a slight slowing up in some directions, but such cases are local and their causes are directly traceable. But, all in all, the readjustment of the country to a war basis is being accomplished with surprisingly little effect upon the financial situation, proving how well our banking system was prepared, under the federal reserve act, to cope with war exigencies.

Government is Slow Pay

One of the principal causes for the occasional slowing of collections is the delay of the government in making payments. Another is traffic congestion, including the holding up of shipments at plants and the delays to goods in transit. It is only a question of time until each of these causes is eliminated. But to date the government has not perfected its organization to a point where it can most efficiently handle the vast sums thrust upon it to spend this year. The government expects to disburse between $15,000,000,000 and $18,000,000,000 during the fiscal year 1918, a sum equal to all its expenditures from 1776 to 1917. With such a task on its hands it is not surprising that there have been some hitches, resulting in a slowing up of payments to government contractors and sometimes extension of the slowing up to subcontractors and to companies supplying material.

For example, a small manufacturer had taken an order from the ordnance department of the army for a number of small but highly important appliances. As he did not have sufficient working capital to swing the contract, the government arranged to advance him 40 per cent of the value of the contract, for which he gave a mortgage on his entire plant. Under this arrangement the government was to retain 40 per cent of the value of each delivery until the loan was paid up. About the first of December he made his first delivery. Two months and a half later he had not received payment for the initial delivery and was facing a shutdown of his plant, through inability to meet his payroll. After the expenditure of considerable effort and time, at Washington, the manufacturer finally managed to secure a promise of a payment of about one-fourth of the amount due him, which assisted him for the time being to meet his payroll. In the meantime, a government contractor, with whom he had a subcontract, asked that its contract with him, providing payment in 30 days, be changed to 60 days after the twentieth of the month following delivery. This was one of the largest munition makers in the country, which apparently also was experiencing trouble with the government. But the subcontractor informed the company that his terms would continue to be 30 days net with 6 per cent interest on overdue payments.

The Iron Trade Review has made an investigation of conditions at Washington with a view to ascertaining wherein the difficulties lay that have given rise to the complaints about slow payments by the government. Secretary of War Baker stated that such slowness on the part of his bureaus never had been called to his attention. In the office of the treasury department's auditor for the war department, it was stated that numerous such complaints had been received but that office had been unable to act on them because it was unable to touch an account until all goods had been delivered under the contract. In such a case, it was stated, the department may force payment as soon as it has had time to investigate. All inquiries on unfinished contracts are being referred to the disbursing officer of the division under which the contract was let. The investigator decided to look further, and took up the matter with General Wheeler, acting chief of the bureau of ordnance. The general referred him to a major, who in turn referred him to a captain—the usual procedure in Washington just now. The captain laid all the blame upon red tape. Offices of the war department are scattered all over Washington and as messenger service is not maintained, except on special business, other matters are entrusted to the mails. The mail accumulates and some matters become deferred, among them sometimes the orders to pay contractors. Not only contractors, however, are suffering, but everyone else with money due, among them the officers' commutation expenses.

Ordinarily 15 days should cover the route of a voucher through all the departmental routine, until the treasury department has accepted the war department's order to pay. This order must be the last word in correctness, according to Uncle Sam's style book and here is where one of the hitches comes in. Many of the new reserve officers at Washington are accustomed to their own systems and are unacquainted with the government's system. Their stenographers and clerical assistants are just as poorly informed as to the proper procedure, with the result that frequently orders are sent back to the division whence they came.

Business Heads Break Red Tape

In other words, the government is like a giant made weak with red tape. It is gradually bursting from its bounds, thanks to the advent of broad-gaged business men into positions of actual authority at Washington, but at present the situation in this respect is distressing.

Some of the army officers, inexperienced in business affairs, have been inclined to be critical of companies which have taken government orders but have had insufficient capital to carry through the latter without assistance. The fact is being gradually brought home to them, however, that practically all business that is not for the government is embargoed and that the government cannot expect the workmen in plants and shipyards to wait 60 to 90 days for their wages. This is what they would have to do if their employers did not act as a buffer between them and the government.

Where a manufacturer is devoting nearly the entire capacity of his plant to government work, unless he has an unusually large working capital, it is apparent the government must be reasonably prompt in making payment, else he will have trouble in meeting his own obligations. The larger steel companies follow up collections from the government just as aggressively as they would with an ordinary commercial consumer. If a voucher is long overdue a representative of the company personally investigates the cause for the delay and speeds matters up. However, as stated previously, such lapse is only occasional, although it is sometimes used as an excuse by buyers who wish to disguise their real reason for being slow. As the credit manager of one large steel company said, "These are times which are beginning to show up the weak brother."

Occasionally traffic congestion and railroad embargoes hold up shipments in such a way as to cause some financial friction. In the steel trade about 90 per cent of the transactions made are on the basis of 30 days net or one-half of 1 per cent discount for cash. In most cases the sales are

made f.o.b. shipping point. When the goods are manufactured and ready for shipment the consumer is expected to assume the responsibility of delivery to his own works and to pay within 30 days from date of invoice, even though goods are not shipped within that period, due to inability to get cars or shipping permit. Steel has been so scarce and so much in demand that the buyer has been willing to assume this responsibility in order to get the material.

On the other hand, pig iron sellers doing business with small consumers, such as the smaller foundries, sometimes hesitate to press their customers for payment until the goods are delivered. The same terms prevail in the pig iron trade as in the steel trade. Frequently more than 30 days elapse between date of invoice and date of delivery and some sellers concede an extension of time to their customers accordingly. If the seller is a merchant, operating on a small commission, each day the bill is overdue eats a perceptible hole into his commission, for the merchant always pays his bills promptly to the furnaces he represents. Thus, if the merchant is operating on a 2½ per cent commission, an account five months old would consume his entire commission.

Pig iron market conditions the past year have helped speed up the average of collections in this trade, despite the slowing up in some individual instances. Many large consumers used to pay their bills on a certain day of the month following delivery. Thus, if this certain day was the twentieth, a delivery of pig iron on Jan. 3 would not be paid for until Feb. 20. But with the coming of the pig iron famine,, these buyers found themselves discriminated against in favor of the consumers who paid more promptly. Accordingly, they adjusted their payments so as to put themselves in the preferred class, which has improved the average of collections.

The acceptance of government orders has altered the credit standing of many manufacturers. Steel companies do not hesitate to raise the limit of credit granted to such of their customers as have big government contracts, for they know they are dealing indirectly with the government. It is not unusual to find a man who was unable to buy more than $25,000 worth of steel on credit in normal times now owes $150,000 for steel and has not yet reached the limit. He has to pay promptly, just the same, although if there is some hitch the steel producer is inclined to view the case on its merits and if an extension of time is necessary and excusable, in rare instances will grant such extension. Merchants, however, such as machinery dealers, who are compelled to carry large stocks, are pushing collections even more vigorously than usual in cases where the government contractor is slow in his payments. They operate on such a narrow margin of profit that they feel it is only just that they should not be compelled to act as the customer's banker.

It is interesting to note that such complaints of slow collections as are reported come rather from the small than the large sellers, probably because the consumer is anxious to keep his credit intact with the "big fellows".

The iron and steel industry has found money somewhat tighter, a condition which was, of course, to be expected. For instance, the Winchester Arms & Ammunition Co. the other day, wishing to refund $8,000,000 worth of two-year 5 per cent notes, sold one-year notes at the same par



J. L. SUMMERS, DISBURSING CLERK OF THE TREASURY

He is shown here operating one of the new time and labor saving machines adopted by the government for the signing of all vouchers in payment of war orders. These machines are in use in all departments and checks received from the government by manufacturers now are signed in quintuplicate

value to bear interest at 7 per cent and to be offered to the public at 99½. Some time ago, the Bethlehem Steel Corp., needing some additional working capital, was compelled to sell 8 per cent preferred stock at a price to yield 9 per cent to the investors.

Steps are being taken at Washington to ease the way for the government contractor who needs funds for war work. Secretary of Treasury McAdoo recently had introduced in congress a bill which was designed in part to this end. This bill would create a "war finance corporation" with a capital of $500,000,000, all appropriated from the treasury of the United States and to have a board of directors consisting of the secretary of treasury and four persons to be appointed by that official with the approval of the President. This corporation, if created by congress, will have the power not only to license or refuse to license corporations desiring to place securities upon the market, but to supply credit for such purposes to an extent reaching startling figures. The corporation would be empowered to make advances for periods not exceeding five years to banks which have outstanding loans to persons or industrial companies whose operations are necessary or contributory to the war, and also, in exceptional cases, to make loans direct to such persons or companies. Such loans are not to exceed 75 per cent of the value of the collateral furnished. Bankers generally have approved this much of the measure, but differences of opinion prevail as to the advisability of empowering the corporation to issue its interest-bearing notes to an amount outstanding at any one time of $4,000,000,000, and to authorize the federal reserve banks to deal in these notes in the same way as they would bonds and notes of the United States. In some quarters it is felt that this would open the way for undue expansion, possibly inflation.

From the strictly industrial standpoint, Mr. McAdoo's bill is expected to prove of assistance. Its enactment would enable the manufacturer whose work is necessary to the war and whose capital is insufficient, to get financial aid from the banks, which previously may have considered him too great a risk, or that he had already borrowed the limit. And in cases where the banks still refuse assistance, if the manufacturer's product is important enough, the government will assist him directly.

The government already is rendering financial assistance in a great many cases. Shipbuilders are granted advances of 10 to 30 per cent of the value of their contracts to enable them to construct or expand their yards, while they in turn may make similar advances to their subcontractors. The companies which have been awarded ordnance and shell contracts are given advances to enable them to construct and equip their plants. Arrangements, varying with individuals, have been made in practically every case where the government needs the product of the manufacturer. The proposed war finance corporation would facilitate and standardize the granting of such assistance.

At this time Secretary McAdoo's bill is under consideration by congress and there is no means of predicting as to its fate. But whether this bill or some other method is adopted, there is no question but what the government contractor will continue to receive such assistance as he needs. What the government wants is ships and munitions, for the production of these essentials is the real problem; the money side of this problem is only a minor phase.

But, the manufacturer will say, "it is not a minor phase to me. What am I going to do? The government owes me money, and the vouchers are slow in coming through. I have goods in my yard, finished and awaiting cars, but I won't realize on this until the traffic congestion eases up. I have to meet my payrolls regularly and at the same time get together a large sum of money to pay my taxes June 15. I am already almost up to the limit of credit usually allowed me by the bank. Where is the money coming from?"

The manufacturer faces hard, cold facts. He must pay his labor if he is to continue in business and to

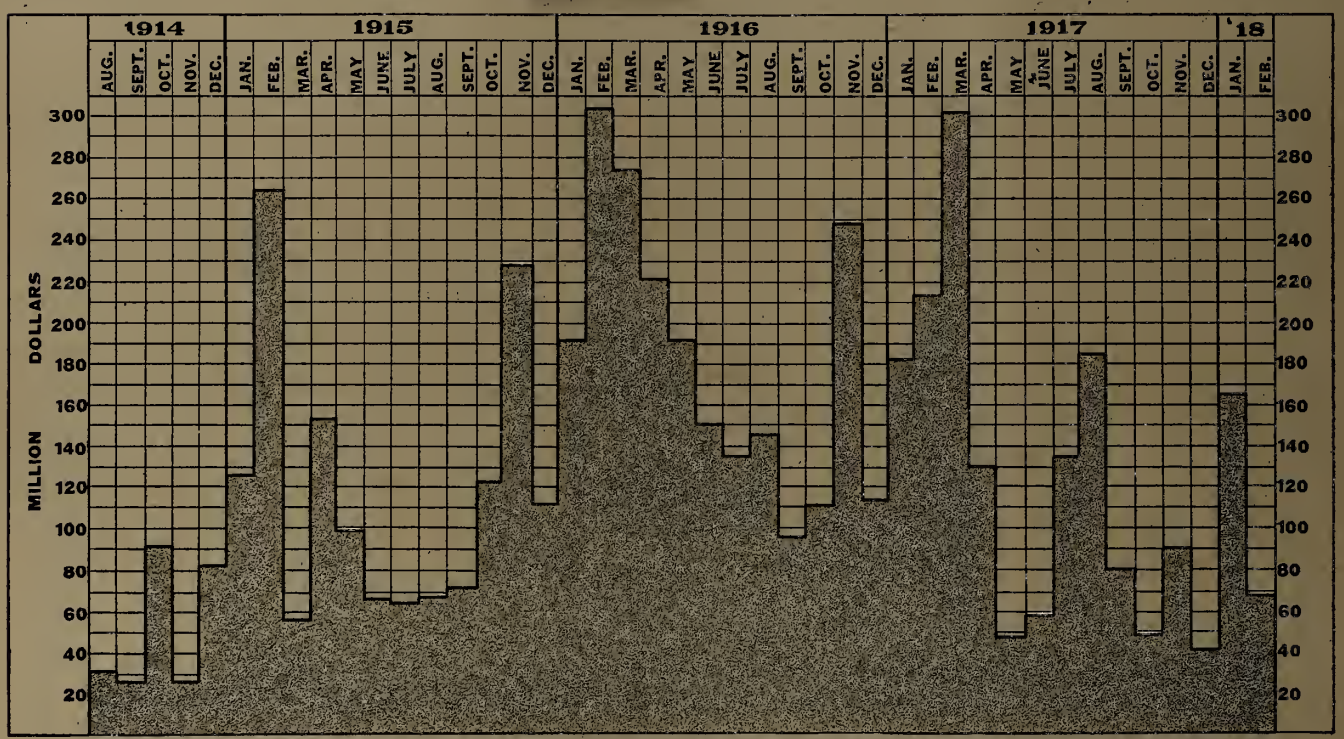


CHART SHOWING COMBINED CAPITALIZATION OF NEW INCORPORATIONS BY MONTHS SINCE THE BEGINNING OF THE WAR

serve the government. In the foregoing case about all that he can do is to put his case squarely up to his bank. If he has no representative or friend at Washington perhaps he can send some one or possibly go himself to trace the delayed voucher. The probabilities are, however, that he will find his bank inclined to do more for him than he had expected.

Avoid Rush for Funds

In looking forward to the payment of his war taxes, he is exercising a very sensible precaution. Individuals and officers of corporations who expect to wait until the afternoon of June 14 to borrow requisite funds to pay their taxes, may have an unpleasant experience, for there is no telling how many such cases there will be. So many companies, however, had expended a large part of their 1917 income before the enactment of the war revenue act, that they will be compelled to borrow at least part of the amount they will require. The majority of iron, steel and allied companies are setting aside so much of their income each month against the date of these taxes. In order to facilitate these savings, the government has offered for sale treasury certificates bearing interest at 4 per cent due June 25. Taxes are payable in these certificates and many corporations have bought heavily of them, including the United States Steel Corp. and leading independent companies. It is incumbent upon every corporation to make some suitable arrangement in plenty of time for the payment of its taxes in order that it may avoid the possibility of an eleventh hour rush for funds in a tight money market.

Attention has been called to the fact that money is easier in London than in New York. The present Bank of England rate to clearing house banks is 4 per cent, as compared with 4½ to 5 per cent discount rate for 60 to 90 day paper maintained by banks in this country. This situation is deemed extraordinary, for England has been three and one-half years at war and has spent about $24,000,000,000 of new money, whereas this country has been at war less than one year and to Feb. 1 had expended only about $7,100,000,000 for its own and the allies' war purposes. Leading bankers ascribe the less favorable condition in this country to the heavier demand for credit for business purposes in this country than in England, where a more stringent control is exercised over industry. An individual cannot employ money or labor in England for any purpose he desires and there is a growing tendency in this country toward the adoption of similar policies.

Nonessential industry slowly but steadily is being starved out in the United States. This process is gradual but certain, for an elaborate system of priorities, extending to fuel and materials, together with railroad embargoes, is militating against the production and movement of other than essentials, such as food, fuel, munitions, etc. As the government sees it, the principal benefit to be derived from nonessential industry in war time is the employment of surplus labor over and above the labor needed in government work. As the adjustment to a war basis progresses,



WALTER W. WARRICK,
Comptroller of the Treasury

He is really the auditor-in-chief of the department, his decisions being final in all matters in which dissatisfaction arises from settlements made by the various departmental auditors. He may revise any account settled by any auditor and countersigns all warrants signed by Secretary McAdoo.

both the needs and opportunities of nonessential industry are diminishing. The financial problems of the nonessential industry, therefore, are another story, and are not so easy of solution. The government intends to prevent the issue of new securities by nonessential industry, while the banks will have all they can do to carry the burdens imposed by the government. The system of priorities on fuel and materials plainly is being extended to include money.

But, this is not a matter of such worry for the iron, steel and allied industries. Already about three-fourths of the present output of steel is destined for government work. The remaining one-fourth is largely for the essential needs of the civil population. Even in war time a certain amount of steel is required to supply these needs. So the industry is assured of a privileged place in the scheme of financial priorities. In this connection it has been suggested that self-interest as well as patriotism may dictate the sale of material to an essential consumer, rather than a nonessential consumer, all other things being equal, despite the occasional sluggishness of the government in paying its bills.

Manufacturers Must Aid Financing

The paramount financial problem in the United States today is almost as much the problem of the manufacturer as it is of the banker. The great fiscal task which now must be accomplished is to provide sufficient funds for essential private business and at the same time adequately supply the government. The war taxes must soon be met. The beginning of the campaign for the third Liberty loan is not far off. Bankers must bear the strain of these government activities and at the same time finance general business. They are being called upon to lend their customers much more money than in normal times because the value of stocks of merchandise has increased unprecedentedly. It is the duty of the seller of materials as well as the banker, to see that these stocks do not become unduly large and constitute a menace against the return of normal values with the conclusion of hostilities. It is incumbent upon manufacturers and merchants to lend their efforts to easing the credit situation by checking overbuying in domestic commerce and to eliminate laxness from their business systems. An immense fund of valuable capital is hopelessly tied up in open accounts. Now is the time to mobilize this frozen capital for the benefit not only of manufacturers and merchants themselves, but also for the country at large. This need is graphically stated by F. C. Schwedtman, vice president of the National City bank, of New York, in a recent address:

"Most of all in the very critical time of our country's existence, we need that very system which holds laxness in check, which will discipline business and marshall its forces into lines as mobile as the most highly organized army. By the adoption of a system of credit extension under these conditions, eliminating any possible excessive inflation, but which would release the enormous amount of capital tied up in open book accounts, we could unloose a mighty cataract of sound credit sufficient to

turn the wheels of finance and generate motive power in production and distribution which would carry us beyond the deceptive shoals of war inflation and relieve us of the distress of after war depression."

As a means of bringing about this much to be desired closing of open accounts, the "trade acceptance" offers great benefits. The trade acceptance is a credit instrument representing actually existing values. It is prima facie evidence that the obligation of the acceptor grows out of the transfer of goods from the maker. The federal reserve board recognizes the superiority of the trade acceptance over promissory notes and other commercial paper by discounting trade acceptances at a rate from one-fourth to one-half of 1 per cent less than that charged on ordinary commercial paper. The federal reserve banks may issue currency against acceptances which they hold. This makes possible the greatest elasticity in credit extension upon the soundest possible basis.

The trade acceptance does not offer a panacea for all business ills, as some of its warmest supporters insist, but it does tend to check careless overbuying and to induce the payment of obligations at the specified time. The largest proportion of commercial failures can be attributed directly to the failure of individuals, firms and corporations to pay their bills promptly or at all. Sometimes manufacturers and merchants are unable to free their capital from open accounts in times when they need it most, with consequent receiverships and bankruptcies.

The number of commercial failures in January this year was the smallest for any corresponding month in 10 years. The record for January, next year, will compare just as favorably, provided proper care continues to be exercised now by business men and provided the government cuts away the red tape and runs its business in a businesslike way.

Foreign Trade After the War

BY E. M. HERR
President Westinghouse Electric & Mfg. Co.

THIS war has opened the eyes of America and of commercial people in other countries. It has made all realize the value of foreign trade and commerce. Business men, since the close of the Civil war have been so engrossed with the development and care of domestic trade that foreign business has held little interest because in comparison with the domestic it was not only far less profitable, but much more difficult to handle. Geographic remoteness and the attendant unfamiliarity with language and customs abroad tended to cause foreign trade to languish. On account of this apathy toward foreign trade, rather than a contributing cause of it, came the decline in shipbuilding and the remarkable decrease in the American merchant marine, which was accentuated by adverse legislation, culminating in the seaman's act of March 4, 1915. By the fall of that year the remaining American steamship in foreign trade on the Pacific ocean had to leave the sea.

Merchant Fleet Assured

The act creating the United States shipping board was signed and brought the present unprecedented activity in the acquisition and construction of merchant shipping. Now the board has under construction in excess of 1100 vessels and is endeavoring to add during 1918 more gross tonnage to the merchant marine of the United States than was comprised in the entire American merchant registry three years ago. This enormous addition will be still further increased, if the war continues beyond another year, and even should the war end sooner, the large and splendidly equipped yards now on our coasts will undoubtedly enable our merchant fleet to be further enlarged to provide ships to replace those destroyed. What this shipbuilding program really means will be better understood by a comparison of some statistics of the world's shipping before the war.

At the outbreak of hostilities, the merchant shipping of the world, of 100 tons and upward, according to Lloyd's register of shipping, consisted of 30,836 ships of 49,089,552 tons, of which 24,444 were steamers of 45,403,877 gross tons and 6392 were sailing vessels of 3,685,673 net tons. Great Britain and colonies owned 10,123 steamers of 20,523,706 gross tons, while all belligerents except the United States owned 16,331 of 32,334,893 gross tons. The United States and Great Britain on July 1, 1915, owned in steam 4,854,748 tons, or 0.053 per capita and 19,235,705 or 0.425 per capita, respectively. From 1890 to 1915 the world's merchant marine tonnage increased 122.7 per cent. Steam tonnage increased 252.2 per cent. In that period the United States merchant marine tonnage increased 30.9 per cent while the country's steam tonnage gained 161.1 per cent. In 1890 the United States had 20 per cent of the total tonnage of the world and in 1915, 11.96 per cent.

Shipbuilding is developing a new era, brought about by the much higher wage rate than the foreign. Since American engineers have demonstrated their ability to underbid the world in the cost of erecting structural steel used in high buildings, notwithstanding higher wages, it is possible to carry out the same operation with shipbuilding. This idea has been so developed that the ships of the Emergency Fleet corporation are being built of steel plates and shapes, all the laying out, cutting and punching of which is done so accurately by the manufacturers in their shops before shipment to the yard that on their arrival they are quickly assembled and riveted.

Important Economies Effected

These ships are also being provided with high speed steam turbines geared directly to the propeller shaft, which are much more economical in steam consumed per horsepower delivered to the screw propeller and are at the same time much lighter and smaller than the ordinary reciprocating marine steam engine and even with the gearing required occupy much less space. By the use of this lighter, more efficient propelling machinery, several important economies and improvements are effected; cargo space and tonnage are saved and carrying capacity increased; less coal bunker space is required, although with equal space, larger steaming radius is had, and turbines are more easily and cheaply inspected, maintained and operated. With an adequate merchant marine economically built and efficiently propelled, what further is necessary to enable merchants and manufacturers to successfully develop foreign trade after the war?

Let us consider what competition will be most difficult. Some light on this important subject may come from examining competition met before the

war, when England and Germany were the leading nations in export trade, the United States being third. In 1913 the value of the combined imports and exports of England was $7,000,000,000; Germany, $5,000,000,000, and of the United States upward of $4,000,000,000; France and the Netherlands, $3,000,000,000 each, followed by Belgium, Russia, Austria-Hungary and Italy, with $1,700,000,000, $1,500,000,000, $1,300,000,000 and $1,200,000,000, respectively.

Imports exceeded exports in all the above countries except the United States and Russia. For Great Britain the difference was $650,000,000; for Germany, $160,000,000 and for France, $315,000,000. This difference is paid for by Great Britain through ocean freights, income from foreign investments and the trade in commodities among the countries. The other countries pay for their surplus imports in general in the same way, a larger amount, however, being paid in trade, which means that they are all vitally concerned in their foreign trade and are, therefore, the great trading nations of the world, and the largest and best customers of the United States. We, however, take more of their manufactured products and they take more of our raw products. As we develop in ability to reduce our manufactured products cost and learn how to better meet the trade's exact requirements, we will gradually increase our exports of manufactured products to these countries. This is especially true now that we have become a creditor instead of a debtor nation. The opportunity for such increase is, however, much better in countries of smaller industrial development.

Germany Wants to Keep Briey Mines

ON May 20, 1915, six of the leading industrial and agricultural associations of Germany addressed an important memorial to the then imperial chancellor, Dr. von Bethmann-Hollweg, setting out their reasons why in all future peace negotiations the German plenipotentiaries should unconditionally insist on the possession of the fortresses of Longwy and Verdun, together with the retention of the Briey-Longwy basin, with its rich iron-ore deposits, and should also secure the possession of the coalfields in the departments of Nord and Pas-de-Calais, in the north of France, together with those of Belgium. The six associations in question were: The League of Agriculturists; the League of German Peasants; the provisional combination of christian associations of German peasants (now the Westphalian Peasants' associations); the Central union of German Manufacturers; the League of Manufacturers, and the Union of the Middle Classes of the Empire.

In the course of the memorial its authors, after pointing out that the monthly output of pig iron in Germany had risen, since August, 1914, to about 1,000,000 tons, proceed to state that the manufacture of shells alone called for quantities of iron and steel which were formerly undreamt of. For the shells of gray iron alone, which served then as substitutes for cast steel and forged steel shells, quantities of pig iron had been required during the last few months, amounting to at least 4000 tons daily. No exact figures on this point were available, but it was certain that if the production of pig iron and steel had not been doubled since the previous August it would have been impossible to continue the war. As raw material for the production of these quantities of pig iron and steel minette ore takes rank of ever increasing importance, as this ore alone can be extracted in that part of the continent in rapidly increasing quantities. The output of other territories was greatly reduced, and the importation by sea, even of Swedish ores, had become so difficult that in many regions, even outside Luxemburg and Lorraine, about 60 to 80 per cent of the output of pig iron and steel now made, were from minette ore. If the supply of this ore were interfered with the war would be as good as lost.

The memorial points out that if the fortress of Longwy, with the numerous French blast furnaces of that region, were restored to the French, and if a new war were to break out, the many blast furnace plants in Germany and Luxemburg territory could be paralyzed in a few hours with a few long-range guns. These furnaces to which the distance in English miles from the fortress is given in brackets are as follows: Rodingen (4), Differdingen (6), Esch (10), Oettingen-Rumellingen (13), Dudelingen (15). By stopping these works the output of German pig iron and steel could be reduced by about 20 per cent. A glance at the map of this territory shows that, for instance, Jarny, the minette ore mine of the Phoenix Co., is 18 miles from Verdun, and that the most westerly ore mining concessions of Landres and Conflans commence at a distance of 16 miles from Verdun at the very most. The Germans were bombarding Dunkirk from a distance of about 23 miles. Does anyone really believe that, in the next war, the French would neglect mounting long-range guns at Longwy and Verdun in order to prevent the Germans from continuing to extract their iron ore and to smelt their pig iron? The memorialists mention, incidentally, that the large output of steel from minette affords the only possibility of supplying German agriculture with the requisite phosphoric acid when importation of phosphates is stopped.

As regards coal, the memorialists emphasize the fact that the possession of large quantities of this commodity, and especially of highly bituminous coal,

Bismarck Miscalculated When He Split Up Alsace-Lorraine

ONE of the biggest issues at stake in the European conflict is the ultimate disposition of Alsace-Lorraine. It is the firm conviction of the allies that Germany will fight till her last division is overcome before she will suffer herself to be deprived of this province, rich in its iron and coal deposits. When the treaty of Frankfort was consummated almost 50 years ago the astute Bismarck apparently did not realize that the safety and commercial position of future Germany could be insured only by a solid bulwark of iron and steel. Fortunately for Europe the almost uncanny instinct which rarely forsook the chancellor when political intrigue was concerned apparently did not enable him to realize this fact. Later years have developed that the bulk of the great iron ore deposits in Lorraine were for him on the wrong side of the international boundary line.

The memorial on the Briey mineral lands is understood to have been addressed "in strictest confidence" by leading German industrial and agricultural interests to Chancellor Bethmann-Hollweg. A copy managed to find its way into France and was promptly translated and circulated by the Comite des Forges de France, and embodied in a report prepared by that body in its Special Syndical chamber. The memorial was likewise translated into English and ENGINEERING, *London, through the courtesy of Sir Robert Hadfeild extracted many interesting particulars which are reproduced in greater part in this article.*

which abounds in the basin of the north of France, is of at least equal importance to Germany as is the iron ore, for the issue of the war. Belgium and the north of France produce between them over 40,000,000 tons, and the prohibition of coal exports issued by England on May 15, 1915, proved what was already apparent before, that coal is one of the most decisive factors of political influence. The industrial neutral countries are obliged to obey the one among the belligerents who can assure to them their supply of coal. The Germans cannot do so adequately at this moment—states the memorial—and are obliged hence to have recourse to the production of Belgian coal in order to prevent their neutral neighbors from falling entirely into dependence on England. It is probable—the authors remark—that systematic development of the production of Belgian coal will, even in this war, be of the greatest importance as regards the maintenance of neutrality of several neighboring countries.

The confiscation of the iron ore districts of Meurthe-et-Moselle and of the French coalfields of the departments du Nord and Pas-de-Calais on the western frontier is urged.

Book Review

Eye Hazards in Industrial Occupations, by Gordon L. Berry; published by the National Committee for the Prevention of Blindness; paper, 150 pages; furnished by THE IRON TRADE REVIEW for 50 cents.

In this well-written volume the investigator reviews the chief hazards to eyesight in the industries of the United States. Case reports, well illustrated, feature each section, and suggestions are made for such changes in working conditions as have been found suitable for protecting the employe.

The scope of the book is indicated by the section headings, which are as follows: Statistics of eye accidents, chipping operations, machine operations, abrasive wheels, sandblasting, mushroomed tools, riveting, radiations from intense light and heat sources, ultraviolet rays in illuminants, radiant energy in arc welding and in molten metal, metallurgic operations, glassblowers' cataract; infections, gage glasses, acids and chemicals, treatments of acid burns, industrial poisons, removal of dangerous fumes, vapors and gases, spray process hazards, methyl alcohol, bottling accidents, mining and quarrying, agricultural hazards, goggles, garment trade hazards, industrial lighting, the safety movement.

The book is written in a general informative way for the manufacturer who is seeking light on the subject of accident prevention. The fact that there occur annually in the United States alone nearly 200,000 eye accidents, many of which result in total blindness, is evidence enough that a comprehensive book on this subject fills a distinct want and will be read to advantage by the manufacturer of iron and steel whose processes involve eye hazards.

Germany Covets French Iron Ore Mines

AT the third meeting of the Verein Deutscher Eisen Und Stahl Industrieller which has been held since the war, in Berlin in early December Dr. August Muller, under secretary of state, offered a report on the production of iron and steel. The report states that the iron and steel industries demand the retention of the iron ore basins of Briey and Longwy in France which are necessary to supplement the mines of Germany, the life of which are estimated at from four to five decades at the most. The allies know that if the basis of the iron ore supply is not extended, after a lapse of 50 years, the Germans can no longer carry on war with native iron.

Professor Krusch, councillor of mines, presented a paper at the same meeting on the question of how far the German iron-ore mines will be able to supply the demand after the war. The author stated that out of the 19,800,000 tons of pig iron made in the year preceding the war, the blast furnaces were dependent upon foreign ores to the extent of about 50 per cent, while the whole of the 700,000 tons of manganese ores had to be imported. He referred to geological investigations which he had carried out in relation to the remaining inland deposits of iron ore. Taking the output of the mines, and assuming a natural development of mining without artificial restrictions in the production, the following results are obtained: The deposits in Lorraine, which yielded 21,100,000 tons in 1913, would only last for about 45 years; those in the Siegerland spathic ore district (2,700,000 tons in 1913), would last 42 years; those in the Lahn-Dill region (1,100,000 tons in 1913) would continue for 66 years for red ore and 32 years for brown ore. These three principal districts furnished about 25,000,000 tons out of the total production of 27,000,000 tons, the possible output of the other localities supplying the balance of 2,000,000 tons being of a limited nature also for the future. Under these circumstances German iron ore mining will be exhausted in about 50 years, and the country will then be entirely dependent upon foreign supplies.

Future Reserves Lacking

The author states that certain native ore deposits can not be regarded as reserves in the case of a future war. The country is therefore dependent upon foreign deposits in order to guarantee its supplies, and the most important country in this connection is France, which possesses 2,600,000,000 tons in the district of French Lorraine alone. In Normandy, Anjou and the Bretagne the ore deposits, mostly proved by Germans shortly before the war, amounted to 5,000,000,000 tons, while with the smaller deposits in the Pyrennees, Perigord, Algiers and Tunis, the aggregate reserves of France totaled 8,200,000,000 tons. On the other hand, the German deposits only total 2,300,000,000 tons of an average iron content of 30 to 35 per cent. The French deposits range from 45 to 50 per cent. As France only consumed 8,300,000 tons in 1913 out of a total production of 21,500,000 tons, that country was more favorably situated than Germany, and was able to surrender without damaging her own industry the quantity which Germany lacked.

The paper also mentioned the necessity for supplies from the Russian district of Krivoi-Rog, and from Poland, Sweden and Norway, and asserted that a share should also be secured in the extensive and valuable ore deposits in Brazil. In conclusion, the author urged that in the peace negotiations account should be taken of the imperative needs of the German iron and steel industry in the matter of securing the supply of iron ores, including manganese, as upon these requirements depend the existence of the industry, and the nation.

The opinions of the author were unanimously accepted by the meeting, and a memorial was prepared showing why the possession of Briey and Longwy should be permanently retained, and the imports of Russian iron ore and manganese should be guaranteed.

During the past year the General Electric Co. added approximately 60,000 horsepower to the capacity of main roll drives in the steel mills throughout the country.

How Gun Lathe Castings Are Made

Uncle Sam's War Program Includes the Production of Some of the Largest Machine Tools Ever Built—Castings for These Tools Present Unusual Foundry Problems

BY H. COLE ESTEP

THE demands of the war on the foundry business are as extensive and varied as the numerous ramifications of the industry itself. Every avenue of the trade has been called upon to contribute its quota of productive energy. The makers of the lightest castings are finding that the army, the navy and the shipping board need their output. Producers at the other end of the scale, who specialize on massive, intricate castings for heavy tools and machinery have also been called upon to set aside a large share of their capacity to fill the needs of the hour. In fact in this branch of the business, on account of the size of the castings required, some unusually spectacular achievements have already been recorded.

Require Huge Castings

Our armies need quantities of the heaviest artillery and the manufacture of this artillery in turn requires the use of some of the largest and most powerful machine tools ever built. The foundries operated by the several builders of heavy machine tools in this country, therefore, have recently been called upon to turn out castings both in unprecedented sizes and quantities. In executing this work some unusual foundry problems have been encountered and solved.

One of the most widely-known plants in the United States devoted to the construction of heavy machine tools is the Niles works of the Niles-Bement-Pond Co., Hamilton, O. This foundry, which has been operated under the direction of Louis Baden, superintendent, for a number of years, is specially equipped for the production of large gray iron castings for fine machine tools. In fact it might be said the shop has been a center for this line of work for three or more decades. In making castings for heavy machine tools, such as large boring mills, lathes, planers, etc., more skill and ability is demanded than that required simply for melting and handling large masses of metal. Large machine tools for heavy ordnance work are instruments of precision that must work as accurately as shop equipment of smaller and more normal sizes. The castings used in the construction of these large tools, therefore, must meet certain standards of quality which are more severe than in many other lines of work. The metal must have maximum strength and homogeneity but at the same time must be easily machinable. The metal also should be uniform throughout the casting in order that the large bearing surfaces frequently employed may wear evenly. Large areas of these castings, often hundreds of square feet, have to be machined and unless the foundry work is executed with unusual care and precision heavy losses may be incurred through the partial machining of defective pieces.

Massive Lathe Beds

Among the many large castings now being made for war purposes at the Niles tool works, perhaps the most interesting are the beds, headstocks and tailstocks for 102-inch gun lathes. One section of a bed casting for one of these lathes is shown in Fig. 3. There are five such sections in the complete lathe bed. Three of them are 9 feet 10 inches wide and 39 feet in length, the other two being the same length but somewhat narrower. The partially completed mold for one of these sections is shown in Fig. 2. These castings weigh 75,000 pounds as they come out of the sand and 70,000 pounds when machined.

In making castings of this character certain general principles are involved which apply to practically all heavy machine tool work. As a rule the castings cover a large area, with comparatively little depth. Therefore,



FIG. 1—BORING-BENCH CASTING FOR 102-INCH GUN LATHE WITH GATES AND RISERS ATTACHED

they are molded in shallow pits and since most of the castings are relatively flat only the plainest sort of cover copes are necessary. Sweeps of the simplest possible construction are used to form the drag portions of the molds.

Surfaces Require Care

The surfaces of these castings must be practically without blemish. Unusual attention, therefore, is directed to the facing sand. The natural facing sands which abound in the lower Miami valley are utilized. At the Niles works the sand is mixed mechanically in a machine furnished by the Standard Sand & Machine Co., Cleveland. The facing usually employed consists of 12 or 14 parts of sand to one of coal. Of course it is not necessary to use all new sand. Old and new sand mixed in equal proportions has been found most satisfactory. In extra large castings the facing is 2 inches thick, backed by floor sand of the usual character.

In addition to imparting a good surface to the casting, the sand should have an open structure to take care of the gas generated by the large quantities of metal poured into these big molds. For the same reason it is necessary to vent the cope carefully and to provide for the free exit of the gases in all directions.

It is impracticable to dry molds of the size required for the large castings made at the Niles Tool Works. It also has been found inexpedient to use loam. All of the work is done in green sand and in order to protect the mold surfaces they are thoroughly and carefully skin-dried. The drying process penetrates to a depth of about 1 inch, and the sand is particularly well baked for the first half inch. The molds are dried by means of oil-burning torches furnished by the Hauck Mfg. Co., Brooklyn, N. Y. Large flat molds, similar to those shown in Figs. 2 and 11, are covered with old corrugated sheets beneath which the flame of the torch is allowed to play during the drying process. This converts the mold into an oven thus drying all parts uniformly and effectively. It is customary to dry each mold all night.

Molds for castings such as those shown in Figs. 1 and 3 are carefully weighted to prevent any shifting during the pouring process. For this purpose large cast-iron blocks, 16 inches square and from 8 to 12 feet long are employed at the Niles tool works. These blocks are cast with short pieces of shafting in each end for convenience in handling by means of crane slings. Each block weighs from 5 to 9½ tons. Enough blocks are piled on each mold to hold the cope and casting securely in place. Usually from three to four times the weight of the casting is necessary. A pile of these weights is shown in the immediate background of Fig. 2.

For the successful production of heavy machine tool castings it is necessary to pay particular attention to the character of the metal. If the metal is unsatisfactory the best molding practice in the world will not save the casting from the scrap heap. For castings of this character at the Niles tool works the cupola mixtures are proportioned to produce a metal containing approximately 1.70 per cent silicon, 0.10 per cent sulphur and 0.70 per cent phosphorus. Generally speaking, steel is not used in the mixtures. The customary 50-50



FIG. 2—SWEEPING OUT A MOLD FOR ONE OF THE BED SECTIONS FOR A 102-INCH GUN LATHE

pig and scrap mixture is employed. Both No. 2 and No. 3 pig iron are utilized in the proportion of 70 per cent No. 2 southern iron running 2.25 to 2.75 per cent silicon and 30 per cent No. 3 northern iron running 1.75 to 2 per cent silicon. Both home and foreign scrap are used, the proportions varying with the production of scrap in the foundry. Care is exercised in purchasing scrap to insure a uniform quality.

Control Metal Quality

Mr. Baden believes in the practical control of the cupola operations by the results shown in the machine shop. For this reason he keeps closely in touch with the machining department and watches the progress of his castings through their finishing operations. Whenever any tendency toward hard-



FIG. 3—ONE END OF A 70,000-POUND GUN LATHE-BED CASTING SHOWING GENERAL DESIGN AND THE CHARACTER OF MACHINING REQUIRED FOR FINISHING



FIG. 4—GUN LATHE-BED CASTING AS IT COMES FROM THE SAND IN THE FOUNDRY WITH RISERS ATTACHED—THIS CASTING IS A DUPLICATE OF THAT SHOWN IN FIG. 3



FIG. 5—TOP SIDE OF SIDE SECTION OF 34-FOOT BORING MILL TABLE FIG. 6—BOTTOM VIEW OF SIDE SECTION OF 34-FOOT BORING MILL TABLE FIG. 7—BOTTOM VIEW OF CENTER SECTION OF 34-FOOT BORING MILL TABLE FIG. 8—TOP VIEW OF CENTER SECTION OF 34-FOOT BORING MILL TABLE FIG. 9—THIRTY-SIX-FOOT BORING MILL MOUNTING 34-FOOT TABLE

ness or other unsatisfactory features appear they are immediately corrected before they become serious.

For large castings, such as those made at the Niles tool works, it is necessary to pour the metal as hot as possible and for this purpose the iron may be said to be superheated in the cupola. It comes out of the spout sizzling white hot, probably 2500 degrees Fahr., and on account of the large ladles employed, there is very little loss of heat between the cupola spout and the runners leading to the castings. In work of this character hot metal is the primary consideration to which coke consumption must be subordinated. Nevertheless, efforts are made at the Niles works to keep the coke consumption within satisfactory limits and for the three-month period ended Dec. 31, 1917, the melting ratio was 9.51 to 1.

As previously stated, the gun-lathe bed casting shown in Fig. 3 weighs 75,000 pounds in the rough and 70,000 pounds after machining. This casting is so large that ¾-inch must be allowed for finish on the machined surfaces. The metal sections range from 1 to 1½ inches. This casting is 9 feet 10 inches in width and 39 feet in length. It is that portion of the lathe bed which supports the headstock. The general arrangement of the mold, which is swept out to conform to the outside dimensions of the casting, is shown in Fig. 2.



FIG. 10—A GROUP OF SEGMENT CORES FOR BORING-MILL TABLE MOLD

The flanges and webs of the three girders constituting the casting are formed by heavy dry-sand cores which are set in place after the drag portion of the mold is finished. Each core is made in an ordinary core box, rolled out on a plate and dried in an oven in the usual manner. The cores are properly rodded together and are filled with coke to insure free venting. In addition, a vent pipe extends up through the middle of each core. These pipes are so arranged that they come up through the joints in the cover cores forming the cope, thus affording a direct free passage for the gases from the interior of the mold to the atmosphere. These cores, which are merely large blocks of sand with suitable prints extending between the flanges of the castings on the drag side, are built-up on an iron foundation arbor of lattice or grillwork construction.

The cope for the gun lathe-bed mold consists merely of a series of flat cover-cores held in place by the large square weights previously described.

Fig. 4 shows the lathe-bed casting as it appears just after coming out of the sand. The rods used to reinforce the cores are illustrated and the method of gating also is clearly shown. The mold is gated at one end to bottom-pour runners which connect with the lower flanges of the casting. This insures the metal rising in the mold with the least tearing effect. At the same time any slight impurities will be carried to the top where they may be machined off. The arrangement of the gates, which are about 2 x 3 inches square, and the runners, is clearly shown in the foreground of Fig. 2. A pouring basin of suitable size is used in connection with the gate. There are four risers on each side of the casting as shown in Fig. 4. These risers are each 4 inches square and are joined to the upper flange of the casting. All of the work on one of these large molds is executed by two molders and a helper. Pneumatic rammers are employed extensively.

A heavy gun-lathe boring-bench casting as it comes from the sand is shown in Fig. 1. This bench rests on



FIG. 11—BORING-MILL TABLE MOLD WITH SEGMENT CORES PARTLY SET

the bed of the lathe and supports the boring bar during the operation of finishing the inside of the gun. This illustration clearly shows the method of gating the casting and the arrangement of the risers. Two bottom-pour gates attached to one end of the casting together with eight risers are employed. This casting is made according to the principles previously described, the mold being swept in a pit with a sweep of simple construction. The flanges and sides are formed by dry-sand cores which are set in the drag portion of the mold after it is completed.

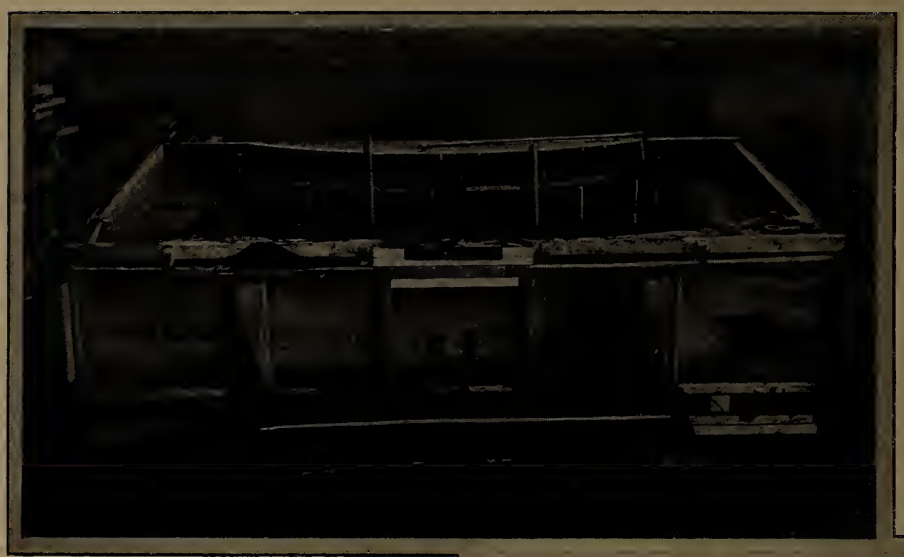


FIG. 12—CORE BOX FOR BORING-MILL TABLE CORE

Casting Large Boring Mill Tables

Some of the problems to be solved in casting a large boring-mill table are suggested by Figs. 5, 6, 7 and 8, which show sections of a 34-foot table for a 36-foot boring mill. Owing to transportation difficulties, the table is cast in three sections, including a center section and two side segments. The top and bottom sides of the center section, which weighs 83,000 pounds, are shown in Figs. 7 and 8, while Figs. 5 and 6 show the corresponding sides of one of the side sectors.

The method of making one of the molds for this work is illustrated in Fig. 11, which shows a mold for a 102-inch tire mill. Like the gun-lathe mold, previously described, these molds are made in a pit using a plain cover core. The necessary ribs and configurations on the under side of the table are formed by core segments similar to those shown in Fig. 10. These segments are assembled in the mold as shown in Fig. 11. One of the core boxes employed on this work is shown in Fig. 12, which also illustrates clearly the method of making the core. This core is provided with eight rows of rods and two vent pipes. It is rammed by hand using core sand of standard composition. The total weight of the three parts of the table for the 36-foot boring mill, as they come out of the sand in the foundry, is 240,000 pounds, or 120 tons. The reason for the segments is obvious. The melting equipment is an exceedingly important part of the Niles foundry inasmuch as it furnishes the metal required for the extra large castings that are continually made in this shop. Mr. Baden states he has run 130-ton heats in a single day and could if necessary run 350,000-pound heats. Three cupolas are provided, 48, 60 and 68 inches in diameter inside of lining, respectively. They were built by the Calumet Engineering Works, now a part of the Whiting Foundry Equipment Co., Harvey, Ill. These cupolas are rated at 7, 11 and 15 tons per hour respectively, figuring from the time the wind goes on to the end of the heat. Under ordinary circumstances the smallest cupola is used only as an auxiliary or for small, special heats. Fairly heavy charges are employed, the metal charges for the three cupolas being 3000, 4000 and 5000 pounds, respectively. A 6000-pound bedcharge is placed in the 68-inch cupola; the bed charge in the 60-inch cupola is 4700 pounds and that in the 48-inch cupola, 3500 pounds.

In order to handle the large amounts of metal melted every day, special yard equipment has been provided. The supply yard, which is immediately adjacent to the building, is 91 feet wide and 450 feet long. It is served by two 10-ton Niles cranes with trolleys protected from the weather. These cranes are employed to transfer the charges from the yard direct to the charging platform, as indicated in Fig. 13. The interior arrangement of the charging platform, together with the scale and charging car, is shown in Fig. 14. This platform is of standard construction. Parallel to the supply yard is a storage yard of equal size where large numbers of flasks and heavy castings are stored. It is equipped with a 25-ton crane.



FIG. 13—GENERAL ARRANGEMENT OF SUPPLY YARD SHOWING TRAVELING CRANE SERVING CHARGING PLATFORM

The metal is handled from the cupolas to the molds in two 25-ton ladles, each of which will pour 45,000 pounds clean. The ladles are handled by the foundry cranes and also by small Jeffery storage-battery trucks similar to that shown in Fig. 15. This also indicates the general arrangement of the melting department.

The main bay of the foundry, which has a span of 60 feet, is served by three 30-ton Niles cranes and two 3-ton traveling jibs. The side bay which is 60 feet wide, is served by four 10-ton traveling cranes and four 3-ton jibs. Both the center and side

bays are 450 feet in extreme length.

Some of the smaller castings made in this foundry, which would be unusually large in an ordinary shop, are molded on a jar-ramming machine of 35 tons capacity furnished by the American Molding Machine Co., Terre Haute, Ind. In addition, several other molding machines of various kinds are provided for smaller miscellaneous work.

Huge Magnesite Deposit Under Development

Many years ago a deposit of magnesite in Stevens county, eastern Washington, was mistaken for marble, and marble claims were located on it. At one of these claims the rock was quarried and sawed into building stones and some was polished and sold for tombstones. It did not stand exposure to the weather well, however, and the industry was short lived. For many years a few people have known the character of the deposit, but its distance from market and the high freight rates made its development impracticable. When the supply of European magnesite was cut off and the demand for domestic magnesite became great and the price rose high enough to justify the exploitation of the Washington deposits, they were sought out for development.

A preliminary geological examination of the area was made early in August by R. W. Stone, department of the interior, who reports that magnesite occurs at several places in a narrow belt extending northeastward from the claims of the United States Magnesite Co., 18 miles west of Springdale to the Finch quarry of the Northwest Magnesite Co., five miles west of Chewelah. Most of the properties are within easy reach of Valley, a station on the Great Northern railroad, 56 miles north of Spokane. Shipment of crude magnesite began in December, 1916, a few hundred tons being shipped each week. By Aug. 15, 1917, four companies had made shipments, but the industry was not fully developed and production was irregular. On that date practically all the 500 tons shipped daily was produced by one company, but the others were preparing to begin or to resume shipments. On Sept. 30 the shipments of magnesite from Stevens county were about 700 tons daily, only a very small portion of which was calcined.

The companies now in the field are Northwest Magnesite Co., American Mineral Production Co., United States Magnesite Co., and Valley Magnesite Co. The Northwest Magnesite Co. is shipping crude magnesite from its Finch quarry and is installing three 105-foot rotary kilns at Chewelah. The American Mineral Production Co. is developing large quarry faces at its Allen and Red Marble properties and has six vertical kilns—four at the Allen and two at the Woodbury quarries. Five of these kilns are 6 feet in interior diameter and about 30 feet high above the fire box. The company has shipped both crude and calcined magnesite. The United States Magnesite Co. discontinued operations after shipping some crude ore, and the Valley Magnesite Co. is developing the Double Eagle quarries and building vertical kilns.

A broad gage railroad from Valley to Dear Creek, near the Red Marble quarry, a distance of 12 miles, and a five-mile aerial tramway from the Finch quarry to Chewelah are being constructed. All material from the Finch and Allen quarries is now hauled by auto truck or team at a contract price of about $2.50 per ton for the shortest haul, which is seven miles.

Diamond drilling and other exploratory and development work are in progress, and a larger output is expected when transportation facilities are improved and the kilns are completed. The district will then be able to supply a large part of the crude and calcined magnesite required to meet the domestic demand.

The magnesite deposits are in mountainous country, where forest cover and hill wash conceal most of the bedrock, and as the outcrops are discontinuous and the depth of the deposits is unknown, estimates of the quantity available may vary extremely. As the quality of the rock can be determined only by chemical analysis, a visual examination of the outcrops is not sufficient to show the proportion of commercial ore it contains.



FIG. 15—MELTING DEPARTMENT SHOWING LADLES AND STORAGE BATTERY TRUCK



FIG. 14—CHARGING PLATFORM SHOWING ARRANGEMENT OF SCALE AND CHARGING CARS

The deposits are large. One-half of a hill 300 feet high and several hundred feet in diameter at the base appears to be magnesite; another deposit which crops out on the top of a ridge and dips at a high angle appears to be more than 300 feet thick and 1500 feet long. A cliff over 300 feet high appears to be composed mostly of magnesite. The beds of which the cliff is composed can be traced back from it for several hundred feet. Computations of the quantity of magnesite in these deposits are astoundingly large when compared with the quantity of magnesite found at other localities in the United States. On more than one of the properties an estimate of 1,000,000 tons of ore within 100 feet of the surface is reasonable. It is safe to say that there are 7,000,000 tons of magnesite in the Stevens county district, and exploratory drilling may multiply this estimate many fold.

The crystalline magnesite of Stevens county is suited to refractory uses and is being shipped to large manufacturers of magnesite products in the central and eastern states.

Works Engineers to Study Electrical Application

At the regular monthly meeting of the Pittsburgh section of the Association of Iron and Steel Electrical Engineers, held at the Hotel Chatam, Pittsburgh, April 20, W. S. Scott, of the Westinghouse Electric & Mfg. Co., presented a paper on "The Electric Furnace After Annealing Treatment and Forging of Steel". Judge J. J. Miller, of the orphans' court, made an address dedicating a service flag in honor of the members of the association now in the military service. The Philadelphia section of the association will hold its next meeting on Saturday, May 4, at the Majestic hotel, Philadelphia, when H. A. Lewis and W. H. Burr, electrical engineers, of the Alan Wood Iron & Steel Co., will present a paper on "Electrically Operated Door Hoists for Open-Hearth Furnaces". Major William A. Garrett will deliver an address on "Some of My Observations in France".

The Chicago section will hold its next meeting on April 20 at the Great Northern hotel, Chicago, the session being in the nature of an experience meeting. This section is now working on plans for a joint technical session to be held in May with the Chicago section of the American Institute of Electrical Engineers. The Cleveland section will hold its next meeting on April 27 at the Union league rooms of Hotel Statler, Cleveland, when T. F. Bailey, president of the Electric Furnace Co., will present a paper on "Electric Soaking Pits and Heat Treating Furnaces and Furnaces for Melting Nonferrous Metals". A joint technical session of the Pittsburgh and Cleveland district sections will be held at Youngstown on May 18, when the McDonald plant and Ohio works of the Carnegie Steel Co. will be inspected.

Storage Rack for Tote Boxes

To save space and provide an improved method of storing tote boxes, the New Britain Machine Co., New Britain, Conn., has devised the rack



STEEL STORAGE RACKS FOR TOTE BOXES

shown in the accompanying illustration. The design was based upon considerations of light weight and rigid construction. The front uprights are of flat steel, while those at the back are angles. The runners supporting the boxes and upon which the boxes slide in the manner of cupboard drawers, are angles electrically welded to the uprights. The backs of the racks are closed and stiffened by sheets bolted to the back vertical members. The units may be expanded horizontally and added to in the manner of sectional book-cases. A safety feature preventing accidental dropping of one of the boxes is provided by the narrow clearance between the backs of the tote boxes and the front cross members.

The Cleveland Milling Machine Co., Cleveland, recently published a revised stock list of milling cutters which includes every type of milling cutter manufactured by that concern.

Arrange Merger of Two Associations

A letter ballot of the members of the American Institute of Metals now is being taken on the merger of this organization with the American Institute of Mining Engineers. When consolidated, the Metals Institute will be known as the Institute of Metals division of this society. The proposed union has been favorably acted upon by the executive board of the American Institute of Metals and the board of the American Institute of Mining Engineers and now requires only the sanction of the members of the Institute of Metals.

This metals division will elect its own officers, raise funds for its own special work and will have active control of such funds. Two meetings will be held annually. The winter meeting will be held in February, in New York, the program to consist principally of technical papers on metallurgical subjects. The fall meeting will be continued and will be held concurrently with the annual convention of the American Foundrymen's association. The program will consist of papers on practical foundry topics and probably will be combined with the iron and steel section of the mining engineers, whose meeting will be held simultaneously. The headquarters of the mining engineers in the Engineering Societies building, New York, will be the headquarters of the Institute of Metals division. W. M. Corse, Titanium Alloys Mfg. Co., Niagara Falls, N. Y., is president of the American Institute of Metals, and F. L. Wolf, Ohio Brass Co., Mansfield, O., is secretary.

Utilize Waste Dolomite

Assigned to the Allen S. Davison Co., 2119 Oliver building, Pittsburgh, United States patent No. 1248486 has been granted to James O. Handy and Robert M. Isham, that city, and covers a dolomite refractory brick and a process for its production. Use is made of the dust and fine materials in granulating calcined dolomite for the manufacture of refractories for basic open-hearth furnaces, either separately or by using other materials in a mix. The waste dolomite is dead burned as it is produced and subsequently is submitted to a brick-making treatment and another dead burning, resulting in strong, dense and refractory bricks which it is claimed do not slack when placed in boiling water. In burning it is convenient to add water as desired to the dust for boiling it up to be handled in a rotary kiln suitable for first burning.

Automatic Pressure Governor

A new pressure governor to control standard self-starters for motor-operated pumps and compressors has been developed by the General Electric Co., Schenectady, N. Y. The governor shown in the accompanying illustration maintains a pressure between predetermined limits on any gas or liquid systems that will not corrode the Bourdon tube.

This governor can be used on any standard alternating or direct-current circuit. It is rated for pressures of 60, 100, 160, 300 or 500 pounds and operates within settings of from 3 to 12 pounds between high and low pressures. Governors for higher pressure have been designed.

The governor consists of a Bourdon tube, an indicating needle, a graduated pressure scale, and adjustable high and low pressure stops. The latter determine the desired pressure range. A relay which actuates the contacts in the control circuit of the self-starter is also provided. The working parts are enclosed within a dust-proof case which is easily opened for inspection. Action of the governor is dependent on the Bourdon tube which is connected to an independent discharge pipe from the pressure tank. The free end of the tube *I* is mechanically connected to the indicator needle *N* and moves it over the scale as Achanges of pressure affect the tube. After the settings for the pressure range have been made, the governor automatically maintains pressures within those limits.

The operation of the pressure governor is as follows

Assuming that the pressure is at the low value, as indicated by the left hand indicator *I*, the contact *C* on the needle *N* completes the circuit through the contact C^1 on the movable arm *N*. When this contact is made, the circuit is completed through the relay coil *R*, causing the armature *A* to close. Attached to this is the contact *CO* which upon closing, completes the control circuit to the self-starter, causing the motor to start. The armature is also attached to the spring *S* which holds the contact C^1 firmly against *C* until contact is broken at *P*.



GOVERNOR WITH COVER REMOVED

As the pressure increases, the needle pointer moves to the right, but its lower part to which the contact *C* is attached moves to the left, and is followed by the movable arm *M*. When the high pressure point is reached, the movable arm is prevented from traveling further by stop *F* and the needle continues its course, breaking the circuit by separating contacts *C* and C^1. The instant the circuit is broken, the relay *R* is de-energized and its armature falls. This releases the tension on the spring *S* and the movable arm *M* being counterweighted returns to the stop post P^1. When the pressure is decreased to the minimum value, the contact *C* again completes the relay coil circuit by engaging contact C^1 and the cycle of operation is repeated. .



EXPANDING SHELL REAMER

Expanding Shell Reamer

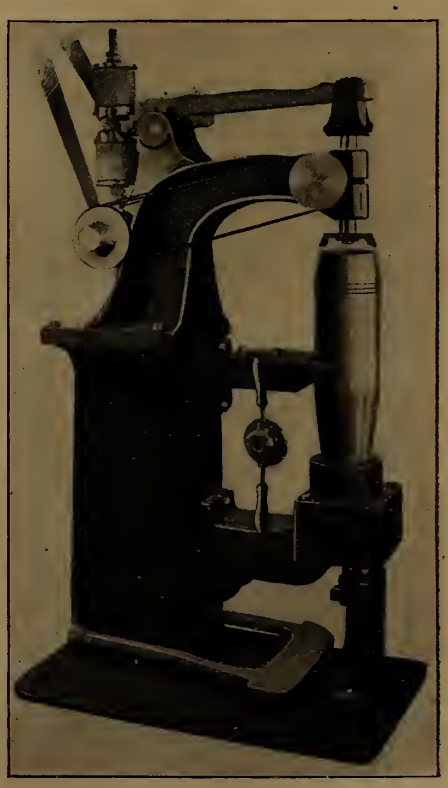
Special tools, such as taps, reamers, hobs and gages used in the production of munitions have developed more during the past few years than in the previous decade. The accompanying illustration shows an expanding reamer made by the Wetmore Mechanical Laboratory Co., Milwaukee. It is a floating type reamer made to fit a 3-inch turret hole and designed for finish sizing fuse holes of 155-millimeter shells. The blades are set on a left-hand angle for smooth cutting and the elimination of chatter. These blades are expanded by means of two ground nuts. A true center in the end of the reamer makes it possible to grind the blades in place if desired, though they may be removed and replaced without taking the tool apart.

Caulking Gas Checks

A new machine which is specially adapted for caulking or peening gas checks in the bases of 155-millimeter shells has been developed by the High Speed Hammer Co., Rochester, N. Y. A shell is placed in the machine and a combination burring and crimping tool is applied by hand. One or two revolutions of this tool under slight pressure removes any burrs or sharp edges from the angular groove in base of the shell. If these are not removed there is danger that the gas check may be cut through during the peening operation. The copper gas check is placed in position and the crimping operation is accomplished by a half turn. The burring and crimping tool is then removed. With the gas check in place the lead wire gasket is inserted and the machine, shown in the accompanying photograph, is started by a foot-treadle. Controlled elastic blows, at the rate of 900 per minute, are struck, and the peen slowly revolves, thus caulking the lead firmly into the angular groove. This also causes the lead to conform to the angle required. The operation is completed in less than 30 seconds.

Buys Mile of Track

The Sharon Steel Hoop Co., Youngstown, O., recently purchased a little over a mile of track from the Ohio & Pennsylvania Belt Line Railroad Co., to connect its blast furnace and open-hearth plant at Lowellville, O. The company's recent increase in capitalization from $10,000,000 to $15,000,000 is to provide stock for the purchase of the Ohio Iron & Steel Co.'s Lowellville furnace, and to pay for the plant extensions now under way, including a Morgan continuous sheet bar mill.



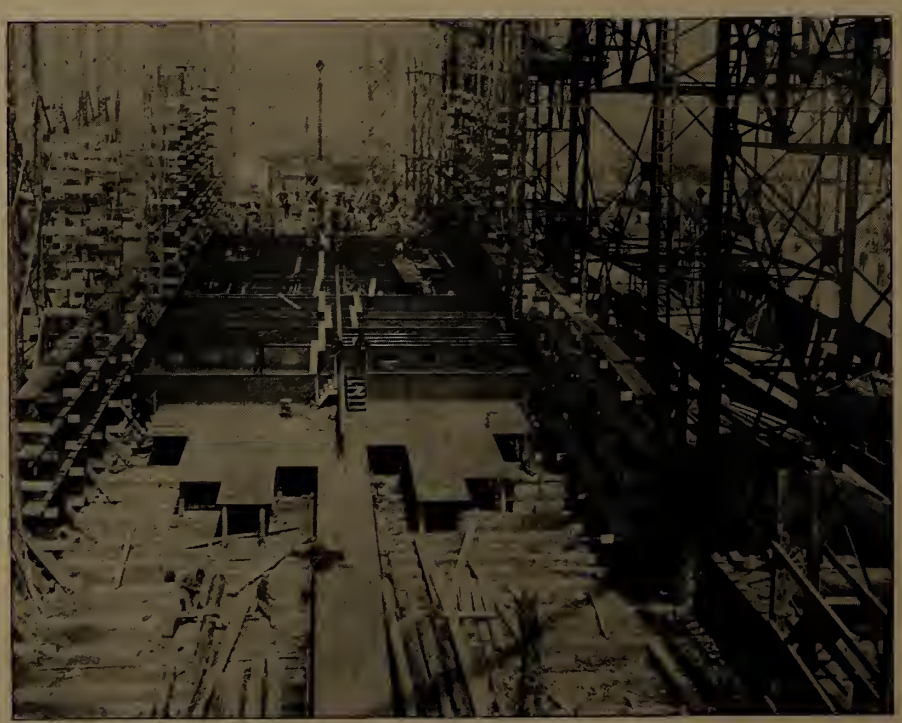
CAULKING GAS CHECKS



A Panorama of the Great Hog Island Yard of the American International Shipbuilding

World's Greatest Shipyard at Hog Island

NO STORY of unswerving devotion to a high cause, of unrelenting tenacity and accomplishment in the face of the severest discouragements, and of truly American ideals and traditions fulfilled, eclipses that of the achievement at Hog Island. Here, on a site which seven months ago was an isolated waste of underbrush and marsh land, not even reached by a decent wagon road, the largest shipyard in the world, larger than the five biggest yards in this country a year ago, has been 65 per cent completed. In pushing the work there were times during the winter when the limits of human endurance were scarcely recognized, when the inability of the men to withstand the intense cold led to a labor turnover of many thousands of workers each week. In one week, in fact, approximately 35,000 names appeared on the payroll, and yet at the end of the week the working force numbered only about 20,000, or about the same as at the beginning. Hog Island for weeks was frozen to the rigidity of granite and the men were able to work no more than half an hour at a time in the icy blasts that swept down the Delaware valley. During these intense periods piles for the foundations of the shipways and important buildings were driven into earth softened by live steam or shattered by dynamite. At no time was progress seriously interrupted. The schedule in accordance with which ships are to be completed and launched at Hog Island, was based originally on the belief that orders to proceed with the construction of the yard were to be issued early last summer, in which event pile-driving would have been well completed before midwinter. Despite the fact that the contract authorizing the construction of the yard and the building of ships was not signed until Sept. 13, the terrible obstacles which the winter engendered were overcome to such effect that Hog Island now is ahead of its schedule. The schedule called for the laying of the first keel at this yard on Feb. 18. It was on Feb. 12 that the first keel actually was laid. The American International Shipbuilding Corp., which,



ERECTING FLOORS IN HULL NO. 492A AT HOG ISLAND YARD



Corp., Showing a Few of the Fifty Shipways and Auxiliary Buildings Under Construction

Now Busy Building Ships to Win the War

as agent of the United States shipping board, is building and operating the Hog Island yard, recently issued this statement: "We can see no reason to believe that it will be necessary to change the schedules laid down in our contracts, which call for the delivery of 50 ships from Hog Island yard by the middle of December, 1918."

Although the cold weather and the delay in letting the original contract were the greatest handicaps to the builders of the Hog Island shipyard, there were countless other difficulties. When the plans for the yard were first made it was expected that all the ships to be built would be of the same size and type, namely, 7500-ton, 11½-knot, 400-foot, steel cargo carriers. The contract signed on Sept. 13, 1917, did call for 50 vessels of this type. On Oct. 23, however, was placed a second contract for seventy 8000-ton, 450-foot, 15-knot, combined troop and cargo carriers. To accommodate the larger vessels, it was found that instead of making all of the ways 491 feet long, it would be necessary to lengthen 30 of them to 541 feet. With the one type of vessel, only one material classification and storage yard would have been necessary; with the addition of a second type, additional material yards were required. It became essential to relocate buildings and make general changes in plans. As the yard now is being completed, ways are being provided for the simultaneous construction of twenty 7500-ton and thirty 8000-ton vessels. When the plant is in full operation, the output will be one ship every two working days.

The schedule calls for their completion and delivery to the government as follows: Twenty-five 7500-ton vessels within 13½ months from the date of the original contract, Sept. 13, 1917; twenty-five 8000-ton vessels in 15 months; twenty-five 7500-ton vessels in 18½ months; twenty-five 8000-ton vessels in 20 months, and thirty 8000-ton vessels in 22 months. A third contract just has been placed which calls for an additional sixty 7500-ton freighters. Officials of the American



LAYING THE BOTTOM PLATING FOR A CARGO CARRIER



WOODEN TIMBERS SHORE UP THE SHIP WHILE IT IS BEING BUILT—NOTE HEAVY STEEL CONSTRUCTION

International Shipbuilding Corp. say that the only anxieties with respect to delays which they feel at present, are occasioned by difficultes in obtaining shipments of steel at a rate adequate to the capacity of the forces at the yards; owing to the improved schedules at which steel mills are operating, however, they look for an early enlargement in the supply of steel.

Staggering the Imagination

An idea of the immensity of the plant at Hog Island may best be conveyed by figures. The combined water requirements af the yard call for a capacity that would supply a city the size of Minneapolis. The sewer system would answer the needs of a city of 30,000 people. For operating the machinery throughout the plant, motors are required having a connected load of more than 28,000 horsepower, which is equal to the maximum demand for power in the city of Providence. The air compressor equipment at Hog Island is exceeded in size by only one other installation in the world, that of the Rand mines in South Africa. Some 75 miles of standard gage railroad track have been laid in the yard; the rolling equipment on these tracks comprises 20 locomotives, 500 freight cars and 50 passenger coaches. The coaches are used exclusively for transporting the workers between Hog Island and Philadelphia. In addition to the railroad trackage, 15 miles of substantial roadway have been built for hauling with motor trucks. Approximately 25 acres of the shipyard site are being placed under roof.

Hog Island was designed primarily as a ship assembling rather than a shipbuilding yard. That is, all the various ship parts and materials are manufactured elsewhere, in some 3500 plants throughout the country, and shipped in such completed form that they may be put right into place in the hulls without further finishing. Therefore, the shop buildings at the yard are devoted entirely to the maintenance of working tools and equipment, to the manufacture of templates, and to such corrective work as occasionally is required on fabricated plates and shapes and other parts. Of such magnitude is even this work at the Hog Island yard, however, that some of these shop buildings are nearly 700 feet long.

Over a Mile of Shipways

The 50 shipways extend more than a mile along the river front. For efficient management, they are divided into 10 groups of five ways each, all under a central supervision. Each group is provided with a ways administration building, a service building, a tool house and a compressor house. Between each two ways are two steel derricks, each provided with four cantilever arms. Thus each way is served by eight arms which command all parts of the way. Forty of the 50 ways are of wood pile and timber deck construction; the remaining 10 are entirely of concrete. The method of sinking the concrete piles is to drive sheet steel sheaths which are filled with the concrete. Work on the wet basins or fitting out piers, where the ships will be provided with turbines, boilers, pumps, lighting sets, steering gears, engines, windlasses, joinery work, winches, refrigerators, deck houses, piping, etc., now is under way. In order to provide the necessary depth of water, it is necessary to remove 3,500,000 cubic yards of mud; the latter is being pumped into impounding basins on marsh land which

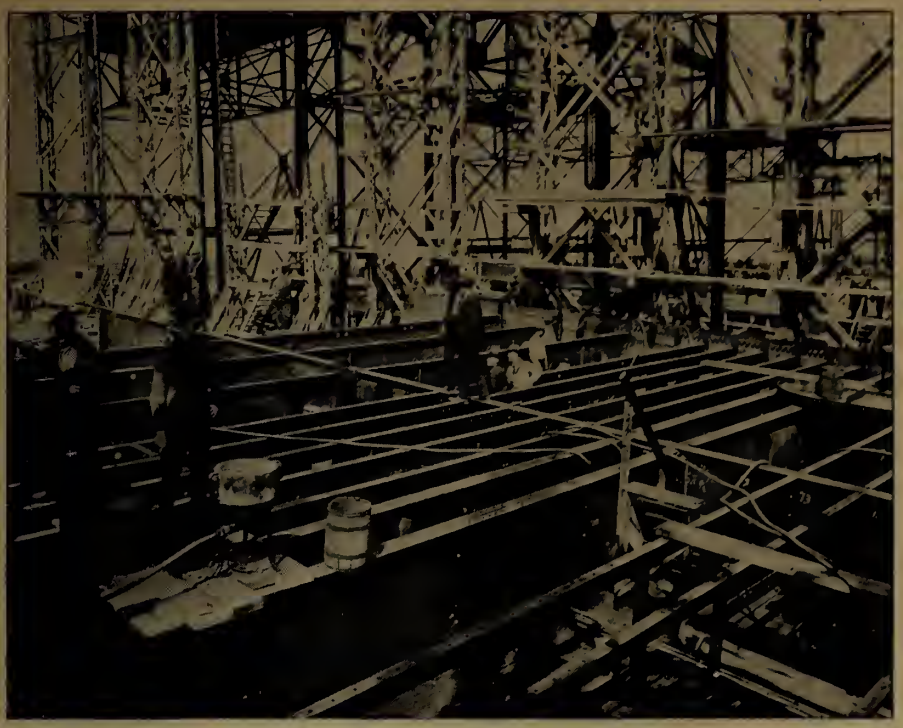


RIVETS THAT DO NOT PASS INSPECTION ARE CUT OUT WITH AN OXYGEN TORCH AND REPLACED

thus is being reclaimed. The fitting out piers will be seven in number, each 1000 feet long, and they also will occupy more than a mile of river front immediately south of the ways. Each pier will accommodate four hulls, making the total simultaneous fitting out capacity ample for 28 hulls. This capacity corresponds with that of the ways, since less time is required for fitting out than for assembling the hulls.

The Agent of the Government

The American International Shipbuilding Corp.'s status is solely that of agent of the United States shipping board in building and operating the shipyard. All the work entrusted to the corporation is being done under the approval of the United States shipping board, with Rear-Admiral F. T. Bowles, assistant general manager, in direct charge. The contract for building the yard and ships is held by the American International Corp., which owns all of the stock of the American International Shipbuilding Corp. The site of the yard, 846 acres, is the property of the American International Corp., which purchased it at $2000 per acre. The United States shipping board now is paying a rental for the site equivalent to 6 per cent per year on the purchase price, and it holds the privilege of purchasing the site at the purchase price at the end of the war. The American International Corp. holds the privilege, in case the United States shipping board does not exercise its option, of acquiring the shipyard at its appraised value at the end of the war. In the meantime, all expenses and the cost of labor and materials for building the yard and the ships are being defrayed by the United States shipping board.



THE DOUBLE BOTTOM IS FORMED BY HEAVY GIRDERS CONNECTING THE INNER AND OUTER SKINS OF PLATING

With regard to the fees which the government is paying the American International Shipbuilding Corp., officials of the company are content to allow the facts to speak for themselves. The only fees which the company will receive are $41,000 for each completed 7500-ton vessel, and $65,000 for each 8000-ton vessel. Inasmuch as the estimated costs are $1,100,000 for the 7500-ton and $1,650,000 for the 8000-ton vessels, respectively, the fees are equivalent to approximately 4 per cent. However, while the subcontractors who are doing various parts of the shipyard construction work are paid fixed fees approximately 5 per cent on the cost, the American International Shipbuilding Corp. is not receiving any remuneration whatever for such construction work, or its supervision. In fact, the company is donating its services in this direction. Comparing the fees for building the vessels with the combined cost of the vessels and the yard, they are equivalent to some 3½ per cent. In the construction of the yard, the company enjoys the cooperation of Stone & Webster, who furnished the services of more than 400 skilled construction engineers. The American International Shipbuilding Corp. also utilizes the services and facilities of the New York Shipbuilding Corp., which is owned by the American International Corp.



AFTER BEING CUT AND ROLLED, TO SHAPE, THE BILGE PLATES ARE FIRST BOLTED IN PLACE AND THEN RIVETED

Bonuses and Penalties

The contract between the United States shipping board and the American International Corp. provides an inducement in the form of premiums to be paid to the latter company for speedy delivery of the vessels. The government will add $500 to the $65,000 fee for the 8000-ton vessels for each day gained in delivery up to a maximum of $17,500, and a

penalty to the same amount will be exacted for each day the company falls behind in its schedule, also up to a maximum of $17,500. In case the cost of the vessels proves less than the estimated figure, the American International Corp. will be privileged to share in this saving to the extent of 50 per cent, providing the amount going to the corporation does not exceed $17,500. It also stands to share in excess costs on the same basis. In the case of the 7500-ton vessels, the premium or penalty for days gained or lost in delivery, is $300 per day; the maximum penalty or premium is $14,000. The shipping board also will pay the corporation 50 per cent of any saving from the estimated cost, and the corporation shares the excess in cost on the same basis up to $14,000.

Hog Island is on the west shore of the Delaware river, about 12 miles below Philadelphia. It is an island no more, as the narrow channel which separated it from the mainland has been filled in. Prior to Sept. 13, 1917, the island's sole claim to fame was its use as an occasional picnic ground to which excursionists from Philadelphia were transported by ferry. The only buildings on the island were a ferry house and a few ramshackle barns and sheds. The considerations which led to its selection as a shipyard site, were its proximity to a large city which had a certain amount of housing facilities and from which a certain amount of labor might be drawn; it was on deep water, having a 35-foot channel, which was well inland and away from enemy attack, and it was in a district served by an established power plant of sufficient capacity to fill the requirements of the shipyard.

Work Started with a Rush

It was in May, 1917, that the United States shipping board originally requested the American International Corp. to undertake the erection of a shipyard for the construction of 200 steel ships. Although the commencement of the work was delayed for four months, it began with a rush as soon as the original contract was signed on Sept. 13. By Sept. 15, Stone & Webster had the nucleus of the engineering organization on the job at Philadelphia and the work of surveying Hog Island actually had started. The actual work of clearing the island was begun on Sept. 17 with a force of laborers borrowed from a Philadelphia contractor. An employment department was organized and each day saw startling increases in the number of men at work. At times during the winter, the men numbered as high as 26,000. At present, there are about 21,000 workers at Hog Island, but it is expected that when the yard is working to capacity, approximately 30,000 men will be employed. The labor turnover now is well under 100 per cent per month, but the figure still is large enough to make hiring men an important feature of the company's activities. The employment department, therefore, has been located in quarters which are specially designed to facilitate the sorting out of the new men. Applicants for work, when they come to the yard, are introduced into a huge room, at one end of which are a number of booths, occupied by experts who examine the applicants in their qualifications for the particular work they desire. Those who are rejected are passed out to a street exit, while those accepted, are transferred to an employment room. An idea of the magnitude of the work of the employment department is conveyed by the size of the physical examination department. This is comprised of 25 booths arranged into groups of five each, so that five physicians examine five 5-men groups simultaneously. The physical requirements are as rigid as is necessary. The primary needs are that men have no infectious diseases, and that they be physically fit to do the work to which they are assigned. Before going to work, the men are conducted to the housing department, where they may make arrangements for dwellings or apartments, or if they desire, they may obtain a bunk in one of the barracks. They then are turned over to the foreman of the department in which they are to work. Incidentally, the United States shipping board now is working out plans for additional housing facilities in the neighborhood of Hog Island. Bunk houses already on the island have capacity for about 6000 men.

The handling of materials at a plant which has a capacity for using them as fast as the Hog Island shipyard, necessitates unusual methods. The supply department has charge of providing all material from locomotives and lead pencils to steam shovels, carpet tacks, cranes and common pins. All the steel, rivets, bolts and other materials for ship construction as they are received at the plant, are unloaded in one of two classification yards. One of these contains the material for 8000-ton vessels and the other for 7500-ton craft. These classification yards serve as feeders to a third yard, known as the day storage yard. In the classification yards the desired materials are assembled into carloads which are switched into the day storage yards. The following morning these cars are moved to the ways where they are needed. Loading the cars is accomplished with facility by means of locomotive cranes. The handling of the materials to be used at the fitting-out piers is being worked out along similar lines.

Fire fighting facilities constitute an important division of the comprehensive plan at Hog Island. Four fire stations provided with modern motor fire vehicles are located at strategic points, while a force of 100 firemen constantly is on duty. The guard system at Hog Island is comprised of 600 men, many of whom have seen service in the present war. They are commanded by a former major in the Canadian expeditionary forces, who received wounds in France which incapacitated him for further active military service. The guards have barracks of their own which are provided with a cafeteria and recreation hall.

Teaching Shipbuilding

One of the plans at Hog Island to draw recruits to the always insufficient supply of skilled labor, is a group of educational courses by which partly trained or untrained men may become specialized in one of the more important branches of work. This school has courses for erectors, chippers, caulkers, heaters and passers, shipfitters, riveters, carpenters, drillers, bolters, tool room boys, pipefitters, cutters and welders and machinists. The school was organized Feb. 1. The present enrollment is 600, while 2000 applicants are waiting to enroll. The courses require two days to six weeks, depending upon the previous training of the men and the ground covered by the course.

Accurate templates are imperative in building standardized steel vessels. Therefore, the work in the drafting and template departments is of a high order of importance. So are all the templates which are being used by fabricators in preparing the ship steel for the Hog Island shipyard, as well as the templates needed for installing piping and other equipment in the hull, have been made at Camden, N. J., with the assistance of the New York Shipbuilding Corp. All of this work in the future, however, is to be done right at Hog Island in a new ship template shop now being completed. The template shop has been provided with turbines, boilers and a complete piping system, all set up in the same arrangement as in a completed vessel, in order that accurate templates may be made for use in fitting-out work.

Victory First, Then World Trade

Fifth Foreign Trade Convention Pledges Its Forces Toward Winning the War—Export Combinations Under Webb-Pomerene Bill Receive Consideration—Maintenance of American Merchant Marine Urged

WIN THE war and in so doing fortify the future of the foreign trade of the United States, was the message written in three days of serious, comprehensive and patriotic deliberation by 1000 merchants, manufacturers and other business men identified with the export field in attendance upon the fifth National Foreign Trade convention at Cincinnati, April 18 and 20. To the primary end of winning the war, the services and experience of the exporters of the nation was tendered to the government and it was declared that every plan for the extension of the foreign commerce of the country should count most toward bringing victory to American arms. "It has been recognized in all deliberations that whatever is now done looking to larger trade when peace comes, must be subordinated for the time being to measures that meantime will impose new and heavy penalties upon our adversaries," declared the convention. "To play its part in winning the war, American foreign trade must be maintained both as a support of national credit and a source of materials required in military and moral operations."

Two subjects it was apparent underlay the discussions and the expressed thoughts of the convention. One of these was the imperative necessity of maintaining as the right arm of foreign commerce the American merchant marine already established under the driving force of war and destined to great further expansion. Measures which will insure American-operated ships of equality of competition with those of foreign countries after the war were demanded in the various addresses. Repeal or nullification of the crippling seaman's act and other proposals calculated to safeguard and render permanent the new American fleets, were brought forth.

Final enactment of the Webb-Pomerene bill recently, legalizing combinations of competitors in export trade was hailed with widespread gratification, as marking the dawn of a new day for the foreign commerce of this country. Plans of operation under the new measure formed the chief subject of one group meeting and there was much discussion, both formal and informal, as to the best course of procedure. President Clarke, of the Lackawanna Steel Co., in his paper relating to metals as a factor in the war, suggested the present method of co-operation by committees between the American Iron and Steel institute and the government might serve as a nucleus for a concerted export plan. It was made apparent that no definite means yet have been worked out by exporters whereby the provisions of the law are to be grasped. It was stated, however, that the lumber manufacturers at the convention had launched a movement to form an export combination in that line.

"The imperative need of the hour is the presence in the North Atlantic of as great tonnage as can be handled in military transport without weakening the lines of supply of our forces which originate in all the non-European markets," reads the declaration of principles of the convention. "Sacrifices necessary to this end will be gladly borne. The members of this convention, individually and through the National Foreign Trade council stand ready to place at the government's disposal their experience and information to the end that the determination of the essential character of the various trades and the necessary curtailment of exports and imports shall be both practical and effective."

It was urged that southern and gulf ports be more extensively used by the government in shipping abroad owing to the congestion at eastern ports; the diversification and use of inland waterways under a broad national policy was supported; the importance of a constantly increasing number of American enterprises in foreign trade and of the part that education must play in the field was sounded. On the question of the tariff, it was declared, the law should provide for the encouragement and protection of foreign trade and to this end, the principle of a flexible or bargaining tariff was approved.

Steel Men in Prominence

Steel men were prominent at the meeting. President James A. Farrell of the Steel corporation and chairman of the National Foreign Trade council, called the meeting to order. Mr. Farrell was given an ovation on that and subsequent occasions in recognition of his efforts to advance the interests of the council and of organized foreign trade in this country. Mr. Farrell in opening the meeting said: "While the great problems of the war are engrossing the attention of all mankind, it must be borne in mind that the men assembled here are among those peculiarly interested in the vital questions of the aid their respective industries are giving, and will continue to give, towards winning the war, and to prepare for the economic situation and work of rehabilitation after the war."

President E. H. S. Clarke of the Lackawanna Steel Co., was made the presiding officer but after serving Thursday morning was called away by urgent business.

Mr. Farrell was the principal speaker at the banquet, Friday evening.

He spoke on "Foreign Trade Aspects" In part he said:

"Four years have passed since the first National Foreign Trade Convention met in Washington. It was a thoroughly representative body, but, compared with its successors, relatively small in numbers. These four years have been probably the most momentous in the whole history of the world. Half a century of change has been compressed within their limits; the trend and complexion of generations of progress will be found to have been determined by the epoch-making events they have witnessed. Their central feature has been the culmination of two score years of a work of preparation, capably and carefully planned by Germany, to enable her to dominate the world. The basis of it all was the perfecting of a military machine of unequalled power and efficiency. It was buttressed by a financial system more conspicuous perhaps for daring than for soundness, but which lent itself most successfully in time of peace to the dvelopment of industrial enterprise at home and commercial adventure abroad. Had Germany been content with the results of 40 years of peaceful progress; had she employed the same resourcefulness in expanding the area of her industrial and commercial influence that she had devoted to its creation, she would doubtless have achieved a position of dominance in the arts of peace which will surely be denied her as part of the fruits of war.

Prospects Are Favorable

A reassuring picture of industrial prosperity after the war was drawn by Mr. Farrell. He said: "The problems which before our entry into the war were peculiar to the belligerent nations, are now our own problems: the employment of returned soldiers; the displacement or further utilization of female labor; the conversion of war industries into agencies for the fabrication of articles for peaceful consumption; the readjustment of the complex machinery of finance so as to conform to the requirements of a world a large part of which will be staggering under a load of taxes ,and in which the neutral nations will be seeking for financial support for the maintenance and expansion of their industries. There can hardly be a question that for a good many years after peace is restored the rehabilitation of the vast territory wasted by war, and the replacement in neutral countries of equipment which has necessarily suffered from deterioration while replacements have been impossible, will provide a large outlet for surplus production. Moreover, the creation of conditions hitherto nonexistent of equal opportunity for international commerce and industrial enterprise, should so quicken the world's demand for manufactured products as to insure a long period of industrial prosperity. Much will, of course, depend on the character of the terms of peace, but if these are such as to relieve the small nations from any fear of their more powerful neighbors, and to leave every country free to follow its natural development along the line of least resistance, we shall see such an increase of the world's wealth as will go far to compensate for the appalling destruction which the last four years have witnessed.

"As we have willingly devoted our lives and our fortunes to the cause of the allies who have already given most of their wealth to carry on, in our behalf as in their own, this titanic struggle for liberty and freedom, it would be a natural corollary to this joint enterprise that there should evolve at the end of the war a definite plan of co-operation in the financing of foreign enterprises. When we consider that the loans already advanced to its allies by the United States aggregate some $6,000,000,000 and that their end is not yet; when we take into account the equal generosity of the British to their allies, and the load of taxation which must be borne by all of the belligerents for the generations to come, it is evident that the future of foreign commerce must be largely identified with international co-operation in finance.

"It is reasonable to expect that with a secure peace established among nations divested equally of the power and the desire to make war on each other, great world enterprises will be undertaken under the stimulus of international combinations of capital, and of a common surplus of materials available for improvement and reconstruction. No longer should it be the case in future years, when it may become possible for us to lend financial aid to the present neutral countries of the world for the development of their enterprises, that America should withhold its proper participation and expect the European countries to carry the entire load of foreign financing. Neither would it seem just or equitable, should we emerge from this war with sufficient surplus capital to warrant generous investment in foreign enterprises, that we should selfishly disregard the claims of our present allies to that participation in such financing which insures an adequate share of resulting trade.

Whatever may be the eventual terms of peace, one conclusion would seem to be reasonably certain: We and our allies will have sacrificed our blood and treasure in vain if we have not succeeded in insuring hereafter conditions of peace under which we shall be free to carry on our domestic and foreign commerce without the fear of military dictation or aggression."

Hurley Sends Message

Chairman Edward N. Hurley of the United States shipping board was programed to speak at the banquet but was detained in Washington. He sent a long message which was read at the banquet by Mr. Farrell. He said: "In Washington we are all deep in this immediate task. We are so deep in it that some of us forget that if the righteous purposes of this war are to be achieved we must fill our trade function in the future. America never again can return to the provincial attitude of the past. We have become a world leader in war, and we must maintain our world position in peace. The share of world commerce to which the United States aspires is that to which the resources, the skill and the resourcefulness of our people entitle us in fair and friendly competition with the nations who are at once our customers and our supplies of materials and merchandise.

"We are building ships first and foremost for the war, but they will be useful for the future world trade as well. Remember that once their part in the winning of the war is ended a large number of them will

Farrell Boosts Loan

IN addition to acting as the guiding spirit of the convention, President Farrell found time to assist prominently in pushing Cincinnati's Liberty Loan campaign "over the top". He was a speaker of honor at a large luncheon at the Hotel Sinton, Friday noon, when patriotic and business leaders of Cincinnati met to clinch the city's quota of $20,000,000 *and win for it an honor flag. Mr. Farrell delivered a short address and made a personal subscription of* $25,000 *to Cincinnati's credit. Mid scenes of great enthusiasm the total subscription went forward with a rush and finally topped* $24,000,000. *Cincinnati nati is the second city of its size to pass its quota, Detroit being the first.*

be engaged in bringing back to home and industry the victorious soldiers, and in transporting to Europe the materials necessary for reconstruction of normal life freed from the menace of avaricious autocracy. These vessels will serve the commerce of other nations equally with our own, their facilitation of the trade of the world will be the corollary of the freedom of the seas we fight to assure. And if there are any men among you who doubt that we are going to have a vast fleet I will simply ask whether you have heard of a well-known man in our organization whose name is Charles M. Schwab."

Frank Waterhouse, of Seattle, in presenting the subject "Trade Follows the Flag", suggested a practical method whereby the disadvantages of higher cost of operation of the American merchant marine under existing laws in competition with the foreign shipping, may be overcome after the war.

Existing law gives the President authority to sell in whole or part, to lease or charter the vessels now owned, under construction, and to be built by and for the Emergency Fleet corporation. It is obvious that the item of cost can receive little consideration in employing these vessels for commercial purposes, after the war is over. The cost of these vessels is a war expense and will have to be so charged. Now instead of selling this emergency fleet in whole, or in part, I suggest that the United States should continue to own

Belligerents Prepare For After-War Trade

Report by National Foreign Trade Council

WITHOUT waiting to determine what the outcome of the present war shall be, the great commercial and industrial nations of Europe, chief among the belligerents, are already taking measures of preparation for the economic competition which every circumstance indicates is certain to follow the termination of the armed conflict. The restoration of peace is bound to be followed by a renewed struggle for the markets of the world; a struggle, which, to judge from the way the nations are preparing, will surpass the commercial competition of the epoch that ended in 1914, as the present war surpasses that of 1870-71.

England is preparing, France is preparing, Germany is preparing. Just as in the military struggle, each side learns constantly from the other, and their methods become in various respects more and more alike.

England

THE most important of England's industrial and commercial preparations consist of definite plans for stimulating her export trade, and providing it with the three things which it most lacked before the war—credit, full information, and adequate representation in the foreign markets. The British Trade Corp., a semi-official corporation with an authorized capital of $50,000,000 is expected to put an end in part to the difficulties as to long credits and credit insurance. The creation of the Overseas Trade Development and Intelligence department under the joint direction of the foreign office and Board of Trade; and the reorganization of the consular, commercial attache and trade commissioner service is expected to fill the gap as to information. And various schemes are being considered for voluntary co-operation of noncompeting firms in securing representation in foreign markets, such as the proposed British manufacturers' association covering the entire field of industry. Trustification to lower cost of production is taking place to some extent. The proposal to extend government control over imports and exports for three years after the war is strongly objected to by the business world. Imperial preference will be the keynote of the new tariff policy. The reorganized Board of Trade and the ministry of reconstruction are closely studying all questions relating to industry and to foreign commerce.

France

FRANCE'S preparations take to a great extent the form of setting up barriers against an economic invasion by Germany after the war. Among the proposals for direct action are laws against commercial espionage, industrial and commercial publicity, prohibiting German merchant vessels entering French ports, forbidding Germans to belong to, or to be directors, officers or agents, of French business houses, forbidding the use of German capital in French enterprises, the development of water-power to make France independent of German coal, the establishment of an annual fair at Lyons to rival the Leipsig fair, the founding of L'Exportateur Francais on the model of the Deutsche Export Revue. The proposed Banque D'Exportation pour la France, modeled after the British Trade Corp., may become a reality after the war. A large dye and chemical corporation, formed recently, will play an important part in the reconversion of munition plants. Technical education is being stimulated, reforms in the consular service mooted, as well as an extension of the activities of the official "Office of Foreign Commerce". The tariff question is being studied by government experts, the merchant marine subsidized. Associations for the promotion of foreign commerce and for the exploitation of the country's resources are springing into being. An industrial census to inquire into the nature and number of machines and supplies of raw material has been proposed.

Germany

GERMANY means to offset her disadvantages after the war by acting practically as a unit—buying raw materials as a unit, making use as a unit of such credit or possibilities of getting credit as remain to her, pooling her sources of commercial information, her technical intelligence, continuing those supercartels in the important branches of industry which were brought about by government compulsion as a war measure; and which will be equally useful in the coming commercial war. Throughout Germany industries, committees, associations, chambers of commerce are uniting, or being forcibly united into larger or more powerful organizations, all under government supervision or control. And schemes for giant government monopolies urged by some for revenue purposes by some for the purpose of preventing duplication and conserving man-power are being considered. Certain other industries may be used as means of retaliation in a possible commercial war. Stress is being laid on the keeping of technical and trade secrets. Measures are being worked out forcing up the value of the mark and for preventing wholesale efforts to dispose of war loans immediately after the war from causing financial disaster. A new ministry of economies has been organized, devoted in part to promoting export trade. The rebuilding of the merchant marine is being stimulated by huge subsidies. Demobilization will take place gradually, according to industrial needs.

it; that it should charter the same to responsible individuals, firms and corporations, citizens of the United States, to be operated in trades approved by the shipping board, under the United States shipping board's form of bare boat charter, running three or five years, with renewal options; annual hire to be based on 15 per cent of a valuation fixed for chartering purposes at £14 per deadweight ton carried.

The maximum price for building an ordinary good cargo boat in England for some years before the war was about £9 per deadweight ton carried. The present price for similar boats now being built for the British government is £16. It is not expected that the price will be less than £16 for some years to come. Therefore, if the modern British cargo boat is valued at £16 per deadweight ton, and our emergency fleet is valued for chartering purposes at £14 per deadweight ton, the American charterer should be quite on an equality with the British shipowner, as the latter would have to earn at least 15 per cent for interest, depreciation and insurance on £16 per ton valuation, while the American charterer would be paying in hire 15 per cent on a £14 valuation, which margin would be sufficient to equalize the increased expense of operating under the American flag. Of course, this argument is based on the value of new tonnage. Such a plan would allow the government 5 per cent per annum for depreciation of vessels, 6 per cent for insurance and 4 per cent for interest; of course the charter rate would decrease each year as the value of the vessel was written down. If the use of government form of time charter was preferred, this form could be easily utilized on somewhat similar lines."

Thomas L. Chadbourne, counselor to the war trade board, stirred the assemblage to an outburst of patriotism when he described the economic and political effects upon the central powers of the embargo imposed by the board on exports of supplies to the Scandiavian and border countries which had been flowing through the latter into Germany.

Tells of Japanese Ship Deal

Mr. Chadbourne cast some light on the inside details of the bargain which the government has made with Japan whereby the latter will furnish a large tonnage of ships in return for the release of a heavy tonnage of plates. "Among other things," he said, "the board has participated in denying to the steel manufacturers of the country or perhaps I should say, deferring to the steel manufacturers of the country, the difference between 3.25c per pound, the price fixed by agreement with them and our government for the sale of domestic plates, and 8c, which was about the average price upon 300,000 tons or thereabouts of steel contracted before the war to be shipped to Japan. We embargoed that steel for the purpose first of ascertaining whether it was possible to let go such an amount of steel under any circumstances and then at the instance of Chairman Hurley, in order to see whether it was possible to secure from Japan in case it was exported, a return in actual ships completed. We entered upon that negotiation with the Japanese government and for three months it was conducted until we were informed by the Japanese government that it believed we had better negotiate with the shipbuilders in person. We undertook the negotiations with the shipbuilders and finally have closed for an aggregate of 553,000 tons of shipping of which 150,000 tons are chartered and the balance is to be built from now until the end of the year."

Combining Under Webb Bill

BY GILBERT H. MONTAGUE

Counsellor at Law, New York City

WITH all proper safeguards against abuse, the Webb-Pomerene bill permits, in foreign markets, a degree of free action to which the American export trade heretofore has been a stranger. Under conditions, and with formalities, that are not excessive—considering the rigor of our national policy toward combinations and single concerns of dominant size, and considering the partiality of our national attitude toward competition and independent concerns of small size—the Webb-Pomerene bill permits any American exporter to act in combination with any other American exporter, and with as many, or as few, as he desires, under any arrangement that he and they may agree upon, for any purpose whatever that relates to American export trade, or to trade in any foreign market, so long as such arrangement does not affect trade within the United States or does not include unfair methods of competition against some outside American competitor who is also engaged in the American export trade.

Such arrangements may be effected through the creation of a corporation, a partnership, a common selling agency, a common sales branch, an exclusive agency, a nonexclusive agency, an individual sales branch, or any kind of contract or understanding whatsoever.

Such arrangements may include an entire industry, or only a few concerns, or only a single concern; and the fact that the parties to such arrangements have theretofore been competitors in domestic trade and in export trade, and thereafter will continues to be competitors in domestic trade, is wholly immaterial.

Such arrangements may provide for the apportionment of orders, profits, losses, business, and territory, or for agreements regarding prices, in foreign markets, upon any basis whatsoever.

Such arrangements may be shaped, and fashioned, and changed, and molded, conformably to the varying requirements of widely differing exports, in widely differing markets, and under widely differing competitive conditions.

So long only as such arrangements do not affect trade within the United States, and do not include unfair methods of competition against some outside American competitor who is also engaged in the American export trade, such arrangements are permitted by the Webb-Pomerene bill.

The best solution, in some particular situation, may be a corporation, or a partnership, or a common selling agency, or a common sales branch, or an exclusive agency, or a non-exclusive agency, or an individual sales agency, or a simple contract or understanding. It may be an arrangement that includes an entire industry, or one that includes only a few concerns, or one that is limited to a single concern. It may require the apportionment of orders, profits, losses, business and territory, or agreements regarding prices. Whatever it be, it can, under reasonable conditions, and with certain formalities, be accomplished under the Webb-Pomerene bill, so long as trade within the United States is not affected, and so long as there are no unfair methods against some outside American competitor, who also is engaged in the American export trade.

The Webb-Pomerene bill is merely intended to permit, in the American export trade, certain legitimate methods and arrangements that otherwise

might be held to be in violation of the anti-trust laws.

In any foreign market, where competitive conditions call for use of any of these legitimate, and now legalized, export arrangements, the Webb-Pomerene biil will be useful. By complying with the formalities and conditions prescribed by the bill, American exporters desiring to use any of these methods and arrangements may do so.

Additional American export trade obtained by these methods and arrangements need not, and will not, disturb, or alter the character of, American export trade already carried on by present methods and arrangements, or through existing means of representation in foreign markets. Such additional trade, and such particular methods and arrangements, as will be permitted, under the legalization of the Webb-Pomerene bill, will be simply supplementary to the existing volume and channels of American export trade.

The Webb-Pomerene bill, therefore, must be used and judged solely with respect to these supplementary methods, arrangements and volume which the permission afforded by the bill will add to existing methods, arrangements, means of representation, and volume of our export trade.

Our Shipbuilding Prospects

BY M. E. FARR

President American Shipbuilding Co.

ONE of the greatest tasks confronting the world today is the replacing of ocean tonnage destroyed or incapacitated for use, through war operations. The sinkings of vessels by enemy submarines do not represent the total destruction of deep sea tonnage. The normal wear and tear, and the losses through collision, stranding and from other causes incident to operation under war conditions, have greatly reduced the world's tonnage. All of this tonnage must be replaced by the shipbuilders of the world, principally by Great Britain, Japan and the United States.

The most reliable reports now obtainable show that the production of new ship tonnage overbalances that destroyed. A large amount of new American tonnage will soon be available, and production will rapidly increase in volume until an ocean carrying capacity is provided fully ample to meet war and commercial requirements.

Owing to high wages and the prevailing standard of living, construction costs in this country are excessive and compare unfavorably with conditions in Great Britain and Japan.

The average wages for a nine-hour day in British yards in December, 1917, were: Skilled, $2.16 to $2.79; semi-skilled, $1.94, and unskilled, $1.81; for a Japanese ten-hour day in 1917: Skilled, 75 to 90 cents, semi-skilled, 70 cents, and unskilled, 60 cents; for an eight-hour day at present in leading American yards: Skilled, $5.80; semiskilled, $4.40, and unskilled, $3.20. Piecework rates in American yards proportionately higher.

The standardization of ships has come to stay. This standardization may be applied to the conventional or the fabricated type. Variations in size and arrangement of steamers are necessary to meet the requirements of special trades and commodities, but in any event the ship should be of standard design. Recent reports concerning concrete ship construction are encouraging.

A committee consisting of representative shipbuilders, similar to the council associated with the British Admiralty, would be of great assistance to such of our governmental agencies as are concerned in the production of merchant ships.

District Export Sales Plan

BY GEORGE H. CHARLS

American Rolling Mill Co., Middletown, O.

IT IS the purpose of this paper to deal with the organization of a district export selling company under the Webb bill. It seems obvious that a simple plan, conservatively drawn, on a nonpretentious scale, will be the easiest to inaugurate.

Before comprehensive plans may be followed, a great amount of educational work must be accomplished. It is evident that this preliminary work must be done if America, as a whole, is to benefit as it should in the new freedom this bill offers exporting companies. Proceeding on the assumption that "what is everybody's business is nobody's business," and that the executives engaged in export business, who have vision, are too busy to carry on this vital educational work, the reason and paramount need for district organization under competent management is apparent.

The first step in organizing a district export selling company, in accordance with the principles of the Webb-Pomerene bill, would be for fiv or ten of the leading exporters in the district to meet informally and discuss the idea, determine the extent of the district geographically, and outline plans for organization and operation. The geographical extent of a district will naturally vary with the proximity of the cities within the district to the central, or hub city.

The plan of operation should call for the organization of a district export selling company, including all the export concerns in the district, under the leadership of a competent, experienced export executive, with headquarters at some central point in the district. The individual manufacturers should at all times quote the company their lowest export prices, allowing the company a commission, and agree to set aside a definite yearly amount of their product for export sale. They should further agree to extend such credit as the company should recommend. The capital stock of the company should be sufficiently large to include every exporter in the district among its stockholders.

A second move would be to merge noncompetitive manufacturers in the district who were doing business through foreign houses in some single country. This idea could be carried so far as to have these manufacturers rent their own warehouse in the principal city of such foreign country, and arrange to do business direct with the final consumer. While such district office and warehouse would be under the direct supervision of the district manager, the companies interested could send their own technical salesmen to work with the manager in charge. This plan would call for lowest export prices and commission to the company, as well as a consignment of stock, if necessary, and proper advertising matter. It would also require of the members the extension of such credit as would be necessary to compete with foreign buyers.

Having organized the first geographical group, similar groups should immediately be called together to co-operate and join hands in each foreign country being solicited by five or more noncompetitive members.

Metals Prove Backbone of Warfare

Method of Successful Co-operation of Iron and Steel Industry With Government in War Work Suggested as Nucleus for Concerted Export Trade Effort Under Webb Bill—New Cabinet Portfolio Proposed

BY E. A. S. CLARKE

AMONG the many factors essential to success in modern warfare, perhaps the most important is an adequate supply of metals. In the present European conflict the daily consumption of metals, in various forms, has reached amounts so enormous and so much in excess of any previous figures that unless an adequate, constant and continuous supply is available to us and to our allies, the bravery and devotion of our men will be without avail and victory impossible. There is no item among the long list of munitions and supplies necessary to prosecuting the war that does not involve the use of metals in some form as a necessary part. Men are, of course, the first essential; but to be effective they must be supplied with arms, ammunition, food, clothing and transportation, each of which, in turn, is dependent on an adequate supply of one or more of the various metals, even the rarest. This war is, truly, an economic war, from this point of view as well as from others.

Fortunately for us, as well as for our allies, we possessed, even at the outbreak of the war in 1914, ample developed sources of supply of those metals most needed and in the largest quantity, viz.: iron and steel, copper, lead, zinc, gold and silver; while out allies or the other neutral nations had similar sources for the supply of tin, manganese and the other necessary metals, which, thanks to the freedom of the seas as maintained by the British navy, were available for use against the enemy; and it seems as though this advantage must in the long run be a deciding factor in our favor as against the less favorable situation of the central powers.

The widespread uses of steel, copper, lead, zinc, tin, gold and silver are too well known to need special mention. An interesting statement of the uses and sources of supply of some of the rarer metals may be found in the February, 1918, issue of *The Americas*, published by the National City bank of New York. The figures given in that article are interesting, not only as regards their influence on the present war, but in respect of their bearing on foreign trade after the war.

The increase in output of metals in the United States during the war has been remarkable, the figures for iron and steel being of especial interest. Production in gross tons of the items shown in the following table was, in 1915, substantially the maximum to that time, though slightly exceeded in 1912 and 1913:

	1915 Production	1916 Production	Per Cent Increase
Iron ore	55,526,490	75,167,672	35.37
Coke	37,126,027	48,690,700	31.15
Pig iron	29,916,213	39,434,797	31.82
Steel ingots	32,151,036	42,773,680	33.04
Rolled iron and steel	24,392,924	32,380,389	32.75

Exact figures for 1917 are not yet available, but while there was some decrease in pig iron, ingots and rolled steel were substantially the same as in 1916, showing that notwithstanding increases in production in other countries, the United States is today producing at least 50 per cent of the total of the world's steel.

The same general conditions obtained in respect of copper, lead, tin and zinc, production having increased very greatly since the outbreak of the war. While there was some shortage in copper during 1917, due mainly to labor troubles in the West, and zinc also showed a reduction in output, the military necessities of both our government and the allies have been fully met.

Increasing Production

The great increase in the production of iron and steel, while due in part to the full operation of existing facilities, is also, to a large extent, due to very considerable additions to existing plants, as well as to the construction of entirely new plants. These increases in capacity have naturally followed the lines indicated by demand, and it is gratifying to note in view of the enormous demand that exists for ships, the plate-making capacity of the country has been nearly doubled. It now stands at about 6,000,000 tons per year, the equivalent of 18,000,000 dead weight tons of ships, with approximately 1,000,000 tons of additional capacity under construction which will all be in operation before the end of the year.

Practically no new plants or mills have been built for the manufacture of shell steel. Shell steel, while not made in quantity in this country before, is a quality of steel not greatly different from other grades which have long been manufactured in the United States, and requires only careful, conscientious supervision for its successful manufacture.

The steel industry has stood ready at all times to increase capacities to whatever extent needed to supply the requirements of our government and our allies, and will not be found wanting; there will be sufficient steel produced for all uses.

The above statement in regard to ample supply of steel is, of course, predicated on the necessary supply of the metals which are not produced in this country to the extent of the full requirements of the industry, notably manganese and chrome. While the domestic production of the ores of both of these metals has been very greatly increased, it is still not equal to the total demand, and the balance must be imported from Brazil, New Caledonia and South Africa.

With the urgent demand for ships for military uses, the government naturally desires to limit the shipping engaged in transporting manganese and chrome to the greatest extent possible, and the steel industry is co-operating to that end. It has, however, seemed necessary to point out very strongly to the authorities at Washington that a reasonable margin for contingencies must be allowed. Ocean transportation is not a matter that can be controlled as can railroad transportation; and the time involved in voyages to Brazil and South Africa is also an important factor, since if a vessel is lost, the cargo can only be replaced after an extended time, and the industry may suffer severely meanwhile. It has seemed necessary, therefore, to ask for more tonnage than a theoretical calculation would indicate.

It is also fortunate that the principal users of manganese and chrome foresaw the present situation and made heavy purchases as a matter of protection, soon after the beginning of the war, much in excess of their immediate requirements, and involving very large amounts of capital. Many of them also purchased or chartered ships at heavy cost to insure the transportation of these materials. These large purchases also had the effect of stimulating production at the producing points, and we may be grateful for the broad vision which prompted these concerns to take such action, as otherwise stocks on hand would be materially less than they

From a paper by E. A. S. Clarke, president of the Lackawanna Steel Co., Buffalo, presented before the fifth National Foreign Trade convention at Cincinnati, O., last week.

now are and less ships available for North Atlantic trade.

The steel industry has also very greatly increased the production of by-product coke, in the manufacture of which both benzol and toluol are produced. Benzol is the base material for the synthetic manufacture of carbolic acid from which picric acid, one of the necessary high exposives, is made. Toluol is the basic material from which tri-nitrate of toluol, known as TNT, another necessary high explosive, is made. Benzol and toluol are also base materials for the manufacture of the aniline dyes.

Similar accomplishments have been made in respect of the production of other metals and the country's record in the war contributions of the metal industry is a handsome tribute to the patriotism, energy and ingenuity of the industry.

When, a little over a year ago, this country entered into the war, there was no systematic control in the steel industry, which would permit co-ordination of effort and the maximum utilization of resources for the military needs of our government. Early in April, 1917, however, at the request of government officials, the American Iron and Steel institute assumed such control of the situation so far as iron and steel were concerned, by appointing a general committee on steel and steel products, with sub-committees for each of the various principal lines of the industry for the purpose of dealing, in co-operation with government officials, with all problems relating to production, distribution of product, priority of manufacture, and prices.

The sub-committee on steel distribution, dealing directly with officials of the government at Washington, allocated to each steel manufacturer in the United States his fair proportion of government orders, based on his respective percentage of total capacity.

When the requirements of the government became so great as to take a considerable proportion of the output of all the manufacturers, it became necessary to take measures with regard to priority of manufacture, so that essential material might be manufactured in its proper order, and in this work the committees of the institute have also co-operated.

Disregarding any question as to the wisdom of price fixing as a government policy in time of war, the experience obtained in mobilizing the various lines of industry so that the requirements of the government might be promptly met affords a valuable lesson to the country. It has demonstrated, more effectively than could have been expected a few years ago, the value of co-operation and co-ordination of effort, and the economic wastefulness of the unrelated efforts of the many, striving to accomplish separately results which can be so much more easily and effectively accomplished collectively.

When the war is over and the world again turns to peaceful pursuits and the rebuilding of the industries of the devastated countries, there will necessarily be intense competition for the trade of the consuming countries. The manufacturing nations of Europe, exhausted by war and bearing heavy loads of debt and taxation, will be under the most pressing necessity of exporting as much of their products as possible, as a means of obtaining essential supplies of food and raw materials as well as of re-establishing their credit. Notwithstanding the tremendous struggle in which they are now engaged, the governments of all these nations are making the most thorough preparations for re-establishing and extending their foreign trade after the war, and with the assistance and advice of their leading business men—manufacturers, merchants, steamship owners and bankers—are studying and proposing solutions for the problems involved.

Value of Co-operation Proved

In Great Britain there is a ministry of reconstruction, which has organized and appointed no less than 87 different commissions and committees covering practically every department of industry, finance and commerce, both foreign and domestic, besides many other matters connected with the return of the nation to normal conditions after the war. There are serving on these committees many of the foremost men in Great Britain, experts in their own particular lines, whose services are being given freely and to the best of their ability.

A large bank has already been chartered, with ample capital, for the express purpose of fostering, developing and assisting foreign trade; and not the least of the purposes which it is intended to serve is that of furnishing accurate, reliable information as to the real nature and prospects of success of proposed foreign enterprises, and as to the financial standing and credit of foreign buyers.

Former Ambassador Gerard informs us that all German shipyards not needed for naval vessels are crowded with merchantmen under construction, and that German manufacturers are accumulating surplus products for the purpose of making a drive for foreign trade immediately the end of the war releases their ships. The German network of banks and commercial houses covering South America is practically intact, and past experience leaves no room for doubt as to the efficiency of its organization. We now know that it was largely organized with the assistance of the German government, from whom it has received support in every practicable way. Co-operation and co-ordination of effort have characterized German industry and trade for many years past and, notwithstanding the effects of the war, it will still be necessary for us to reckon with much the same persistent, intelligent and effective competition from German manufacturers and merchants as in the past.

In our own country, where, due to a greatly expanded productive capacity, we shall be in more urgent need of foreign outlets than ever before, no concerted effort has as yet been made either privately or under government auspices, to study this subject intelligently with a view to laying plans for an active campaign, with the exception of these conventions, and the work of the National Foreign Trade Council, the Manufacturers' Export association, and similar associations of private individuals and companies.

The assistance furnished to our government in the working out of the many problems involved in meeting war requirements, by the co-operating committees of the American Iron and Steel institute, suggests a method by which, under the Webb act, committee or associations might assist in devising plans for meeting world competition after the war, for resisting the foreign invasion of our own markets and for promoting the distribution and sale throughout the world of our own products.

At present the work of the American Iron and Steel institute in connection with war requirements is performed by a number of sub-committees subject to one general committee. In other lines of industry, similar committees, each composed of members fully conversant with its particular subject or department, reporting to a general committee on foreign trade, of the respective industries, might deal effectively and successfully with our export problems. To sub-committees might be assigned the duty of covering certain important phases of foreign commerce, such as credits, transportation and freight rates, port facilities, customs tariffs, etc., etc.

In view of what is being done along similar lines by the governments of the manufacturing nations of Europe, it would seem that our government might well consider establishing a separate administrative department, with a member of the cabinet at its head (in effect, a secretary for foreign trade), whose duty it would be to foster and assist in mobilizing the development and extension of the foreign trade of the United States, and to which the committees above suggested could make recommendations, and under whose direction and supervision they might, if approved, be carried out.

To Build Up Coke Zone System

Government Making Progress in Eliminating Crosshauls in Deliveries by Ovens— New England Foundries and Other Consumers to Draw Upon Fuel Made Within That Territory— 450,000 Tons Needed

WASHINGTON, April 23.—The coke division of the fuel administration has under consideration a plan to require New England to produce its own coke. The matter is regarded as comparatively simple, as being a matter of readjusting contracts, embargoes, etc., as the normal consumption of coke by the states in this section is approximately 450,000 tons. This figure represents the foundry coke output of the 400 by-product ovens of the New England Gas & Coke Co., Everett, Mass. The arrangement which will be made will be part of the division's plan to establish a zone system for the distribution of coke with the elimination of crosshauls.

If the plan is finally ordered, shipments of coke into or out of New England will be absolutely embargoed, exception being made only in case of coke which may be shipped to those states by water. No coke will be allowed to leave that section of the country. Fuel administration officials estimate New England's fuel supply will be close to 8,000,000 tons short next year. Some coke is included in this estimate, as the consumption in New England has increased with the tremendous development of war industries.

The proposal was discussed at a conference at the fuel administration here by producers and jobbers making and selling coke made in or sold to New England. It contemplates barge hauls from the ovens of the Seaboard By-product Coke Co., Jersey City, the Consolidated Gas Co., New York, and other eastern producers accessible by water, to Bridgeport, New Haven, New London and other manufacturing points along the Long Island sound coast. The Providence Gas Co.'s new battery of 40 ovens at Providence, R. I., is expected to be in operation in December, but will produce coke for only domestic and metallurgical purposes.

Developing the Zone Plan

Adoption of this plan will make New England a coke zone in itself. By eliminating other similar crosshauls, the coke divison expects gradually to build up a comprehensive zone system for the entire country. The plan discussed a few days ago, of redistributing the McKinney Steel Co.'s output among Cleveland consumers and releasing their present coke supply to the McKinney furnaces at Scottdale and Josephine, Pa., is still under consideration, awaiting adjustment of the Upson Nut Co.'s contracts.

Among those attending the New England meeting last week were, Duac Arthur and C. J. Ramsburg, the Seaboard By-product Coke Co., Jersey Cty; C. K. Sutton and C. A. Wyatt, the Debevoise-Anderson Co., Inc.; R. I. Willcox, the estate of W. J. Rainey; W. T. Bennett, Alley & Page; L. H. Miller and C. A. Reed, Reed, Fears & Miller, Inc.; L. E. Walters, Clare Coke Co., Greensburg, Pa.; W. J. Lavelle, New England Gas & Coke Co., Everett, Mass.; H. B. McLean, the Consolidated Gas Co., New York; C. E. Lesher, geological survey; A. S. Learoyd of the anthracite coal distribution division, fuel administration; A. K. Morris and T. Kay of the transportation division; W. S. Blauvelt, coke director; and F. J. Herman, his assistant.

It is not expected the establishment of the New England zone will bring any readjustment of the prices on coke which now sells at $13.45 per ton, f.o.b. ovens at Everett. The administration, however, in the past week did make some readjustments in other districts, establishing the following maximum prices: Coke in Colorado, $8.50, furnace, and $9.50, 72-hour selected foundry; made in Monongalia county, W. Va., $6.25, furnace, and $7.25, 72-hour selected foundry; and 72-hour selected foundry made by the Empire Coal Co., at Empire, Ala., $8.75. All of these new maximums were effective April 15.

No Official Attention Yet Given to Scrap

WASHINGTON, April 23.— Efforts of scrap dealers, backed by consumers, to have the 3½ per cent commission allowed on all sales, so far has not attracted the official attention of the price-fixing committee of the war industries board. There is a report that the committee this week will receive a formal application from the American Board of Scrap Iron Dealers but the committee has not been so advised officially.

The government committee still takes the position that the usual trade practices are being followed. The committee never authorized a commission, nor did it order one stricken from the price schedules. So far the committee has maintained its misinterpreted attitude of being willing to hear complaints and suggestions of the iron and steel and allied industries when those communications are addressed through the customary channels. If the scrap board wins its hearing it will be either through the general steel committee of the American Iron and Steel institute or through the price-fixing committee's backing down from this position.

Mimeographed Reply Given

The flood of telegrams and letters which were sent the committee, met with little consideration. A mimeographed letter in reply was gotten up and kept handy for answers to the communications from the dealers or consumers in behalf of the commission. It is said office boys turned the letters and telegrams over to stenographers who addressed the reply envelopes without the communications having even gone before any members of the committee.

That the letter sent by the committee to the petitioners individually was vague and intended to cover any class of communication on the subject of scrap commission may be seen in the text of the reply:

"Replying to your communication, would say that you have doubtless seen ere this the announcement made by the President reducing basic pig iron and scrap steel $1 per gross ton. There was never any discussion of a change in the method of purchase or sale of scrap steel and

rumors to that effect were utterly without foundation. The reduction in price of scrap steel was simply made to conform to the reduction in price of basic pig iron."

The letter concludes in the same typed-mimeographed style:

"Sincerely yours,
"Price Fixing Committee,
"War Industries Board.
"By
"Robert S. Brookings,
"Chairman."

In the meantime, the question of scrap commissions remains hanging in the thin air.

Government Moves to Take Over Canal Operations

Washington, April 22.—Announcement has been made that G. A. Tomlinson of Duluth, one of the largest independent owners and operators of vessels on the Great Lakes, will have charge of barge operation on the Erie and New York state barge canal systems, which have been taken over by the railroad administration. A fleet of barges will be constructed immediately and operated under the direction of Mr. Tomlinson, who was appointed by Director General McAdoo a member of the committee on inland waterways to investigate the feasibility of a plan to utilize inland waterways to relieve traffic on rail lines.

This is the first inland waterway whose operation under the railroad administration has been definitely decided upon as a result of that investigation but within a few weeks, it is expected that the director general will order several other canal systems and navigable rivers taken over, including the Chesapeake & Ohio canal, the Black Warrior river in Alabama and several Atlantic coast waterways.

Capital Odds and Ends

THE following changes in rates on iron and steel articles are asked of the interstate commerce commission: by the Pittsburgh & Lake Erie railroad, an increase from 6.8 cents to 7.4 cents per 100 pounds from Monessen, Pa., to Charleroi, Pa., and from 58 cents to 84 cents per ton in the carload rate on billets and articles taking the same rates from Monessen, Pa., to Donera, Pa.; by the Buffalo, Rochester & Pittsburgh, an increase of approximately 15 per cent from points on its line to certain points in Pennsylvania; and the Delaware, Lackawanna & Western, an increase of 1 cent per 100 pounds from points on its lines, including Buffalo and Black Rock to stations on the Boston & Albany.

* * *

Increase from $2.65 to $3.40 per ton in the rate on coke from Holt, Ala., to East St. Louis, Mo., is sought by the Mobile & Ohio railroad.

* * *

Increase from $2.25 to $2.50 per net ton in the commodity rates on coal from mines in Oklahoma and Arkansas to Port Arthur Docks, Tex., is asked by railroads.

* * *

An increase of from 20 to 20¾ cents per 100 pounds on iron ore is sought from Denver and other Colorado points to New Orleans, Port Chamette, Baton Rouge, La., and Mobile, Ala.

* * *

Establishment of rates resulting in both increases and reductions has been asked by carriers on railway standard rolling stock from Chicago, Hegwisch, Burnham and Chicago Heights, Ill., to Memphis, Tenn., Vicksburg, Miss., Mobile, Ala., Baton Rouge and New Orleans, La., on basis provided in Illinois classification to Ohio river points and southern classification south, plus Ohio river bridge tolls.

* * *

Cancellation of carload rates on ore and concentrates from various points in Colorado to Buena Vista, Colo., is sought by the Denver & Rio Grande railroad.

* * *

The Baltimore & Ohio railroad seeks an increase of 10 cents per ton in the carload rates on coal from Pennsylvania, Maryland and West Virginia mines to Creedmore and Franklin Square, N. Y.

* * *

Cancellation of the rules governing the reshipping of pig iron at East St. Louis, Ill., Louisville, Ky., Memphis, Tenn., Norfolk, Va., and Primers Pt., Va., is sought by the Southern railway.

* * *

Increase from 20,000 to 24,000 minimum carload weight on mixed carloads of agricultural implements from Ohio and Mississippi river crossings and related points to points in Virginia, South Carolina and Georgia, is sought by railroads.

* * *

New Orleans as a pig iron producing point, is the hope of Senator Ransdell, of Louisiana, who has interested several iron and steel producers in the plan urges completion of an industrial canal to be built there and establishment of a free port. Ore could be shipped by water from Cuba or the Mesabi range, with only a short rail haul to St. Paul. Coal could be shipped by water from Alabama; Winnfield, La., could supply limestone and coke could be produced from by-product ovens which are in contemplation. New Orleans is also said to produce much scrap.

* * *

Instead of the present rate of 12 cents, minimum weight 4500 pounds, the New York Central railroad asks establishment of a rate of 14½ cents per 100 pounds, minimum weight as per official classification, on iron and steel castings from Auburn, N. Y., to Poughkeepsie, N. Y.

* * *

An increase in rates on agricultural implements is sought by the Chicago, St. Paul, Minneapolis & Omaha railroad from St. Paul, Minneapolis, and Minnesota Transfer to Calumet, 33 cents; Lake Linden, 32 cents; and Dollar Bay, Hancock and Houghton, Mich., 27 cents per 100 pounds.

* * *

The plan to charge a fee of $2 for delivering a car to the property line of an individual plant and an additional $1 per car for spotting cars within the yards of the industries which was under consideration by the railroad administration, has been finally abandoned, it has been learned

* * *

Secretary of the Interior Lane has approved working instructions and regulations under the potash leasing act of Oct. 2, 1917. These instructions are broad in outline and simple in form, and it is believed that applicants under the law will have little difficulty in presenting claims to the department for consideration.

* * *

The collector of internal revenue will accept a return for the excess profits tax based upon a fiscal year instead of a calendar year, if a partnership that keeps its books upon the basis of a fiscal year ending the last day of any month other than December has filed a return based on the calendar year.

* * *

Among a wide variety of German-owned goods taken over by Alien Property Custodian Palmer are small quantities of machine tools and nickel. These are to be sold without public advertisement but announcement will be made later as to the amount and value.

* * *

The practice of giving liquor, cigars, meals or personal property to employes of customers or prospective customers, by 26 varnish companies to influence purchase of varnish and kindred products has been ordered stopped by the federal trade commission. These companies admit that the charges are true.

* * *

The federal trade commission has ordered the Chicago Lino-Tabler Co. to cease interfering with the customers of its only competitor, the Auto-Mat Tabler Co., Ft. Worth, Tex. The Chicago company has endeavored to get trade papers to refuse its rival's advertisements, and caused their customers to loose faith in them by threatening suit for infringement of patents, the commission claims.

Large Meeting

Of Nut, Bolt and Rivet Manufacturers Held—Committee Named

Fifty-five concerns, approximately 98 per cent of the nut, bolt and rivet manufacturers of the country, were represented at a meeting held at the Waldorf-Astoria, New York, last week. At this meeting a committee of nine members was selected to represent the industry as a means toward effective co-operation with the government in anything the government might request. Charles J. Graham, of the Graham Nut Co., Pittsburgh, was made chairman of the committee. Other companies represented on the committee follow: Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.; Bethlehem Steel Co., South Bethlehem, Pa.; Oliver Iron & Steel Co., Pittsburgh; Gary Screw & Bolt Co., Chicago; Buffalo Bolt Co., Buffalo; Foster Bolt & Nut Co., Cleveland; Falls Rivet Co., Kent, O.; and Townsend Co., New Brighton, Pa.

One of the committee's first duties was the revising of specifications of machine bolts, carriage bolts, tire bolts and stove bolts, at the request of the quartermaster's department at Washington. This was the largest specification for bolts ever placed in this country, covering approximately 129,000,000 bolts. Twenty-five per cent of this specification was wanted at once and by calling upon all the manufacturers for their stock lists, this proportion was made available immediately and was allocated to some 24 manufacturers. The remaining 75 per cent of the specification is for shipment monthly during the remainder of the year and will be distributed on as nearly a proportionate basis as possible among the manufacturers who are prepared to handle the business. This committee has thus far been called upon only by the quartermaster's department at Washington, but it is a standing committee and is prepared when called upon to assist all other government departments as well as the allied governments, to allocate their requirements on the most efficient basis possible. It also stands ready to cooperate in any other governmental service relating to the bolt, nut and rivet industry. All of the manufacturers represented at the meeting agreed to stand back of the committee and abide by its decision.

The business of the W. D. Dunning estate, which operated the Alexander Iron Works, at Syracuse, N. Y., has been consolidated with that of the Boomer & Boschert Press Co., under the latter's name. The machine shop and foundry and the manufacture of specialities of both concerns will be carried on with the same organization and increased facilities. R. E. Boschert is president; W. S. Dunning, vice president; C. A. Dunning, secretary and treasurer, and George E. Boschert is superintendent.

British Meeting Program is Announced

Announcement is made by the British Iron and Steel Institute that its annual meeting will be held May 2 and 3, at the Institution of Civil Engineers, Great George street, Westminister, London, England. Thursday morning, May 2, the council's and treasurer's reports will be read and nominations for new memberships taken, also the retiring president, Sir William Beardmore, Bart., will be presented with the Bessemer medal for 1918, and will introduce the president elect, C. Eugene Schneider, who will deliver his inaugural address. Several papers will be read and discussed.

On Friday, the award of grants from the Andrew Carnegie research fund in aid of research work will be announced and more papers will be read and considered.

Some of the comprehensive papers to be presented include the following: Report of the blast furnace committee, "Practical Points Affecting Yield and Efficiency of Blast Furnaces", "Importance of Coke Hardness" by G. D. Cochrane; "Economic Value of the Jurassic Iron Ores of Great Britain", by Dr. F. H. Hatch; "Fuel Economy in Blast Furnaces," by T. C. Hutchinson; "Potash Recovery from Blast Furnaces", by Kenneth Chance; A Cause of Brittleness in Mill Steel Boiler Plates", by Dr. W. Rosenhain and D. Hanson; "Iron, Carbon and Phosphorus", by Dr. J. E. Stead and "Damascene Steel", by Colonel N. Belaiew. The Autumn meeting of the organization will be held Sept. 12 and 13..

Obituaries

COLONEL GEORGE POPE, a pioneer in the bicycle and automobile manufacturing industry, for many years president of the Pope Mfg. Co., Hartford, Conn., and Westfield, Mass., and for five terms president of the National Association of Manufacturers, died at his home in Hartford, April 19, aged 74 years. He had been sick since last August. He enlisted in the civil war when 17, was a captain when Fort Wagner, Charleston, S. C., was attacked, was promoted major when 20, and a lieutenant-colonel when 21. In 1890 he was made president of the Hartford Cycle Co. In 1895 he became treasurer of the Pope Mfg. Co., of which his cousin, Colonel A. A. Pope, was president. It began the manufacture of automobiles in 1896, which proved unsuccessful and the company failed, Colonel Pope being appointed one of the receivers. He was vice president of the Walker & Barkman Mfg. Co., Hartford, at the time of his death, also honorary president of the Connecticut State Manufacturers association and treasurer of the National Automobile Chamber of Commerce.

William Henry Jackson, president of the Jackson Engineering Co., Pittsburgh, died from pneumonia on April 16, in St. Francis' hospital, that city. Mr. Jackson came to Pittsburgh about two years ago from the south and organized the company of which he was head. Burial was made at his former home at Augusta, Ga.. He was 50 years old.

J. Lefferts Conard, 53 Delawareview avenue, Trenton, N. J., was drowned recently at Ocala, Fla. He was president of the Florida Utilities Co.

Thomas L. Farrell, for many years associated with the Newark Tube & Metal Co., as chemical engineer, died Friday, April 12, at his home in Long Island City, N. Y. He was 60 years old.

Charles F. Sise, for many years president of the Bell Telephone Co. of Canada, died at Montreal, April 9, aged 83. He was born in Portsmouth, N. H., and in his earlier career was identified with the shipping and cotton trades at New Orleans and Mobile. He acted as secretary to Jefferson Davis in the civil war and took a prominent part in the fitting out of the cruiser ALABAMA. After spending some years in England, he became interested in the telephone patents on his return to America. He then went to Canada and organized the telephone business there on a national basis by forming the Bell Telephone Co. of Canada.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

GRAFTON D. DORSEY, director of the National Lead Co., New York, and head of its subsidiary, the National Lead Co. of Argentina, has been made a member of the subcommittee on pig tin of the American Iron and Steel institute, as a representative of American producers of pig tin. He was appointed on the recommendation of George Armsby, chief in charge of the raw tin division of the war industries board. Mr. Dorsey is a vice president of the Williams Harvey Corp., which is a combination of American, English and Bolivian interests in the mining and smelting of tin. As the National Lead Co. is one of the largest consumers of tin in the world, Mr. Dorsey has been in close touch with every phase of the tin situation.

Charles S. Mott, vice president of the General Motors Corp., Flint, Mich., has been elected mayor of that city.

Herbert Longstaff was recently made manager of the St. Louis office of the Asbestos Protected Metal Co., Pittsburgh.

Price McKinney, president of the McKinney Steel Co., Cleveland, subscribed $250,000 worth of third Liberty bonds.

Fred W. Ramsey, president of the Cleveland Metal Products Co., Cleveland, was recently elected first vice president of the Cleveland chamber of commerce.

Jerome R. George, chief engineer of the Morgan Construction Co., Worcester, Mass., was recently elected president of the Worcester council, Boy Scouts of America.

R. L. Ireland, formerly a member of the firm of M. A. Hanna & Co., Cleveland, made one of the large personal subscriptions to the third Liberty loan, taking $200,000.

William B. Saunders of the Simonds Mfg. Co., Fitchburg, Mass., addressed the April meeting of the New England Iron and Hardware association at Young's hotel, Boston, April 16, on "The Business Man and the War."

W. L. Robinson recently entered the operating department of the E. I. du Pont de Nemours Co., Wilmington, Del., resigning as supervisor of fuel consumption on the Baltimore & Ohio railroad.

Colonel H. P. Bope, who recently resigned as vice president and general manager of sales of the Carnegie Steel Co., Pittsburgh, has opened an office in that city in room 639, Union Arcade building.

Frank R. Whitehead became purchasing agent of the Emergency Fleet corporation at Washington upon his recent resignation from a similar position with the United Steel & Metal Corp., 15 Park Row, New York City.

T. L. Bryce, general manager, William Baitman, chief draftsman, and D. H. Sweeney, works manager, have purchased their employers' plant, the Litchfield Foundry & Machine Co., Litchfield, Ill.

S. H. Widdecombe has been placed in charge of the Washington office of Lewis F. Schoemaker & Co., Philadelphia, iron and steel, in the Munsey building. He was formerly affiliated with the company's New York office.

J. V. Hutchins of J. V. Hutchins & Co., Baltimore, makers of band saws and grinders of edge tools, recently purchased the plant of the Columbia Steam Grinding Works, Washington.

Robert E. Frame, formerly assistant to the president of the Haskell-Barker Car Co., Michigan City, Ind., was recently elected vice president of the Hutchings Car Roofing Co., with offices in Detroit.

Earl B. Wilmar, who for some time has been office manager of the Columbia Steel Co., Pittsburgh, Cal., resigned recently to enlist in the signal corps of the United States army. His present address is Camp Lewis, Wash.

Lieutenant Moses Taylor Jr., a son of Moses Taylor, vice president of the Lackawanna Steel Co., is reported as missing in action in the casualty list of April 19 from General Pershing.

G. F. Danielson, works manager of the Youngstown Pressed Steel Co., Youngstown, O., retired recently to give his time to the government. He was employed for the past 14 years by the Sharon Steel Hoop Co. The pressed steel company is a subsidiary of the Steel Hoop company's predecessor, the Youngstown Iron & Steel Co. No successor has been appointed.

Capt. F. Wells Prince is now quality expert for the Franklin Electric Mfg. Co., Hartford, Conn., having resigned as superintendent of the lighting department at the Hartford Electric Light Co., where Harry L. Thomson succeeds him.

Albert E. Kenworthy, assistant superintendent, American Steel & Wire Co., Trenton, N. J., is personally responsible for the securing of $80,000 in third Liberty loan subscriptions, $35,000 from fellow employes and $45,000 from the company.

William J. Mahoney, chief accountant of the Gaston, Williams & Wigmore Steamship Corp., will serve the government as accountant for the Emergency Fleet corporation. His services were requisitioned by Auditor Wilcox.

George W. Wildin, upon his resignation as general manager of the New York, New Haven & Hartford railroad, entered the employ of the Westinghouse Air Brake Co., as general manager of the Locomotive Stoker Co., with headquarters at Pittsburgh.

Karl J. Eklund, formerly assistant to the president, has been made general manager of Mudge & Co., Chicago, in charge of the engineering and manufacturing departments. He also will have charge of the service department.

Robert C. Moeller who has been affiliated with the American Steel & Wire Co., for the past 18 years, latterly as sales agent in the Worcester, Mass., district, resigned recently to become general manager of the Collyear Insulated Wire Co., Pawtucket, R. I.

William C. Davenport, who for five years has been general superintendent of the East Brimfield, Mass., branch factory of the Snell Mfg. Co., Snellville, Mass., augers and bits, resigned recently to take an extended vacation, after 33 years of continuous service.

Frank F. Rowell became general sales manager of the Independent Silo Co., St. Paul, Minn., upon his resignation as secretary and sales manager of the I. B. Rowell Co., Waukesha, Wis., manu-

facturer of farm implements, Ford engine starters, etc.

W. S. Pilling, of Pilling & Crane, Philadelphia, was elected president of the recently organized Merchant Pig Iron Distributors' association and W. W. Hearne of the Matthew Addy Co., also of Philadelphia, was elected secretary at a meeting held April 16.

A. W. Ferguson recently took charge of sales for the Blystone Mfg. Co., Cambridge Springs, Pa., builder of machinery for mixing foundry sands, concrete, mortar and plaster. He formerly was service department manager of *Concrete*, published in Detroit.

George W. Bender has been made eastern manager with headquarters at 30 Church street, of Mudge & Co., Chicago. He formerly was assistant to the president. Clyde P. Benning, formerly assistant to the vice president is now western manager with office in the Crocker building, San Francisco.

A. Gulowsen, president, and O. C. Rossoe, factory manager, of the Gulowsen Co. of Christiana, Norway, manufacturer of crude oil engines, has been in Seattle, taking up with the chamber of commerce and commercial club, the question of manufacturing oil engines in Seattle.

W. Y. Banks recently became sales manager of the Connellsville Foundry, Machine & Steel Casting Co., Connellsville, Pa. He also has charge of the Pittsburgh office at 901 Park building. Mr. Banks was formerly connected with the United Engineering & Foundry Co., in that city.

P. J. Hopkins, for several years eastern representative of the Cleveland Punch & Shear Works Co., Cleveland, with offices at 50 Church street, New York, is soon to enter the military service of the government. He will be succeeded by C. W. Hancock, of Cleveland.

John W. Higgins, who is president and treasurer of the Worcester Pressed Steel Co., was recently elected president of the Worcester, Mass., Y. M. C. A., to succeed Clarence W. Hobbs, president and manager of the Hobbs Mfg. Co., who has held that office for the past four years.

Harold L. Stevens, Brookline, Mass., who has been manager in New England for the Lackawanna Steel Co., has been elected treasurer of the New England Castings Co., East Longmeadow, Mass., recently incorporated to make small electric steel castings.

D. M. Callis, formerly with the Maryland Steel Co., at Sparrows Point, Md., and later with the Seattle Construction & Dry Dock Co., was recently promoted to the position of assistant northwest district officer of the Emergency Fleet corporation under Capt. John F. Blain.

William P. Palmer, president of the American Steel & Wire Co., Cleveland, with the entire board of directors, recently made a tour of inspection of the company's three works in Worcester, Mass. Clinton S. Marshall, Worcester district manager, entertained the party at dinner at the Tatnuck Country club.

Thomas O'Neil, formerly affiliated with the Hercules Gas Engine Co., Evansville, Ind., has succeeded George W. Thexton as assistant to John D. Bird, general manager of the Cudahy, Wis., plant of the Henry R. Worthington Co. Mr. Thexton has been appointed works manager of the Bucyrus plant, South Milwaukee, Wis.

Joseph Risney was recently appointed foundry superintendent of the new plant operated by the Davis Mfg. Co., Milwaukee, builder of tractor engines. He formerly was foundry superintendent of the Iowa Valve Co., Oskaloosa, Iowa. F. N. Davis is president of the company, and W. I. Denny, purchasing agent.

I. D. Shaw, former manager of the Cincinnati Ball Crank Co., Cincinnati, O., is president of the Automotive Mfg. Co., with headquarters at 1316 Dime Bank building, Detroit. The company manufactures universal joints and pressed steel parts for motor cars in a plant at Loraine and Grand River avenues.

Robert Blake, who with others founded the Blake Electric Mfg. Co., Boston, was recently made district sales manager of the Duquesne Electric & Mfg. Co., with headquarters in Chicago. Mr. Blake has been Pittsburgh district manager of the Condit Electric Mfg. Co., for some time.

Herbert Jackson has been elected president of the Chicago Pneumatic Tool Co. to succeed W. O. Duntley, resigned. Mr. Jackson for some time has been connected with the Bethlehem Steel Corp., and recently as the head of the Boston office of this company. The company is developing a new line in the manufacture of motor trucks.

Earl L. Sanborn, chief engineer of the Smith Engineering Works, Milwaukee, was chosen temporary chairman of the Milwaukee section of the American Society of Mechanical Engineers, recently organized at a meeting of 25 Milwaukee district engineers. J. C. Pinney Jr., dean of engineering at Marquette University, was made vice president; J. F. Roth, the Electric Co., secretary, and A. L. Monroe of the T. L. Smith Co, treasurer. Permanent officers will be elected at a subsequent meeting.

H. G. Weidenthal, formerly works manager of the General Steel Co., Milwaukee, has joined the staff of metallurgical, chemical, testing and inspecting engineers maintained by James H. Herron, 2041 East Third street, Cleveland. Mr. Weidenthal will be in the steel works design and operation department and will give special attention to electric furnace operation.

K. B. MacDonald, formerly vice president and general manager of the Curtiss Aeroplane Co., Buffalo, having charge of the company's research laboratory at Garden City, L. I., has received a commission as lieutenant-commander in the navy and has been placed in charge of the naval aircraft factory at League island, near Philadelphia.

Austin E. Poirier, mechanical engineer for the American Tube & Stamping Co., Bridgeport, Conn., and Henry Babcock, mechanical engineer for the Bridgeport Brass Co., Bridgeport, Conn., have enlisted in the scientific research division of the Signal Corps, aviation section, of the army, and have been ordered to report for duty at Waco, Tex.

E. L. Hang formerly secretary and treasurer of the United Alloy Steel Corp., Canton, O., was made vice president and treasurer at the company's annual meeting. J. P. Mosely, who has been assistant secretary, was made secretary. C. W. Kreig, secretary and treasurer of the Berger Mfg. Co., was made a director to succeed W. P. Woodin, New York.

William Newman, has resigned as naval architect and works manager of the Polson Iron Works and Steel Shipbuilding Co., Toronto, Ont., and now is visiting on the Pacific coast. He has received offers from the Emergency Fleet corporation for the Hog Island plant and from another large American company on the Pacific coast, as well as from a Port Arthur, Ont., company but no announcement is made as to his plans.

J. Waldo Smith, chief engineer of the New York board of water supply, was recently awarded the John Fritz gold medal for special achievements in engineering in 1918, in recognition of his work in the construction of the Catskill aqueduct. The medal was awarded by representatives of the civil, mining, mechanical and electrical engineering societies. Ambrose Swasey, Cleveland, of the American society of mechanical engineers, made the presentation address.

Iron and Steel Men in War Machine

Col. Guy E. Tripp, Chief of Production Division, Ordnance Department

COL. GUY EASTMAN TRIPP, chief of the production division of the ordnance department, is a striking example of the type of widely known business men with marked executive ability, which the United States government is calling to the colors. Notwithstanding the fact that his position, like that of many others, is far behind the lines, upon him falls no small measure of responsibility for the successful and efficient prosecution of the war, for it has been truly said that munitions are the life of the battle. Without shells, defeat is almost certain. Therefore Col. Tripp's efforts to supervise and stimulate production of all ordnance supplies, are signally important. As chairman of the board of the Westinghouse electric & Mfg. Co., New York, Mr. Tripp, with his associates, little thought that the handling of extensive British and Russian munition contracts shortly after the outbreak of the European war was fitting him for this vital service to his own country. Much if not all of the war business booked by the Westinghouse companies was under Mr. Tripp's personal direction. Up to the end of March, 1916, this approximated $96,527,000. In connection with one English contract for 18-pound shrapnel shells, he made a record. On this, 1,250,000 shells were manufactured and delivered in less than a year, the first two months being consumed in preparation. Familiarity with war munitions thus gained and ability thus displayed, doubtless inspired the ordnance bureau appointment in January, 1918. The board granted Mr. Tripp leave of absence for the duration of the war and shortly after he reached Washington, he received a colonel's commission.



COL. GUY EASTMAN TRIPP

At that time he was identified as director with many of the Westinghouse subsidiaries, with several financial institutions, public utilities, etc., in New York, Pittsburgh and Wheeling, W. Va. In some he held executive offices and in many of these connections, he still continues to serve.

It was in January, 1912, that he was elected chairman of the Westinghouse board to succeed Robert Mather, deceased. For the two preceding years, he had been chairman of the joint committee on reorganization of the Metropolitan Street Railway Co., New York. There he manifested his ability in connection with electric traction matters and the highly successful New York Railways Co., was the result. To accept that appointment, he resigned from the Stone & Webster Engineering Corp., Boston, which he had joined in 1897. In the following 13 years, he received several promotions. When he left he was vice president. He was born in Wells, Me., in 1865, educated in Berwick academy and entered the business world at 17, working seven years for the Eastern Railroad Co. At 25, he became identified with electric railroading and was employed by the Thomson-Houston Electric Co., which later consolidated with the Edison Co. to form the General Electric Co., as auditor until 1897.

British Steel Capacity Expanding

Many Extensions Under Construction in Sheffield and Other Centers and Preparations Made to Meet Speeded Up Shipyard Demand—Native Ore Deposits Take Place of Imported Material—Iron Shortage Continues

Bureau of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 29.

SCARCITY of pig iron is reported from every district, without exception. A contributing element is the scarcity of trucks. A strike of cokemakers in South Yorkshire has affected Northampton and to a less extent Derbyshire. Some furnaces for a time had to suspend production, while others were kept going by the substitution of coal for coke, and the use of inferior material. It is now reported that an understanding with the men has been reached. There are a number of blast furnaces in different parts of the country, especially in South Staffordshire, which could be started up, if the requisite fuel and labor were available. But, instead of this, a curtailment of coal supply is in prospect through the "combing out" of miners for military requirements. It is intended to take in all about 50,000 men, of which some 1200 will go from the comparatively small district of Warwickshire, and something like an equal quota from South Staffordshire. A peculiar development is that the Miners' Federation have, by a large majority, declared that they do not agree to this proposal, and they have asked the government to postpone its demand for the men for one month with a view to the subject being fully considered. The federation is a very powerful body which, so far, the government has not been able to ignore.

Coal Shortage is Serious

The shortage of coal is a very serious element. The government has to consider the imperative necessity to furnish coal supplies for Italy and France, and it is stated that an undertaking has been given that this shall be done next winter. A very sharp eye is to be kept on all sales through merchants. Some Birmingham merchants have been called upon to furnish exact particulars of the persons to whom they sent out material during the month of January. It is more than hinted that coal, gas and electricity will all have to be rationed within the next few months.

Orders for foundry pig iron are very heavy, and cannot be fully met. Most makers are rejecting more business than they are able to book. The small foundries are likely to revert to production of domestic wares owing to the fact that a certain cast iron element in munitions has not been found altogether satisfactory, and makers are going back to brass and copper produced by the brass foundries. At Bloxwich it has been found possible to restart a furnace which has been inactive for three months. Wherever possible, plants will be restarted. There is a great outcry for scrap to make up for the scarcity of pig iron.

Native Ores Utilized

Recent combinations in the iron trade have had in view the strengthening of the position of certain Sheffield firms in regard to pig iron supplies, especially in the increased utilization of North Lincolnshire mines. The firm of Messrs. Steel, Peech & Co., which lately was combined with Samuel Fox, has acquired the half share of the Appleby Iron Works in North Lincolnshire hitherto held by the Steel Co. of Scotland. The effect of this acquisition is to place the combine in full possession of four blast furnaces and a steel plant now in course of construction.

Steelmakers have had to recognize the gradual working out of the superior hematite ores of Spain and elsewhere. Imports are of less consequence, now that high quality steel can be made from high phoshorus and sulphur native ores, formerly regarded as only suitable for basic steel. There is any quantity of this kind of ore in Lincolnshire, and as the distance is not great, the Sheffield steelmakers regard with great satisfaction the improved prospect of their raw material supply. It appears that for some time past large Welsh firms, like Lysaghts, have been utilzing Lincolnshire ore chiefly for the manufacture of tin plates and sheets, and a plant is in course of erection likely to absorb very much more ore than hitherto has been used.

The Cleveland district continues busy, but is having its share of transit difficulties. Owing to scarcity of trucks, the iron sent to Scotland has been shipped; but this form of traffic is more costly than the railway. The export business is quiet, though France is getting rather better supplies. It is reported that west coast hematite is available in larger quantities.

With regard to production in the iron trade, there appears to be no slacking in government demand. In this respect, the position is rather different from that prevailing in the nonferrous trades, where some easing off of demand for munitions is reported. The government appears to be taking all it can get under every head of iron supply. Gas strip, in particular, is called for in large quantities for tubemaking, especially in shipbuilding, while the enormous merchant shipping program calls for exceptional quantities of nut and bolt, chain and cable iron, all these branches being very busy. There is an increased demand for light sheets and strip, various forms of wire, and light material of various kinds essential to aircraft building, which is an industry in course of very great expansion. Much further growth is looked for in this department during the remainder of the year.

The rapid growth in the price of strip has frequently been commented upon in recent months. For some reason the government has left this uncontrolled, with the result that prices have mounted up to £16 10s ($79.20). Before the war, gas strip and common bars were sold at about the same price, the former being £6 5s ($30) and the latter £6 10s ($31.20). At the present time, unmarked bars are £13 17s 6d ($67.60), so that the gap between the two has enormously widened. The present proposal on the part of the men is that an extra £1 10s ($7.20) should be allowed on the price of bars.

May Subsidize Billetmakers

In the steel trade the question of the price of billets is still under serious consideration. Makers say that after two years of steadily rising materials and increasing cost of labor the present figure of £10 7s 6d ($49.80) has become absurdly small and that some concession must be made. Rumors are prevalent that the government, instead of altering prices will apply to half-finished steel the subsidy system now operating in the pig iron and finished iron department. On this matter, manufacturers are comparatively indifferent, their only desire being that, in some way, they may be saved from actual loss.

Labor Differences

Arising From Time Shift Adjusted By Federal Mediators

Differences between the Bethlehem Steel Co. and its employes which grew out of the change from 8-hour to 10-hour shifts have been adjusted following a conference of the federal mediators, representatives of the steel company and representatives of the employes. Demands of the employes for time and half time pay for overtime, including night shifts, double time on holidays and Sundays and other concessions, were granted. No man is to be discharged for holding membership in any labor organizations and members recently discharged are to have their cases taken up immediately.

Needs Export Managers

Men to take charge of the branch offices of the bureau of foreign and domestic commerce, which the government will locate in the principal commercial cities, are needed by the United States department of commerce. Salaries for managers range from $1800 to $3000 and for assistants, from $1200 to $1800. Applicants should communicate with the bureau of foreign and domestic commerce at Washington to obtain full details of the non-competitive examination which will be held May 16 in various sections of the country. These examinations will be given under the direction of the civil service commission and will be in export trade technique, promotion of commerce and economic geography. Credit will be given for a knowledge of foreign languages.

1918 Wages Estimated

Steel workmen will receive at least $750,000,000 in wages during 1918, according to estimates recently made compiled from annual reports of steel manufacturers. In 1917, the combined payrolls of steel companies approximated $694,000,000, and the recently announced 15 per cent increase will bring the estimated wages for 1918 almost up to $800,000,000. The payroll of the United States Steel Corp. is estimated at about $399,000,000 and that of the Bethlehem Steel Corp. at $95,000,000.

Adjust Labor Disputes

In one week recently, 17 industrial disputes were adjusted by the labor department. Among them were strikes at the Standard Tin Plate Co., Canonsburg, Pa.; Globe Stove & Range Co., Kokomo, Ind., and Menefee Foundry Co., Ft. Wayne, Ind.; a threatened strike at the General Electric Co., Pittsfield, Mass.; and controversies at the Pollock Steel Co., Cincinnati; Cleveland Worm & Gear Co., Cleveland; American Smelting & Refining Co., Garfield, Utah; Utah Copper Co., Binghan and Garfield, Utah, and the Gisholt Machine Co., Madison, Wis.

Holds First Meeting

The first meeting of the national war labor board, recently appointed by President Wilson, was held last week, Ex-President Taft presiding, at the office of Secretary of Labor Wilson. Labor conditions were discussed and a plan of organization was mapped out. Upon conclusion of the conference with Secretary Wilson, the board adjourned to its permanent headquarters in the department of labor building and took up some disputes now pending which have not been adjusted by existing governmental machinery. No case will be heard in which the parties have not first submitted their controversies to the regular machinery of the department boards or commission now functioning and been found incapable of adjustment by ordinary means. Former President Taft and Frank P. Walsh will preside alternately at future meetings.

High Cost of Living Hits China

An increase of 5 cents per day in wages was recently asked by the Guild of Iron Founders of Shanghai, China, to meet the rising cost of food products, particularly rice, according to Consul General Thomas Sammons. Pay for iron founders, blacksmiths, etc., averages from $15 to $28 Mexican, per month. Ordinarily the equivalent of the Mexican dollar in gold is figured at about 50 per cent, although current rates of exchange give a higher valuation. On a two for one basis, wages paid Shanghai iron founders and blacksmiths as figured in gold dollars would be $7.50, $9, $12 and $14 for the first, second, third and fourth grades respectively. Apprentices are paid $6 to $12 Mexican per month.

Iron molders in Fitchburg, Mass., foundries recently demanded an increase of $1.25 a day over the $4 wages they were receiving, A strike was prevented by a compromise increase of $1 a day.

Labor Shortage

Handicaps Production of Government Work in Detroit

Detroit, Mich., April 20.—A shortage of labor, particularly skilled mechanics, menaces industries here and threatens a serious problem in maintaining schedules on government work.

The board of commerce has stated that a shortage of 20,000 of such workers now exists and that with the beginning of operations in the new plants of the Lincoln Motor Co., Detroit Shell Co., Dodge Brothers' munitions plant and the Henry Ford projects, this will be increased within the next month to 30,000 or 35,000.

The shortage is due to the operations of the draft law, enlistments and the exodus of skilled workers to other cities engaging in new lines of government work. This drain on the labor supply has hit the motor car industry worse than any other line of manufacturing in the country, it is said, leaving these plants handicapped for maintaining volume production on some $750,000,000 worth of war work.

Women are being trained in certain lines of industry, but a survey reveals that they can be utilized only up to a point of 19 or 20 per cent in vocations formerly occupied by men.

Through the board of commerce industrial bureau a branch of the United States employment department, of the department of labor, is to be established in the city to aid in adjusting labor requirements among plants engaged in munitions work. It is expected that this will stop "cut-throat" tactics of manufacturers in the scramble for workers which has sent wages up to unprecedented levels, the same as it has in other lines of industry.

The Employers' association has found that Detroit has already lost 20,000 trained factory workers through the draft.

Fisher Body Corp. has let the dampproving contract on its aeroplane factory and units, to be erected at Fort street and West End avenue, to the J. H. Maneck Ceresit Waterproofing Co.

Contract for the erection of a one-story acetylene gas plant for the Aluminum Castings Co., at Dunn road and Jos. Campeau avenue, has been let to Martin N. Burkheiser.

Chalkis Mfg. Co., 666 Mack avenue, of which Hugh Chalmers is president, and D. H. Peoples, secretary-treasurer, has been awarded an $8,000,000 anti-aircraft 3-inch gun contract.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Steel Profits Good Despite Low Prices

"BETWEEN 50 and 60 per cent of the steel output of the country will be called for by the government and possibly more," said John A. Topping, chairman of the Republic Iron & Steel Co., at the annual meeting of stockholders in Jersey City, last week. "In regard to the future prospects of the business, with such a large tonnage of steel output, 50 per cent or more going to war purposes, the usual tonnage going into peaceful purposes will not be supplied. In other words, there will not be enough steel to go around if the normal steel requirements prevail. Therefore it is apparent that the capacity of the company's plants will be fully occupied, but at lower prices. But notwithstanding lower prices, with the facilities the company now enjoys, we contemplate a good year, with reasonable profits."

A week earlier, Judge Elbert H. Gary told stockholders of the United States Steel Corp. that "it is fortunate that the government has fixed prices which enable us to make fair profits and pay large dividends, temporarily, at least. If we were profiteering we would have opportunity to pile up these profits as surplus, but we feel we are living up to the policy outlined by the President of the United States when he said that prices should be large enough to pay living wages to the workers, fair salaries to officials and provide for necessary plant additions for war work." The corporation is spending about $13,000,000 to $14,000,000 monthly on additions which will add to the facilities of war production.

The remarks by these spokesmen are fairly representative of the attitude of the steel trade generally, which is accepting willingly lower profits as the result of price fixing, and throwing its entire strength behind the government's war preparations. At the same time their words reflect a spirit of fairness on the part of the government, which dictates a price policy enabling the steel producers to continue to enjoy moderate prosperity. It is early in the year yet and there is no means of knowing how 1918 will compare with 1917 from an earnings standpoint. However, the Republic Iron & Steel Co. and the Lackawanna Steel Co. have issued reports for the first quarter of the year. Both of these reports indicate the same tendency—decreases in earnings as compared with a year ago, yet a broad margin over dividend requirements. The Lackawanna Steel Co.'s report, which was printed in these columns last week, showed net profits available for dividends, after allowances for federal taxes, at the rate of 34.15 per cent per annum compared with 39.40 per cent in the first quarter of 1917. The Republic Iron & Steel Co.'s quarterly report follows:

Net earnings	*$3,527,729	5,836,181
Total income	3,782,056	5,877,856
Net profit	3,213,869	5,573,778
Balance after charges	3,021,768	4,346,927
Preferred dividends	437,500	437,500
Common dividends	407,865	407,865
Surplus	2,176,403	3,501,562

*Net earnings from operations after deducting charges for maintenance and repairs of plants amounting to $1,003,070 and provision for federal taxes, etc.

Unfilled orders on hand March 31 were 421,021 tons of finished and semi-finished material, compared with 418,943 tons Dec. 3, 1917.

The Steel corporation quarterly report is due shortly and it is generally expected to show a similar tendency, a good volume of earnings, but under those of a year ago.

Dividend Restored

Common stock of the Sloss-Sheffield Steel & Iron Co. once more is on a dividend basis, after a lapse of more than a year. Directors last week declared a quarterly dividend of 1½ per cent payable May 10 to stockholders of record April 30. After the directors' meeting a statement was issued explaining why the dividend was passed last year and describing the improved condition of the company.

In April of last year, when it was decided to defer payment of the dividend on the common stock, the company was not in a strong cash position. Since that time the company's cash position has been greatly improved. The bonds which matured on April 1, 1918, have been paid, and in addition the company had on hand April 15 $681,000 in cash and $300,000 of Liberty bonds fully paid.

It also has accounts receivable of approximately $2,000,000, inventories and raw materials of approximately $1,500,000, and total quick assets of approximately $4,400,000. Its only indebtedness, other than current operating indebtedness, is $2,000,000 of mortgage bonds maturing Feb. 1, 1920, and $1,275,000 of notes payable. The earnings for the first quarter of the current year exceeded $1,250,000 after setting aside approximately $500,000 for taxes and after charges for depreciation and depletion of mineral resources.

Earns $4.69 Per Share

Before deducting for depreciation, the net profits of the Walworth Mfg. Co., Boston, for the year ended Dec. 31, 1917, were $1,739,718. Depreciation, interest and $444,561 income and excess profits taxes reduced the earnings to $1,033,987, and the final balance for common stock was equivalent to $4.69 per share on 200,000 shares. Net profits for the last six months were double those for the first six. The balance sheet shows at the end of 1917 the company had a balance of net quick assets of $4,517,702, which is sufficient to cover at par the $2,000,000 of bonds, the $1,000,000 of preferred stock and to leave a balance of $7.50 a share for the common stock. The total asset value of the common shares is close to $30.

Pays Third in Taxes

The Ingersoll-Rand Co. last year paid more than 34 per cent of its earnings before depreciation allowance, in federal taxes, amounting to $3,452,815. The total net earnings amounted to $9,674,182, an increase of

$1,749,026 over the result in 1916. The balance for dividends was $5,189,785, compared with $7,255,616, equal to $46.22 a share of common stock after allowing for preferred stock dividends. In the preceding year the common stock dividend balance was equivalent to $65.17 a share.

Common Earns 43 Per Cent

Profits of $781,973 for 1917 are shown by the financial statement of the Canadian Fairbanks-Morse Co., Ltd. After deducting allowances for depreciation, war taxes and dividend on preferred stock, the balance earned for common stock was $691,793 as against $546,629 in 1916. The net profit on common stock was equivalent to 43 per cent. The surplus was increased to $1,340,439.

Gross Profits Less

Gross profits of the Canadian General Electric Co. fell off by $174,303 in 1917. Gross profits for 1917 and 1916 were $2,051,609 and $2,225,912, respectively. From the gross profits, $524,317 was reserved for depreciation of buildings and $393,694 for amortization of munitions plants and equipment. A comparative account follows:

	1917	1916
Gross profits	$2,051,609	$2,225,912
Depreciation	524,317	408,887
Amortization	392,694	631,603
Net profits	1,133,596	1,185,420
Dividends	780,000	779,843
Surplus	353,596	405,577
Undiv. profits from 1916	612,696	707,119
Transferred to reserve..	500,000	500,000
Balance	466,293	612,696
Total reserve	4,000,000	3,500,000
Surplus	4,466,293	4,112,696

While contracts for machinery have fallen off very materially, sales of standard machinery and supplies continue to improve, and in addition the Davenport works have received contracts for a number of machine engines and boilers for ships, that are being built in various parts of the country. The structural shop at Bridgeburg, Ont., which was purchased from the Canadian Shipbuilding Co. some years ago, has been reconverted into a modern shipbuilding plant. The company is at present engaged on a contract for the construction of four 3500-ton steel cargo ships.

Realizes Large Profits

Profits of $6,040,318 in 1917 show an increase of $1,018,927 over 1916 for the Steel Company of Canada, after deductions for repairs, improvements, war taxes, etc. This is an increase of 86 per cent over the 1915 profits of $3,230,452. After providing for sinking fund allowances, bond interest and 7 per cent preferred dividend, the balance available for the common stock was $3,686,843, as compared with $3,046,382 in 1916. The earnings after preferred dividend, etc., were equal to $32.50 on each share of the $11,500,000 common stock against $28.50 earned in 1916 and $15.30 in 1915.

The company's growing earning power is shown in the following table, the figures of which are in thousands:

	1917	1916	1915
Profits	$6,040	$5,021	$3,230
Depreciation, res.	1,206	601	400
Balance	4,834	4,419	2,830
Sinking fund	177	165	88
Net earnings	4,656	4,254	2,731
Bond interest	515	525	531
Balance	4,141	3,728	2,210
Preferred dividend.	454	*682	454
Balance	3,686	3,046	1,756
Common dividend	690	460	.....
Balance	2,996	2,586	1,756
Reserve	1,446	953	.....
Surplus	1,550	1,632	1,756
Previous balance	4,647	3,014	1,258
Total surplus	6,197	4,647	3,014

*Includes $227,370, representing dividend arrears from 1915.

President Hobson, in his statement to stockholders, said:

"Together with other steel companies, your company has secured two valuable ore properties, one on the Mesabi and the other on the Gogebic range, and its proportion of ore to be received will be sufficient to meet over half its requirements for a considerable number of years. We will commence to receive our share of the Gogebic ore during 1918 and shipments from the Mesabi range will commence late in the 1919 season."

Sales Gain 35 Per Cent

The J. I. Case Threshing Machine Co., Racine, Wis., in 1917 improved its financial position and experienced largely increased earnings. Gross sales were $17,657,753 as compared with $13,047,256 in 1916, a gain of 35 per cent. The company charged off $274,293 for war losses abroad. In 1917 the earnings on the common stock were equivalent to 18.14 per cent while in 1916 they were but 9.6 per cent. An effort is being made to switch the business to a cash basis. During 1917, cash was realized on the 87 per cent of the business transacted. Foreign trade showed an increase. The company's comparative income account follows:

	1917	1916
Net operating income.	$4,066,854	$2,658,997
Int. and disc. on bonds	726,540	737,389
Depreciation	290,933	273,887
Prem. on bond bought.	143,315	.....
War losses abroad.	274,293	.....
Reserve for federal tax	275,000	.....
Net income	2,356,772	1,647,721
Preferred dividends.	850,500	850,500
Surplus for year	1,506,272	797,221

The receiver for the Standard Roller Bearing Co., Philadelphia, has been discharged by the Federal district court.

More Toluol

Released for Commercial Purposes—Foreign Shipments Lag

New York, April 20.—Toluol for commercial consumption continues to be released cautiously by the committee of the war industries board. The releases thus far are against old contracts. In addition, some 5000 gallons not covered by contracts have been released. The price of toluol thus released now is $2 per gallon at producer's plants. Large sales of benzol are being made to manufacturers of illuminating gas, who are utilizing this product for improving the quality of gas. The latter otherwise would suffer from the extent to which toluol is being extracted. The demand for benzol is better. The market continues at 30 to 35 cents per gallon.

Although no particularly large sales developed in solvent naphtha this week, the aggregate booked was large. In fact the demand for several months has been slightly in excess of production. On most requirements, 18 to 22 cents per gallon is being paid, although sales of single drums are being made at 25 cents. In phenol and naphthalin there is very little activity because these products are sold up on contract. Spot phenol continues at 52 to 55 cents per pound, and spot naphthalin nominally at 10 to 12 cents per pound. Sales of sulplate of ammonia continue entirely in occasional spot carloads. The market is $5.55 to $5.60 per 100 pounds, tidewater.

The output of coal tar products generally, it is estimated, now is at the rate of 85 to 90 per cent of capacity. It is said by producers that the only tendency toward accumulation of stocks of late has come from the falling off of foreign shipments.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.30 to .35
Toluol (on sales sanctioned by government)	2.00
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12

Per 100 Pounds at Seaboard

Sulphate of ammonia	$5.55 to 5.60

Contract

Pure benzol	$0.30 to .35
Pure benzol	no market
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia	nominal

Shipyards Buying Tools and Cranes

Completion of Preliminary Work in Many Large Yards is Marked by Demand for Metal Working and Carrying Equipment—Large Requirements Are Expected from Shell Shops

THE saturation point, that time when the demand for machine tools for war work will cease, seems indefinitely in the future. Although no large business in war channels has been undertaken for some time, which would necessitate a large quantity of equipment, inquiries for small lots, the replacement and renewal factors and plant extensions to expedite production have all contributed to keep up a volume of business which is extremely large in the aggregate. A slowness is apparent in the eastern market due, it is reported, to a delay in awarding contracts upon which machine tool needs are conditional. When this business develops, tools which are now held on order will become available through dealers who are now holding for bidders that may be unsuccessful. The Pittsburgh region expects to receive a proportion of the shell finishing work for which the steel was recently placed with the mills. Semisteel shell production by the foundries is under consideration, and if adopted will furnish additional demand for tools. Shipbuilding continues to provide a varied list of requirements. Cranes and all classes of machine tools necessary to shipyard work are being purchased. The American International Shipbuilding Corp., is negotiating for additional cranes for the Hog Island plant. An inquiry from the same company is asking for 7000 pneumatic tools of various classes. In the central west the smaller communities are absorbing munition work, principally through sub-contracts, though some exceptions are noted in which large plants are coming into existence for this class of work. This results in a wide distribution of small lot tool inquiries.

Single Inquiries Continue in Steady Volume

DESPITE the fact that the government is trying to speed up its war program, considerable delay in awarding machine tool equipment for this work continues to be felt in the eastern market. Instances of this slowness in placing orders are the Wright-Martin Aircraft Co., New Brunswick, N. J., and the Ingersoll-Rand Co., New York, both of which companies the trade has been watching expectantly. Several weeks ago the Wright-Martin company issued a long list, against which a few tools were bought last week. However, no action has been taken on the bulk of the machines listed, the company explaining it has not received word from Washington to go ahead. The Ingersoll-Rand Co. has been figuring on recoil mechanisms for some time, it is understood, yet it has not put out a formal inquiry for machines. Other instances might be named where big orders which involve heavy purchases of machine tools are hanging fire.

In discussing this situation one important builder stated that if all the inquiries now before him from companies with whom the government is figuring should be closed, his plant would be busy for many years. However, he added, some of the companies will receive orders and others will not, so that the amount of machine tool business in the air at this time is really not so large as the sum total of inquiries would indicate.

Large Arsenal to be Constructed

With the definite assurance that the plans are the subject of contemplation by the government in the construction of a large arsenal, larger than either the Watervliet or Watertown arsenals, and that final details have been about completed, early activity in the purchase of machine tools for the manufacture of heavy ordnance is anticipated. It is stated that a large machine shop will be erected at the arsenal, requiring several million dollars worth of tools. In addition to guns, a large shell plant will be constructed for the manufacture of 8 to 16-inch shells, which will also result in the purchase of considerable number of machine tools, as few private manufacturers today are equipped to handle this work.

A development of considerable interest to the trade during the past week was the announcement that the George A. Fuller Construction Co., 175 Fifth avenue, New York, was to build a merchant shipyard for the government at Wilmington, N. C. An operating company now is being formed to construct 18 steel ships of 9600 tons deadweight. An indication of the wide variety of equipment required in ship construction is found in the fact that almost co-incident with the purchase of a large list of cranes mentioned last week, the American International Shipbuilding Corp., Philadelphia, is inquiring for over 7000 miscellaneous pneumatic tools.

Navy Crane Order is Placed

A leading development in the crane market was the allotment recently of about $600,000 worth of cranes for the Washington navy yard. It is understood that the greater number of these cranes went to the Cleveland Crane & Engineering Co., while the Penn Bridge company received the remainder, with the exception of one 100-ton traveler, which went to the Whiting Foundry Equipment Co., Harvey, Ill. The original list, which came under Specification 2775, includes two 200-ton, one 100-ton, three 25-ton, three 20-ton, nine 15-ton, one 10-ton and two 5-ton electric cranes. The bureau of supplies and accounts at Washington recently closed bids on 1066 chain hoists of various capacities for the navy yards. This is the third largest inquiry of this sort ever put out, 3500 chain hoists being purchased several months ago by one department of the government and about 1800 hoists being purchased later by the Emergency Fleet cor-

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Philadelphia Office: 603 Widener Bldg. Frank Wallace, Dist. Sales Mgr.

Syracuse Office: 621 University Block. T. B. Davies, Dist. Sales Mgr.

J. E. Dockendorff & Co., 20 Broad St., New York, Gen. Export Agents.

poration. Included in crane inquiries now before the market is that of the Bethlehem Steel Co. for two 10-ton electric cranes for its plant at Sparrows Point, Md. The Philadelphia Rapid Transit Co., Philadelphia, is in the market for a 15-ton electric crane. The Pennsylvania railroad is inquiring for a 10-ton transfer crane for its plant at Olean, N. Y. Business recently placed includes 13 electric cranes for the New York Shipbuilding Co., Camden, N. J. These cranes, 11 of which are of 10 tons and two of 15 tons capacity, are to be built by Pawling & Harnischfeger, Milwaukee. The Lidgerwood Mfg. Co., Jersey City, closed on a few hoists for the Braden Copper Co., New York. The Whiting Foundry Equipment Co., Harvey, Ill., will build a 15-ton handpower crane for the Thompson-Starrett Co., contractors in charge of the government's explosive plant at Charleston, W. Va.

Subcontracts Furnish Tool Business in Chicago

BUYING of machinery in the Chicago district is largely of small and odd lots to fill out equipment to handle the large number of subcontracts on government war work now being placed in the west. This makes up the backbone of a considerable aggregate without large individual buying. However, a number of prospective lots of larger size are likely to materialize as the distribution of war work is increased. The Standard Steel Car Co., which has large government contracts, is letting subcontracts on gun carriages, trucks and shell work. The list issued recently by the Chicago, Burlington & Quincy railroad seems likely to produce some business shortly. Much activity is evident in the Tri-cities, Moline, Rock Island and Davenport, which is becoming an important center for war work. Winslow Bros., of Chicago, now equipped for handling a large government order, is planning considerable enlargement to take on further business. James B. Clow & Sons, Chicago, manufacturers of plumbers' supplies, has taken a subcontract for shell parts. The Joslyn Mfg. & Supply Co., Chicago, is building two additions. The Reliance Die & Stamping Co., Chicago, gage and jig manufacturer is adding to its equipment. The Gary Foundry & Machine Co., Gary, Ind., is building additions. At Terre Haute, Ind., the Rott Glass Co. will add to its machine shop. The National Twist Drill & Tool Co., Detroit, will build an addition. The Madison-Kipp Lubricator Co., Madison, Wis., is building a machine shop and assembling building. The Auto Power & Mfg. Co., Omaha, will build a foundry. The Western Forge & Mfg. Co., Bell, Cal., will build a drop forging plant. The Norway Pacific Construction Co., Portland, Oreg., manufacturer of marine motors, will build a plant. Armour & Co., Chicago, is building a machine shop and the International Harvester Co. is having plans made for a large foundry at Thirty-first and Rockwell streets, Chicago. The Hoover Steel Ball Co., Detroit, will build a machine shop and hammer shop. The Universal Machinery Co., West Allis, Wis., will build a plant including a foundry, main building and power plant.

Limited Inquiries Continue Brisk

A BRISK DEMAND for small lots of individual machines continues in the Cleveland district. No extensive lists are extant, but the volume of business furnished by these separate small requirements is large. A quiet expansion of these plants which are engaged in above 90 per cent war work is apparent. Building permits and contracts for new extensions to foundries and machine shops indicate that a steady demand for additional machine tools will be prevalent for some weeks. The Stearns Motor Co., Cleveland, have purchased a number of tools for their work on a new contract for the Rolls-Royce motors, but have been unable to date to fill their requirements for special milling cutters. A heavy inquiry for presses and larger machines is noted. Used tools of this character are in demand, but are difficult to obtain. Considerable activity is noted among southern manufacturers who are in the Cleveland market for small lots of machines. The Southern Machine Co., Chattanooga, Tenn., is inquiring for milling machines; the Helmick Foundry & Machine Co., Fairmount, W. Va., wishes a 24-inch, 10-foot lathe; and the Columbia Sanitary Mfg. Co., Louisville, Ky., will purchase a 20-inch lathe. The Borden Co., Warren, O., is inquiring for an automatic screw machine. The Davis Sewing Machine Co., Dayton, O., is in the market for a number of planers. The Dudley Electric & Machine Co., Uniontown, Pa., requires a number of lathes and turret lathes. The Ohmer Fare Register Co., Dayton, O., has not yet placed an order for a vertical boring mill for which it inquired some weeks previously. The Sharon Hardware & Mfg. Co., Sharon, O., requires several planers. The Globe Machine & Stamping Co., Cleveland, is building a plant to cost in the neighborhood of $125,000. The White Co., Cleveland, has commenced work upon a building to cost about $310,000, but no statement as to tool requirements has been made. C. O. Bartlett & Snow Co., Cleveland, manufacturers of hoisting and conveying machinery, have purchased a site for a large new plant to be erected in the near future. The King Bronze & Aluminum Co., Cleveland, are contemplating an addition to their foundry. The Shelby Tractor & Truck Co., Shelby, O., has an order for finishing 4.7-inch shells which will require the purchase of lathes, presses and cutting-off machines.

Shipbuilding Provides Bulk of Crane Business

Shipyard activities furnish a brisk inquiry for cranes, while individual orders continue to be placed by the navy department. Negotiations are in progress for the placing of 30 modified hammer head cranes for the American International Shipbuilding Corp., Philadelphia, at the Hog Island yard.

Pittsburgh Forge Shops to Expand for Shell Work

HEAVY requirements soon will be made by the government upon forging shops for the production of shells. In some quarters anxiety has been expressed that capacity in this country is inadequate to meet the forthcoming demand, but machine tool interests say that the available capacity ready to take care of the work is large, and while it may not be sufficient at present, it will not have to be increased greatly. It is known that at present there are idle shops in the Pittsburgh and other districts equipped to manufacture projectiles at once. It has been determined by the ordnance department to manufacture enormous quantities of semisteel projectiles. The foundry industry is being mobilized to this work and it is reported that the initial order, to be placed soon, will involve 1,000,000 8-inch shells. New government buying of machinery and machine tools in the Pittsburgh district is not heavy. Makers and sellers expect to be called upon soon for additional war requirements, and among other equipment will supply large requirements for the enormous government arsenal which it is said will be built in the Pittsburgh district for the production of howitzers up to 16 inches and also shrapnel and shells. The railroads, which have been out of the market for a long time, will soon begin to buy large quantities of general equipment for maintenance, according to reports coming to the trade.

EXPANSION with ROLLING MILL JIM



Say fellows—was out to the Hubbard the other day and the boys showed me the plans of the new steel foundry they're putting up. She sure is a humdinger—electric furnaces and all that. The next time I go over I'll rubber around a lot more and tell you all about it.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

SKOWHEGAN, ME.—The Bowman Hardware Co. has been incorporated here with a capital of $20,000. Albert C. Bowman, of Springfield, Vt., Edwin L. Clough and Mina L Clough, of Skowhegan, are the incorporators.

SOMERSWORTH, N. H.—The Great Falls Mfg. Co. has let the contract for a brick, mill construction, 4-story and basement, 100 x 76-foot storehouse and a 40 x 80-foot storage shed.

MIDDLEBURY, VT. — Grover & Connor, engineers, are drawing plans for a 1-story, 28 x 90-foot power house for the Hortonia Power Co.

BOSTON.—Plans have been drawn for a $35,000 power plant, to be erected in this city by the navy department. C. W. Parks, chief of bureau of yards and docks, Washington, D. C., is in charge of this work.

BROOKLINE, MASS.—Work will shortly be resumed on the foundations for the terra cotta and plaster addition to the Brooks hospital on Summit avenue. Plans drawn by Thomas Mott Shaw, Boston, show a 2-story structure 33 x 95 feet in dimensions. The estimated cost is $30,000. The main building will be connected by a tunnel 50 feet long.

CAMBRIDGE, MASS.—The general contract for a $20,000 boiler house extension has been awarded by the Cambridge Electric Light Co. to the John F. Griffin Co., 17 Milk street, Boston.

LOCKLAND, MASS.—The Diamond Tack & Nail Works received bids shortly for the construction of 1-story, 25 x 40-foot addition to its store house.

NATICK, MASS.—Fire in the Union Lumber Co. yard caused a property loss of not less than $15,000 and threatened at one time to wipe out a large portion of this town. Flying embers set fire to the company's office, to a nearby coal trestle and several houses.

NEW BEDFORD, MASS.—The New Bedford Textile Co. has let the contract for a brick, mill construction, 1-story, 115 x 77.8-foot addition to its new 2-story mill, and two towers.

SOMERVILLE, MASS. — Fire destroyed part of the Boston Elevated Railway system's Clarendon Hill car barn Sunday evening, causing a loss of about $200,000. This includes 75 cars and 16 snow-plows that were burned. Of the cars destroyed, six were of the semi-convertible type, 35 of the old box type and the others open or service cars.

WESTFIELD, MASS.—The Foster Machine Co. will be ready for bids about April 17 on the construction of a 2-story, 56 x 120-foot machine shop. Architect M. B. Harding is drawing plans.

PROVIDENCE, R. I.—Ten of the largest size ocean-going tugs for the United States shipping board are to be constructed by the Providence Engineering Corp. The machinery and all the necessary equipment for the vessels are to be built here and the hulls are to be laid, under a sub-contract, at a shipbuilding plant at City Island, N. Y. It is a rush order, and to meet the request of the government, the power plant and the working force will be immediately enlarged.

NEW LONDON, CONN.—The Eastern Connecticut Power Co. has acquired the Rogers farm at Browning Beach and will erect there at once a large power plant. The company originally planned to build this plant at Thamesville, but it was decided to build on the Rogers site, which is nearer the sound and offers advantages in obtaining coal by the water route.

NORTH GROSVENOR DALE, CONN.—The Grosvenor Dale Co. has let the contract to the J. W. Bishop Co., Worcester, Mass., for a reinforced concrete, 1½-story, 30 x 33-foot addition to its hydroelectric power plant, for a turbine room and a 1-story, 36 x 40-foot addition for a generator room, to cost $35,000.

NORWICH, CONN.—The Eastern Connecticut Power Co. is receiving bids on the construction of a steam power station. The Harry M. Hope Engineering Co., 185 Devonshire street, Boston, drew the plans.

STAMFORD, CONN.—The general contract for the construction of a plant has been awarded by the Stamford Rubber Supply Co. to Steven A. Gregory.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The New York Dock Co. will erect a 5-story addition to its warehouse, costing $12,000. M. J. Weigand, Montague street, is architect.

BROOKLYN, N. Y.—A $200,000 factory building will be erected by the Vulcan Roofing Co., 583 Deane street. The plans, which have been drawn by Architect A. C. Kenzy, 53 Elliot avenue, Middle Village, L. I., call for a 2-story structure, 130 x 200 feet.

BUFFALO.—The Delaney Forge & Iron Co. is revising plans for a new forge building and machine shop. It is understood the proposed structures will be one story high, 130 x 300 feet, and 100 x 250 feet, respectively.

BUFFALO.—The Standard Hardware Lumber Co. will rebuild its plant at a cost of $20,000.

BUFFALO.—The Hession Tiller & Tractor Co. will remodel the plant of Chase & Baker Co., East Jewett street, for its own use.

CORTLAND, N. Y.—Architect C. W. Clarke is drawing plans for a $20,000 machine shop for a company now being formed. Vises and drill presses will be manufactured, it is understood.

LITTLE FALLS, N. Y.—A. N. Mitchell has a contract for an addition to the plant of the Barnet Leather Co., East Mill street, this city.

LITTLE FALLS, N. Y.—The Little Falls Fibre Co. let a contract to Harry B. Lane, this city, for an addition to its plant.

LITTLE VALLEY, N. Y.—The Cattaragus Cutlery Co. will erect three additions to its plant, costing in all $60,000. The new extensions will be two stories, 60 x 100 feet, 40 x 60 feet and 30 x 40 feet, respectively.

LONG ISLAND CITY, L. I., N. Y.—Bids are now being received by the John Pollachek Bronze & Iron Co. for the construction of an 8-story plant addition, 50 x 85 feet.

ONEIDA, N. Y.—Plans are being drawn for a $12,000, 2-story, 40 x 100-foot extension to the plant of the Oneida National Chuck Co.

ROCHESTER, N. Y. — The Austin Co., Cleveland, has been chosen to erect the proposed $25,000 addition to the machine shop of the Morgan Machine Co. The new building will be one-story, 74 x 100 feet.

SCHENECTADY, N. Y.—The General Electric Co. has awarded the contract for a 300-foot brick addition to its plant in this city, to the Austin Co., Cleveland.

UTICA, N. Y.—D. K. Poole, South street, let a contract to the Kimberley Construction Co., for a machine shop, 10,000 square feet floor space.

UTICA, N. Y.—A $100,000 power plant will be erected near here by the Adirondack Power Co., Niagara Falls, N. Y. It is understood this company later will construct a power house in the Schoharie district.

YONKERS, N. Y.—Lynch & Larkin have been awarded a contract for the construction of a $40,000 boiler house by the National Sugar Refining Co.

ALTOONA, PA. — A $500,000 glass plant will be erected here by the Glass Casket Co. Two buildings will be erected, one 2 stories high, 100 x 150 feet, and the other, 1-story



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CASTINGS

Farrell-Cheek Castings are cast to obtain the greatest ***resilient strength*** with ***minimum weight,*** qualities especially essential in castings used in the construction of trucks or tractors to insure safety and durability.

We also manufacture ***Blank Gears;*** Carbonizing Boxes; and Case Hardening Boxes.

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high, 120 x 200 feet. C. O. Manning is architect.

COLUMBIA, PA.—The Columbia Malleable Castings Co. contemplates erecting a $10,000 addition to its plant.

HAZLETON, PA. — The Diamond Water Co. will build a reservoir at Gardner and Eighth street, this city.

LITTLESTOWN, PA.—Neuman & Mayer, Philadelphia, is arranging to build a cigar factory here.

MILLERSBURG, PA. — Architect Thomas H. Hamilton is receiving bids for the proposed $15,000 machine shop, to be erected by Brubaker Bros. Plans recently were revised.

EMAUS, PA.—The Zollinger Silk Co. is going to take bids for an addition to its plant.

McKEESPORT, PA.—The Atlantic Refining Co., Sixth avenue, Pittsburgh, has arranged to build a $15,000 service station at Walnut street and Eighth avenue.

PARKERSBURG, PA.—The Parkersburg Iron Co. will build a boiler house, to cost $18,000.

PHILADELPHIA. — J. R. Kein & Co. have awarded a $25,000 factory addition to the Robert E. Lamb Co.

PHILADELPHIA.—The Philadelphia Textile Machinery Co. will build a $15,000, 40 x 100-foot addition to its plant. William J. Gruhler has been awarded the general contract.

PHILADELPHIA. — The Integrity Title, Insurance & Trust Co. is taking bids for alterations to its warehouse. It is estimated the work will cost about $20,000.

POTTSVILLE, PA.—The Industrial Foundry & Machine Co., Water street, has let a contract to the Austin Contracting Co., Philadelphia, for a plant 90 x 140 feet.

READING, PA.—Bids now are being received by Mulenberg Bros., architects, on the construction of a $20,000, 1-story foundry for the Carpenter Steel Co.

WILKESBARRE, PA.—Bids were received April 5 for colliery shops, estimated to cost $200,000, by Studevant & Poggi, architects. The owner's name is being withheld.

DELANCO, N. J.—The machine shop of the D. L. Steel shipyard, a subsidiary of the Chester Shipbuilding Co., was badly damaged by fire on April 9.

MAPLEWOOD, N. J. — Brown Chemical Co. has been chartered with $500,000 capital to manufacture chemicals. The incorporators are O. G. Brown, F. H. Brown and A. G. Hamilton, all of West Orange.

NEWARK, N. J.—The Butterworth Judson Corp., 61 Broadway, New York City, is understood to be contemplating the erection of several large additions at its plant in this city.

NEWARK, N. J. — The Submarine Boat Corp., 5 Nassau street, New York City, is having Architect E. R. Shole, Buffalo, draw plans for an additional building at its yard on Newark bay.

NEWARK, N. J.—Pyrophoric Metals Co. has been chartered with $100,000 capital to manufacture and deal in metals and alloys. The incorporators are George W. Cunningham, of Paterson; William Rea, of Bloomfield and William Bonnman, of Passaic.

RAHWAY, N. Y.—National Pneumatic Co. has awarded contract to John N. Gill Co. for a one and two story brick, concrete and steel factory building, 200 x 360 feet in size.

TRENTON, N. J. — The city commission contemplate erecting a municipal power plant along Sanhican creek and securing power from the stream. Address Mayor F. W. Donnelly.

WEST ORANGE, N. J.—The general contract for a power house, 100 x 100 feet, has been awarded by Thomas A. Anderson, Inc., to the Underpining & Foundation Co., 290 Broadway, New York City.

Activities in the Central States

APPLETON, WIS. — The Standard Mfg. Co., woodworking manufacturer, will erect a new shop building, 120 x 120 feet, and will purchase woodworking machinery at a cost of about $18,000. G. H. Schmidt is secretary.

BRODHEAD, WIS.—The electric light and water commission of Brodhead, Wis., is taking bids until April 30 for improvements estimated to cost $35,000 in the municipal power plant and pumping station. The work is in charge of the Power Engineering Co., Minneapolis, Minn.

CAMPBELLS FORT, WIS.—Bids will be taken during the latter part of April for the construction of a waterworks and sewerage system for the village of Campbellsport, Wis., according to plans and specifications prepared by Jerry Donohue, consulting engineer, Sheboygan, Wis.

EAU CLAIRE, WIS.—The United States Auto Gearshift Co. has awarded following contracts for the erection of its new plant, to cost $75,000: General contract, Hoeppner & Bartlett, Eau Claire; Fenestra sash, Robertson & Jackson, Germania building, Milwaukee; glazing, Schliewe Bros., Eau Claire. Edward Hutchens, 860 Superior street, Milwaukee, is consulting engineer.

EAU CLAIRE, WIS.—A complete service and distributing group will be erected in Eau Claire by the Standard Oil Co. of Indiana, W. W. Holcomb, LaCrosse, Wis., district manager. R. M. Adams, 72 West Adams street, Chicago, is preparing plans. The project will involve about $30,000.

GREEN BAY, WIS.—George Y. Lauchin, formerly of Crystal Falls, Mich., but now located in Green Bay, has organized the Lauchin Air Starter & Tire Inflator Co., with a capital stock of $50,000 and will establish a plant for the manufacture of pneumatic appliances for automobiles and trucks. Joseph F. Rothe, owner of the Rothe Foundry Co., Green Bay, is a principal stockholder in the new company.

GREEN BAY, WIS.—The Automatic File & Index Co., maker of metal and wood filing cabinets, desks, etc., has increased its capital stock from $25,000 to $75,000 and will double the size of its plant by the erection of two stories on the present two-story factory, 100 x 175 feet. A two-story annex, 24 x 100 feet, will be added also. O. C. Straubel is secretary and treasurer.

HARTFORD, WIS.—Bids will be taken about May 1 for the installation of a 100,000 or a 200,000 gallon steel tank on a steel tower, 140 feet high overall, for the city waterworks and fire protection system. Plans are being prepared by City Engineer A. Martin.

MANITOWOC, WIS.—Architects Juul & Smith are preparing plans for a one-story brick and concrete repair shop addition to the garage of the Dicke Motor Car Co. at Franklin and Eleventh streets. It will be 60 x 120 feet, and cost about $15,000.

MARINETTE, WIS.—The Landover Truck Co., formerly of Chicago, which is building motor trucks in the former plant of the Marinette Iron Works, has sent one of its models overland from Marinette to Houston, Tex., where it will be submitted to government experts for army tests. A large contract for trucks is contingent upon the outcome of the tests.

MILWAUKEE. — Articles of incorporation have been filed by the International Oil Burner Co., Milwaukee. The capital stock is $25,000 and the incorporators are Lyman G. Wheeler, Richard S. Witte and A. J. McKerihan. The company will manufacture auxiliary heating devices.

MILWAUKEE.—Frank O. Phelps, county clerk, is receiving sealed bids until April 12 for equipping all factory machinery in the new Milwaukee county house of correction, town of Granville, with steel safety devices.

MILWAUKEE.—The Production Pattern & Equipment Co. has been organized with a capital stock of $25,000 to manufacture wood and metal patterns, foundry, machine shop and factory equipment. Paul E. Keller and Otto Koblitz, expert patternmakers, are promoting the new concern.

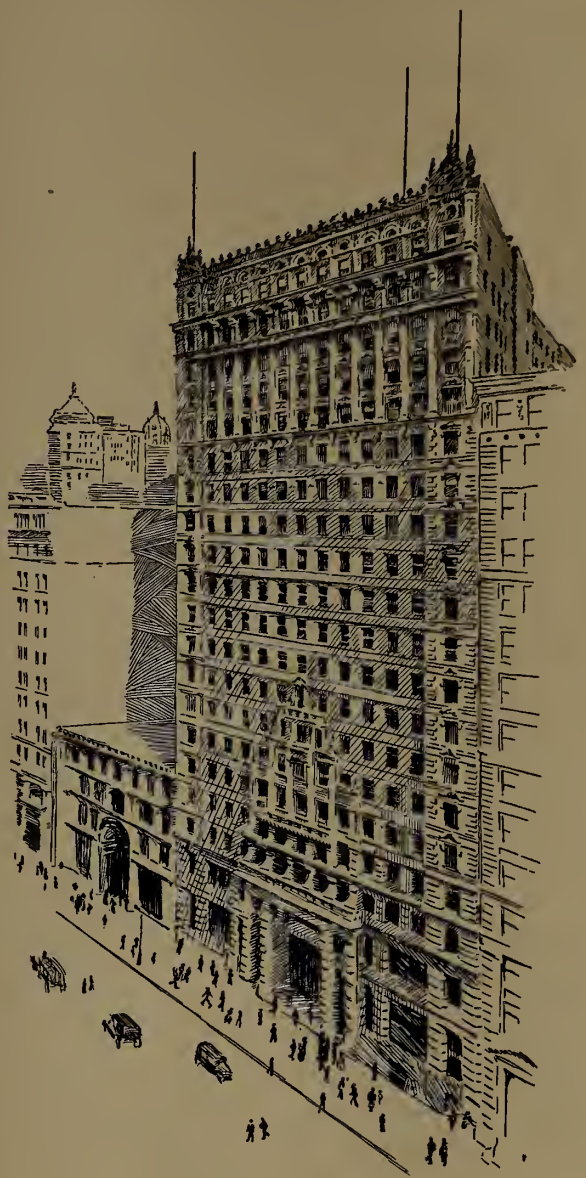
MILWAUKEE.—Architect C. E. Malig, department of public works, is preparing plans for a $50,000 meter repair shop and pipe storage house, 100 x 200 feet, to be erected by the city at Clinton and Florida streets. An annex, 20 x 30 feet, will be erected for garage purposes. Percy Braman is commissioner of public works.

MILWAUKEE. — The Pfau Motor Pump Co., Milwaukee, has been incorporated with a capital stock of $30,000 to succeed to the business of Otto R. Pfau, manufacturer of motor-driven compressed air pumps and water systems. Maynard S. Matteson, Unity, Wis., has become associated with the business and purchased a financial interest. He will take charge of the manufacturing end of the plant, which is located at 248 Fourth street and will be enlarged.

MILWAUKEE. — W. F. Cummings, 330 South Paulina street, Chicago, is lowest bidder at $83,855 for installing the municipal street illumination system at Milwaukee. The contracts for practically all material were placed some time ago and were reported at the time.

MILWAUKEE.—The Modern Pattern Co., 126 Clinton street, will erect a two-story brick and steel addition, with mill floors, 70 x 80 feet, to be used as a pattern shop addition, machine and boiler shop. Architect M. E. Vierheilig is in charge.

MILWAUKEE. — The Allis-Chalmers Mfg. Co., Milwaukee, is making delivery of an



42
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The New Home of the Federal Export Corporation

After May 1st, 1918, the headquarters of the Federal Export Corporation will be in the Federal Export Building, 42 Broadway, New York, where large office space has been provided for the various departments.

These offices, in the heart of the financial and shipping districts, are favorably located for the purposes of an international trading corporation. Here the visiting manufacturer interested in foreign trade will find provision made for his convenience and here, he will meet merchants from the principal markets of the world.

An invitation is extended to all interested in the future of American foreign commerce to visit the new headquarters of an organization earnestly devoted to furthering the interests of that trade.

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8,000,000-gallon pumping engine to the city of Madison, Wis., to replace a unit installed in 1881 when the municipal waterworks system was established. The total pumping capacity will be 15,250,000 gallons daily when the new pump is installed.

MILWAUKEE. — The Ricketson Mineral Paint Works, Milwaukee, has increased its capital stock from $20,000 to $50,000. The output is constantly being increased by the installation of additional equipment, without extensions to buildings. Edward Bogk is president and general manager.

MILWAUKEE.—The Milwaukee Structural Steel Co. is the lowest bidder at $10,672 for furnishing steel and cast iron plate for a new fog signal house and auxiliary buildings for a new installation in Chicago harbor under the direction of L. N. Stoddard, Government

NIAGARA, WIS.—The village board has awarded the contract for furnishing material and constructing a municipal waterworks and sewerage system to J. J. Connolly, St. Paul, Minn., at his low bid of $38,746. The contract for the reservoir was awarded to C. R. Meyer & Sons, Oshkosh, Wis., at $4892.

OREGON, WIS. — C. A. Hanan, village clerk, is taking sealed bids for a 175-gallon centrifugal pump and a suction pump, together with a 220-volt, 3-phase, 60-cycle electric motor with automatic control, starter, etc., for the municipal waterworks.
building, Milwaukee, district inspector.

PLAINFIELD, WIS.—A public garage and commercial machine shop, 55 x 80 feet, will be erected at North and Main streets by Walter & Fields for the use of Walter Smith and Frank Bentley, machinists, who have consolidated their interests.

PORTAGE, WIS.—The Portage Hotel Garage has been purchased by York & Robinson, who will make the building fireproof and do a general machine shop and automobile repair business. The building is 40 x 120 feet in size. Some new equipment will be installed.

RACINE, WIS.—The Belle City Malleable Iron Co. has let a contract to Nelson & Co., Racine, for rebuilding its 2-story warehouse and shipping room, 80 x 190 feet, for foundry and core-room purposes. at a cost of $50,000. The Belle City foundry was badly damaged by fire two months ago with a loss of $75,000.

SHEBOYGAN, WIS.—The Badger State Tanning Co., South Water street, will build a new steam generating plant in combination with a small machine shop and private garage. The building will be of brick, steel and concrete, 76 x 130 feet, part two stories and basement. Architects Juul & Smith, Dempsey building, are completing plans.

SHEBOYGAN FALLS, WIS.—The Falls Motors Corp., which recently was awarded a large contract for the manufacture of standardized motor truck engines to be supplied to the Kissel Motor Car Co., Hartford, Wis., for army trucks, will build a steel and brick machine shop addition, 60 x 125 feet, costing $20,000, to provide the additional facilities needed to execute its contracts. Plans are being prepared by Architect A. C. Clas, Colby-Abbot building, Milwaukee. Angelo R. Clas is secretary of the company.

SOUTH MILWAUKEE.—The city of South Milwaukee, Wis., will close bids April 16 for waterworks improvements costing about $35,000. The requirements include a horizontal cross compound crank and flywheel pumping engine of a capacity of 2,000,000 gallons daily, and all equipment and materials for two additional 500,000-gallon filtration units. John O'Connell is city clerk.

STURGEON BAY, WIS.—The public utilities board is ready for bids for the erection of a new pumping station, extensions of the water main distribution system, and the installation of five additional hydrants. About 100 tons of pipe and special castings will be required. The work will cost about $25,000.

WEST ALLIS, WIS.—The common council has awarded the general contract to the Kroening Construction Co., Majestic building, Milwaukee, for constructing and equipping a sewage disposal plant, at its low bid of $39,800.

WEST ALLIS, WIS. — The West Allis Iron Works, organized in 1910 to manufacture steel, semisteel and die-steel castings, has increased its capital stock from $50,000 to $75,000 and changed its name to West Allis Foundry Co. to better express in its title the nature of its business. The concern is increasing the capacity of its plant at Seventy-fifth and Elm street by the installation of additional equipment, but for the present does not contemplate extensive additions. Leo Rehorst is secretary of the company.

WEST BEND, WIS.—The general contract for the erection of additions costing $75,000 for the West Bend Aluminum Co., West Bend, Wis., has been awarded to the Northern Construction Co., 421 Milwaukee street, Milwaukee. As already reported, the work consists of erecting a 3-story shop building, 70 x 200 feet, of reinforced concrete, steel and brick, and a 1-story addition to the present main building, 60 x 60 feet. The Federal Engineering Co., Stephenson building, Milwaukee, is architect and engineer. B. C. Ziegler is secretary of the Aluminum company.

DETROIT. — The plant of the Monarch Steel Castings Co., Detroit, which was partially destroyed by fire recently, will immediately be repaired. J. H. Barry is manager.

PORT HURON, MICH. — The Theisen-Braithwaite Co., manufacturer of gray iron castings for the automobile trade, is erecting an addition to its foundry, 70 x 150 feet, which will be modernly equipped throughout. The officers of the company follow: A. J. Murphy, president and treasurer and A. J. Theisen, secretary. Henry W. Johnson is superintendent of the plant.

BRADLEY, ILL.—The David Bradley Mfg. Co., owned by Sears, Roebuck & Co., Chicago, contemplates the erection of a malleable iron foundry for the production of castings used in the manufacture of its line of agricultural implements. J. C. Bohmker is manager of the plant.

MATTOON, ILL.—The Chuse Engine & Mfg. Co. has increased its capital stock to $300,000 and has purchased an adjoining site for a complete new foundry and machine shop additions. H. A. Chuse is general manager.

HAMMOND, IND.—An explosion in the paint mixing shop of the Standard Steel Car Co. resulted in heavy damage to the passenger car plant and to 15 new passenger cars ready for shipment. The damage is said to run close to $750,000.

STEUBENVILLE, O.—Rumors are current that the Wheeling & Lake Erie Railroad Co. has purchased a large tract of land in the vicinity of Jewett, O., where the local branch connects with the main lines, and will build yards and shops.

COVINGTON, KY.—The Foundry Equipment & Metals Co., capitalized at $10,000 has been chartered to manufacture machinery and tools, Frank X. Bertsch, of Coalton, Ky., is manager.

LEXINGTON, KY. — Manufacturers of drilling equipment, oil well casing, steam pipe, oil well rods, etc., interested in obtaining this class of business, also boilers, engines, etc., may obtain lists of numerous oil well equipment requirements by writing to F. B. Tomb, president of the Kentucky Oil Men's association, Lexington, Ky.

LOUISVILLE, KY. — The C. Lee Cook Mfg. Co., manufacturers of metallic packing, is installing $20,000 plant addition in order to take care of heavy government orders. Present machinery will be re-assembled to increase capacity.

LOUISVILLE, KY.—The Gray-Von Allmen Co., creamery operators of Louisville, will erect 2-story brick addition, costing $15,000. Additional machinery will be installed.

LOUISVILLE, KY.—The Reynolds Corporation, manufacturers of cleansing powders, have placed contract with C. A. Koerner & Co. for brick and concrete addition to cost $14,000. Some new machinery will be required.

WHITESBURG, KY.—The Rockhouse Coal Co., headed by P. M. McClannahan, of Knoxville, Tenn., and with capital of $500,000, has plans calling for the expenditure of about a million dollars in constructing a modern coal mining plant.

WHITESBURG, KY. — The Middle West Coal Co. will develop 1000 acres of valuable coal properties and 10 mines with a daily capacity of 1000 tons will be opened.

BELINGTON, W. VA.—Kelly Bros. Mfg. Co., capitalized at $50,000, to operate a foundry at Belington, was chartered by J. F. Kelly, M. J. Kelly, J. P. Kelly, Elkins; J. A.

Business Changes

THE Duplex Machinery Co., Cleveland, has been established by G. J. Hawkey to handle new and used machine tools. The offices of the new company are in the Leader-News building, and a warehouse will be established as soon as a location can be obtained.

Announcement is made by R. L. Knox, president, that the Blaw-Knox Steel Co. will remove its plant from Wheatland, Pa., to Pittsburgh, about Sept. 1.

J. R. Stone Tool & Supply Co., dealer in new and used machinery, will move from the Goebel building to 997 *Woodward avenue, Detroit, on May* 1. *J. H. Marlotte is secretary-treasurer.*

The Wolverine Tractor Co. is removing its plant from Detroit to Saginaw, Mich. A new factory is being constructed under direction of W. E. Wood.

C. W. Prichard Co., Inc., dealers in new and used machine tools, engines, dynamos and motors, is removing its office to another suite in the same building, 50 *Church street, New York.*

W. J Crouch Co., steel exporter, has leased the entire fifteenth floor at 68 *William street, corner of Cedar street, New York,, where it will be located after April* 29.

The Machinery & Metal Sales Co., New York, has opened a branch office at 1216 *Merchants Exchange building, San Francisco.*

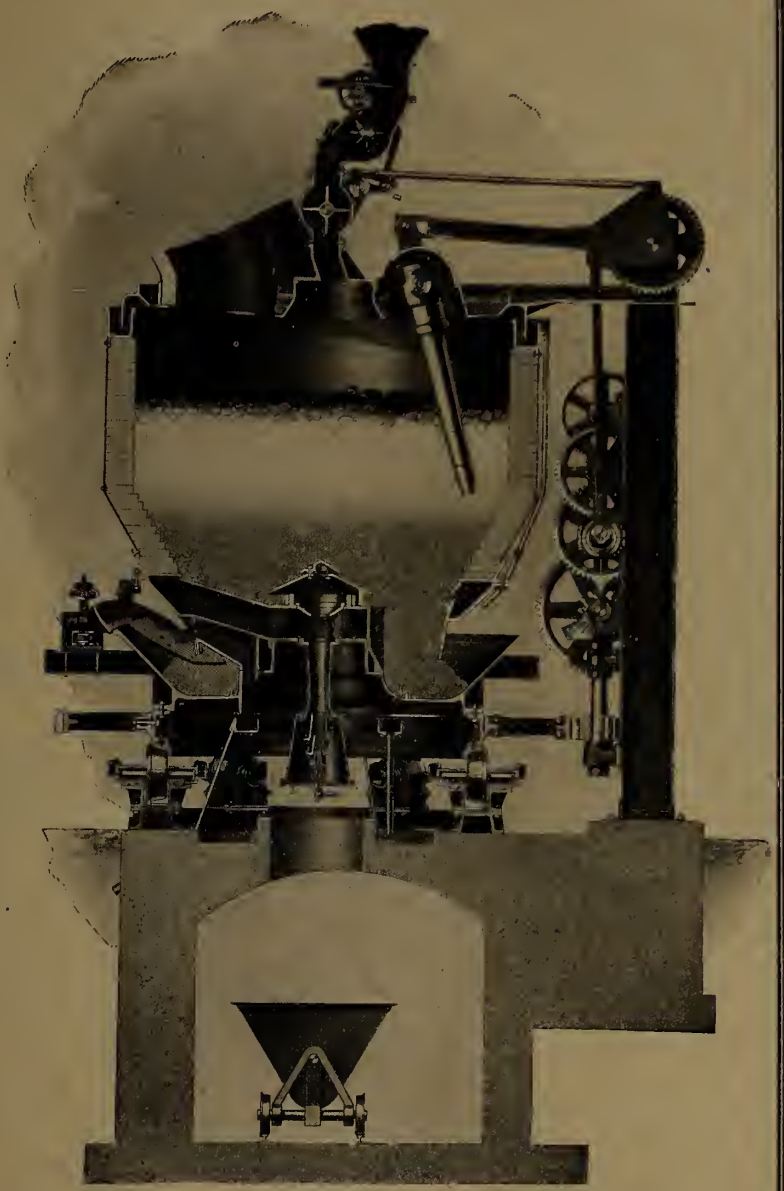
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A 4

Bulletin A 4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Say you saw it in THE IRON TRADE REVIEW

Viquesney and H. V. Viquesney, of Belington.

CHARLESTON, W. VA.—The Marpike Coal Co., capitalized at $50,000 to operate mines in Pike and Martin counties, Ky., has been chartered by T. J. Robson, C. L. Rice, W. R. Reynolds, O. H. Hiserman, and R. D. Epling, Charleston.

CHARLESTON, W. VA.—The MacBeth Coal Co., capitalized at $300,000 to operate mines in Logan county, was chartered by John Laing, T. J. Robson, David Evendoll and P. B. Evendoll, Huntington, and A. W. Laing of McAlpin.

CHARLESTON, W. VA.—The Charleston Ice & Storage Co., capitalized at $100,000, to operate an ice and storage plant at Charleston, has been chartered by J. P. Chapman, East Bank; C. H. Thompson, Ronceverete; S. A. Moore, A. E. Peck and H. D. Rummel, Charleston.

HUNTINGTON, W. VA.—The Branchland Supply Co. capitalized at $25,000, to operate at Huntington, was chartered by W. J. Rodgers, Lamy Rodgers, David Fox, Blanche G. Fox and L. L. McClure, Huntington.

HUNTINGTON, W. VA.—Harry P. Hite, this city, will build a machine shop 50 x 200 feet on Twentieth street.

HUNTINGTON, W. VA.—The Riverside Engineering Co., capitalized at $5000 to operate at Huntington, has been chartered by E. C. Leach, S. Krensin, G. A. Koontz, M. A. Simms and E. E. Williams, Huntington.

MORGANTOWN, W. VA.—The Economy Tumbler Co. is arranging to double the capacity of its plant at a cost of $175,000.

PARKERSBURG, W. VA.—The Brown Flint Glass Co., capitalized at $50,000, to operate a factory at Parkersburg, has been chartered by J. W. Brown, C. C. Brown, T. M. Brown, Vienna; E. A. Brown, Williamstown, and John Godfried, Rochester, Pa.

Up and Down the Pacific Coast

CONNELL, WASH.—The Loon Lake Copper Co. has authorized the issuance of $40,000 in bonds for construction of a mill and equipment of the mine, situated 4 miles from Loon Lake, Wash., equipment of the mill to consist of a flotation and fine grinding system.

EVERETT, WASH.—A. de Soucy, president of the Money Creek Mining Co., a corporation composed largely of Marysville and Silvana farmers, announces that a concentrator will be installed for the company.

NEWPORT, WASH.—Henry H. Armstead has raised $150,000 for construction of a concentrator and the further development of mining property on Lake Pent Oreille.

SEATTLE.—Seattle Chain Works has made application for lease of tract 12 of King county industrial sites.

SEATTLE.—The Olympic Steel Works has filed notice of increase of capital stock from $20,000 to $25,000.

SEATTLE.—Filling necessary for the proposed site of the Centennial Mill (flour) to cost $350,000, at Marginal Way and Dakota streets will be started at once.

SEATTLE.—Immediate construction of the elevated railway to the shipyards has been assured by purchase by the state of the $350,000 in bonds voted by the city for that purpose at the recent election.

SEATTLE.—According to H. B. Earling, vice president of the Milwaukee Railroad Co., the company will extend its lines from Port Angeles to the forks of the Hoh river on the Olympic peninsula if Director General McAdoo gives the permission. This would open up spruce tracts.

SEATTLE.—Meacham & Babcock Shipbuilding Co. will erect a $10,000 machine shop.

SPOKANE.—Spokane Sheet Metal Supply Co. with capital stock of $50,000, has purchased property at Broadway and Madelia streets on which a large warehouse will be erected for distribution of sheet metal. J. H. Flanders is manager and chief engineer.

YALE, WASH.—Frank G. Tillman of Portland and associates contemplate construction of a sawmill near here on the Lewis river.

GRANTS PASS, OREG.—Federal aid has been asked for completion of the first unit of the proposed line of railroad from Grants Pass to Crescent City, Cal.

PORTLAND, OREG.—Pacific Coast Steel Co. has filed for record in the county clerk's office the deed taken a year ago to a tract of land at Willbridge near Linnton as a site for the company's steel roller mill.

BAKERSFIELD, CAL.—The San Joaquin Light & Power Co. is to build a new power plant at the mouth of the Kern river canyon with a capacity of 20,000 horsepower and at a cost of $1,500,000. It is planned to dismantle the old plant after the new one is completed.

FILLMORE, CAL.—The Thomas Haverty Co., 517 South Los Angeles street, Los Angeles, has been awarded the contract constructing distributing system for the municipal water works for $25,794.95. Paul H. Ehlers, 5618 Harold way, Los Angeles, was awarded contract for building circular reinforced concrete reservoir for $12,000 and a pump pit and pump house for $1800.

FRESNO, CAL.—The city trustees will ask alternate tenders on cast iron and concrete electroliers for both sides of Van Ness avenue.

LOS ANGELES. — The Keystone Iron Works has been awarded the contract for the construction and erection of 134 cast iron ornamental lamp posts on Broadway for $69,000. The contract includes the construction of conduits and appurtenances.

MARYSVILLE, CAL.—Contracts have been let by the county supervisors to T. H. Polk, of Chico, for the construction of a 24-foot bridge at Bullards Bar to cost $2,172; and to Jenkins & Wells to build a 21-foot bridge at Brownsville for $1085.

OAKLAND, CAL. — The San Francisco Oakland Terminal Railway Co. is considering the construction of a railroad line on Adeline street from First to Sixteenth.

SACRAMENTO, CAL.—The final shipment of steel for the Rio Vista bridge, a $230,000 project, left the East recently. The structure will be completed by November.

SAN FRANCISCO.—The Clear Lake Railroad extension between Lakeport and Hopland is to be started immediately. Guy L. Hardison, Rialto building, is the contractor.

SAN FRANCISCO.—The United Railway Co. is to build a temporary street railway line over Army street to accommodate the thousands of extra employes of the Union Works engaged in shipbuilding.

SAN FRANCISCO.—The Clinton Construction Co. has been awarded the contract to construct a 5-story and basement reinforced concrete loft building for A. E. and J. D. Spreckels. The contract price is $252,000.

SAN FRANCISCO.—The Hercules Powder Co. will build three additional sulphuric acid and an enlarged nitric acid plant.

SAN FRANCISCO.—Eaton & Smith have secured the contract awarded by the board of public works for the construction of the "D" line extension of the municipal railway system on Greenwich street for $28,600.

SAN FRANCISCO.—Engineer H. J. Brunnier Sharon building, is preparing plans for an 11,000-foot concrete approach to the Fernbridge over the Eel river in Humbolt county, to cost about $60,000. Bids will be taken April 15.

SAN FRANCISCO. — The University of California Extension Division project to erect a million dollar building to house the 4000 students in this city is expected to prove an important factor in the coming state election. The board of supervisors of the city and county of San Francisco has passed a formal resolution practically offering the new building a site in the civic center if its architectural lines will lend fitting beauty to the group of municipal edifices. Inquiries should be addressed to the board of regents, University of California, Berkeley, Cal.

SAN FRANCISCO.—The state water commission has received an application to divert water for power from A. M. Wishart, A. Cameron and J. E. Herrin, of Yerrington, Nev. The construction of a metal flume 3¾ miles long is contemplated.

SAN FRANCISCO.—The Pacific Building Materials Co. has been awarded the contract for furnishing the steel door for pier No. 3 for $10,379.

YUBA CITY, CAL.—Alvin Weiss, county clerk, will receive bids until May 7 for remodeling county jail in accordance with plans drawn by the Pauly Jail Co., Monadnock building, San Francisco.

WATTS, CAL. — A proposition to issue $98,000 bonds for the construction of a trunk line sewer and septic tank will be submitted to the voters here on April 8.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic.

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M. A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

HANNA

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	28.50 to 29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	26.50 to 27.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	26.50 to 27.00
Heavy melting steel, Birming.	23.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. steel, eastern Pa.	39.00
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	27.00 to 30.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.50 to 25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	38.50 to 39.00
Angle bars, steel, St. Louis.	35.00 to 35.50
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland.	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati.	25.00 to 25.50
Busheling, No. 1, Chgo.	28.00 to 28.50
Busheling, No. 2, Chgo.	18.75 to 19.75
Busheling, No. 1, St. Louis.	27.00 to 27.50
Cast borings, New York	16.50 to 16.75
Cast borings, eastern Pa.	19.00
Cast borings, Cleveland	16.00 to 16.25
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 13.00
Cast borings, Chgo.	17.50 to 18.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chicago	31.00 to 32.00
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	16.00 to 16.25
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	15.50 to 16.00
Machine turnings, Pitts.	19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago.	17.50 to 18.00
Machine shop turnings, St. L.	18.00 to 18.50
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.25 to 26.75
Pipes and flues, St. Louis	25.50 to 26.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo.	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 1, Chgo.	33.00 to 33.50
Railroad wr'ght, No. 2, Chgo.	31.00 to 32.00
R. R. wrgt. No. 1, Birming.	26.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham.	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 28.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.00 to 31.50
Cast No. 1, Cincinnati	29.00 to 29.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.25 to 32.75
Cast, No. 1, Chicago	30.00 to 30.50
Cast, No. 1, Pittsburgh	34.00
Cast, No. 1, St. Louis	25.00 to 25.50
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	32.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.00 to 31.50
Malleable railroad, St. Louis	28.00 to 28.50
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	34.00
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	43.00 to 44.00
Locomotive tires, St. Louis.	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, May 2, 1918 *No. 18*

Whole Industry at War's Call

Commercial Business is Plunged in Greater Uncertainty by Pledge of Producers of 100 Per Cent Output to Government—Pig Iron Makers Prepare for More Effective Co-operation—Car Prices Disappoint

IF THE WAR shall require it, the steel industry is prepared to put approximately 32,000,000 to 33,000,000 tons of rolled products annually at the disposal of the government. This is the literal significance of the formal pledges now being given by producers generally to the government that their full capacity is subject to call and that all commercial business is to be subordinated. The statement has been made officially by the steel director that military necessities are so great that they will absorb a 100 per cent output in almost all lines. This is suggestive of the fact that unparalleled war demands now are approaching ultimate form. The experiences of Great Britain, France and even Germany in the present war, however, raise the question in many capable quarters whether such a tremendous application of tonnage would be required for an indefinite period. This dedication of the whole industry to the war is in sequence to recent events and to the sweeping new policies covering orders and distribution which the war industries board has been weighing, as outlined a week ago.

Pig Iron on War Basis

Washington's keener appreciation of the serious situation in pig iron has been brought to a head by the large tonnage represented by government requirements. It is felt that maximum production in iron is necessary to keep pace with the great war needs in steel. Producers foreseeing the inevitable conscription of output and the readjustment of old orders are seeking the adoption of more effective methods of distribution through government representatives. Under this plan complete control of output would be vested in the committee on pig iron, ore and lake transportation and the government's needs would be filled promptly to the exclusion of all present obligations and contracts. The government soon is to make a heavy demand for basic iron for plants producing shell steel. A further need of 400,000 to 600,000 tons of basic, foundry and malleable is represented by the castings for the large car order. It is believed it will be necessary to allocate much of this tonnage. The 20,000 tons of bessemer needed for France will be supplied by a New Jersey furnace company which is to receive an equal tonnage of lake ore for the conversion.

Force Close Car Prices

A month of haggling over specifications and prices on the part of the purchasing powers of the railroad commission has brought forth the long delayed, though vitally needed, car and locomotive orders. There is manifest dissatisfaction in the equipment industry over the close bargain which the director of purchases has forced upon it. The terms provide for a profit of 5 to 6 per cent on manufacturing cost. If the cost exceeds the estimate the percentage of profits must absorb this margin. On the other hand, if the costs fall below the estimate the government is to get the benefit of the saving. The division of the 100,000 cars gives 30,000 to the American Car & Foundry Co.; 13,500 each to the Standard Steel Car Co. and the Pressed Steel Car Co.; 7500 each to the Pullman Co. and Haskell & Barker Co.; and 3000 each to the Ralston Steel Car Co., Mt. Vernon Car Mfg. Co. and Cambria Steel Co. The remaining 19,000 cars now are being distributed. Owing to the urgent demand for plates for shipbuilding and for steel for other purposes, large use is to be made of wooden designs. Nevertheless, the steel requirement in total remains heavy. Under the government locomotive program an initial order for 1025 has been divided between the American Locomotive Co. and the Baldwin Locomotive Works. Approximately 200,000 tons of steel are involved in this order.

Scrap dealers have won their fight for a commission allowance on sales. The war industries board has given official approval to a rate of 3½ per cent, but has left its payment optional with the consumer. It is believed that this action will lift the market out of its recent uncertainty. Whether this commission ruling can be regarded as establishing a precedent for other lines of iron and steel is not yet clear.

MAY 2, 1918

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Meeting the Iron Shortage

PROPER and timely appreciation of the pig iron shortage which has been overhanging the country for months is being shown by the government. It has been realized by those charged with the vital duty of keeping the war machine promptly and adequately supplied with the essential products of iron and steel that the pig iron situation has been one of the danger spots. The 1,500,000 tons slump of output in the November-March period and the continuing hampering of production by fluctuating coke supplies presents a margin of loss that must be compensated for in some way. This factor has assumed increased importance because of the 100 per cent output for war purposes which the government now is urging upon the steel manufacturers. It has been in steel-making iron especially where the shortage has been felt most. This has lead the steel director's office in recent weeks to commandeer surplus basic stocks in steel works yards in behalf of consumers in less favored positions. It is announced that sales henceforth must be in accordance with government business.

This commandeering of tonnage now and the increasing allocations through the government where iron cannot be had by consumers themselves, who are executing war orders, points the way to what may be expected in a far greater degree after midyear. The number of consumers who have found it impossible on their own initiative to buy iron covering their needs over the last six months of the year is large. It generally is appreciated in the industry that this fact is certain to intensify the future effects arising from a condition of short supply.

The government is recognizing the fallacy which repeatedly has been pointed out by THE IRON TRADE REVIEW of permitting pig iron distribution to follow usual commercial channels, if essential needs are to be served first. It has been shown that this in the end only has meant conscription of tonnage already sold and increased complications and confusion. If it is so vital that the government shall have, temporarily at least, 100 per cent of steel output, a corresponding supervision over the supplying of the raw material from which this tonnage is to be made, is equally necessary. The prime duty of the government is to see that the iron being made is placed at the disposal of those who ought to have it in the order of their importance as providers of essential products. The pig iron producers are loyally rallying to the aid of the government. They have proposed plans whereby the imperative needs for iron may be met speedily and old business subordinated. This involves the sacrifice of many high-priced orders, but it is the price of patriotism which they are cheerfully paying.

Railway Shop Equipment Needed

CAR shortage has been the diagnosis advanced for the transportation ills of last winter. Lack of motive power and slowness in repairing rolling stock and equipment have been symptoms accompanying and contributing to these ills; but as in the case of purely physical disorders, malnutrition resulting in this case from excessive economy during the last few years was the one fault which produced the breakdown. By no means the least important cause was the limitation which has been placed on the engineering departments of some roads with regard to the purchase of machine tools for the shops. Roads which were notable exceptions to this policy of restriction did not crack under the strain last winter.

The process of purchasing tools for a railroad involves necessary delays at the best. The master mechanic makes a request for needed machines to the superintendent of motive power of the division. The mechanical engineers of the motive power department pass judgment upon the requirements, and the list as approved is passed to the executive department for permission to make the purchase. It is then given to the purchasing department. Lists are submitted to the machine tool trade and proposals are taken. These are tabulated and checked by the engineers of the motive power department, who often exercise their judgment to the point of selecting the more expensive tools where the need demands. In the past, the lists

of requirements, in many cases, have been sliced as mercilessly as a peace time congressional navy appropriation. The error of this procedure was demonstrated last winter.

At the present time it is, of course, necessary to submit the amount desired for machine tools to the government's regional committee in charge of the railroads. No definite statement has been made as to the policy which will be followed in allowing these appropriations nor as to whether the separate organizations of the different roads will be allowed to proceed to make needed replacements in shop power tools. It is to be hoped earnestly, however, that the existing methods for handling the purchase of machinery may be allowed to proceed with the utmost speed. Replacements are badly needed, and although the types of machines used in the railway shops do not conflict with those used on most munitions work, some serious delay may intervene in securing deliveries. At the present time most of the railroads have extensive tool lists awaiting approval, and apprehension has existed in some quarters that the group or zone plan of purchasing this machinery might be considered. It is not believed feasible by either the railway executives or the machinery interests to handle the purchasing in this way, from the fact that very few duplicate machines are to be found even in the requirements of two divisions of the same road. This removes the one advantage to quantity buying. Considerations based upon the familiarity of machinists with types of tools at present installed, and questions of policy and engineering judgment condemn the centralizing of the purchasing agencies for railway shop tools.

Putting Patriotism Above Profits

THE spirit of loyalty and co-operation with which machine tool builders generally are striving to serve the government at this time is reflected in a communication recently addressed by a large manufacturer of the middle west to his district representatives. In commenting upon the scarcity of certain tools it was explained that in ordinary times great effort is made to have representatives receive tools in proportion to the size and importance of the territory they cover, but that in the present emergency such a policy would be subordinated so that the best distribution could be made "regardless of present profit or future advantage". It appealed to representatives that they "ignore entirely advantages that may accrue by placing machines in hands of desirable customers", and further implored them to assist customers to secure maximum production with present equipment regardless of make. Doubtless, it added, there are many cases where the purchase of a machine may be thereby avoided. In all cases, the communication stated, the company must have complete assurance that the use to which machines are to be placed, is essential to the war or the maintenance of necessary industry.

With these and other like statements, the company went on to discourage many practices of ordinary business which in the past have meant much in the way of profit and the development of its commercial position. That the dealers will respond to this highly patriotic appeal, even though it may cost much in the way of profits, there is reason for little doubt. In fact, a transformation has been going on steadily for months, until now it may be regarded that the spirit of the communication quoted is general throughout the machine tool industry. Still there are some interests who, perhaps due to the isolated positions of their plants or, possibly, to the character of the work in which they were engaged prior to the war, have yet to swing over and enter whole-heartedly into the business of winning the war. To these and to others who have not yet felt the urgency of co-operation and the need for self-sacrifice, this quiet, unobstrusive inter-office communication of a middle western tool builder carries a tremendous appeal.

Ties Welded in Blood

ANNUAL meetings of the National Metal Trades association these past twenty years have been businesslike affairs, with a minimum of time wasted on irrevelant subjects. In this respect, they have been unlike some other conventions, where two-thirds of the delegates have gossiped in the halls, while the faithful "old guard" applauded the speakers. Yet this year the association gave up an hour or two of its limited time to a famous comedian. A breath of the bonnie heather wafted in the meeting room of the Astor, inspiring the delegates there to even a deeper realization than before, of the wrenched hearts of our allies across the sea and their determined will to defeat a cruel enemy. Harry Lauder is a comedian no longer, for he has shared in his country's sorrow. His mission now is to help "brea-ak the German hear-rt". In the space of 10 minutes after he had finished his eloquent address the 300 delegates present had subscribed $7000—not to the Liberty loan nor to the American Red Cross nor anything else American—but to the Harry Lauder "million-pun-fund" for the rehabilitation of crippled British soldiers. What better proof is needed that American business has made common cause, heart and soul, with England, than this spontaneous response to such a call? The incident is only a straw, but it points the direction of a mighty current that will one day sweep the Kaiser and the Potsdam gang into oblivion.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1156

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00
Spiegel, contracts, furnace	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	170.00 to 185.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh.	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. & small., Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products May 1, average for April, 1918, average for February, 1918, and average for May, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 1, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Bessemer pig iron, Pittsburgh..	$36.15	$36.15	$37.25	$44.95
Basic pig iron, Pittsburgh.....	32.95	32.95	33.95	42.15
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	43.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	43.20
Lake Superior charcoal, Chicago	37.50	37.50	37.50	49.25
Malleable, valley	33.50	33.50	33.50	42.70
Malleable, Chicago	33.50	33.50	33.50	43.20
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	32.00	33.00	40.75
**No. 2X Virginia, furnace....	33.50	33.50	33.50	41.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	43.25
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	425.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	85.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	88.00
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	88.00
Open-hearth billets, Pitts.....	47.50	47.50	47.50	85.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.50
Steel bars, Chicago.....	2.90	2.90	2.90	3.84
Iron bars, Philadelphia.....	3.50	3.50	3.50	4.109

	Prices May 1, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	3.50	3.50	3.50	3.39
Beams, Chicago	3.00	3.00	3.00	4.34
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.185	3.185	4.659
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	5.49
Tank plates, Philadelphia.....	3.435	3.435	3.435	7.559
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	7.00
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	6.65
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	8.80
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.50
Connellsville furnace coke.....	6.00	6.00	6.00	8.00
Connellsville foundry coke.....	7.00	7.00	7.00	8.50
Heavy melting steel, Pitts.....	29.00	29.00	30.00	28.40
Heavy melting steel, eastern Pa.	28.50	28.30	30.00	26.00
Heavy melting steel, Chicago..	29.00	28.65	30.00	28.70
No. 1 wrought, eastern Pa.....	34.00	34.00	35.00	40.75
No. 1 wrought, Chicago.....	33.50	33.50	35.00	36.40
Rerolling rails, Chicago.....	34.00	34.00	35.00	36.80

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1156)

Placing Pig Iron on War Footing

Producers Plan Reallocation of Tonnage and More Comprehensive System of Distribution Which Will Give War Needs Precedence Over Other Business—Big Demand in Sight—20,000 Tons for France Placed

Pittsburgh, April 30.—Preliminary plans for placing the pig iron industry on a strictly war footing were discussed April 25 at the regular monthly meeting of the Cleveland district of the American Pig Iron association, which was held at the William Penn hotel, this city. It is proposed to work out the details of this new policy at a meeting to be held in Cleveland on Friday of the current week by the committee on pig iron, ore and lake transportation. Among other things, the proposed plan will involve the reallocation of tonnages and the systematizing of distribution. It is confidently expected that the entire industry readily will agree to the proposal. Once the latter is put into operation, the government through the committee is to have absolute control of the pig iron output to the exclusion of all requirements, regardless of contracts or other obligations that furnaces now may have. Contracts, deliveries, tonnages involved, output, etc., will be canvassed. In other words the industry will be operated as a single unit so that it will be on a basis similar to that to which the steel trade rapidly is being shifted, and in the future 100 per cent of the pig iron output will be placed at the disposal of the government. It then will rest with those having charge of the distribution of tonnages to provide iron for consumers who first will have to secure government permits, or "procurement orders", as they will be called. Among those who addressed the meeting of the Cleveland district of the American Pig Iron association here last week were Edmund W. Mudge of Edmund W. Mudge & Co., Pittsburgh, and C. D. Dyer, vice president of the Shenango Furnace Co., and president of the American Pig Iron association. Those attending were urged to provide iron as fully as possible for the committee on pig iron, ore and lake transportation immediately, to serve the government first and to make commercial requirements secondary. By this plan nonessentials will be eliminated altogether. The meeting was devoted particularly to the comparing of statistics as to costs and production and was presided over by R. C. McMahon of M. A. Hanna Co., of Cleveland, in the absence of T. W. Friend, vice president of the Cleveland district of the association and treasurer of the Clinton Iron & Steel Co., Pittsburgh. Inquiries continue to come to makers for iron, but practically all furnaces are fully committed for the entire year and sales made represent only small lots of off grades. A consumer who recently put out an urgent inquiry for 10,000 tons of basic has been unable to cover in this district.

Embargoes Still Hamper

Boston, April 29.—Deliveries of pig iron on contract in this territory continue quite satisfactory on government or embargo committee permits, but while there are melters here who could use more iron than they are getting, inquiries are not especially numerous, nor is much new business being booked. The furnaces apparently are more intent on catching up with the orders on hand than in seeking new business. The iron coming forward is practically all for government work, but in view of the

fact that almost all melters in New England, with the possible exception of some of the stove concerns, are directly or indirectly engaged on government orders, probably very few outside of the exceptions are not getting some of the iron arriving. The New Haven road is still embargoed on inward freight, suggesting a continued congestion on the Pennsylvania and within the past day or two the Boston & Albany has imposed an embargo. This leaves the Boston & Maine the only clear line for New England deliveries outside of shipments accompanied by special permits. Congestion on the New York Central lines east of Rochester probably explains the Boston & Albany embargo.

Eastern Market is Stagnant

New York, April 29.—The only sizable pig iron business transacted in this district during the past week was approximately 2000 tons of southern foundry for second half. The Wharton, N. J., furnaces, however, will make and ship 20,000 tons of bessemer to France during the June-September period under government allocation. Several furnaces continue occasionally to reserve some additional second half tonnage for regular customers, but they refrain from making additional sales, either because they already have as much business on their books as they desire, or they are waiting for prices to be established as of July 1 before adding to their bookings. Sales of prompt and nearby iron during the week were made up of a few small tonnages of off grades which could not be shipped on regular contracts. New inquiries continue to come out but they are not as numerous as in previous weeks owing to the fact that consumers are finding it useless to try to buy iron.

Inquiry Pouring In

Buffalo, April 30.—The same voracious demand for pig iron continues to exist and the same situation confronts it—no iron. Furnacemen here say that the inquiry for all kinds of pig iron is strong and incessant. It is pouring into this district and from consuming centers as far away as the Pacific coast. Every inquiry is treated in the same way;—it is turned down summarily. All the furnaces of the district are sold up for the balance of the year. The American Car & Foundry Co. is expected to enter the market shortly for large tonnages of malleable and charcoal covering government car orders, but it is said that this will stand little chance of being satisfied in this territory.

Furnace interests have been instructed that they must sell no iron except on government order. This, it is believed, may interfere also with certain iron that is being delivered now, and which was contracted for months ago. Furnacemen had been contending that they should be allowed to ship this iron, but the government promulgation apparently prohibits this. The furnaces of the district at the present time are working 80 to 85 per cent on government orders, so this will affect a relatively small trade. At the same time, some hardship may be brought about for the foundries or mills affected. The government demands will be enormous before very long, sellers say, and they further add that the situation is merely in its incipient stage.

Heavy Allocations in Sight

Cleveland, April 30.—Producers of iron are urging the government to adopt more formal and comprehensive methods whereby the increasing allocations for war purposes may be expedited. At present, these allocations are being made by the committee on pig iron, ore and lake transportation through deputized representatives on request. Some sort of an official procurement system may be worked out. A heavy tonnage of iron requirements for government purposes is in sight. Principal among this are the 400,000 to 600,000 tons of basic, foundry, malleable and charcoal grades to cover the war railroad car program since each car will require 3½ to 4 tons of castings. A leading New Jersey furnace interest, because of its near-tidewater location, will supply 20,000 tons of bessemer wanted by the procurement division of the war department for June-September shipment to France. Involved in this allocation was the providing of 20,000 tons of lake bessemer ore which will be used by the furnace in mixture with an equal amount of its own local ore. An Ohio river steel works with ordnance contracts which had tried unsuccessfully to buy basic is to be furnished 3000 tons of prompt iron by allocation. A Minneapolis foundry will receive 500 tons of high silicon high manganese iron from Virginia and wants 200 tons more; for the Mare Island navy yard, 400 tons of coke foundry has been taken by Pittsburgh and southern Ohio furnaces, 800 tons of copper free low phosphorus by a Milwaukee maker, and 400 tons of charcoal by Lake Superior interests. The Norfolk navy yard wants 500 tons of No. 1, 1000 tons of No. 2, 900 tons of No. 3 and 500 tons of charcoal, delivery half in 120 days and half in 140 days. There remains in the market a large amount of uncovered inquiry. New requests are considerable. The General Electric Co. still is endeavoring to place orders against its recent large inquiry.

Await Government Action

Chicago, April 29.—Principal interest now in the pig iron market is centered in the method to be determined in alloting pig iron to various users to obtain best results for the general situation. Although producers have booked tonnages in keeping with normal consumption by various users, it is felt that war demands and government work may cause the iron to be used in a varying proportion, and that the former plan will be disarranged. At present various tonnages are being awarded by the government and furnished on order ahead of contracts, thereby delaying deliveries on regular business. It is hoped that plans will be made to reduce contract tonnages proportionately as this especially ordered iron is delivered. No selling is being done from local stacks and such inquiry as is being received and turned down comes for the most part from outside sources or is for iron formerly bought in the south. Local melters are well cared for and are in no distress. Some selling of off iron is being done and it has been found that such iron with high silicon along with high sulphur can be used readily with No. 3 foundry iron to get a suitable result. Carlots of these irons have been disposed of recently without difficulty. In some cases melters have allowed these irons to be applied on regular contracts at a proportionate reduction in price. Close observers believe that careful distribution will result in sufficient iron being supplied for all uses through the remainder of the year and that no real famine will result, though efforts to accumulate stocks will have that effect.

Southern Movement Jumps

Cincinnati, April 29.—The movement of southern iron shows a wonderful improvement. The car supply, for some reason, has been better in the last few days than at any time for months. A result is the rapid forwarding of iron on contracts that was long overdue. Estimates differ as to the amount of iron piled in the south awaiting cars, but the tonnage is conceded to be close to 200,000. This iron is already sold and does not represent any metal that can be offered. Pig iron merchants are again talking of a foundry iron famine for the last half. It was thought that some southern furnaces would be able to sell a fair-sized tonnage for that

delivery, but later reports show that there will be little iron to spare and certainly not enough to go around.

Southern Shipments Heavier

St. Louis, April 27.—The movement of southern iron into this district has picked up materially during the past two weeks, due to an improvement in the car situation, but more directly to embargoes against other districts, which have resulted in diverting more tonnage to the St. Louis gateway. Several important consumers of foundry iron say it is their opinion Alabama furnaces will have a fair accumulation to dispose of during the last quarter. They base their belief on the intensive production and quiet admonitions from Washington to southern furnaces as to what is expected of them.

Still Selling Cautiously

Birmingham, Ala., April 30.—Inquiries for pig iron are numerous and southern makers are picking such orders as will accommodate regular customers and are in small lots for delivery during the last half of the year. Agencies of producers of this section are sending in many orders, advising acceptance and urging delivery. The business could not all be accepted, even if it were desired, as later some buyers whom the furnaces feel obligated to serve would be cut off. Furnace companies in this section could book business right now that would take up their whole probable make of the last half of the year. Shipments of iron from the south are better, the railroad car service showing improvement. Production is steadily gaining in Alabama, and if there is no unlooked-for setback, the record output will be realized during the coming month. Two furnaces will go into operation the end of this week or the first of next, which will add considerably to the aggregate production.

Low Phosphorus Sold Up

Philadelphia, April 30.—Spot pig iron sales are more numerous in this district, but in the total they have been relatively small. About 1000 tons of mostly foundry grades were closed in the week. Although unfilled requirements for both prompt and future delivery are large, new inquiries are less numerous. Consumers apparently know they cannot get the iron. A canvas of the low phosphorus situation by the American Iron and Steel institute shows that in counting the orders previously placed by the non-war consumers, 85 per cent of this has been sold for essential war purposes, leaving 15 per cent available for additional war requirements.

Plan Coke Plant for War

Government Looks for Site in Pittsburgh District for By-Product Works to Produce Explosives—Car Supply Irregular

Pittsburgh, April 30.—Engineers of the United States government are said to be making an investigation in this district with a view to selecting a site for a by-product coke plant to be built in order to get an increased supply of explosives including toluol and benzol. Details regarding the plans of the government have not been given out. The car supply in the Connellsville coke region continues to be irregular and is a source of more or less complaint by producers who are unable to adjust operations along a uniform line. Shipments going to furnaces are moving freely and while there are instances where some makers of iron find they are short of fuel, they are not common. The car supply on the Monongahela railroad yesterday was 100 per cent, today it was 70 per cent and for tomorrow 60 per cent is promised. Producers under their present operations can load about 75 per cent based on a 100 per cent car supply so that when an average over 75 per cent is furnished, cars are left over for the next day. The average on the Monongahela railroad last week was 58 per cent. Production during the week ended April 20 was 336,876 tons as compared with 334,291 tons for the preceding week, according to the *Connellsville Courier*.

New England Watches Washington

Boston, April 29.—Much interest centers in the coke situation and Washington is being closely watched by local consumers and brokers for some official announcement concerning the policy of the federal fuel administration. It is said that the New England Coal & Coke Co. is capable of a net production of 600,000 tons annually, while the New England foundry consumption is from 200,000 to 240,000 tons annually. There being considerable doubt whether there are ample transportation facilities to supply the coal necessary to insure this output. Contracts for a considerable amount of Connellsville coke have been booked in New England and word is waited from Washington as to whether these contracts will be allowed to stand.

Buy New England Fuel

New York, April 29.—If the fuel administrator adopts the order under consideration to prohibit the movement of coke into New England from outside producing districts, all New England consumers will be forced to depend for their requirements upon the New England Coal & Coke Co. It is considered in the trade that the proposed ruling undoubtedly will become effective shortly. As a result, a great many New England consumers, whose forward requirements still were open, have closed for large tonnages.

Production Is Problem

Cincinnati, April 29.—Production is now the serious problem. Occasionally there is a big improvement in the car supply, and this is heralded broadcast. This has caused a somewhat erroneous impression to get out that the shortage of both furnace and foundry coke has been relieved to any considerable extent.

Shipments Grow Slightly

St. Louis, April 27.—According to dealers shipments of coke from eastern ovens are a shade better, the average this week being about 60 per cent. The railroad situation has limbered up considerably. The number of loaded coke cars coming through during the past 10 days has been the largest in any like period since last fall.

Increased Output Needed

Birmingham, Ala., April 30.—Coke production in Alabama is about at maximum, but the unfilled demand remains strong. Rehabilitation of old ovens has been carried on for the past two years and very few units now are out of commission that could possibly be fixed up. According to well-informed coke men, 1000 tons daily more than is being produced could be sold. No time is being lost on the construction of new ovens throughout the district, particularly the big addition to the by-product coke oven plant of the Tennessee Coal, Iron & Railroad Co. at Fairfield. Recent revisions in coke prices by the government have had a most encouraging effect though several of the producers have contracts which will keep them from the market for at least 60 days. J. W. McQueen, president of the Sloss-Sheffield Steel & Iron Co. announces that arrangements have been made for a supply of coke to take the place of that being made now at Sayre where property has been leased.

Ruling Gratifies Dealers

Allowance of 3½ Per Cent on Scrap Sales by War Industries Board Expected to Clear Market of Uncertainty

FOR COMPLETE SCRAP PRICES SEE PAGE 1156

Philadelphia, April 30.—Scrap dealers in eastern territory are much gratified over the action of the war industries board in giving official status to their claims for a commission of 3½ per cent on sales. While the board, it is understood, has left the payment of the commission optional with the consumers, many of the latter have been favorably disposed toward this additional charge and it is expected that this tentative arrangement will not cause any complication. The general opinion is that the settlement of the commission matter clears the market of much of the uncertainty which recently has overhung it. For that reason it is believed that considerable revival of business will be stimulated. During the past week the market has continued in its drifting state.

Cast Demand Active

Boston, April 29.—Cast scrap is in good demand at firm prices by New England foundries, but the situation otherwise is quiet and without new feature. With the matter of commissions still in abeyance, there is not much inclination on the part of the trade to do much, while the lack of normal transportation facilities is restricting to a considerable extent the shipments to important consuming points outside of New England. Supplies in all lines are moderate and the market is firm, being held in bound only by the government limitations. There is no quotable market on cast iron car wheels for the reason that all that become available go directly to the makers under the provisions of the contracts for new wheels which call for an old wheel in exchange for every new one. The railroads are behind in their exchanges and naturally open market offerings do not amount to much.

Paid Commissions in Advance

New York, April 29.—Sellers of scrap report a good volume of business. While trading is not to be compared with that during the past year, buying is far above normal. The feature is the great scarcity of cast scrap. Dealers state that under no circumstances would they accept orders, unless they had this material actually on hand. Steel scrap, however, is becoming more plentiful, this being due in part to the increased activities of the shipyards. Prices remain comparatively steady, the only changes being in wrought pipe and No. 1 machinery cast. These descriptions are now holding at $29.50 to $30 and $31.75 to $32, respectively. Many buyers are paying dealers a 3½ per cent commission in anticipation of a later adjustment. Buyers in some cases also are accepting material on back contracts at prices prevailing prior to April 1, believing that a decision will be rendered in this matter favorable to the dealers.

Turnings Slightly Firmer

Pittsburgh, April 30.—The market for machine shop turnings, which has been quotable at $18, delivered, or $1 a ton under the government maximum, appears to be established at $18.50. A consumer in this district who has been paying the former price has closed for 500 tons at $18.50. Limited lots of heavy axle and forge turnings have been sold at $24, the government figure. Cast scrap desirable for the cupola is scarce but sales have been made at $31 to $33. Two sizable lots were bought by a consumer in this district at $32.50, or $1.50 under the government maximum. Heavy melting steel is firm at $29. Dealers say that stocks of consumers are low or entirely exhausted. Shell turnings are being offered rather freely. Some consumers are willing to take tonnages from dealers with the understanding that a commission is to be allowed in the event it is approved by the government, while others refuse to insert such a provision in their contracts.

Better Movement Interrupted

Buffalo, April 30.—The market continues strong for almost every grade of scrap material with no change in prices. The movement of material had been easier for a time, but this has been interrupted during the past week by the scarcity of gondola cars. The majority of these cars are being sent back to the mines empty instead of being diverted in large numbers to the scrap trade as formerly. The interest of the trade still is active in the matter of the cast scrap price. It is believed that the strong protests that have been made against the price of this material will bear fruit in the shape of a new level and a reduction some time before July 1, when the other schedules come up for revision. It is considered likely that malleable scrap will receive similar consideration, and that in the case of this, too, before July 1, a new price of possibly $5 less than the present will be made.

Detroit Under Embargo

Cleveland, April 30.—Outside of heavy melting steel, which is holding even with the $29 government maximum, scrap iron and steel prices in the Cleveland district are soft. No. 1 cast has little demand as the foundries are out of the market. No. 1 busheling also is finding few buyers. Borings and turnings are not showing any recovery. More fish plates, knuckles and couplers would change hands were they available. Contracting is not active because of general uncertainty. A Big Four railroad list, with a total of about 575 tons, closes May 4. A 12-day embargo has been imposed upon shipments of scrap in and out of Detroit. Rejections are being made more frequently than in the past few months.

Steel Active at Chicago

Chicago, April 30.—Except for activity in steel grades, the scrap iron and steel market is quiet and steady. Much of the present demand for steel scrap results from short sales for which dealers are seeking to obtain material in the absence of large supply. This is causing some competition in the market. The quotation is at the maximum, $29 per gross ton, which allows little opportunity for speculation. Quotations are steady and although most grades are selling at less than the maximum, they have not weakened perceptibly and in a few cases prices have advanced a shade. Scrap is not moving freely and comparatively little is coming out. The Rock Island and the Northwestern each has offered 3500 tons. In the former list 500 tons of steel rails, 700 tons of No. 1 wrought and 500 tons of No. 2 wrought were features, and in the latter list 500 tons of No. 1 wrought and 750 tons of steel rails were most noticeable. These tonnages are unusual and have not been equaled in railroad offerings for some time.

New Business Unimportant

Cincinnati, April 29.—A dealer very aptly describes conditions as warranting the display of crepe as far as new business is concerned. Transactions are of a minor character. Shipments to some consuming sections gave promise of improvement, but

the same old difficulties as to embargoes still are to be contended with. Although no highly skilled labor is required in a scrap yard the supply of workmen available is curtailed and has become more unreliable. No changes in prices have been made, but all quotations are not firm.

Buyers Are Holding Off

St. Louis, April 27.—The scrap market here continues dull and featureless. Both buyers and sellers are disposed to hold off, awaiting some decision in the matter of commissions. Deliveries on contract are coming along in fairly satisfactory shape, many delayed shipments having reached their destinations during the last two weeks. This fact has a further tendency to curtail new business. Generally there seems to be an abundance of scrap. Only a few grades are scarce, among them being steel car wheels and iron car axles, both of which are quoted at or close to the government maximum. The price tendency is downward, especially on materials for iron mill use. Stove manufacturers, who are beginning to feel keenly the scarcity of pig iron, have been quietly annexing old metal wherever they can pick it up at a bargain. One large plant on this side of the river purchased a heavy tonnage this week for the last half. Stocks with several important rolling mills are low. Fair shipments out of this district to eastern points were reported during the week, and May 1 will find contract deliveries closer to par than for many months.

Unsettled Condition in South

Birmingham, Ala., April 30.—The scrap market in the Birmingham district still is unsettled. The demand is light though stocks are diminishing gradually. The fact that nonessential industries are being asked to curtail operations to conserve on fuel and transportation demands is being felt by dealers. Cars are plentiful and dealers are able to ship all the scrap for which they have orders. Quotations show but little change. Consumers in home territory are not obliged to pay the maximum prices.

Handles Pipe Sales

L. P. Sutter has been appointed district sales manager in the Pittsburgh office of the Mark Mfg. Co., 538 Oliver building. Mr. Sutter, who has had charge of the Indiana, Ohio and Michigan territory of the company, with offices in Toledo, O., succeeds B. T. Bechtel, who has been made assistant general manager of sales with offices at the company's headquarters at Chicago.

British Want Shell Steel

Lack of Forging Capacity Causes Rounds to Pile Up on Mill Yards—Last Half Orders Unplaced

New York, May 1.—No further allotment of 4,030,000-ton shell steel order for the government and its allies which was referred to by THE IRON TRADE REVIEW, April 11, has been made. It is hinted that 1,200,000 tons of this order, previously distributed, is all the mills can handle for first half delivery on account of the limited forging capacity in this country. Part of the foregoing tonnage is already rolled but is waiting instructions from Washington as to where it is to be sent for forging. Makers do not expect to receive their second half allotments until later. However, the British are out after more tonnage for immediate delivery. Unless the government agrees to give them part of the 1,200,000-ton order, the mills will be unable to pay any attention to the British demand. At the same time the government allotted the 1,200,000 tons of shell bars it placed 300,000 tons for the British and when second-half allotments are made 350,000 additional tons is expected to be placed for the latter.

No Tonnages Available

Pittsburgh, April 30.—Insistent inquiries for billets and sheet bars are being answered by makers and sellers that they have no available tonnages whatever. Scarcity of semifinished steel is becoming increasingly acute and is causing considerable apprehension. The drain made upon producers by government demands has been and is enormous and the confining of output to tonnages for essential manufacturers is more marked that ever. Sheet mills are particularly urgent in their request for sheet bars. One maker of sheets is seeking 6000 tons. Among the inquiries for 4 x 4 billets is one for 3000 tons. Inquiries for slabs also are coming to producers from platemakers in the east. As an example of the sweeping demands of the government may be cited a case where a consumer had bought a considerable tonnage of ingots for the production of billets and sheet bars. When the buyer asked for shipment he was advised that the government had commandeered the raw steel for its own use.

Strip Market Quiet

Pittsburgh, April 30.—The market for cold-rolled strip steel is quiet. Production is proceeding at a good rate of capacity and owing to the improved supply of cars shipments are more satisfactory.

Better Inquiry

Shown in Cast Iron Pipe in East—Dullness Elsewhere

New York, April 29.—Bids on several good-sized tonnages of cast iron pipe are to be closed this week by eastern cities. The largest inquiry involves 2100 tons of 36-inch for Buffalo, bids to be closed May 1. Hartford, Conn., will close bids May 3 on 700 tons of 24 to 42-inch. On May 6, Lebanon, Pa., will also close on a smaller tonnage of 6-inch, about 5000 feet being required. A source of encouragement to sellers this week has been the decided improvement in miscellaneous private demand, inquiries involving several thousand tons now being before the market. Government demand also is a good volume.

Mills Heavily Booked

Pittsburgh, April 30.—Pipe mills are heavily booked, especially for lapweld sizes, and some are not taking any new business. Others examine inquiries carefully before taking tonnages. Sizable lots are being taken either directly or indirectly for the government.

West Buys No Pipe

Chicago, April 30.—Inquiry and selling of cast iron pipe is practically a thing of the past. Cities are not coming into the market and pipe shops are not busy, some being shut down. Foundries in connection with pipe shops are fairly busy on specials and on castings for machinery and shipbuilding purposes, these foundries being utilized to the full wherever their facilities allow. The United States Cast Iron Pipe & Foundry Co. has been awarded 1500 tons at Springfield, Ill., on which bids were opened a fortnight ago.

Southern Demands Small

Birmingham, Ala., April 30.—Orders for cast iron received by southern manufacturers are few and in small lots. The largest tonnage reported lately is for an explosives plant to be erected near Nashville, Tenn. Some few orders for pipe to be used by the government have been and are yet being filled.

Trade May Get Bar Steel

Government's Heavy Demands for Open-Hearth Material Leaves Some Bessemer for General Use—More Cancellations Made

Cleveland, April 30.—Further cancellations of a commercial tonnage in steel bars which long have been on makers' books and is not likely to be shipped under the increased restrictions on nonwar business have been made by some producers. While large producers are booking nothing but government orders, there are occasional gaps between the latter on mill schedules and these are being being filled in with commercial tonnage. The implement trade is getting some tonnage in this way. This practically is all of bessemer steel owing to the government's heavy demand for open-hearth metal. Shafting remains in considerable demand for various war purposes. A sale of 200 tons for range finders was made this week. Local manufacturers of nuts and bolts are having difficulty to get steel to fill their requirements and they may have to resort to the use of bar iron. Nut and boltmakers in this district have received their quotas of the large government orders recently placed.

Consider War Business Only

Pittsburgh, April 30.—Some makers of steel bars report that they are giving consideration to no business whatever except through the sanction of the government. Implement makers, however, will be given a good position on the books of makers, inasmuch as their machinery is necessary for the harvesting of crops. Inasmuch as the government tonnage chiefly is in open hearth some of the mills still are able to supply their own and other consumers with bessemer steel. Steel bars are said to have been placed in the third of three classifications arranged by the war industries board according to the priority of tonnages, which are to be rolled. Makers of iron bars are heavily committed and are taking no new business except that for the government.

Sell Only to Government

Chicago, April 30.—Under present heavy pressure for steel for government purposes, the largest interest and the leading independent in the Chicago district have ceased booking any tonnage for delivery at convenience of the mill. Some business of this kind has been taken during recent weeks to cover requirements of regular customers, but even this slight concession has now been stopped. The domestic user desiring steel for other than war purposes is now practically restricted to such tonnage as does not pass the rigid government inspection and can be shipped without delaying war preparation. Inquiry for hard steel bars on the part of manufacturers and reinforced concrete builders is increasing but until scarcity of rerolling rails is lessened, mills will be unable to take on further business. The state of Illinois is seeking 650 tons of reinforcing bars for the new penitentiary at Joliet. With the government car order placed, makers of bar iron expect an increase in their tonnages to cover requirements of car builders. It is believed that allotment of the entire 100,000 cars will furnish bar iron mills with sufficient to cover practically all their production for the remainder of the year. Current business is light and nothing is being done for last half delivery.

Big Bolt Order Pending

Chicago, April 30.—With a demand aggregating 129,000,000 nuts and bolts for the government, other inquiries are not likely to receive much attention, especially as mills are well filled already with general business. On the large inquiry just mentioned, about 25 per cent was desired for prompt shipment, from stock, and is understood to have been apportioned in the east as western boltmakers were too fully filled up to make immediate shipment. On the remainder it is understood no allocation has been made.

Hoop Tonnages Wanted

Pittsburgh, April 30.—Fair demand for tonnages of hoop steel continue to come to makers and limited lots have been booked. The market for bands is quiet.

Shafting Orders Placed

Pittsburgh, April 30.—Fair-sized orders of cold-rolled shafting for both small and large sizes are being placed. The tonnages are for the government exclusively and are placed by it either directly or indirectly. Shipments are promised in 60 to 90 days.

Deliveries More Prompt

Boston, April 29.—There has been no special change on conditions in the steel and iron jobbing trade. Fewer complaints concerning deliveries are heard. Buffalo steel mills have had much more success in getting their shipments through to New England than have the Pittsburgh mills. This is explained by the better railroad facilities out of Buffalo than from Pittsburgh, and the fact that there is very much less congestion on the New York Central lines than on the Pennsylvania. Business in domestic lines is flat. War plant needs constitute practically all of the current dealings at the warehouses.

Import Ban

On Ferro and Spiegel Arouses Protest—Corporation Buys Ore

New York, April 29.—Considerable dissatisfaction prevails over the import restriction announcement of April 22, which prohibits imports of ferromanganese and spiegeleisen, except overland by way of the Great Lakes from Canada, or overland from Mexico. Importers point out that no ferromanganese or spiegeleisen is coming to this country either from Canada or Mexico. Furthermore, they cannot understand the advantage to be gained, since there is plenty of vessel space for bringing these metals in from England, where all the supplies should have been obtained. Several of the leading importers of English ferromanganese have formally protested to the authorities at Washington. Demand for ferromanganese, while not as active as has been usual in recent weeks, still is brisk. Among current inquiries for 70 per cent ferromanganese is one for 1000 tons from the Youngstown Sheet & Tube Co. Numerous smaller inquiries are out. The market on ferromanganese appears firm at $250, delivered, for 70 per cent and $290, delivered, for 80 per cent, which is equivalent to a premium of $4 per unit for metal exceeding 70 per cent.

Some consumers who recently inquired for spiegeleisen on account of the scarcity of ferromanganese, have found the former is the more difficult of the two to obtain. Among current inquiries for spiegeleisen is one for 1000 tons of 18 to 22 per cent. The market on 16 per cent appears to be firm at $75, furnace, for spot metal, while second half is quoted at $70.

The market on 50 per cent ferrosilicon is devoid of activity. Current inquiry is for prompt and nearby carloads. These are held at all the way from $1.65 to $1.70, delivered. The contract market continues at $155, delivered.

Ferrotungsten apparently has recovered from recent irregularity. Seventy per cent metal is quoted at $2.20 to

$2.30 per pound of tungsten contained. Demand is fairly active. Spot ferrochrome continues to be quoted all the way from 40 to 50 cents per pound of chrome contained, for 60 to 70 per cent metal, containing 4 to 6 per cent carbon. The contract price is nominal at 31 to 35 cents.

Corporation Buys Manganese

New York, April 29.—The United States Steel Corp. will take manganese ore and concentrates from the Butte-Detroit Copper & Zinc Mining Co. at a minimum rate of 4000 tons monthly, or practically the entire output of the Butte-Detroit company, in accordance with a contract just signed. The contract covers a period to Aug. 1, 1919, at which time it may be renewed for one year. The present capacity of the mill at the Ophir mine of the Butte-Detroit company is insufficient to meet the Steel Corporation's requirements. Arrangements, therefore, have been made whereby the output of black manganese ore from the Ophir mine will be concentrated at Helena, Mont., by the New York & Montana Testing & Engineering Co. The pink manganese ore will be concentrated at the Ophir mill.

Inquiry is Light

Pittsburgh, April 30.—Inquiry for ferroalloys is quiet. Small lots of 70 per cent ferromanganese and 16 per cent spiegeleisen are being sought and sales are being made at $250, delivered, and $70, furnace, respectively, for prompt shipment. Makers report that there is a shortage of spiegeleisen. The market for 50 per cent ferrosilicon is not active. This alloy is quoted at $170 to $180, delivered, for spot shipment and $155 for the last half.

Nagle Buys Mill

Philadelphia, April 30.—The Nagle Steel Co. has bought the plate mill of the Glasgow, Pa., which it has been operating under lease since April, 1916. An option of purchase within three years after the lease now has been exercised. The purchase includes a 96-inch sheared plate mill, office building, testing room, etc. The puddling mill at Glasgow remains in the possession of the Glasgow Iron Co. The Nagle Steel Co. now owns three plate mills, including a 54-inch sheared unit at Pottstown and a 16-inch mill at Seyfert.

The Central Iron & Steel Co., Harrisburg, Pa., recently increased wages of its laborers, 15 per cent.

Reallocate Ship Tonnage

Plate Orders for Emergency Fleet Being Redistributed to Obtain Uniform Production and to Eliminate Useless Transportation

Pittsburgh, April 30.—With a view to remedying faulty distribution of tonnages, which has caused delays in building vessels, the war industries board has adopted a plan by which ship steel is being reallocated among the mills. It is understood that this policy has been put into effect at the direction of Charles M. Schwab, director general of Emergency Fleet operations. By readjusting orders for plates, shapes and bars, mills will be given certain portions of tonnages entering into the construction of ships, and other mills will be given other tonnages, so that when the two are put together and produced simultaneously, they will represent so many complete ships. Shipments to fabricators are to be made under a similar plan, so as to involve the least possible transportation of steel to them and from them to shipyards. It has been made clear that one great cause holding up the shipbuilding program has been the faulty distribution of steel among mills and of orders with fabricating plants, resulting in much unnecessary transportation and the waiting of steel for one part of a ship while that for another part already has been produced and fabricated. Men connected with the plate industry have signed readily the formal pledge by which makers promise prompt production and delivery in the largest possible quantity that the government may require for itself and for its allies.

Commercial Tonnage Passed

Cleveland, April 30.—It now has become practically impossible to place any orders for plates where the delivery is not made subject to class A priority orders. Certain makers stipulate that in taking commercial orders to be rolled at convenience they are noncancellable and are entered at present prices. Where some mills in the east particularly were able to offer tonnage chiefly in universals, this practice has ceased and these plants now are on practically a 100 per cent war basis. A new inquiry in this district calls for 500 tons for the shipping board for restoring lake vessels which are to be cut in two to pass the Welland canal. While the formal orders have not yet been placed, it is understood the bulk of the approximately 100,000 tons for the new Fleet corporation vessels to be built by the American Shipbuilding Co. will go to a Pittsburgh mill and a considerable portion to Chicago.

Western Production High

Chicago, April 30.—Greatest insistence is being placed on the production of steel plates for shipbuilding, and mills are straining every facility to add to their tonnage. Requirements for this line are increasing steadily as new shipyards come to the point where they can begin construction. Some difficulty is being experienced in obtaining sufficient fuel and cars, which is said to be reducing output about 15 per cent in some cases in the west. Mills continue working at utmost speed, as far as circumstances will allow. The leading interest has all its 66 open hearths active at its two plants. This condition has continued several weeks and it establishes a new record for steady operation.

Terne Sheets

In Big Tonnage Asked for Gas Containers—War Needs Heavy

Youngstown, O., May 1.—Inquiries came out to one of the mills here this past week from a branch of the ordnance department at Pittsburgh for 16,000 sheets of terne plate to be used for acid and gas containers. The valley mills, however, are not large producers of this material. On this account and because the particular mill was booked two months ahead with government orders, this inquiry was satisfied in another district. Tin plate mills are operating at 100 per cent capacity and are all on government work. Export inquiry is unusually brisk having increased the past month, but mills are in no position to take on any new business in view of government demands for food containers.

Car Supply Adequate

Pittsburgh, April 30.—Tin plate mills now are receiving an adequate supply of cars. Stocks in warehouses are being reduced steadily and before the end of the current week perhaps will be normal, or about one week's production of approximately 800,000 boxes. The output during the past week was continued at a good rate, although it was reduced under the average of recent weeks owing to interruptions caused by the temporary breakdown of machinery.

Export Sheets in Demand

Buyers Offer Attractive Premiums to No Avail—Mills Push Output of Painted Stock for Trench Use

Chicago, April 30.—Sheet mills are receiving and resisting a tremendous inquiry for steel sheets for export on which prospective buyers are willing to pay considerable premium over fixed prices on domestic contracts. Recent offerings have included 6c, Chicago mill, for No. 28 gage black sheet; 7.25c, Chicago mill, for No. 28 gage galvanized sheets, and 5c, Chicago mill, on No. 10 gage blue annealed. These prices are a substantial advance over the figures limiting sales in this country, but under the circumstances, mills are unable to participate in this business. The government is not taking many sheets, but the irony of the situation is that sheet mills cannot obtain sufficient steel in the form of sheet bars, the ingots being diverted to other purposes, in which the war needs are greater. An independent sheetmaker in this territory has production covered almost through third quarter.

Steel Shortage Cuts Output

Pittsburgh, April 30.—Demands made upon sheet mills by the government are extremely heavy, but producers are greatly handicapped owing to a shortage of sheet bars. Operations in this district probably do not exceed 50 per cent of capacity. Some mills still are down because of the lack of steel and considerable concern is felt that orders directly and indirectly placed for the government may not be filled on schedule time. Requirements for galvanized and corrugated sheets are especially large. Strictly domestic demands are light. The American Sheet & Tin Plate Co., soon will open its books for last half business.

War Demands Are Supreme

Youngstown, O., May 1.—Sheetmakers in this district did not have far to go when the government requested that other than government business be subordinated. Most mills have been rolling government tonnages almost entirely for some time and one mill in particular reported last week that its entire schedule was taken up with government work until the beginning of the third quarter. No large government orders have come out recently. The mills are still working on the government order for painted sheets which was placed about three weeks ago and was unusually large. These sheets are corrugated from stock 30 inches wide, machine painted, and are being forwarded to France where they are used for trench covers and billets. Recently the government found that the corrugations on some of these sheets would not match the corrugations on others. Some mills were corrugating from stock 29½ inches wide while others were corrugating from stock 30 inches wide. This was remedied by deciding on 30-inch widths which the government invariably specifies for corrugated sheets now.

War Takes Shape Tonnage

Only Occasional Lettings in East and West in General Market —Angles Placed for Wire Entanglements

New York, April 29.—The largest structural contract not identified with war requirements, to be let in the east in months, involves 4000 tons of steel for the Culver rapid transit extension, Brooklyn, which went during the past week to the Bethlehem Steel Bridge Corp. With this exception, all the work let or pending, is directly connected with our war program. Altogether, however, the current structural tonnage continues light. In plain shapes the market practically is dead and none of the mills have taken any orders exceeding 50 tons during the past week. Angles for posts for barbed wire entanglements for the American expeditionary forces in France, amounting to about 2400 tons, however, have been placed with a Chicago manufacturer. Bids are being taken for 4000 tons for the pier sheds for the proposed Boston terminal, as against 8000 tons in the original inquiry.

To Readjust Orders

Pittsburgh, April 30—Reallocation of ship steel tonnages among producers so as to expedite the building of vessels also will be applied to fabricating plants. By this arrangement steel will go to fabricators from the nearest mills and from the former to the nearest shipyards, wherever this adjustment can be worked out satisfactorily. By this means much useless transportation, a source of delay under past conditions, will be avoided. It is known that there are fabricators in this district who are getting ship steel from St. Louis despite the enormous tonnage of such material that is produced in the Pittsburgh district. Some of the latter in turn has been going past nearby and to distant fabricating shops and has to be doubled back over a long line of transportation to shipyards after being fabricated. Government orders placed with fabricators in this district during the past week are understood to have been light and the situation may have been due to the plan of reallocation which is being worked out.

Special Steel for Tanks

Cleveland, April 30.—Some special steel will be bought by the local plant which, as stated last week, has received a government order for 500 to 1000 tanks of the smaller type. This will be chiefly for gears, shafts, etc. Each of these tanks will weigh about 4 tons but the bulk of the steel will be of armor plate character and will be supplied direct by the government to the builder. Manufacturing buyers are placing some orders for plain material for stocks as an insurance against transportation troubles.

Shape Tonnage Larger

Chicago, April 30.—Although placing of contracts for structural shapes in the west has been at a minimum for a number of weeks an unusual spurt was taken within the past few days, resulting in somewhat less than 3000 tons being contracted. The largest tonnage is for an office building for the Peoria Life Insurance Co., at Peoria, Ill., involving 2164 tons, the contract for which has been taken by the Christopher & Simpson Iron Works Co., at St. Louis, Mo. Doubt is expressed by many whether the building will be erected for several months. Other tonnages are smaller. Demand on structural mills for shapes to go into shipbuilding continues unabated and absorbs most of the available output.

CONTRACTS AWARDED

Sheet mill extension for Newport Rolling Mill Co., Newport, Ky., 700 tons, to McClintic-Marshall Co.

Extension to plant of Apollo Steel Co., Apollo, Pa., 150 tons, to McClintic-Marshall Company.

Office building for the Peoria Life Insur-

ance Co., Peoria, Ill., 2164 tons, to the Christopher & Simpson Iron Works Co.

Substructure for North Michigan avenue bridge, Chicago, (Rush street bridge), for the Great Lakes Dredge & Dock Co., 352 tons, to the Bethlehem Steel Co.

Icing shed and trucking bridge, for Armour & Co., South Omaha, Nebr., 240 tons, to Omaha Structural Steel Co.

Bridge for Lehigh & New England railroad, 170 tons to an independent fabricator.

Marine railroad for government at Charleston, S. C., 350 tons to Boston Bridge Works.

Plate shop, New York Shipbuilding Corp., Camden, N. J., 300 tons to an independent fabricator.

Crane runway, Wm. Cramp & Son Ship & Engine Bldg. Co., Philadelphia, 1000 tons to an independent fabricator.

CONTRACTS PENDING

Piersheds for government terminal at Boston, 4000 tons, bids being taken.

Bridges for Pennsylvania railroad, 300 tons. Bids being taken.

Mills Cautious

In Selling Wire Products Because of Government Demands

Pittsburgh, April 30.—Makers of wire and wire products are cautious about taking new business. None will commit themselves for large tonnages for commercial use and others will not take any bookings unless the material is for government use. Some makers are canvassing stocks that consumers have on hand and if they consider they already are supplied sufficiently will not take additional business from them. The point has been reached where even an inquiry for a carlot of nails is carefully scrutinized before the business is booked, and no commitments beyond July are being made by some mills Operations have increased and some makers report that production is proceeding at a good rate of capacity. Others are running at only 40 per cent. The government is taking large quantities of nails for shipment to France. Cancellation of the order for 50,000 tons of barbed wire for France releases capacity for the production of requirements from other sources, including 60,000 tons of this kind of wire for Italy.

Italian Order Not Held Up

New York, April 29.—Instructions to hold up work on barbed wire orders which were allocated on April 19, refer, it is learned, only to 50,000 tons of this product originally scheduled for shipment over the next four months to France. Work on the filling of orders for the remaining 60,000 tons will be prosecuted in accordance with the original orders, which specify delivery to Italy over the next six months. The orders for the barbed wire for shipment to France are understood to be held up only temporarily.

Government Cars Awarded

American Car & Foundry Co. Receives 30,000—Unofficial Distribution of Remainder—1025 Locomotives Are Placed

New York, April 29.—With the award of 30,000 cars to the American Car & Foundry Co. this week, the government's vast program for the purchase of railroad equipment has at last been gotten under way. The remainder of the order has been divided among the Pressed Steel Car Co., the Standard Steel Car Co., the Pullman Car Co., Haskell & Barker Car Co., the Cambria Steel Co., the Mt. Vernon Car Mfg. Co., and other builders. It is reported that the Canadian Car & Foundry Co. will receive a considerable number.

The order to the American Car & Foundry Co. called for steel underframe box cars and coal cars, and involved about $80,000,000. This price, it is said, represents a profit to the builder of approximately 5 per cent. The cars are to be completed in time for the heavy fall and winter traffic. Work will be allotted by the American Car & Foundry Co. to its various plants in Indiana, Illinois, Michigan, Missouri, Pennsylvania and Tennessee. Upon being completed the cars will be distributed among the railroads needing them most.

With the exception of government business, car buying during the past month has been light. It is estimated that not more than 3000 cars have been placed by private companies. Included in business recently placed are 100 tank cars to Pennsylvania Tank Car Co. for Swift & Co., Chicago, and 10 hoppers to the American Car & Foundry Co. for the Illinois Zinc Co. The Newburgh & South Shore railroad is asking prices on 100 gondola bodies.

The government also has made a start in placing its large locomotive orders. It has divided 1025 between the American Locomotive Co. and the Baldwin Locomotive Works, at a price of a little less than $60,000 each. The profit to the builders is between 5 and 6 per cent of the manufacturing cost. Deliveries are to begin in July. Most of the new motive power, it is understood, will be assigned to eastern roads.

Awaiting Rail Orders

Pittsburgh, April 30.—Now that the government has worked out its carbuilding program, makers of rails and track equipment are waiting tonnages it is expected to place with them soon. Producers are well booked, some of them as far ahead as the first half of 1919, and are taking no new business. They do not know what, if any, readjustment they may be called upon to make in their rolling schedules by the government or what the latter's requirements will be. It is believed that both bessemer and open-hearth rails will be called, the grades being divided so as to conserve the latter steel. It is not improbable that other branches of output will have to be curtailed in order to take care of the government orders. Railroads are buying small lots of standard spikes, deliveries being made in six to eight weeks. Some makers now are unable to take any more of this business. Producers also are filled up with orders for small spikes. Small tonnages of light rails are being sold but makers are no longer soliciting business.

Car Order Finally Placed

Chicago, April 30.—Announcement of the government car order involving 100,000 cars has taken one large element of doubt from the market. It is announced that the American Car & Foundry Co. has been allotted 30,000 cars, the Standard Steel Car Co. and the Pressed Steel Car Co., 13,500 each, the Haskell & Barker Car Co. and the Pullman Co. 7500 each, the Cambria Steel Co., the Ralston Car Co. and the Mt. Vernon Car Co., 3000 each, and the smaller companies a total of 19,000 cars. It is believed each car will require about 10 tons of steel in some form, although the effort has been made to reduce steel requirements as far as possible. This will mean 1,000,000 tons of steel during the progress of the carbuilding program, and many steel men wonder how it will be possible to get out this material without interfering with the shipbuilding program.

Award New Furnace

Pittsburgh, May 1.—Edmund W. Mudge & Co., Frick building, Pittsburgh, basic and bessemer pig iron merchants, who own and operate Claire Furnace Co., Sharpsville, Pa., and the Ella Furnace Co., West Middlesex, Pa., have closed contracts for a modern merchant blast furnace with a daily capacity of 600 tons, to be located at Weirton, W. Va. Contracts call for the completion of furnace shortly after the first of next year.

Government Drives Hard Bargain

Director Williams of Railroad Purchases Charged With Disregarding Main Vital Considerations to Make Dollars and Cents Showing in Car Purchases—Profit Limited to 5 Per Cent—Locomotive Builders Tire of Haggling

WASHINGTON, April 30.—If the action of the railroad administration last week in awarding contracts for freight cars is to be taken as a criterion, then the iron and steel industry may well join the railroad equipment builders and the railroads themselves in the opinion freely expressed here that the administration is becoming the most penurious of the nation's war organizations. This opinion particularly is held of the division of purchases and is backed by the general belief that the administration is taking advantage of the car builders' lean order books and will force them to come to its own terms. This latter phase draws strength from the fact that only approximately 5 per cent on manufacturing costs is to be allowed to the car manufacturers.

This 5 per cent profit is to be figured on the estimated combined cost of labor, material and overhead. In case the actual cost exceeds the estimated cost, the builders must pay the excess cost out of their 5 per cent profit. If actual costs are less than the estimated cost, the builders must divide such gain with the government. Under the arrangement, the government will supply the materials. The builders originally asked 10 per cent profit. They point out that if the next several months brings an unexpected increase in wages or overhead, increased cost may absorb part or all of their profits.

No less important than these developments, which follow the haggling over the prices extending over more than a month after bids were received, is one report that before deliveries of the 100,000 freight cars are completed, contracts for an additional 100,000 will be distributed. It is a well-known fact that 100,000 freight cars will not keep the railroads properly equipped.

Profits Are Cut Low

Information concerning the award of the first lot of 30,000 cars is very meager. The administration announced that the contracts had been given the American Car & Foundry Co., that "the amount involved was between $80,000,000 and $90,000,000, that the profit to the manufacturer is to approximate '5 per cent on the manufacturer's cost', that deliveries, it is hoped, will be made' in time for the fall and winter business of the railroads," and that "negotiations for the construction of 70,000 additional freight cars are still pending."

The statement indicates that the prices paid for the cars, which are to be "steel underframe box and coal cars of standard modern type and heavy capacity," range from $2500 to $3000 apiece, that deliveries are to begin in October and be completed from the middle of December and that the purchasing division is trying to get the carbuilders to cut their profits to a 5 per cent parity. The administration, being practically the only market for cars, realizes this and will fight for the last penny, according to opinions. The report concerning the withdrawing of the locomotive bids gives rise to the belief the engine builders are tired of the haggling and are actually trying to get the administration to take over their plants.

In addition to this, there is another rumor that John Skelton Williams, director of purchases, and on whom most of the blame is being placed for the dilatory and dribbling letting of contracts, has urged the car and locomotive manufacturers to get rid of their sales forces and to reduce the salaries of their "high-priced executives". The belief is that the administration is trying to show results in dollars and cents, forgetting that the very purpose in its inauguration by the President is to help win the war. That the administration has forgotten this may be seen in its attempts to win a lower price for the locomotive coal and to get equal priority with the shipping board for steel. In each of these attempts, however, the railroad administration was the loser when the questions were brought to a final decision.

Whatever may be the object of the railroad administration, carbuilders point out that Mr. Williams, in his way of handling the equipment purchase, is defeating the administration's own plans. It is certain he is embarrassing not only the car manufacturers, but the steel industry as well. In addition to delaying the ordering of such steel as other war requirements will allow, the dribble system of the allocation is hardly expected to keep pace with the deterioration raito the railroads and carbuilders employ in computing their requirements. The 30,000-car order represents between 1 and 2 per cent of the present freight car requirement of the railroads. Deterioration is figured at approximately 5 per cent annually. Nearly four months of government control has passed and the deterioration losses in that period have not been offset.

Pledge Government Full Mill Output

QUICK action has been taken by the government in lining up the steel plants of the country to furnish a 100 per cent output for direct and indirect war needs if such a demand for essential tonnage shall prove imperative. This is in harmony with the sweeping new policies relating to iron and steel supplies which the war industries board has framed to meet the tremendous requirements for war purposes now at hand or in sight. These policies which represent a new development of great importance both in the relations of the government and the iron and steel industry and in their effect on commercial trade in iron and steel were fully outlined in last week's Iron Trade Review.

Steel manufacturers now have pledged their best and most patriotic efforts toward securing maximum production and toward subordinating all commercial business to the governments requirements. This action was taken at a meeting of representatives of about 50 of the principal steel manufacturers of the country at New York, April 26, which was called at the request of J. L. Replogle, director of steel supply, to discuss the situation and to devise the methods by

which it might be met. Mr. Replogle made a strong statement of the immediate and future requirements of the government for steel in various forms for its military necessities, stating that these are so great as to demand the entire output of the industry in almost all lines. The pledge that 100 per cent of capacity will be devoted to government needs if necessary then was freely given by the manufacturers. It has been estimated that at present about 70 per cent of the country's output of iron and steel has been going direct to agencies of the government or to consumers designated by the latter. The meeting drew up a formal pledge covering prompt production and deliveries. This every member of the American Iron and Steel institute has been asked to sign and place on record as signifying his entire sympathy and cooperation with the movement to insure the government whatever it requires in the minimum length of time.

In sending this blank to members of the institute, President E. H. Gary said: "It is my belief that every member of the American Iron and Steel institute will be in entire sympathy with this action and will wish to be recorded as favoring it for himself and his company. To this end there are enclosed herewith two copies of the pledge as adopted. If it is your desire to be recorded with other manufacturers, please sign one copy and return it promptly to James T. McCleary, secretary of the American Iron and Steel institute, 61 Broadway, New York, retaining one copy for your files. It is hoped that all corporations will pledge themselves, and that in such cases the signature will be by the chief executive officer. I confidently hope that I may within a short time be able to advise Mr. Replogle that every member of the institute has signed this pledge."

Prepare for Future Demands

Judge Gary following the meeting in New York gave out a public statement of the purposes and results of the latter. He said: "The meeting was for the purpose of increasing the output of steel and iron and most of the country's manufacturers were present or represented. The situation in respect to the steel supply is not serious, but we decided to take measures to insure an output adequate to meet future demands of the United States government and the allied nations."

The agreement reached at the New York meeting marks the fulfillment of efforts begun by Mr. Replogle several weeks ago when in response to his requests, a number of steelmakers promised to hold in abeyance all other orders while they devoted 100 per cent of their production to government requirements.

Commercial Tonnage Will Be Cut Very Low

Philadelphia, April 30.—Indications are that eastern iron and steelmakers either have signed or will sign the general pledge to give maximum production to the government. The expected effect is that commercial consumption will be even more restricted than in past weeks; in fact, it is expected that not exceeding 10 to 15 per cent of the entire steel production will be available for commercial purposes. These figures are based on the fact that in recent weeks from 85 to 90 per cent of the average production has been going to the government.

The 100 Per Cent Pledge

April 26, 1918.

FOR myself, my corporation or my firm, I pledge the prompt production and delivery of the largest possible quantity of material in our departments that is or shall be required by the United States government for the necessities of itself and its allies, and agree that all other lines of our business shall be subordinated to this pledge, and all this in accordance with the request of the war industries board. (Signed.)

Under the pledge all steelmakers are taking only orders accompanied by priority certificates or orders they know are entitled to priority. Where any doubt exists, the consumers are being referred to Washington.

Expect War Needs Will Not Take Full Output

Youngstown, O., May 1.—All iron and steel manufacturers in this district heartily approve of J. Leonard Replogle's appeal to furnish the government and its allies with every pound of material possible. Pledge letters to this effect which were sent out by President E. H. Gary of the American Iron and Steel institute have been signed by valley makers and in many cases returned. A majority of the mills here have been almost entirely on government work either directly or indirectly for the past two months and the request, that from this time forward 100 per cent of the country's production be placed at the government's disposal, came as no surprise.

Sales managers are assorting their orders and wherever the orders call for material needed for war purposes, they are set aside and the rolling space allotted to the government. This, however, does not mean that the domestic trade will be ignored. While the mills have agreed to operate on government work at 100 per cent, there will probably be times when shipments of war materials will only average 75 per cent.

For the week ending April 27, coke ovens in the Mahonings and Greater Pittsburgh districts, were operating at 95 per cent, an increase of 3 per cent over the previous week; blast furnaces at 92 per cent compared with 91 per cent; open hearths at 90 per cent, the same as last week; and bessemer plants at 89.4 per cent, an increase of 4.4 per cent. Approximately 4050 tons of steel were piled on account of scarcity of cars. During the past week this amount was reduced to 600 tons. Embargoes are holding up 9539 tons.

Puddlers Given Increase

At the regular bimonthly wage settlement at Youngstown, April 30, it was developed that the average sales price on bar iron in March and April was $3.30 per 100 pounds. For January and February the price averaged $3.10. In March and April of 1917 it was $2.45 against $1.60 in 1916. By this settlement puddlers are advanced from $15.05 to $16.05 per ton and finishers are increased 10 per cent. The comparative bimonthly bar iron average price per pound and the resultant puddling rate are as follows:

	1917		1918	
Jan.-Feb.	2.35c	$11.30	3.10c	$15.05
Mar.-Apr.	2.45c	11.80	3.30c	16.05
May-June	2.65c	12.80	.....	.....
July-Aug.	2.75c	13.30	.....	.....
Sept.-Oct.	2.85c	13.80	.....	.....
Nov.-Dec.	2.95c	14.30	.....	.....

Charter Machinery Firm

The firm of J. J. McCabe, 149 Broadway, New York City, has been reincorporated under the name of the J. J. McCabe Lathe & Machinery Corp. No change, however, will be made in the personnel of the officers or in the future policies of the company. The action was taken that the firm could better meet the demands of present day methods in buying and selling new and used machinery. The officers of the company are: President, J. J. McCabe; vice president, H. P. McCabe; treasurer, J. J. McCabe Jr., and secretary, P. F. Sheeran.

Liberal Earnings

Shown by Steel Corporation in Initial Quarter of 1918

As developed at a meeting of the board of directors of the United States Steel Corp., April 30, earnings for the first quarter, 1918, decreased only $2,762,701 from the preceding quarter. The March earnings were impressive. After deducting expenses of operation, taxes, etc., $56,961,424 was earned in the three months ended March 31. This is on the basis of $7.21 per share of common stock, as against $18 a share in the corresponding quarter of 1917. In the latter case, no deductions were made for federal taxes, while in 1918, $31,585,198 was allowed for such levy. Comparative monthly earnings for initial quarters follow:

	1918	1917
January	$13,176,237	$36,074,425
February	17,313,883	33,416,171
March	26,471,304	43,630,422
Total	$56,961,424	$113,121,018
Dep. and sink'g fund	8,511,607	9,790,824
Net income	$48,449,817	$103,330,194
Bond interest	$5,509,540	$5,585,438
Balance	$42,940,277	$97,744,756
Dividends	27,907,775	27,907,775
Surp. for quarter..	$15,032,502	$69,836,981
Federal taxes	$31,585,198	.....

Rail Bar Mills

Form New Association and Division Holds Pittsburgh Meeting

Pittsburgh, April 30.—Thh light rail division of the Rail Steel Products association met in Pittsburgh April 25 and discussed matters and policies affecting itself and the industries it represents together with their relation to government price-fixing and regulation. Edward E. Hughes of the Franklin Steel Works, Franklin, Pa., president of the Rail Steel Products association, attended the meeting.

This organization was formerly known as the Rail Steel Bar Manufacturers association. At a recent meeting in New York City, it was enlarged, the scope of its work extended and the name changed. At this meeting Mr. Hughes was elected president and A. S. Hook of the Calumet Steel Co., Chicago, secretary and treasurer. The association went on record at its New York meeting as being in favor of the payment of a commission to scrap dealers and brokers. Its three branches includes companies making small rails, 50 pounds and under; steel pipe; general shapes, reinforcing bars, agricultural implement, shapes and bars, etc.

The association consists of the following companies: United States Rail Co., Cumberland, Md.; West Virginia Rail Co., Huntington, W. Va.; Buckeye Rolling Mill Co., Steubenville, O.; Franklin Steel Co., Franklin, Pa.; Buffalo Steel Co., Tonawanda, N. Y.; Calumet Steel Co., Chicago; Eckles-Nye Steel Co., Syracuse, N. Y.; Elyria Iron & Steel Co., Elyria, O.; Interstate Iron & Steel Co., Chicago; Laclede Steel Co., St. Louis, Mo.; Republic Iron & Steel Co., Chicago; Sweet's Steel Co., Williamsport, Pa.; Witherow Steel Co., Pittsburgh, Pa.; Wisconsin Steel Co., Chicago; Danville Structural Tubing Co., Danville, Pa.; Inland Steel Co., Chicago, and Simmons Co., Kenosha, Wis.

Defer Institute Meeting

The fourteenth general meeting of the American Iron and Steel institute which was originally scheduled to be held at the Waldorf-Astoria at New York, May 24 and 25, has been postponed one week to May 31. This action has been taken on account of the Red Cross drive.

Scrap Commission

Is Allowed to Dealers by the War Industries Board

Washington, April 29.—Scrap dealers have established their claim to a commission of 3½ per cent on sales before the war industries board. This is in accordance with letters which were sent today to Chairman E. H. Gary of the general committee of steel and steel products of the American Iron and Steel institute, to W. Vernon Phillips, chairman of the subcommittee of the scrap iron and steel and to others before whom the question has been for the past two months. It is understood the ruling of the war industries board makes the payment of the commission optional with the buyers and it becomes effective immediately.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	**Aluminum	Spot antimony
April 24	23.50	.....	6.80	6.62½	32.00	12.25
April 25	23.50	.....	6.80	6.62½	32.00	12.25
April 26	23.50	.....	6.70	6.62½	32.00	12.50
April 29	23.50	.....	6.60	6.62½	32.00	13.00
April 30	23.50	.....	6.60	6.62½	32.00	13.00

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
**Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 32.10c; one to 15 tons, 32.20c.

New York, April 30.—Interest was revived in the antimony market last week when the war industries board sent out a letter to various importers and holders of antimony, asking bids on 1000 tons, for May-June delivery. Prices accordingly rose from about 12.25c to around 13c, duty paid, exwarehouse, New York. ...

The war department is reported to have purchased about 9000 tons of grade A spelter in the past week, from various producers. The army specifications are somewhat lower than the navy department's, the former specifying 99.50 minimum zinc content, and the latter 99.85 per cent. The market for prime western spelter is extremely dull, largely because of lack of demand from galvanizers. Prices of this metal are considerably below cost, prompt, May and June shipment being obtainable at around 6.62½c. Arrangement has been made between producers of high grade ore and consumers for co-operation in handling ore at a higher price.

The tin situation is unchanged. The tin division of the war industries board has held several meetings with consumers in an effort to reduce consumption. It has also begun a campaign among consumers of tin plate in containers for paint and other commodities aside from food. Shipments of Banca tin from the Dutch East Indies still are being held up, which is of serious consequence since about 16,000 tons or around one-fourth of our imports last year were Dutch tin. There is no spot tin of any grade for sale and only Chinese tin apparently now can be purchased for future shipment from the Far East. The market on this grade is about 94.50c, c. i. f. New York, for May shipment, 95c for April shipment now afloat.

The outside lead market is quiet and unchanged. Outside sellers are quoting around 6.60c to 6.70c, while the American Smelting & Refining Co. is quoting 7c, New York. The trade is looking for another reduction by the leading interest. Inquiry is light.

Practically all of the aluminum output now is being taken by the government, at the fixed price of 32c for 98 to 99 per cent, in 50-ton lots. The price of sheets is 40c, base.

Representatives of leading copper producers meet in Washington on May 1, to take up the question of price fixing for the period beginning June 1, when the present agreement expires. Producers are selling June at 23.50c, the government maximum, subject to government price revision. Less than carload lots are obtainable at 23.50c plus a 5 per cent commission for handling, making this price 24.67½c.

Systematizing Parts Manufacture

Plant of Torbensen Axle Co. Displays Many Original Adaptations of Standard Productive Methods to the Making of Axles for Motor Trucks—Shop Operations Conducted With Great Efficiency

BY HOWARD MARKT

TO organize a new company, design and build a highly specialized plant and establish a broad international market for a single product all in the period of two years is a notable achievement even in this day of intensive industrial development. The methods, studies and ingenuity which have brought about this accomplishment tell an interesting story of initiative and enterprise. That it has been made possible, largely is due to the factor of originality which has characterized the co-ordination of manufacturing departments and to an unusual refinement of mechanical processes.

The principle underlying the physical and operating perfection of the plant of the Torbensen Axle Co., Cleveland, is high grade, quantity production of a single article representing the materialization of a novel idea. That idea is the internal-gear axle for automobile trucks. The Torbensen plant has been expanded so rapidly that at present it is capable of turning out 150 rear and 100 front truck axles daily. Five different types of front axles and an equal number of rear axles of capacities varying from ¾ to 5 tons now are being produced. Quality steel requirements of the plant including chrome-vanadium and chrome-nickel metal have been increased to approximately 10 tons daily. The malleable castings used total from 7 to 8 tons daily.

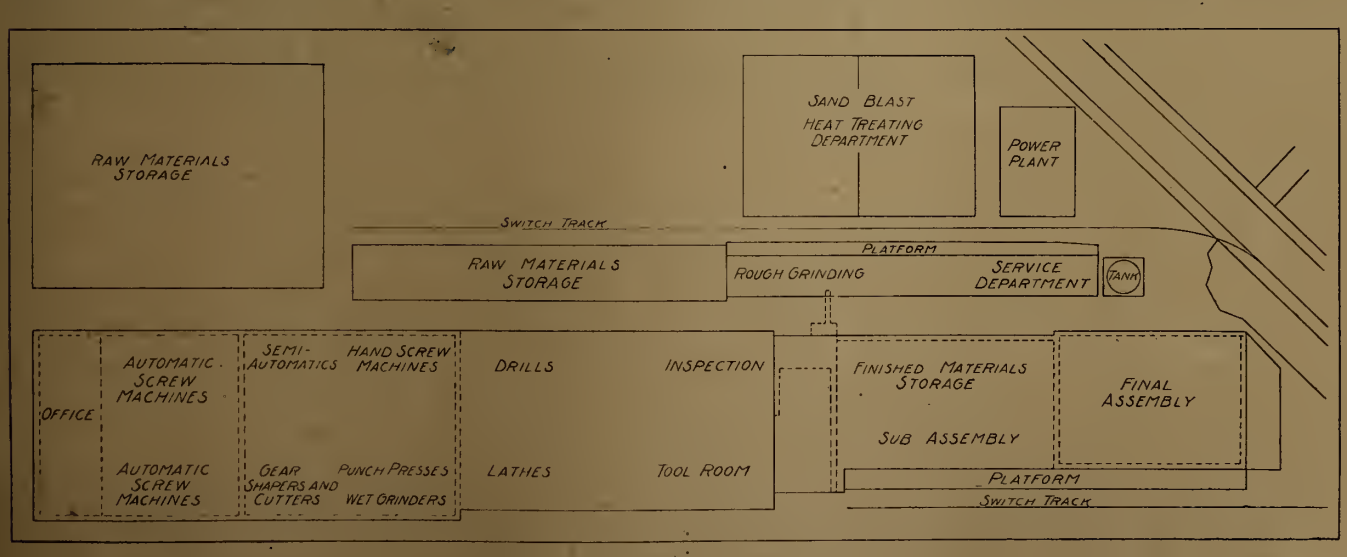
In the development of the plant careful attention has been given to the adoption of methods of greatest efficiency applicable to the special line of manufacture. To this end modern industrial and efficiency systems have been studied and sifted; and only the most modern and effective methods have been retained. The shop especially reflects the unusual care exercised in laying out the entire plant. It is at once apparent that much importance has been attached to the grouping and balancing of machinery and to the expeditious handling of raw materials and finished products. The human side also has not been lost sight of. Time studies are made so that rates for piece workers are fairly and accurately determined. The industrial workmen are carefully studied and their contentment promoted through the medium of the company's welfare activities. A noteworthy feature of the plant is that the same thoroughness that marks the production operations, applies to the efforts of the company to understand and assist its employes.

Many Steps In Manufacture

The product upon which this organization has been built is a truck axle of an unusual type. In this axle, an I-beam carries the load. By means of the usual differential gears, two jackshafts, two pinions and two internal gears, the driving force is transmitted to the wheels. In the production of these and other parts of the axle many interesting manufacturing processes have been evolved. Automatic, or semiautomatic screw machinery, mainly, is used in the initial operations. Succeeding work, depending upon the part, include gear cutting, splining and milling, thread cutting, lathe work, heat treatment, grinding, subassembly, and final assembly and testing. In the determination of the machine tool requirements as well as the grouping of shop equipment, the extent and character of the machining of the individual parts was the deciding factor. To accomplish this, a detailed study of the necessary machine work was made in order to properly correlate and balance the equipment.

The plant has been so designed that any increase of output necessarily requires a proportionately larger number of machines in direct ratio to the particular group. In the event that it would be desired to double the output, twice the number of machine tools in each group would be required. Normally the plant is operated only eight hours daily. Should occasion demand, however, a second shift could be utilized to double production without any increase in machinery. Under existing conditions, the capacity of the machinery is sufficient to enable the shop to meet production requirements on the basis of an eight-hour day.

Since the company has for its object the manufacture of a single product, those problems affecting a shop performing many varieties of work are obviated and a highly specialized arrangement of machines made possible. One of the most interesting examples of an original and effective solution of



PLANT LAYOUT SHOWING ARRANGEMENT OF BUILDINGS AND THE LOCATION OF MACHINE TOOL UNITS

a shop problem is in an oiling system designed for the use of the automatic and semiautomatic screw machine, gears shaper and cutter, milling machine and drilling machine groups. The use of individual pumps on machines of these types long has been a source of inconvenience and loss, not alone in the wastage incurred, but also in time lost in making repairs and adjustments on the pumps. To obviate



GROUP OF AUTOMATIC SCREW MACHINES ROUGH TURNING INTERNAL GEARS

these disadvantages, a central distributing system has been installed. This consists of four tanks connected to form two separate systems; one for each machine tool section. Two of these are elevated about 15 feet and two are located beneath the floor level of the shop. Oil is supplied to one machine tool group through gravity from a line connected to one of the elevated tanks. After the oil has been used, it flows by gravity through a return line to the pump. Here it is strained and pumped again into the upper tank. The value of the system is indicated by the fact that in oil reclaimed and time saved, the installation has more than paid for its initial cost.

Economies have been effected whereever feasible; that is where the cost of installing reclaiming measures has been subordinate to the item of loss. One of the interesting instances of this is in the means taken to collect turnings, borings and scrap derived from all sources. Many shops pay little attention to the subject of waste materials with the consequence that all kinds of scrap are thrown together. In the Torbensen plant efforts are made to differentiate between the chrome-vanadium steel, chrome-nickel steel and malleable scrap. Separate boxes and bins are provided and workmen are instructed to keep the scrap separated. Boxes within easy reach and a systematic method of collection has been found to effectively reduce any negligence of the men in complying with this rule. Where a company is engaged in daily machining large quantities of alloy steel, it is apparent the item of waste materials is large and the differences in market values of grades are considerable.

In the Torbensen plant, inter-machine transportation is done mainly by electric trucks. Raw material as well as semifinished products are loaded on small platforms. Through the medium of a lifting device on the trucks; these platforms are raised from the floor and carried to the spot wherever they are needed. Small hand trucks are used as supplementary carriers. This system necessitates the stacking of parts on platforms and tends to eliminate any littering of the floor with materials in process of finishing. One of the advantages of this system is the greater working space obtained for machine operators. This is an important factor in a plant in which almost every inch of floor space is designed to be utilized.

In their arrangement, the building units have been designed and arranged with a view toward plant expansion. The main building is approximately 700 feet in length and has an area of more than three acres. It is of steel mill construction and one story high. Adjacent to the main structure is a 2-story structure, about 300 x 375 feet. The first floor of this building is utilized for raw materials storage; the second floor is being equipped with machinery preliminary to the beginning by the company of the production of 3½-ton axles on a large scale. Eventually it is planned to devote the entire second floor of this building to the production of 3½-ton axles. A building 28 x 190 feet located in the rear of the raw materials storage, also is used for stocking raw materials. Adjoining this structure is a temporary housing for rough grinding of all kinds. The sand blast and heat treating departments are located in a similar structure 60 x 85 feet in size and are nearby. Toward the rear of the property is the boiler house. At the present time this is used only as a heating plant. Fuel oil for the heat treating department is kept in an 11,000-gallon tank near the boiler house. Additions contemplated involve a 5-story, 74 x 245-foot combined office building and gear cutting department and an extension to the raw materials storage structure.



HAND SCREW MACHINES TURN THE SPINDLES AND BRAKE CAMSHAFTS

The manner in which plant details have been worked out to a fine degree, is shown by a tunnel installation which extends the entire length of the main shop and the other buildings. A centralization of all fuel oil, air, water,

steam and gas lines has been made possible by running these conduits in the tunnel. The use of a centralized conduit system of this kind renders the inspection of the lines comparatively easy and enables repairs to be made promptly without materially interfering with plant operation.

Two sidings forming a Y extend the length of the plant; all the buildings are grouped within the forked space. This affords railroad facilities within easy reach of all departments and tends to eliminate much car switching and trucking. The Y is of sufficient length so that when proposed building extensions are made, no track alterations will be necessary.

In the main shop, a broad aisle extends the entire length of the building. Starting at the front and continuing toward the rear, groups of machine tools are arranged on either side in well-defined sections. At the extreme front end are the Potter & Johnson automatic screw machine, the New Britain automatic and the hand screw machine sections. On the opposite side of the aisle and balancing these tools respectively are the Cleveland automatic screw machine, the Fellows gear



PINIONS ARE TURNED FROM BAR STOCK BY SEVERAL OF THESE AUTOMATICS



A SPECIAL GROUP OF MACHINE TOOLS HANDLES THE REAR-AXLE I-BEAMS

shaper and cutter, and the punch press and wet grinder sections. Directly next to the hand screw machines are the drill section and the inspection department. Opposite is the lathe department and the tool room. Adjoining these latter divisions are the finished material storage section and the assembly section. The final assembly floor, the testing floor and the shipping room occupy the extreme end of the shop. Raw materials enter at the front of the main shop and under this arrangement successive operations are performed with a minimum of trucking. The semi-finished parts move from the automatic screw machines back through the various departments to the shipping floor with digressions in some cases to the heat treating department. Frequent inspection is made, but the inspection department is centrally located. This helps the general plan to provide a minimum of trucking.

The movement of raw materials from storage to finished part and final assembly represent a series of closely-co-ordinated operations. Blanks for the internal gears are transported to the rough grinding department, where, after grinding they are taken to the Potter & Johnson automatics in the main shop. Here the gear is rough turned. After this operation, the gears are placed on platforms, trucked to the inspection department and returned to the gear shaping machines. After the completion of the gear cutting process, a second inspection follows. The gears then are sent to the drill press department for the purpose of having rivet holes drilled and countersunk. Further inspection completed, the internal gears are removed to the heat treating department where, after this process they are sent to the main shop, ground in the wet grinding department and finally inspected and placed in the finished parts storage section. From this department, the internal gears are requisitioned for the subassembly department as needed. The same general procedure is followed by the numerous other parts required for the axle. Some of the major parts are pinions, spindles, differential gears and jackshafts. Deviations from this procedure are obviously necessary in the case of some parts. One instance of this is the brake camshafts. These are rough turned, sheared, upheaded, threaded, heat-treated and ground in the order named. The main difference in the procedure being the upheading operation. The axle I-beams do not follow this same sequence of operations.

The I-beams are taken directly to the lathe department. This department incidentally is engaged for the most part on work connected with the finishing of this section only. The operations involved are: Drilling of all center holes on a Bemis & Smith drilling machine; rough turning the trunnion, milling of lugs, drilling the ends for the axle spindle, shrinking of spindles in the trunnions and counterboring. Frequent inspection is given in the intervals between processes. One of the unique features of this department is the boring operation wherein the axles are bored for the hub spindles. To accomplish this work with the greatest possible expedition, a special Jones & Lamson first turret lathe is installed. This machine has two spindles and bores



VIEW OF THE DRILL PRESS SECTION ILLUSTRATING THE OVERHEAD MOTOR DRIVE USED IN THE PLANT—AT THE RIGHT A MACHINE FOR SIMULTANEOUSLY MILLING EIGHT SURFACES OF A FRONT AXLE IS SHOWN

both ends of two axles simultaneously. The two axles are bored at the same time and one man practically does the work of two. The shrinking of spindles in the trunnions also is done in this section. The two ends of the axles are heated by means of blow torches. The torches then are withdrawn and the spindle is inserted. This is held in position by means of a template until it is secured by the contraction of the trunnions.

The group of Potter & Johnson automatics is engaged principally in the machining of internal gears, hubs, carriers, differentials and cup flanges. Blanks for these machines are furnished from the raw materials storage. On the Cleveland automatics in the section opposite, the operations consist principally of the cutting of pinions from bar stock. The semifinished parts pass from this section to the gear shapers in the adjacent division. In this section made up mainly of gear shapers and cutters, the teeth are cut on internal gears and ring gears. A broaching machine in this section is used to broach steering knuckles, and pinions. Milling machines located here spline and mill the gear ends of the jackshafts. Rivet holes are drilled and countersunk in the internal gears also in this department. In the division opposite, hand screw machines, are utilized for rough turning jackshafts, spindles and camshafts. Thread cutting machines located here also thread the camshafts.

A group of drill presses next in line is equipped with multiple spindle heads, to drill holes for the brake carriers, jackshaft tubes, hubs and similar parts. Constant-speed, alternating-current motors suspended from the ceiling drive the machine groups. Subassembly consists in riveting the brake carriers to the axle, bolting on the camshaft brackets, attaching the external and internal brakes and assembling the differential gear in its malleable iron housing. Upon the completion of the final assembly, the axle is mounted on a testing stand, connected with a dynamometer. It is tested under conditions closely approximating those encountered in actual service.

The accompanying view of the heat treating department displays the facilities of this department to advantage. Arranged along the right are the furnaces: The first is a forging furnace which is used to heat the brake camshafts preceding the upheading operation. Farther toward the rear, are melting pots for drawing. Hardening is done in the four furnaces at the end of the building. Quenching tanks may be seen immediately back of the bulldozer. There are two quenching tanks, one containing oil, the other a solution. All the furnaces are heated by oil. The oil is piped into the building from the supply line which runs through the tunnel previously described. At the extreme right of the illustration is a sand blast machine.

Inspections Are Frequent

Frequent inspection of parts contributes toward a high grade finished product. Parts are inspected in the intervals between machining operations and if any does not measure up to the required limits, it is discarded. Parts are billed through the factory in lot numbers. Orders are made out in quadruplicate by the works manager; one copy is sent to the production department; the second to the cost department; the third to the shop and the fourth is returned to the office when the work is completed. Small stations centrally located record the time required to complete the various operations. Most of the work is on a piece basis.

Welfare work has been carefully studied with the idea of assisting employes in every possible manner. An important branch of this effort is the encouragement given to employes to take up home work. As a means of encouraging the employe in this manner, the company pays part of the tuition for any course the former may desire. It permits the workman to pay his share of the cost in regular installments. A small co-operative store has been installed for the benefit of the workmen. A restaurant operated in connection with the plant supplies meals at a low cost. Among the many other forms of welfare work, the company maintains a dispensary with a regular nurse in attendance at all times. Provision has been made for a large and roomy recreation hall and employes are encouraged to participate in athletic sports of all kinds. Once a month, a meeting of foremen is held to discuss shop problems and to stimulate enthusiasm in the co-operative plans which the company has sponsored. An employes' benefit association is conducted by the organization which, by the payment of small dues, entitles the workman or his family to benefits, in case of illness or death. After employes have been on the payroll for a period exceeding six months, they are insured under the group plan. The efficiency that prevails in the operation of the plant has been applied by the company in its treatment of the labor problem

with the result that the number of dismissals is small and the turnover is at a minimum.

The officers of the company are: V. V. Torbensen, president and consulting engineer; J. O. Eaton, treasurer and general manager; W. F. Rockwell, assistant general manager and factory manager; C. I. Ochs, purchasing agent; R. C. Enos, general manager of sales; H. G. Weymouth, general superintendent.

Crane Built in Two Weeks

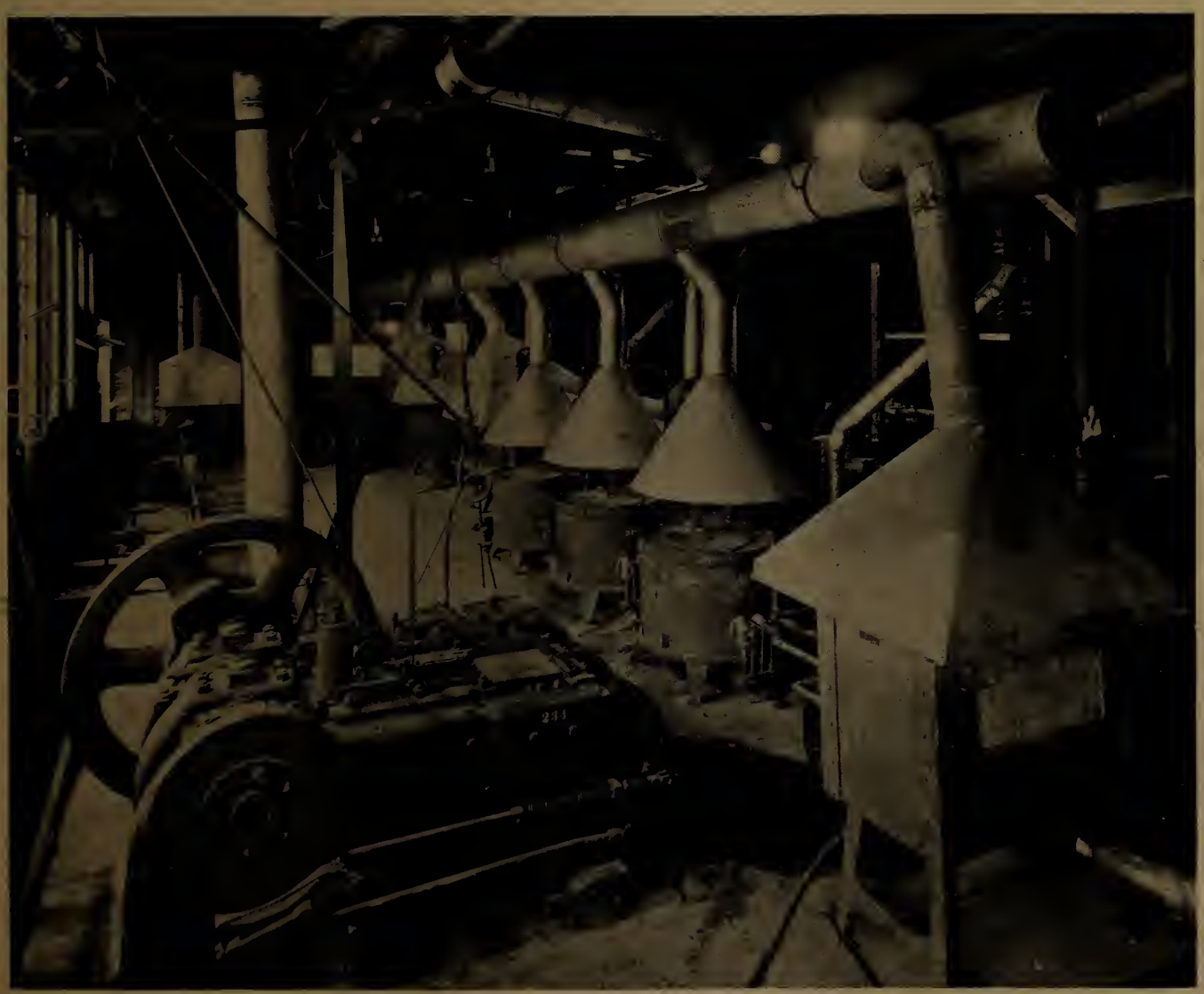
The Alliance Machine Co., Alliance, O., recently built and delivered a special 35-ton traveling crane for the Allis-Chalmers Mfg. Co., Milwaukee, in the remarkably short time of 14 days. Ordinary deliveries on cranes of this type are from 75 to 90 days, and the best previous bid in the records of the navy department is 90 days. The crane was purchased with the co-operation of the navy department since it will be used in the Allis-Chalmers plant for handling propeller shafts during tempering operations. The crane is designed especially for the purpose of transferring the shafts from the furnaces to the quenching baths in the quickest possible time and for this purpose a lowering speed of 140 to 150 feet per minute has been provided. The hoist is provided with two large motors and the hoisting speed is practically one-half that of the lowering speed.

The crane is equipped with one of the standard 75-ton ladle trolleys built by the Alliance Machine Co. The patterns, of course, were on hand, but they had to be changed in order to take care of the special electrical equipment.

The necessary castings were made at the plant of the Otis Steel Co., Cleveland. This company made special efforts to expedite the work. The patterns and castings were handled between Alliance and Cleveland by motor trucks in order to save time. While the trucks were returning to Alliance with the castings, the stage was set in the machine shop so that there was no delay in going about the work of machining. The structural material was fabricated from plain steel in stock. The bridge was designed and fabricated in exactly a week. This crane has a span of 50 feet and operates on a runway 140 feet long.

In appreciation of the record, Josephus Daniels, secretary of the navy, wrote the Alliance Machine Co. a complimentary letter, congratulating it on its success in filling the order so promptly.

Iron founders and blacksmiths at Shanghai, China, who are earning from $7.50 to $14 per month according to the grade of work have asked through the Guild of Iron Founders for an increase of 5 cents a day, according to Consul General Thomas Sammons. The increased cost of food products, particularly rice, have made increased wages in China necessary.



HARDENING AND DRAWING OPERATIONS ARE FACILITATED BY OIL-FIRED FURNACES—TO HEAT BRAKE CAMSHAFTS PRELIMINARY TO UPHEADING, THE FORGING FURNACE AT THE EXTREME RIGHT IS USED

Thermal Refinement of Gear Blanks

Greatest Influence on the Location of the Critical Point is Exerted by Carbon —Annealing of Forgings Removes Strains and Eliminates Distortion and the Resulting Noisy Gears

BY C. R. POOLE

IN the past few years great advancement has been made in the heat-treating and hardening of gears. In this advancement the chemical and metallurgical laboratory have played no small part. During this time, however, the condition of the blanks given the machine shop to be machined has not received its share of attention in the heat-treating department of many forge shops, and in many cases has been neglected or not considered by the machine shops themselves. This is especially true of shops using only the lower carbon steels.

There are two distinct types of gears, both types having their champions, namely, carbonized and heat-treated. The difference between the two, in the matter of steel composition is entirely in the carbon content, the carbon never running higher than 0.25 per cent in the carbonizing type, while in the heat-treated gears the carbon is seldom lower than 0.35 per cent. The difference in the final gear is the hardness. The carbonized gear is filed hard on the surface with a soft, tough and ductile core to withstand shock, while the heat-treated gear has a surface that can be touched by a file with a core of the same hardness as the outer surface.

With the exception of several of the higher types of alloy steels, where the percentages of special elements run quite high, which causes a slight air-hardening action, the carbonizing steels are soft enough for machining when air cooled from any temperature, including the finishing temperature at the hammer. This condition has led many drop forge and manufacturing concerns to consider annealing as an unnecessary operation and expense. In many cases the drop forge has only heated to a low temperature, many times just until the piece showed color, to relieve the so-called "hammerstrains". While this has been only a compromise it has been better than no reheating at all, although it has not properly refined the grain which is necessary for good machining conditions.

Heat-treatment, in the broad sense, is the thermal refinement of the structure of steel and covers the four operations, namely: annealing, carbonizing, hardening and drawing or tempering as it is commonly called. All of these operations are based on the fact that in heating a piece of steel the structure undergoes a change at from one to three points on heating and a corresponding number of changes on cooling, these changes being caused by a molecular rearrangement of the carbon and iron. The points are known as "critical points" or "critical ranges" and vary in number according to the composition of the steel. These points on heating are often referred to as "decalescent point" and on cooling as "recalescent point". Carbon exerts the greatest influence on the location of the critical points with nickel and chromium coming next. A straight carbon steel up to 0.35 per cent carbon has three critical points, from 0.35 to 0.89 per cent carbon two critical points are found and over 0.89 per cent carbon only one critical temperature is found. Each 1 per cent of nickel will lower the critical point 20 degrees Fahr., while each 1 per cent chromium raises the point 10 degrees Fahr. Of the critical points those found on a rising temperature are higher than the corresponding points on a falling temperature. Rising temperatures are always considered in correctly heat-treating a piece of steel. In order to produce the most complete rearrangement of the molecules of carbon and iron and therefore the greatest refinement it is necessary to heat to a temperature slightly in excess of the highest critical point.

Purpose of Annealing

Annealing is the heating to a temperature slightly above the highest critical point and cooling slowly either in the air or in the furnace. Annealing is done to accomplish two purposes: To relieve mechanical strains and to soften and produce a maximum refinement of grain.

Carbonizing is the operation of imparting to a low-carbon steel a shell of high-carbon content. This produces what might be termed a "dual" steel, allowing for an outer shell which, when hardened, would withstand wear and a soft, ductile core to produce ductility and withstand shock. The operation is carried out by packing the work to be carbonized in boxes with a material rich in carbon and maintaining the box so charged at a temperature in excess of the highest critical point for a length of time to produce the desired depth of carbonized zone. Generally maintaining at 1650-1700 degrees Fahr. for seven hours will produce a carbonized zone 1/32-inch deep.

Hardening is the heating to a temperature slightly above the highest critical point and cooling suddenly in some quenching medium such as water or oil. This treatment produces a maximum refinement with the maximum strength.

Annealed steels are called pearlitic, pearlite being the name applied to the microstructure of slowly cooled steels. Pearlite is a mechanical mixture consisting of alternate masses of fewite (pure iron) and cementite (cementite being a compound made up of 6.6 per cent carbon and 93.4 per cent fewite) with the resultant mixture containing 0.89 per cent carbon. Pearlite may be present in two forms, lamellar and granular; with the granular occurring either coarse or fine or elongated with bands of fewite separating the elongated grains of pearlite.

When etched in a weak alcoholic solution of picric or nitric acid and examined under the microscope the fewite, untouched by the etching solution, appears white, while the pearlite is shown up as a black constituent.

Proper annealing of low-carbon steels causes a complete solution or combination to take place between the fewite and pearlite, producing a homogeneous mass of small grains of each, the grains of the pearlite being surrounded by grains of fewite. A steel of this refinement will machine to good advantage, due to the fact that the cutting tool will at all times be incontact with metal of uniform composition and will not be alternately coming in contact with

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From a paper presented at the convention of the American Gear Manufacturers' association, White Sulphur Springs, W. Va., April 18-20. The author, C. R. Poole, is associated with the Frost Gear & Forge Co., Jackson, Michigan.

the soft fewite constituent and the harder carbon particles. While the alternate bands of fewite and pearlite are microscopically sized, the routes has found that with a Gleason or Fellows gear cutter that rough cutting can be traced to poorly annealed steels, having either a pronounced handed structure or a coarse granular structure. A study of the microphotographs of several of the widely used low-carbon steels in gear manufacture will show the condition of the structure direct from the drop hammer, the pronounced banded structure of fewite and pearlite and the change produced by thorough annealing.

Proper Annealing Temperature

Theoretically annealing should be accomplished at a temperature at just slightly above the critical point. However, in practice, the temperature is raised to a higher point in order to allow for the solution of the carbon and iron to be produced more rapidly as the time required to produce complete solution is reduced as the temperature increases past the critical point. Temperatures, exceeding the critical point by over 100 degrees Fahr. should never be used on account of the enlargement of the grains of pearlite and fewite. Microphotographs of a piece of steel annealed at temperatures increasing by 25 degrees from a point below the critical point to the burning point shows clearly the effects of temperature on the grain size.

For annealing the simpler types of low-carbon steels the following temperatures have been found to produce uniform machining conditions on account of producing uniform fine grain pearlite structure.

1.15 to 0.25 per cent carbon straight carbon steel.

Heat to 1650 degrees Fahr. Hold at this temperature until the work is uniformly heated, pull from the furnace and cool in air.

0.15 to 0.25 per cent carbon 1½ per cent nickel, one-half of 1 per cent chromium steel.

Heat to 1600 degrees Fahr. Hold at this temperature until the work is uniformly heated, pull from the furnace and cool in air.

0.15 to 0.25 per cent carbon 3½ per cent nickel steel.

Heat to 1575 degrees Fahr. Hold at this temperature until the work is uniformly heated, pull from the furnace and cool in air.

In the annealing of the higher types of chrome-nickel steel, with the nickel content running about 3 per cent and the chromium about 1 per cent the operation is more difficult, as rapid cooling through the upper critical range produces a hardness due to the slight air hardening properties of steel of this composition. The annealing of this type of steel requires considerable more attention both in the heating and cooling. To produce the best machinability of this steel the following practice will give satisfactory results:

Heat to a temperature in excess of the critical point about 100 degrees Fahr., holding at this temperature for a considerable time to allow for thorough heating and complete solution of the cementite; cool rapidly, either by pulling from the furnace into air or opening up the furnace doors, to a point at which the forgings show no color in daylight; reheat to a point just in excess of the highest critical point and cool slowly in the furnace. The temperatures, length of heating, time and rate of cooling, are dependent on analysis, size of forging and weight of the load of forgings in the furnace.

Not only will benefits in machining be found by careful annealing of forgings but the subsequent troubles in the hardening plant will be greatly reduced. The advantages in the hardening start with the carbonizing operation, as a steel of uniform and fine grain size will carbonize more uniformly, producing a more even hardness and less chances for soft spots. The holes in the gears will also "close in more uniformly", not causing some gears to require excessive grinding and others with just enough stock. Also all strains will have been removed from the forging, eliminating to a great extent distortion and the resulting noisy gears.

With the steels used for the heat-treated gears always of a higher carbon content, treatment after forging is necessary for machining, as it would be impossible to get the required production from untreated forgings especially in the alloy steels. The treatment is more delicate, due to the higher percentage of carbon and the natural increase in cementite, together with complex carbides which are present in some of the higher types of alloys. Due to the many analyses of heat-treated gear steel it is impossible to give in this paper specific treatments, but the general procedure is practically the same as for the case hardening, 3 per cent nickel, 1 per cent chromium steel given earlier. More time should be given to permit the complete solution to take place and the rate of cooling watched closely, together with the temperature at which the forgings are pulled from the furnace. For a furnace load, weighing 550 pounds, of medium section forgings made from a steel of 0.50 per cent carbon, 0.60 per cent manganese, 3 per cent nickel, 1 per cent chromium, the following treatment gave good machining conditions on turning operations as well as on the Fellows gear shapers:

Heat to 1330 degrees Fahr., taking two hours to heat to the temperature. Hold at the temperature for 1½ hours and allow to cool in furnace to 1170 degrees Fahr., taking about one hour to cool. Reheat to 1230 degrees Fahr., consuming three-fourths hour to reheat. Hold at 1230 degrees Fahr. for 1¼ hours. Cool slowly in furnace, not faster than 75 degrees for the first hour, until 900 degrees Fahr., then cool in air.

Incomplete Solution of Cemetite

In the heat-treated steels poor machining conditions are present, generally due to incomplete solution of cementite rather than bands of free fewite, as in the case of case-hardening steels. This segregation of carbon, as it is sometimes referred to, caused hard spots which, in the forming of the tooth, causes the cutter to ride over the hard metal, producing high spots on the face of the tooth which is as detrimental to satisfactory gear cutting as the drops or low spots produced on the face of the teeth when the pearlite is coarse-grained or in the banded condition.

The following gives a few of the hardening numerals on steel used in gear manufacture that produce good machining qualities:

	Per cent	Per cent	Per cent
Carbon	0.20	0.50	....
Nickel	3.00	3.00	....
Chromium	1.25	1.00	....
Carbon-chrome-vanadium	....	....	0.50
Brinell test	156–170	179–187	170–179

In the simpler carbonized steels it is not necessary to test the forgings for hardness after the anneal, but with the high percentages of alloys in the carbonizing steels and the heat-treated steels a hardness test is essential. For this test the Brinell hardness tester is far more accurate than the sclerescope test. However, the Brinell test should not be used without the aid of the microscope. To obtain the best results in machining, the microstructure of the metal should be determined and a hardness range set that covers the variations in structure that produce good machining results. By careful control of the heat-treating operation and with the aid of the Brinell hardness tester and the microscope it is possible to continually give forgings that will machine uniformly and be soft enough to give desired production.

Installs New Galvanizing Machine

The Hanlon-Gregory Galvanizing Co., Pittsburgh, has installed a Watrous galvanizing machine, an invention of E. L. Watrous, Des Moines, Iowa. The apparatus is designed to handle small products such as nuts, bolts, nails, wood screws and other similar articles. The machine is simple. It consists of a heavy frame 16 inches square by 12 inches deep, with a self-locking lid bolted to the top of an upright shaft. This shaft, which is revolved at a high rate of speed, is equipped with a friction clutch and a brake. Only the frame extends above the floor level; the base containing the gears and mechanism, as well as the belt running to the electric motor, is in a covered pit below the floor level. A sheet-steel jacket surrounds the frame to catch the flying zinc.

The work to be galvanized is placed loosely in a basket made of wire or perforated steel. From 50 to 100 pounds are treated at one time. Two men lift the basket by means of a piece of pipe run through the handles, and lower it into the kettle. When the contents are sufficiently soaked, the basket is lifted out and transferred quickly to the machine. One man pulls out the pipe, while the other slams down the lid and throws on the power. The machine takes about three seconds to get up to its speed of 750 revolutions per minute. The surplus zinc, which flies out through the spaces in the basket, is caught against the jacket and falls to the floor, from which it may be picked up and used over again. In about 10 seconds the surplus is all thrown off; the operator then steps on the brake, stops the machine, lifts out the basket and dumps the contents on the floor for cooling. It is said the machine will handle on an average about 150 baskets per hour.

Heads and baskets of different sizes and shapes may be used on the machine; one has been built to handle work 4 feet long. The greatest field for the machine, however, is on small castings or steel stampings, rivets, tacks, nails and especially bolts and wood screws. It is claimed these can be galvanized so smoothly that the nuts will go on the bolts without re-cutting the threads, and yet they will stand four times the United States government test for galvanizing.

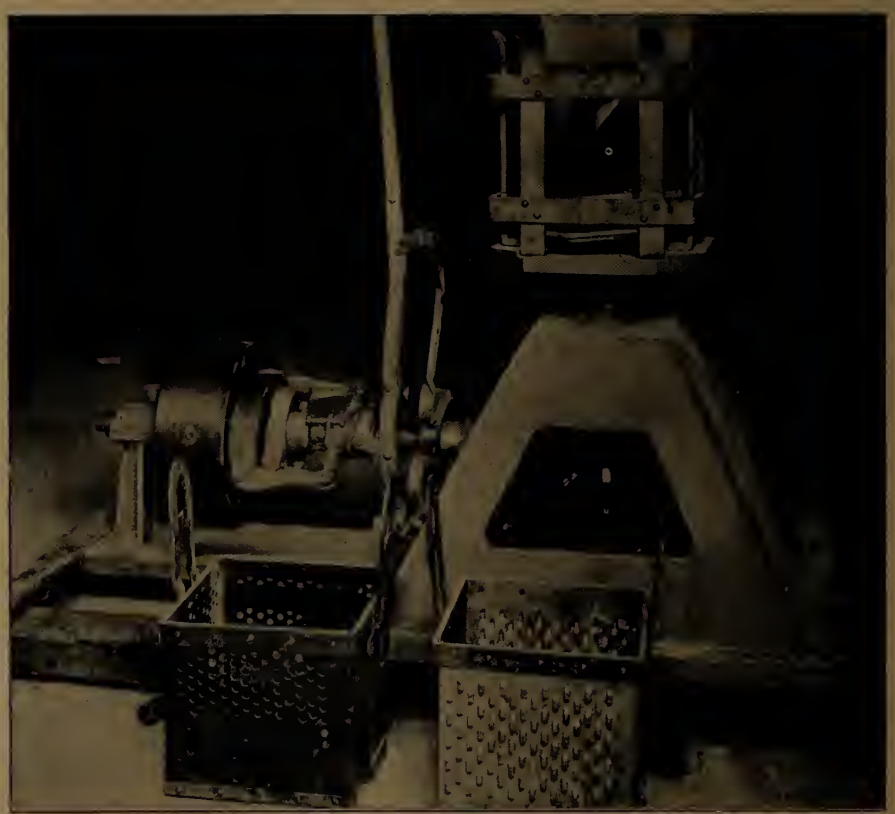
Either a bright or soft finish may be secured as wanted. If the former is desired, the parts are dumped into cold water as soon as the surplus zinc is thrown off; when a darker coat is wanted the work is allowed to cool slowly without quenching.

The machine is specially adapted to coating shingle nails which are difficult to handle by ordinary methods on account of their tendency to pack and stick together. Using the Watrous machine it is said that nails can be galvanized with an addition of only 2½ per cent zinc, compared with 10 to 15 per cent required by ordinary dipping processes.

The Watrous patents are based on the fact that the basket and its contents are whirled together, no attempt being made to transfer the hot, dripping contents of the pot to a cold basket, which causes the zinc to solidify and form lumps wherever there is contact with cold metal.

The thickness of the coat depends on the length of time the work is cooked. In none of the experiments with the device has it been possible to get a coat so thin it will not pass the government four-dip copper-sulphate test, and by proper immersion it may be made to stand 20 dips or more.

The greatest value of this process, however, is said to be in its cheapness. It saves from 50 to 70 per cent of the zinc that would be put on by hand dripping, and this surplus, if allowed to remain, would be an actual detriment to the work, as it is in the shape of lumps, drips and rough spots. It also saves on labor and all other expenses. The machines are put out on a royalty basis at cost, and royalties of 20 cents per 100 pounds on screw-threaded articles, and 10 cents per 100 pounds on all other articles are charged.



A CENTRIFUGAL MACHINE FOR HOT GALVANIZING

New Coal Mine Assures Steady Supply

Shafts are being sunk by the Buckeye Coal Co. at Nemacolin, Greene County, Pa., about 80 miles south of Pittsburgh on the Monongahela river. The Buckeye Coal Co., a subsidiary of the Youngstown Sheet & Tube Co., Youngstown, O., owns about 7000 acres of coal land and the main tonnage of coal will be handled from a shaft equipped with two 10-ton balanced skips. The hoisting equipment is designed to handle 750 tons of coal per hour. A 1500-ton storage bin will be built at the mouth of the shaft. Facilities for screening and picking coal will also be installed. The tipple will be built so that coal can be loaded either in railroad cars or barges. In addition to the main shaft, a slope for handling the men and material is being sunk. This slope will be provided with a tipple and a hoisting engine which will operate six loaded cars to a trip. A 20-foot air shaft in conjunction with a fan which delivers 400,000 cubic feet of air per minute will ventilate the mine. Electric power will be purchased to operate the entire plant. However, auxiliary boilers are being installed to operate the fans, pumps, etc., in case of emergency. Houses for the officials and miners are already under construction.

Steel Foundry Methods on War Work

Successful Production of Army and Navy Castings Demands Detailed Attention to the Molding Practice—Heat Numbers Stamped on Every Casting —Many Inspections and Tests Are Made

DURING the past few months many steel foundrymen have turned their attention to the production of ordnance castings. In every case this work has been undertaken in a thoroughly patriotic spirit, and in many instances government tonnage has been accepted at a considerable sacrifice and under conditions which have made it necessary to make extensive changes in shop equipment and methods. Without exception, however, the situation has been faced cheerfully, the main object of every foundryman turning out ordnance castings being to produce the best possible product without much reference to cost or contract prices. Experience has shown that castings made under government contracts for military purposes cannot be produced as cheaply as work of similar quality turned out for private individuals or corporations. Part of this additional cost is due to the necessity for enforcing specifications which are more stringent than commercial work requires. Additional expense also is incurred in providing facilities for carrying out the routine required by the government's methods which call for the individual examination and marking of each casting. This is perhaps the most important particular in which government work differs from ordinary practice. The ordnance departments of both the army and the navy insist that the heat number be stamped on every casting regardless of its importance or size. In addition, each casting must be examined by a government inspector prior to annealing and again when it is finally finished. Numerous test bars are demanded, many of which must be attached to the castings in specified positions. All of these bars must be tested and their chemical and physical characteristics determined. The requirements of the government as to sulphur and phosphorus are stringent; there is also a lack of uniformity in the specifications of the different branches of the service. Although this irregularity is slight, it is sufficient to make it necessary to use somewhat different methods on navy castings than on army work and still others on work for the Emergency Fleet corporation.

This situation has been summed up in a report of a special committee appointed by the Steel Founders' society in which it is stated that the "government specifications are so written and applied that it is impossible to produce steel castings at anything like the same cost or quantity as those subject to commercial specifications and inspection, on account of the requirements which call for so much handling in the cleaning and finishing departments."

Through their organization, steel founders are exerting their influence to have certain apparently unnecessary requirements of the government modified in order to make possible the production of a greater tonnage of castings of suitable quality. While these negotiations are in progress, the melters are going ahead cheerfully under existing conditions, straining every nerve to realize the maximum output so urgently needed for the prosecution of the war. At the same time, various prominent foundrymen are giving close study to the problem of turning out castings economically under existing government regulations, and as a result, methods have been devised which have somewhat improved the situation.

The Sivyer Steel Casting Co., Milwaukee, which is now devoting two-thirds of its large capacity to government work, has gone into this problem exhaustively. The methods devised by the Sivyer company have been



FIG. 1—THE HEAT NUMBER MUST BE STAMPED ON EVERY GOVERNMENT CASTING REGARDLESS OF ITS SIZE—TWO MEN ARE REQUIRED FOR THIS WORK

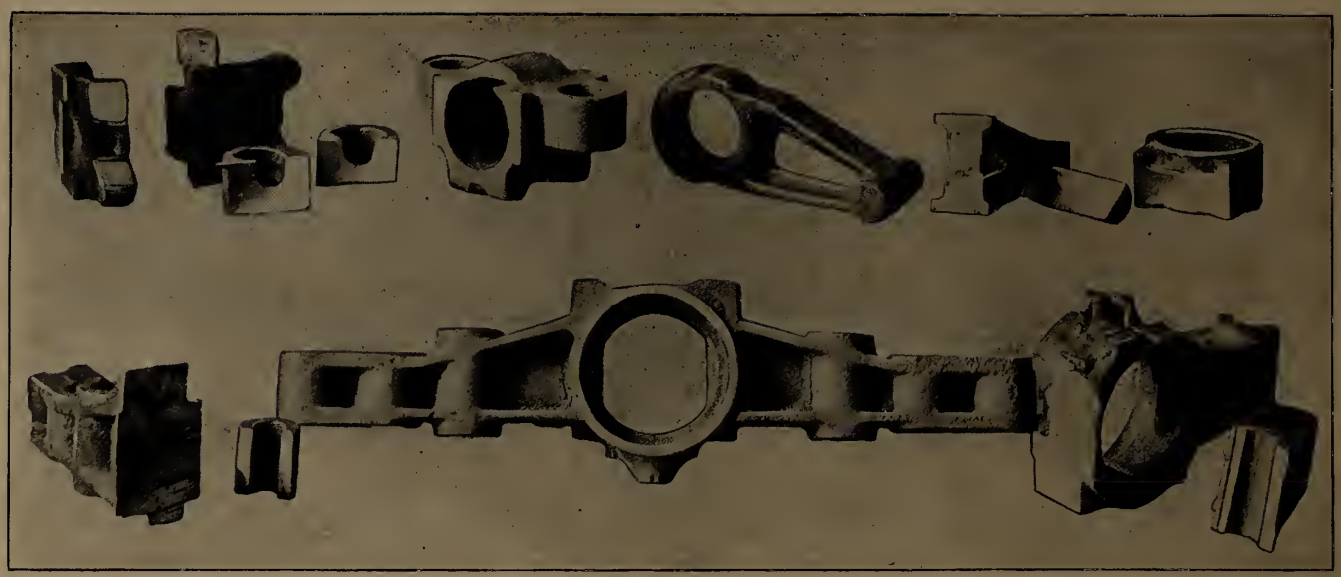


FIG. 2—BEFORE THE MOLDING PRACTICE IS STANDARDIZED SAMPLE CASTINGS ARE MADE AND SAWED APART TO REVEAL HIDDEN DEFECTS

unusually successful in accelerating the production of ordnance castings and in reducing of the cost of meeting the requirements of the government. These methods, therefore, are worthy of special attention.

The Sivyer company is making gun caisson and limber castings for 75 and 155-millimeter field guns, mount castings for 155-millimeter guns, 5-inch navy gun castings, as well as wheels and other special castings for motor trucks for the ordnance and quartermaster departments.

Three classes of castings are made for the ordnance department. They must conform to the following physical and chemical specifications:

No. 1 Cast Steel.—Elastic limit, 25,000 pounds per square inch; tensile strength, 60,000 pounds per square inch; elongation after rupture, 16 per cent; contraction of area, 24 per cent; sulphur under 0.07 per cent; phosphorus under 0.05 per cent.

No. 2 Cast Steel.—Elastic limit, 35,000 pounds per square inch; tensile strength, 75,000 pounds per square inch; elongation, 15 per cent; contraction of area, 20 per cent; sulphur under 0.07 per cent; phosphorus under 0.05 per cent..

No. 3 Cast Steel.—Elastic limit, 45,000 pounds per square inch; tensile strength, 85,000 pounds per square inch; elongation, 12 per cent; contraction of area, 18 per cent; sulphur under 0.07 per cent; phosphorus under 0.05 per cent.

All of the navy castings made by the Sivyer company are Grade *B*. These castings must conform to the following requirements:

Tensile strength, 60,000 pounds per square inch; elastic limit, 45 per cent of the tensile strength; elongation, 22 per cent; contraction of area, 30 per cent; sulphur under 0.05 per cent; and phosphorus under 0.06 per cent.

It will be noted that these specifications are severe particularly for No. 3 army and Grade *B* navy castings. The sulphur and phosphorus limits also are exceptionally stringent in view of present market conditions. In fact, this situation is so serious that the Steel Founders' society in its petition to the government recommends that the sulphur and phosphorus maximums be fixed at 0.06 per cent for open-hearth castings, with an allowance of 0.08 per cent sulphur and 0.07 per cent phosphorus in converter steel castings.

In view of these circumstances, the



FIG. 3—AXLE-BRACKET FOR GUN CAISSONS ARE MOLDED ON ROCK-OVER MACHINES

success of the Sivyer company in turning out a large percentage of satisfactory heats, is commendable. The officials of the company attribute this success partially to close attention to detail and partially to the use of the electric furnace for melting the metal. The accompanying table shows the result achieved by the Sivyer company on a number of heats. This indicates clearly what the steel foundrymen of the country are doing to meet the government's requirements.

The successful production of castings for military purposes demands detailed attention to the molding practice. At the Sivyer plant all of the army and navy castings are made on molding machines in order to insure uniformity in the size and finish of the work. The machines also materially reduce the cost of the molding operations. Whenever a new job is taken up, it is carefully studied and an effort is made to develop the best possible procedure. To this end, before any work is started through the shop on a production basis sample castings are made, employing various methods of molding and gating, and sawed apart in order to reveal any hidden defects. A number of sample castings which have been subjected to this preliminary examination are shown in Fig. 2. As soon as a satisfactory method of molding is developed, the sample castings are submitted to the representatives of the government for approval. The molding method which has been found to produce sound castings is then standardized and the patterns and rigging arranged for quantity production.

The care with which molding details have been worked out is indicated in Fig. 4, which shows the method of molding the drag for a 36 x 6-inch, plate-type military-truck wheel. A jar-ramming, rollover, pattern-drawing machine built by the Herman Pneumatic Machine Co., Pittsburgh, is employed. The flask for the drag is 38 inches square and 12 inches deep. The cope, which is similar to the drag in its general outlines, is molded on a jar-ramming, turnover, pattern-drawing machine furnished by the International Molding Machine Co., Chicago. With two men on each machine, 60 molds are turned out per day. The arrangement of the gating is clearly shown in Fig. 4. The runner is in one corner of the flask, the gate being of the bottom-pour variety with several feeders leading into the lower rim of the casting. It will be noted that the brake drum is cast integrally with the wheel itself. The finished casting weighs 220 pounds. The weight of the rough castings with gates and risers attached is 290 to 300 pounds. This is one of the heaviest castings made by the Sivyer company, which specializes on light work. The wheels are molded in a special bay from which they are transferred by cranes to a convenient position near the furnaces for pouring. The wheel molds are poured with steel proportioned to meet the specifications of the American Society of Automobile Engineers. Its general characteristics are similar to No. 3 ordnance steel. Fig. 13 shows wheels of this type being machined. The principal difficulty encountered in making these castings arises from the strains occurring at the junction between the comparatively thin plate and thick rim. This has been overcome largely by the liberal use of risers and by pouring the steel at the proper temperature.



FIG. 4—MOLDING THE DRAG FOR A 36-INCH PLATE-TYPE MILITARY-TRUCK WHEEL ON A JAR-RAMMING, ROLL-OVER, PATTERN-DRAWING MACHINE

Another method of molding ordnance castings is illustrated in Fig. 3, which shows axle-brackets for 155-millimeter gun caissons. Power roll-over-draw machines of the standard type built by the Tabor Mfg. Co., Philadelphia, are employed for this work. The copes are molded on the machine at the left and the drags on the one at the right. As fast as the molds are completed, they are slid

down the skids, shown in the foreground of Fig. 3. These skids deliver the molds to the pouring floor where they are arranged as indicated in Fig. 5, which shows part of a day's work with some of the cores set. Two castings are made in each flask and four men turn out from 30 to 40 molds a day including the core



FIG. 5—ORDNANCE STEEL IS MELTED IN ELECTRIC FURNACES

setting and closing operations. Round cores of a comparatively simple type are used. Before they are closed, the molds are carefully skin-dried with a gas torch. Steel flasks, 34 inches long and 22 inches wide, are employed. Both the copes and drags are 8 inches deep. The castings are poured from one runner in the middle of the flask, with centrally located gates extending to each mold. In pouring these castings No. 3 ordnance steel is used.

Electric Furnaces Used Exclusively

Electric furnaces are employed exclusively at the Sivyer plant for melting the metal for military castings. After considerable experimenting, the officials of the company have concluded that the electric furnace offers special advantages for this class of work on account of the possibility of exercising accurate control over both the temperature and composition of the heats. The freedom of electric steel from oxidation also is a factor.

Two furnaces are used, including a 1-ton, single-phase, single-electrode Snyder type furnace and a 3-ton, 3-phase Moore furnace built by W. E. Moore & Co., Pittsburgh. The latter is shown in Fig. 5 and its general characteristics are clearly indicated. Standard practice has been followed in designing the furnace and a special effort has been made to provide parts that are amply proportioned, thus avoiding breakdowns and excessive repairs. A 3-ton heat is melted down in about 2½ hours in the Moore furnace. The furnace has been in operation only since December. The Snyder furnace has been operating for nearly two years with good results.



FIG. 6—A FLOOR OF AXLE-BRACKET MOLDS SHOWING METHOD OF SETTING CORES

The charges consist of specially selected scrap steel with occasionally a little low-phosphorus pig iron. The general practice, however, is to melt all-scrap heats. Croppings from shell forging plants are utilized together with springs, knuckles, and other high-grade steel scrap. Care is exercised to keep the sulphur and phosphorus in the charge low and all of the scrap is carefully analyzed before it is used so that the melter knows exactly how to proportion his charges to obtain steel of the correct composition.

During the heat the carbon is watched carefully and preliminary color tests for carbon are run from time to time in order to obtain the correct carbon content. The charges are proportioned to obtain the following percentages of carbon in the finished castings:

	Carbon, per cent
Class B navy steel	0.20 to 0.25
No. 1 ordnance steel	0.20 to 0.25
No. 2 ordnance steel	0.30 to 0.35
No. 3 ordnance steel	0.38 to 0.42

How the Castings Are Stamped

In ordinary steel foundry practice it is not customary to handle the castings individually in the annealing, cleaning and finishing departments. As previously pointed out, however, the government insists that each casting be inspected individually and in addition demands that the heat number be stamped on the casting. Special arrangements are necessary to accommodate this practice. At the Sivyer plant, as soon as a heat is poured and the castings sufficiently cool, the molds are shaken-out and all of the castings together with the test bars for that particular heat are placed in a steel bucket which carries a tag bearing the heat number. Usually the tag consists simply of a piece of board on which the heat number is written with chalk. This bucket is transferred to the cleaning department where the castings and test bars are stamped with the heat number. This operation is shown in Fig. 1. Two men are required and every casting must be stamped. Stamps manu-

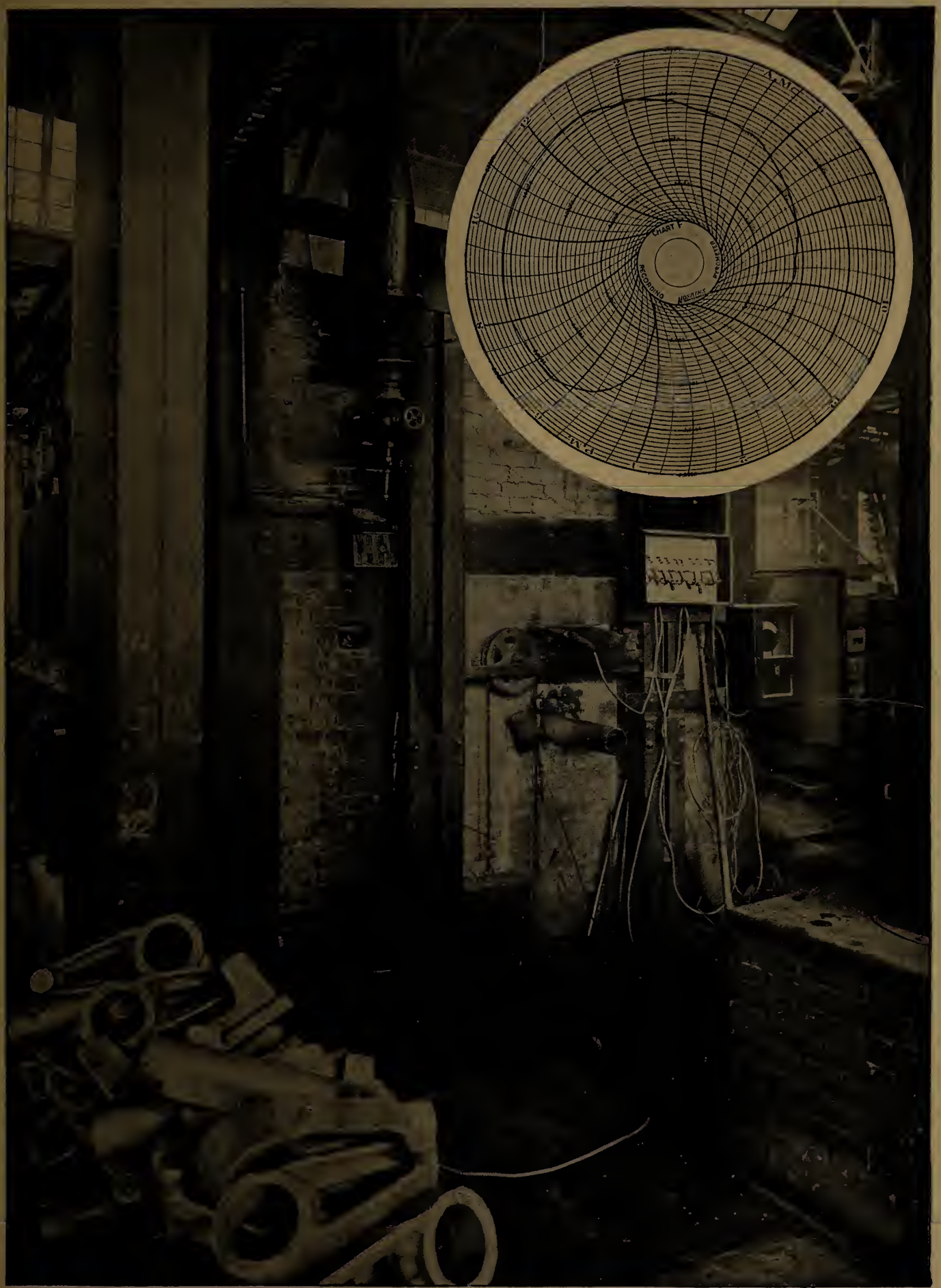


FIG. 7—ANNEALING IS AN EXTREMELY IMPORTANT PROCESS IN MAKING ORDNANCE CASTINGS AND COMPLETE PYROMETER CONTROL IS NECESSARY. FIG. 8—A SAMPLE PYROMETER CHART SHOWING ANNEALING TEMPERATURES

factured by James H. Matthews & Co., Pittsburgh, are employed. They are provided with movable numbers and are so arranged that the entire heat number may be marked on the casting with one blow of the sledge.

Another method of marking the castings is to print the heat numbers in the molds. The numbers then appear on the castings in raised figures. The Sivyer company has found this method less satisfactory than the one just described because it prevents the molds from being held from one heat to another and in case there should not be enough metal in the furnace to pour all of the molds on the floor those left over would either have to be scrapped or the numbers chiseled off of each casting and corrected. After the castings are properly marked with the heat numbers, the heads and gates are removed and the castings are sand-blasted. It is not possible to anneal the castings immediately since it is necessary to determine the chemical analysis of each of the test bars. The results of these analyses must be submitted to the government inspectors for their approval. This requires time and in the interval the castings must be stored conveniently and in an orderly manner.



FIG. 9—WHILE THE TEST BARS ARE BEING ANALYZED THE CASTINGS ARE STORED IN BOXES IN THE YARD ACCORDING TO HEAT NUMBERS

Table I

Result of Tests of Castings Made for Government

Heat No.	Kind of steel	Elastic limit lbs. per sq. in.	Tensile strength lbs. per sq. in.	Elongation in 2 in., per cent	Reduction of area, per cent	Phosphorus, per cent	Sulphur, per cent	Silicon, per cent	Manganese, per cent	Carbon, per cent
299	No. 8	50,750	84,900	20.1	27.4	0.041	0.050	0.25	0.74	0.421
310	No. 3	54,000	100,400	17.5	20.4	.....	.....	....	....	.....
335	No. 3	46,870	89,500	18.7	23.5	0.045	0.055	0.50	0.80	0.427
284	No. 3	46,150	92,450	18.0	23.2	0.034	0.051	0.35	0.78	0.435
261	No. 3	48,650	101,450	11.5	20.2	.....	.....	....	....	.....
297	No. 3	48,850	86,420	18.6	23.6	.....	.....	....	....	.....
314	No. 3	48,750	88,800	14.2	18.4	.....	.....	....	....	.....
291	No. 3	55,020	94,620	16.2	22.6	.....	.....	....	....	.....
348	No. 3	51,600	100,200	13.2	15.8	0.042	0.040	0.54	0.75	0.433
330	No. 3	47,000	88,350	18.0	20.6	0.051	0.049	0.36	0.85	0.371
3279	Class B	37,500	67,580	31.7	37.1	.....	.....	....	....	.....
3280	Class B	41,200	68,200	31.6	46.2	0.044	0.054	0.25	0.35	0.235

The castings, therefore, are taken out into the yard during this period and stored in rough wooden boxes according to heat number. Each box bears a sign giving the heat number of the castings in that particular lot. This temporary storage yard is shown in Fig. 9.

After the analyses are completed the castings must again be rehandled and heats of similar chemical composition assembled together for annealing. Before being loaded on the annealing-oven cars the castings are taken into the cleaning room, Fig. 10, where they are ground, chipped and then inspected both by the representatives of the manufacturer and the government. The government inspection is exceedingly minute, each casting being examined individually and stamped approved by the inspector if passed. Fig. 11 shows the government inspector at work examining green castings for gun caissons. Castings which are approved by the inspector are then piled up on the annealing oven cars, as shown in Fig. 12.

Some castings have to be welded to remove slight defects before annealing. The government inspector has authority to decide whether the casting should be reclaimed in this manner or scrapped. In some shops this has caused differences of opinion and losses of a serious nature. The experience of the Sivyer company along this line has been generally satisfactory.

An oil-fired annealing oven, some of the details of which are shown in Figs. 7 and 12, is employed. It is of the double-end, continuous, car type. Two cars are provided and while one



FIG. 10—EXTENSIVE CLEANING ROOM EQUIPMENT IS REQUIRED FOR PRODUCING ORDNANCE CASTINGS



FIG. 11—EACH CASTING IS EXAMINED AND STAMPED BY THE GOVERNMENT INSPECTOR BEFORE ANNEALING—THOUSANDS OF PIECES MUST BE HANDLED EVERY DAY



FIG. 12—AFTER THE CASTINGS ARE PASSED THEY ARE PILED ON THE ANNEALING-OVEN CAR FOR HEAT TREATMENT

load of castings is being treated the other car is unloaded and reloaded. The oven cars run on a depressed track so that loading platforms are level with the foundry floor.

The oven is of substantial construction with fire-brick walls and a heavy structural steel framework. In order to handle a greater output of annealed castings, the Sivyer company is now building a new annealing oven of a similar type.

Pyrometers Record Temperatures

Fig. 7 shows the pyrometer installation by means of which the heat is controlled. The details of the oil-burner also are shown in this illustration. The burners are of the air atomizing type and the flame enters the furnace at one end at the top. Suitable baffles and flues are provided inside the furnace to insure a uniform distribution of the heat.

The pyrometer installation was furnished by the Hoskins Mfg. Co., Detroit. The pyrometer is of the continuous recording type. An indicating instrument also is supplied and suitable switches are provided so that the temperature of the several thermo-couples inserted in various parts of the furnace may be determined. These couples are arranged on each side of the oven with one additional in the middle.

An effort is made to keep the maximum temperature during the anneal 30 degrees Fahr. above the critical point where the structure changes for the castings that are being annealed. This point, of course, varies with the chemical composition of the castings. This temperature refers to the actual temperature of the castings and not to the oven temperature. By experiment, the Sivyer company has learned that it is necessary to carry an oven temperature 50 degrees higher in order to be sure the castings are being annealed at exactly the correct figure. This difference between the temperature of the oven and that of the castings varies for different ovens and must be determined by experiment in each individual case.

The Sivyer company's experience also shows that it does not make much difference whether the castings are brought up to temperature slowly or rapidly. Every effort, however, is made to maintain the soaking temperature at a constant figure. The care taken in this direction is indicated clearly by Fig. 8, which is a reproduction of the recording pyrometer chart for a heat of No. 2 ordnance steel.

As this chart indicates, the oven was heated rapidly, in about two hours, up to a point slightly above 1500 degrees Fahr. This chart shows clearly the AC_3 and other critical points through which the castings passed; these points are indicated by sudden changes in the temperature due to recalescence, or to the sudden absorption of heat.

As the chart indicates, the heats are maintained at the soaking temperature for about four hours after which the oven is cooled very slowly. Approximately 10 hours are consumed in cooling the charge down to 700 degrees Fahr. The pyrometer record does not cover this entire period since it is not necessary to keep track of the temperature closely below 1000 degrees. The main idea at this stage of the work is simply to prevent the castings from cooling too rapidly. When the temperature has been brought down to 700 degrees, this point being indicated by a test made by the indicating pyrometer, the rate of cooling is accelerated.

As previously mentioned, each anneal must contain castings of approximately the same chemical composition, the carbon being the determining element in fixing the temperature of the critical point. The heats, therefore, are grouped for annealing according to chemical composition and about eight heats are annealed at one time. After the castings are annealed they are ready for the final cleaning and inspecting. The annealed test bars are machined and the required physical tests are made under the supervision of the government inspectors. A standard tensile testing machine is employed for this purpose. When the tests are passed, the castings from the corresponding heats are sand-blasted and tumbled, using the equipment shown in Fig. 10. The Sivyer company has found it necessary to install a large amount of cleaning equipment on account of the large number of small castings handled. An effort is made to clean the castings in as thorough a manner as possible in order that the finished product may have an attractive and workmanlike appearance.

After the castings are finally sand blasted and tumbled, they are again presented to the government inspectors for individual examination, stamping and approval, after which they are ready to be shipped to the machine shop.

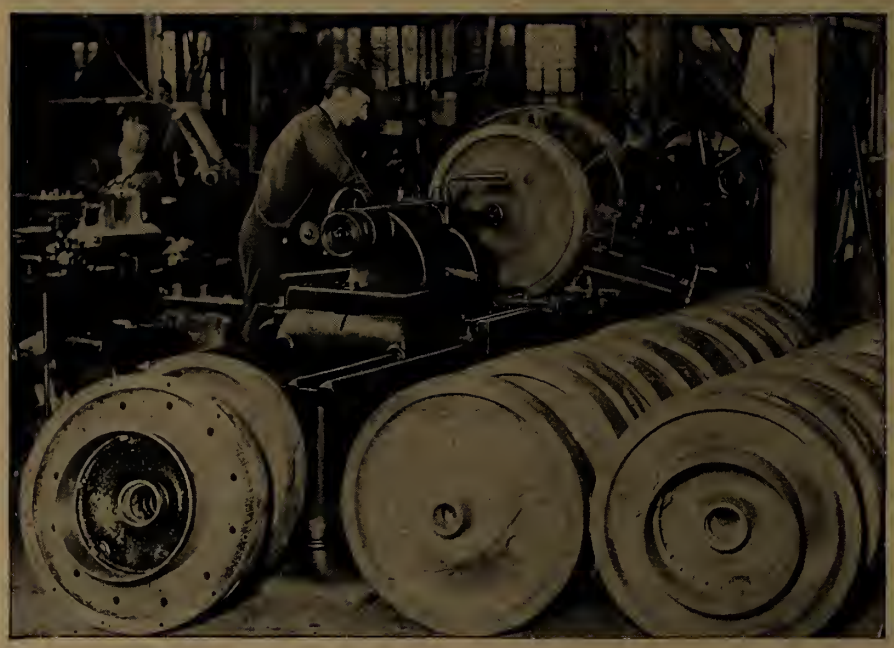
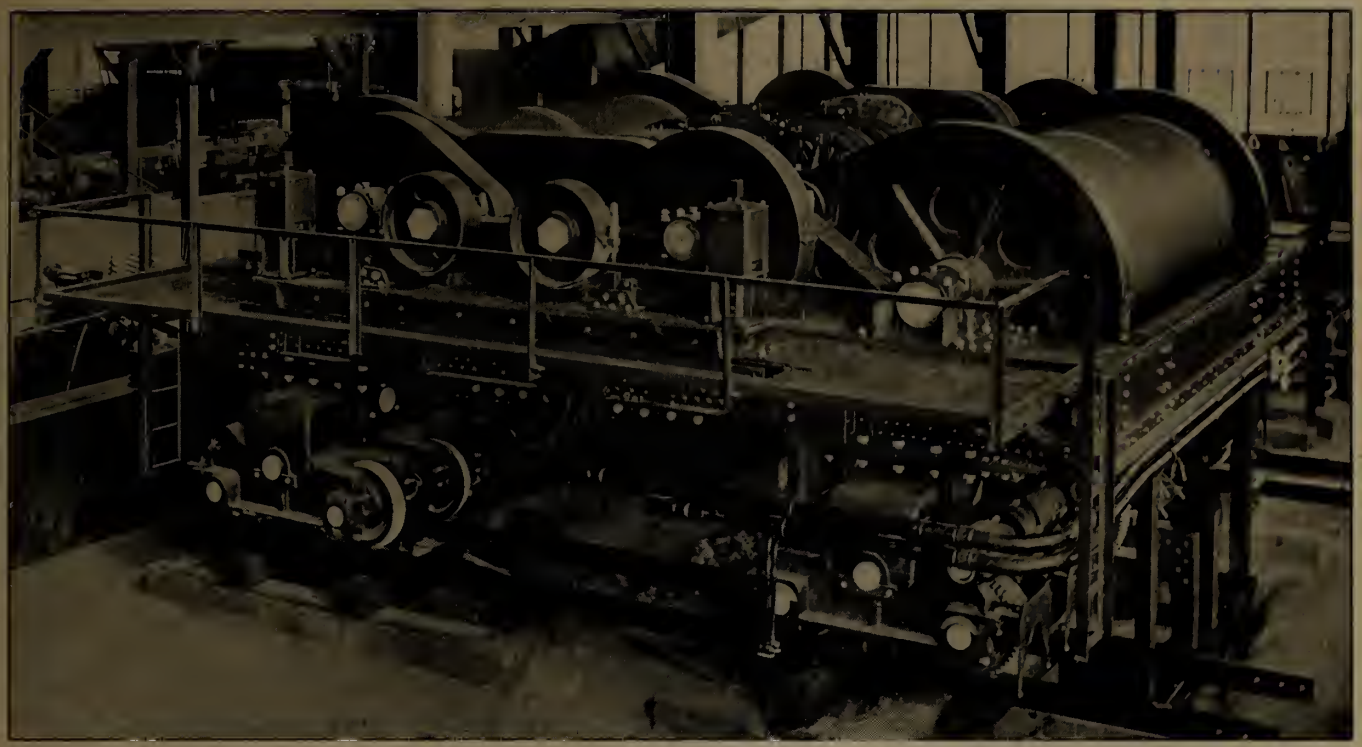


FIG. 13—ORDINARY LATHES ARE USED FOR MACHINING PLATE-TYPE MILITARY-TRUCK WHEELS

The facility with which plug switches may be used to make and break small currents at comparatively high voltages with safety, in addition to the feature of their small cost, has led to a widespread adoption of this accessory for use on both primary and secondary sides of constant current transformers in connection with arc and incandescent lighting. Recent improvements in the design of the switches have been announced by the General Electric Co., Schenectady, N. Y. The newer switches embody safety features which preclude the possibility of accidental contact with the switch when the plug is not in place. The single plug switch has been provided with greater insulation and the plug with a larger handle. The double plug switch follows the design of the single pull element in the use of tube insulation, porcelain and brass supports.

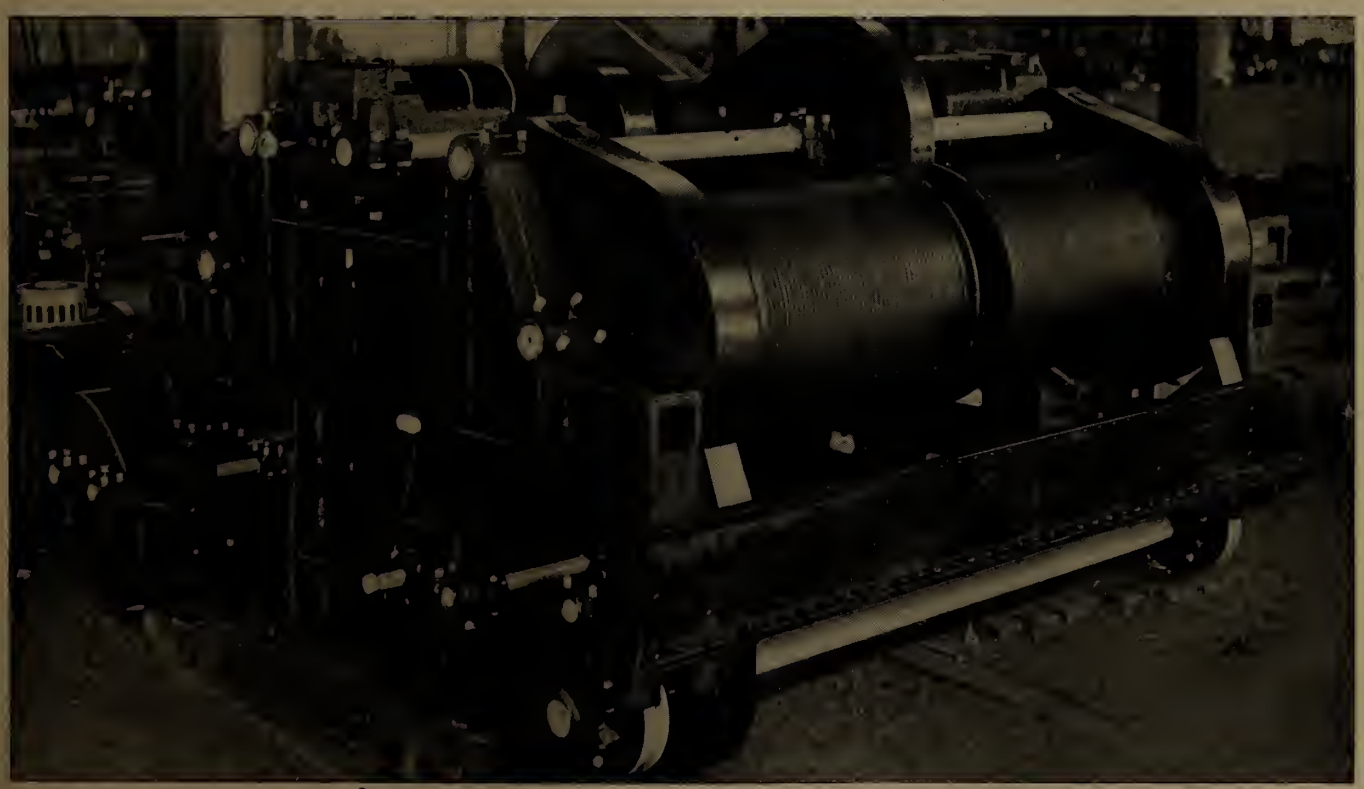


Main Trolley of 430-Ton Crane is of Double-drum Type

New Crane Sets World Record for Size

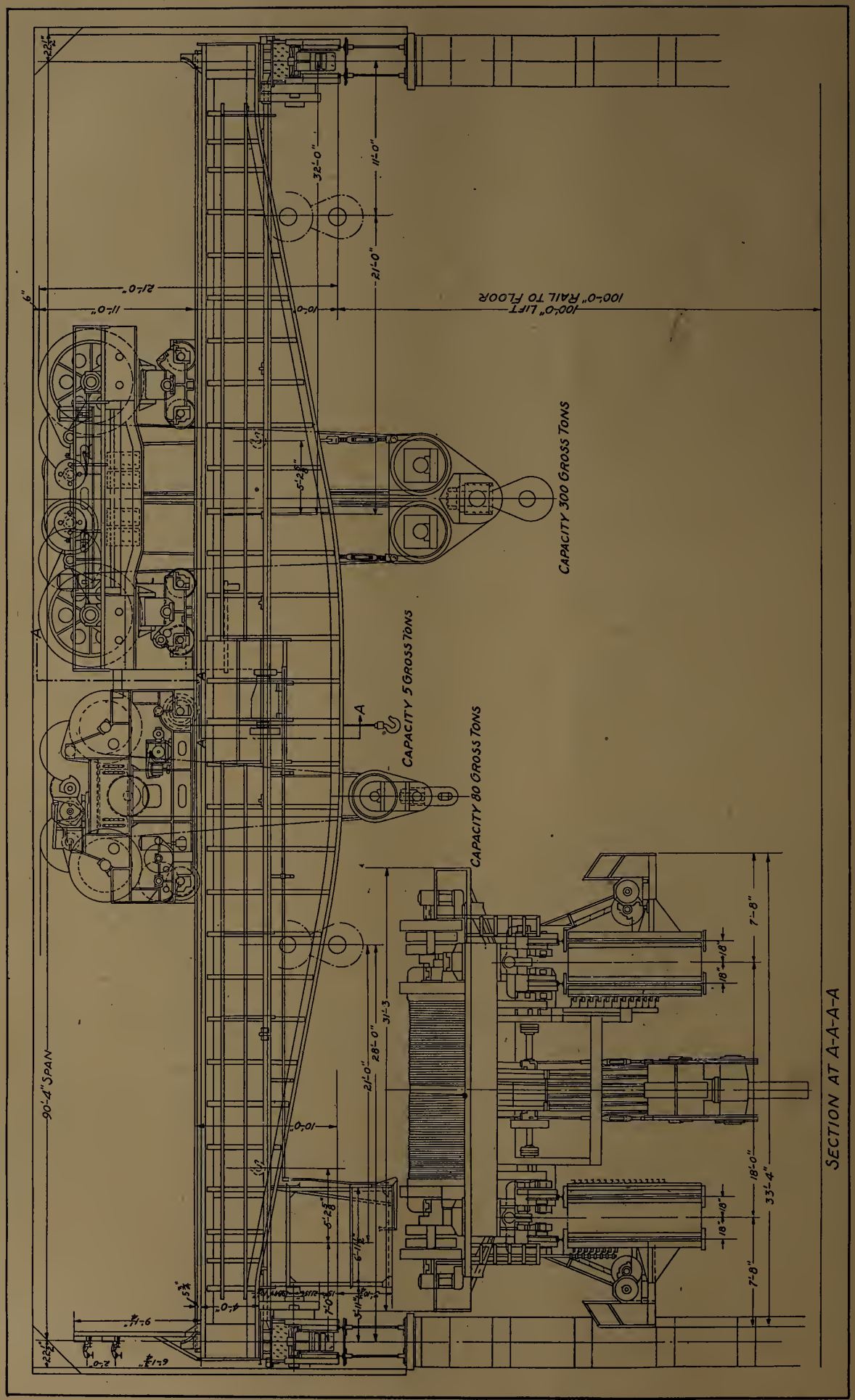
SIXTEEN loaded freight cars left the plant of the Alliance Machine Co., Alliance, O., a few days ago, carrying the component parts of the largest electric overhead traveling crane ever built. Despite its huge size and the unusual problems met in its design and construction, the crane was completed in nine months. It was built for use by the navy department.

The immensity of the loads to be carried and the wide variations in the hoisting and lowering speed necessitated this hoist crane being especially designed. The main hoist has a lifting capacity of 300 gross tons; the first auxiliary hoist, a capacity of 80



AUXILIARY TROLLEY OF BIG CRANE ON ERECTING FLOOR

General Arrangement of Huge Crane and End View of Main Trolley





Bridge of world's largest electric overhead traveling crane has span of 90 feet 4 inches and rests on 32 wheels. Main hoist block and hook shown below is 12 feet high and weighs 37 tons.

gross tons, and the second auxiliary hoist a capacity of 5 gross tons, giving a combined lifting capacity of 385 gross tons, or 431 net tons.

When installed, this huge crane will be in position above two 300-ton cranes. The latter are of the same general design with the exception that the main trolley will have only one drum. The latter cranes are now under construction in the Alliance plant.

The specification called for absolute accuracy of control, and to secure this, the main trolley has a single hoist with two drums and two lines of gearing. This design eliminates the possibility of any swinging movement being imparted to the load. The auxiliary trolley carries two hoists. The two trolleys are independent.

Control is Accurate

The main hoist is designed and arranged so that the operator can lower one-eighth of an inch at a time. Special control and braking apparatus was necessary to secure this accurate control of the load when lowering. Both dynamic and jackshaft braking are employed. The hoisting and lowering speed of the main hoist with full load is 12½ feet per minute. The hoisting apparatus is operated by two 200-horsepower motors. The use of two motors increases the safety of operation as in case of emergency one motor car take the full load for a short time. The motors are coupled to avoid any variations in the speed of hoisting or lowering.

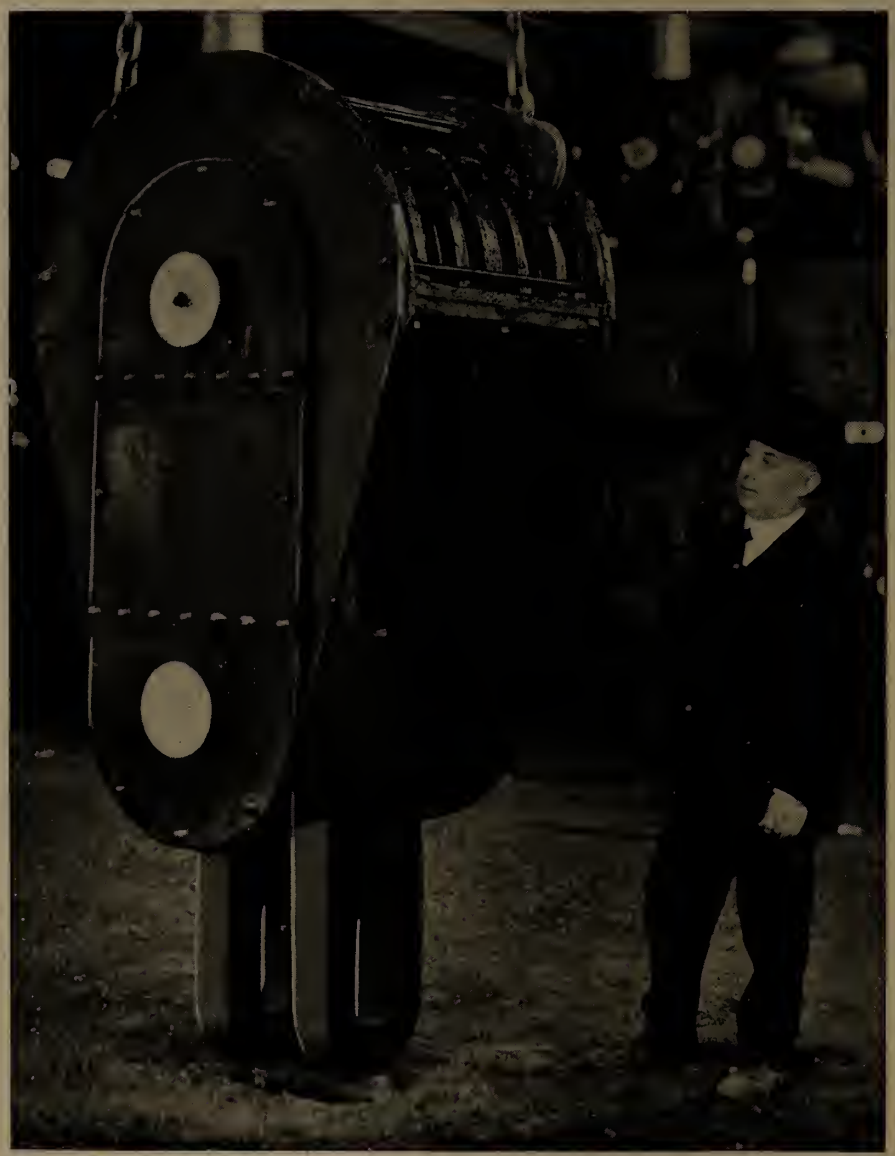
The auxiliary trolley is of special design to meet the different speeds specified for the auxiliary hoists. These speeds vary from 45 to 2 feet per minute. A specially designed mag-



netically operated clutch is provided. Special gearing, giving a ratio of 19 to 1, is employed.

The span of the crane is 90 feet 4 inches. The span of the main trolley is 18 feet. The crane runway is 120 feet above the ground level, the main hoist hook coming to the top of the runway rail. The height of the crane from the top of the rail to the top of the hoist is 21 feet. The maximum lift is 100 feet. The cross travel on the main trolley is secured through an 80-horsepower motor, giving a speed of 45 feet per minute. A 30-horsepower motor controls the cross travel on the auxiliary trolley, giving a speed of 40 feet per minute. Two 50-horsepower motors are installed on the bridge giving a speed of 50 feet per minute. These motors drive independently.

The trolley and bridge driving mechanisms also were especially designed to meet the conditions imposed by the unusual size of the crane. The trolley trucks are designed to oscillate in all directions. The trolleys are carried on four rails and through the use of special bearings, any oscillation is automatically taken care of so that the trolley is kept in alignment at all times. The bridge driving mechanism also is constructed in the same manner to take care of any deflection. The crane is carried on thirty-two 30-inch track wheels and is driven from all corners, two driving wheels functioning in each corner.



AUXILIARY HOOK BLOCK

The runway has been constructed especially to meet the requirements of the crane. Two independent rails are provided on each side.

The problem of securing a maximum lift to the top of the crane rails involved considerable study. This feature was desired in order to hold the height of the runway down to a minimum. The problem was met by raising the compensating trucks and girders both on the trolley and on the bridge.

The distance from the bottom of the main hoist hook to the top of the hook block is 12 feet. The auxiliary hook is 8 feet high. The main hoist hook weighs 37 tons and is constructed of special forgings. The motors and controller system for the crane were furnished by the General Electric Co., Schenectady, N. Y.

Writes History of Steel

"Fifty Years of Iron and Steel" is the title of an attractive new book for complimentary distribution, which has come from the pen of Joseph G. Butler Jr., with the Penton Press, Cleveland, as the publishers. In the main, the new volume is made of the address under a similar title, presented by Mr. Butler before the American Iron and Steel institute at Cincinnati last October. In this address Mr. Butler presented in a narrative form and sequence, the marvelous development of the iron and steel industry covered by the span of his identification with the industry which in fact represents a period of sixty years. The unique and impressive feature of this recital is the fact that many historical events are related from personal experience or reminiscence. In putting his address in book form, Mr. Butler has embellished his intimate knowledge of significant incidents, by the portraits of those who have been distinguished both in the past and present development of the American iron and steel industry and by interesting reproductions depicting the early conditions of the business. There has also been added a chapter on the early use of iron and steel and a supplement containing brief historical reference to the formation and organization of the United States Steel Corp.

Mr. Butler's book adds another valuable addition to the contemporaneous historical literature of the iron and steel industry. Its greatest charm lies in the fact that the author writes from personal knowledge and contact with events and personalities which rank high in the development of the industry during the past half century. In putting his own experience and reminiscences in permantnt form, he has rendered a real service to the entire iron and steel industry.

The Brier Hill Steel Co.'s third blast furnace at Youngstown, O., is being completed as rapidly as possible and it is expected the units will be in operation in four months.

Must Maintain War Production

Labor Controversies Mark Black Spot in Nation's History Says President Vandervoort of Metal Trades Association—Unselfish Co-operation of Employer and Employed Essential—Taft Pleads for Hard-Hitting War Policy

SOON after the United States entered the war, a year ago, the National Metal Trades association held its first war convention. Then it was the association unanimously pledged its support to the government, adopting a resolution to place the plants of its members at the government's disposal and expressing a willingness to allow pending labor questions to lapse for adjustment until after the war. Last week, April 24 and 25, the association held its twentieth annual convention, the second war meeting, at the Hotel Astor, New York. In the year which had passed the members had been enabled to realize more clearly the important part the metal trades are being called upon to take in the conduct of the war, and had shared in the sacrifices demanded by war. There was a sterner note in this second meeting, an atmosphere of determination to see the war through to the bitter end, no matter what the cost. Labor conditions were considered, as usual, but this time with a view to securing the highest possible efficiency in the production of essential materials for the government. The association earnestly endorsed the policy laid down by the council of national defense "that employers and employes in private industry should not attempt to take advantage of abnormal conditions existing to change the standard they were unable to change during normal conditions."

Ex-President William H. Taft, at the annual banquet, comprehensively expressed the feeling of the convention when he cried, "Let's get it into our minds that three years is the time we must count for the rest of this war. Isn't it worth setting aside three years to make the world a place worth living in? We must have an army of 5,000,000 men, with the ships to transport them and the munitions to supply them. If this western drive has taught us anything, it has taught us that man power is going to win this war and we've got the men, if we only apply them. But we've got to do that. Thank God, though, now, we are beginning to get men into control who know how to get the things that must be accomplished, done. Stettinius, Goethals, Schwab (here the applause was thunderous), those are the men in whom our hope rests. But we ought not to lose sight of the great end. Indeed, I think we ought to have a creed which would recite, all of us, every time we meet in patriotic gatherings." And in slow, measured, but intensely fervent tones, ex-President Taft repeated the creed which he had drawn up for the guidance of the nation in this hour.

Inspired by the determination to win the war, the convention was a clearing house for many practical suggestions having a bearing upon war industry. The experience of manufacturers both in England and this country with women labor was studied. The use of various socialistic tendencies, and the spread of seditious theories as fostered by German propaganda were discussed. Helpful hints on plant protection were given by an authority.

President W. H. Vandervoort, in his annual address, emphasized that the lives and fortunes of those who are remaining at home during the war should be dedicated to the purpose of furnishing supplies which are necessary to the boys "over there" and said that in his opinion no organization could be of greater assistance to the country in this critical hour than the National Metal Trades association. After reviewing the setting in motion of the great machinery of war organization—draft, taxes, loans, red cross and so on—Mr. Vandervoort said:

"There remains to be cleared away the one great menace to our ultimate and complete success—labor controversies. That industry should have been held back during this first year of war by more than 3500 strikes, mostly in plants on war essentials, is a black spot on our nation's history. Had labor accepted the policy of the council of national defense as did the employers, this country would have been spared much of the industrial strife that has held back seriously the production so necessary to our winning of this war."

War Labor Policy Outlined

Here Mr. Vandervoort outlined the steps taken by Secretary of Labor Wilson, at the request of the President, to establish a common ground on which both employer and employe might stand for the balance of the war. The National Industrial Conference Board, representing employers. and the American Federation of Labor, representing labor, each nominated five representatives to constitute a commission for the formation of principles and policies to govern in the adjustment of all labor difficulties for the duration of the war. Each group selected a sixth member, the employers choosing William H. Taft and the employes Frank P. Walsh. "For nearly a month this commission struggled with the problem in a sincere effort to bring about that patriotic co-operation so necessary if we are to succeed in this great conflict," he said. "They fully realized the necessity for industrial peace. Both sides found it necessary to modify their opinions in order that the employers and employes might stand shoulder to shoulder in this fight for a common cause.

"This agreement, while not conceding to labor all its cherished industrial convictions, nevertheless preserves to labor all it has accomplished. It condemns the strike and the lockout as an un-American weapon in this, our national hour of peril. It affirms the principle

of the open shop. It preserves the closed union shop where it already exists and by the same token, the closed nonunion ship. It recognizes the right of men to organize themselves for lawful purposes. It prohibits coercive measures and all limitations on production. It recognizes the basic 8-hour day only as required by existing laws and not in any sense as an economic measure. It declares for the maintenance of existing safeguards, the rights of women in industry and the right of all to receive a living wage. The commission has provided for the necessary machinery for the administration of these principles in settlement of controversies. While this labor treaty can hardly be expected to eliminate strikes entirely, it is the belief that, backed by a strong public opinion, and the moral influences of the better elements among employers and employes, it will become effective.

"Thus briefly we have noted the conditions which make for industrial peace at this time, so necessary to the safety of the nation. You ask what should the employer and the employe do to win this war. There must be co-operation, real, unselfish co-operation, an appreciation of what our boys at the front are enduring and what the interruption of the flow of supplies and equipment, the products of our factories means to them. If it were possible, the first thing I would suggest would be that all of us forget that we are either employers or employes. The employers of this country are not at war as such, neither are the employes. Our country is at war and the primary interest of each of us in that war is in our capacity as citizens of the United States."

8-Hour Day Stationary

That the 8-hour day movement has not progressed in the metal trades during the past year was indicated by the report of Secretary Homer D. Sayre. Of those members reporting to the secretary, only 5.6 per cent are operating on a 48-hour weekly basis, while 94 per cent are working 50 hours a week or more, and 51.3 per cent are operating 54 hours a week or more.

The formation, growth and objects of the National Industrial Conference Board were described by Albert Greene Duncan, past president of the National Association of Cotton Manufacturers. In June, 1914, a group of 22 manufacturers and bankers held an informal meeting, at which the idea of such a board was born. The idea was worked upon for two years before the board was finally created in its present form. It consists of two delegates from each of 19 national manufacturing associations and is a co-operative board, acting as a clearing house for information and a forum for discussion of important topics. It is not a controversial body, but is organized with a definite set of principles, first to seek the truth underlying the important labor problems and second to publish the facts found in such investigation. One of its first duties was to answer the call of the council of national defense for a report on the relations of the government, labor and capital.

Makes a Stirring Address

"New Lamps for Old" was the rather enigmatic title of an inspiring address by James A. Emery, counsel for the council of national defense. This title was drawn from the incident in the story of Alladin's lamp, where the magician tempted Alladin's queen into parting with the old lamp by offering a nice shiny new one in exchange. In the same way, Mr. Emery pointed out, the soap-box orators and others of their ilk, the American Bolsheviki, are trying to persuade the American public to surrender the institutions, ideals and principles which have grown up under our democratic form of government. This government, he said, has existed for 140 years, a period longer than the present forms of government in England, Germany, France, or any other country in the world. The people, he pointed out, are benefiting from hygenic measures to protect their bodies from germs of disease. In the same way, he said, why not protect their bodies from the vices of false thought?

"You cannot cure men's acts unless you cure their thoughts," he added. "If, through apathy, indifference or cowardice, manufacturers fail to use their sphere of influence, in the plant, in the office, in the home and socially, to drive out false thoughts, they are not doing their duty as responsible citizens."

He said that German propoganda was more dangerous than German artillery and more accurate than German riflemen, that German propoganda had broken down the resistance of two great nations, Russia and Italy, and that we must guard against such propoganda in this country.

The soap box orator, he said, touches his auditor in two ways. In the first place, human nature is such that one does not mind listening to an appeal to divide someone else's property with him. In the second place, the soap box socialist explains to his auditors, who are generally failures themselves, that their failure is due to the fact that some one else kept them down. This describing of their failure in terms of someone else's success, appeals to the vanity of the failures, forming fertile ground for the American Bolsheviki. Every socialist is a missionary, Mr. Emery continued, not only believing his own creed, but teaching it to others. In the same way, the future of American institutions lies in the hands of true Americans, who must maintain our traditions and keep burning the altar lamps of the public mind. Citizens, especially citizens with property, must retain a sense of trusteeship and guardianship. They must not stand trying to push back the currents of reform, but must lead such current in the right direction. The sending of 3,00,000 or 5,000,000 men to the front will be a tremendous influence, Mr. Emery said, in the upholding of our institutions and ideals after the war. Those men who are defending with their lives these very ideals will not be quick to sacrifice the old lamps for the new. They will want some voice in saying what kind of world they will live in after the war and will be an important factor in determining the course of social reconstruction. And the friends and relatives of those men who are at the front will feel more and more intensely as time goes on, against the efforts of those who are putting obstacles before the government in its war efforts.

"Woe unto the men or the influence that stands in the way of supplying those boys in France with the munitions and materials they need," he concluded.

Discusses Plant Protection

Edwin Leigh, of the federal military intelligence bureau, gave the convention one of its most interesting half hours, in a discussion of "plant protection," a subject of vital importance in these times. Mr. Leigh said that the bureau is maintaining offices in 18 industrial centers, to advise and aid private manufacturers to the best possible protection

Taft Writes Creed for Good Americans

I believe that the cause of the United States and the allies is a just cause and makes for righteousness.

I believe the kaiser and the Potsdam gang cannot make a treaty we have any right to approve.

I believe we do not discharge our duty to ourselves and the world till we have fought this war to a victory over the kaiser and the Potsdam gang and the German government as it is at present constituted.

I believe all our energies during the next three years should be devoted to raising an army of 5,000,000 *men and the ships necessary to transport them to France, and the supplies necessary to them to fight this war.*

I believe we are going to win this war.

of their works. He said that, although at the beginning of the war many manufacturers had requested military protection, the military authorities were opposed to this policy and urged instead that each plant arrange its own protection. Mr. Leigh explained that the selection of an efficient chief of protection, having under him a corps of good alert private watchmen. These men, he said, are of really more benefit to a plant than the military, for they become accustomed to their surroundings and are quick to notice anything unusual, whereas soldiers are continually being transferred. Mr. Leigh laid special emphasis on the necessity for good lighting and fire prevention, mentioning that it has been found that 70 per cent of industrial fires occur between the hours of 6 and 9 p. m., or approximately the time employes leave the plants. He said this was due to leaving burning torches and unextinguished fires, or throwing away matches as they "light up," leaving the works. Mr. Leigh also gave some interesting pointers on "counter-espionage" work, which were received by the members with much interest. He went into some detail in the description of seditious and enemy activities and said that the services of the federal bureau were at the disposal of manufacturers, without charge. He emphatically discouraged the policy of some manufacturers in placing the protection of their plants in the hands of private detective agencies. He intimated that in some cases private agencies are "planting" bombs and stirring up hysteria as a means of promoting their own business.

William H. Barr, president of the National Founders' association, discussed the "present socialistic trend." Reviewing the present labor situation, he said that industry has seen wages doubled, trebled and even quadrupled, while efficiency has decreased and greater arrogance than ever is being shown by organized labor. He traced the transition of labor from domestic labor in the middle ages to the formation of guilds, to join which the worker had served an apprenticeship of seven years. He pointed out that the final downfall of the guilds was due to the fact that they failed to live up to their promises and their principles as originally outlined, and said that in the same way, modern organized labor, through the restrictions of trade unions, is undermining the government. A continuation of such policy, he said, will result in the elimination of the trades unions. There has been a distinct drift since the war began toward socialism, he said, not only on the part of soap box orators but of theorists, who have made fortunes and now talk socialism, and by public men who aim at notoriety. He said the professors of some universities have socialistic leanings and that hardly a state capital in the country that does not have some professors in charge of important departments, while at Washington, "you stumble over them."

Recounts England's Labor Problems

"Liberal England's Message to America" was delivered to the convention by S. K. Ratcliffe, lecturer of London university. He went into detail into England's experience with labor during the war, remarking that England's problems were different from America's, for English labor is a more coherent force, comprised of one race and speaking one language, while American labor is comprised of many races with many different ideals. In England, he said, it was easier for the trade union leaders



JOHN W. O'LEARY
Elected President of National Metal Trades Association at Its Annual Meeting

to swing their members, than in this country. He told of how British labor had surrendered rules and benefits secured after more than a half century of struggle, receiving in return the government's pledge of restoration of prewar conditions after the war. He suggested, however, that this pledge may be difficult of keeping, for the war is having industrial by-products which are changing the outlook for the future almost monthly. He said that after the war the policy of "restricted output" by labor will be impossible; that both employers and labor will see the necessity for making production an efficient and product as large and good as possible, for there will be sharp competition in the world's markets.

A paper by W. A. Viall, of the Brown & Sharpe Mfg. Co. was read. This company represents the large class of employer that had not employed women in manufacturing prior to the war, but under the pressure of present conditions felt itself compelled to resort to measures that would help its output. It possessed a plant built and organized for men only and had to rearrange its shops and adapt its organization to employ women. During 10 months the company successfully placed 800 women at productive work. Mr. Viall continued:

"Much could be said in detail as to the way that they are successfully working on various kinds of work, but I shall enumerate them only as follows: Inspection; grinding, cylindrical as well as tool; lathes; screw machines, hand and automatic; small planing machines; hand lathes, doing polishing and hand tooling work; gear cutting machines; blue print room; stamping; filing; assembling of small tool parts and general bench work. All of these classes are well within the physical power and ability of the average woman."

H. E. Miles, chairman of the section on industrial training for the war emergency of the committee on welfare work, advisory commission, war industries board, discussed the question, "An abundance of efficient well-paid labor—how to get it?" In this connection he stated that it was the duty of employers in this war of machinery not only to make machines, but to make machinists to make those machines. He described, with lantern slides, the employment of women in England's war industries to the present number of 1,250,000, in all classes of work.

The association adopted a resolution to be sent to the President, Secretary McAdoo, the respective committees of the senate and house and to the congress of the United States stating that whereas the financing of industries doing war work must be protected, that measures be taken toward the payment of income and excess profits taxes in installments, instead of one payment. Another resolution adopted was that the association pledge its official support to the national war labor board as created by the President.

The convention concluded with the election of officers. J. W. O'Leary, of the Arthur J. W. O'Leary Co., Chicago, was chosen president, succeeding W. H. Vandervoort. Other retiring officers were re-elected, as follows: First vice president, Murray Shipley, the Trailmobile Co., Cincinnati; second vice president, H. W. Hoyt, Great Lakes Engineering Works, Detroit; and treasurer, F. C. Caldwell, H. W. Caldwell & Son Co., Chicago.

About 325 delegates were registered at the convention. The association's membership now is about 720.

Call On Yards For Huge Tonnage

Goethals Understood to Have Told Schwab Overseas Military Movements Require 10,000,000 Tons of Shipping Delivered in 1919—New Director General of Ship Program Against Changes in Construction Plans

WASHINGTON, April 30.—Charles M. Schwab had hardly been in office a week as director general of the Emergency Fleet corporation before Maj. Gen. George W. Goethals, one of his predecessors and now director of traffic, supplies and storage for the army, laid before him and other officials of the corporation and the shipping board the war department's plans for transporting men and munitions to Europe at a speed which will require 10,000,000 tons of shipping delivered in 1919. Of this huge tonnage, it is believed 8,000,000 tons will be of standardized steel construction, requiring nearly 3,000,000 tons of plates and structural shapes.

Official confirmation of this tonnage is lacking, but estimates based on statements by Edward N. Hurley, chairman of the shipping board, and the efforts of the war department being made to rush as many men as possible to the front gives grounds for the belief that the figure is approximately correct. As a means of speeding production, Director General Schwab has declared that as far as practicable changes in present ship plans would be abandoned and that every available facility for rushing construction of vessels would be utilized. This news is expected to be heralded with great acclaim by shipbuilders and fabricators who before, have had plans and specifications shifted on them without notice.

While General Goethals was telling the shipbuilding heads what his department needs and expects, especially for transports and refrigerator ships, the Fleet corporation wasted no time in awarding contracts for 22 new steel freighters of a total tonnage of 204,600 tons. These are to be of the Isherwood type, that being built by the United States Steel Corp.'s shipbuilding subsidiary. Twelve of these are to be of 9600 tons each and the other ten 9400 tons, the Carolina Shipbuilding Co., Wilminton, S. C., and the Union Construction Co., San Francisco, participating in the awards. The Whitney Bros. Co., Superior, Wis., was given contracts for four 150-foot sea-going tugs and the Wilson Shipbuilding Co., Astoria, Oreg., orders for three 3500-ton wooden ships. Announcement was also made that the Liberty Shipbuilding Co. had begun construction of the government's first concrete shipbuilding plant, at Wilmington, N. C., to be completed in six weeks for construction of at least eight concrete ships, tankers, of from 3500 to 7000 tons each.

Many New Awards Made

Mr. Schwab has begun a tour of the leading shipyards of the east and so far has been favorably impressed with the progress being made both in the completion of yards and in the construction of ships. Mr. Schwab realizes what the general public has overlooked, that the vastness of the task confronting the Fleet corporation, and himself now, has to have a beginning and that the building of the ways must come before vessels can be constructed. However, the reports which have been coming in of "new record" launchings from various shipyards, particularly along the Pacific coast, and the selection of Mr. Schwab to see that even newer records are established, are believed to be appeasing the public of the long delay in "getting action."

The actual figures contemplated in the 1919 program were stated by P. A. S. Franklin, chairman of the ship control committee, at a dinner held here at which General Goethals and shipping board and flee corporation officials were present. The guests included Chairman Hurley, Director General Schwab, Charles Piez, vice chairman; E. F. Carry, director of operations; Dean Gay, director of statistics and planning; Mr. Franklin, John A. Donald, Bainbridge Colby and Charles Page, members of the shipping board; Sir Connaught Guthrie, England's representative on the ship control committee; C. D. Mallory, member of the committee; Charles Day, of the shipping board; General Goethals and his aide, Colonel Hines.

The shipping board's official announcement of the conference said it was "the most important conference since the shipping board was organized"; that "everyone agreed that speed in construction is now the essential thing", and that "plans were made for speeding up the construction of refrigerator ships so that our armies on the other side can be supplied with fresh meats". General Goethals strongly urged speed in delivering this type of vessel as well as army transports as rapidly as possible.

Ryan Expected to Speed Up Air Program

WASHINGTON, April 30.—Aircraft production is expected to go forward with renewed vigor, now that John D. Ryan has been made director of that branch of the army's work. While it is admitted that Mr. Ryan knows little of airplane manufacture, it is pointed out that his administrative ability will force this part of the war program to "deliver the goods", as Charles M. Schwab is expected to do in regards to ships. Mr. Ryan's appointment is another answer of the government to the universal demand that business men be given control of the government's war machine.

It is too early for Mr. Ryan or anyone else to say what he is going to do in putting out the planes so badly needed by the American forces. He supplants not only the signal corps, which had the work directly in charge, but also succeeds the aircraft production board of which Howard Coffin was chairman. No blame attaches itself upon Mr. Coffin personally in the failure of the aircraft program to meet expectations. He, like many others, has been a victim of red tape, his friends say, but like General Goethals and others who have been removed from one job only to be given another, will find his stride in some other field of government service.

Mr. Ryan, like Mr. Schwab, is not to be held back by red tape. The military movements of the work, controlled by General Squiers, chief of the signal corps, now have been removed and Mr. Ryan is free to employ the business experience he has gained as president of the Anaconda Copper Mining Co. and as director

of the American International Corp., the United Metals Selling Co., the Chicago, Milwaukee & St. Paul railroads and some half dozen other business concerns. His lack of intimate knowledge of aircraft manufacturing is believed to be more than offset in other ways.

Under the existing laws, General Squiers still is the legal head of the aircraft production program, but will not interfere with Mr. Ryan's directions and will devote his time only to strictly signal corps duties. W. C. Potter, who has been chief of the equipment division of the corps, continues in that capacity and Brig. Gen. William L. Kenly, an artillery officer fresh from France where artillery and airplanes are closely associated, has been named chief of the division of military aeronautics, created under the reorganization. He will manage operation of the aircraft produced by Mr. Ryan and equipped by Mr. Potter.

This reorganization meets the recommendations of the senate military affairs committee and is expected to receive legal changes which will make the regime of Mr. Ryan absolute. The Overman bill may cause this.

To Curtail Ferro Imports

WASHINGTON, April 30.—The second list of restricted imports proclaimed by the war trade board in conjunction with arrangements with the shipping and other war functioning boards of the United States is expected to be the means of conserving another 157,000 tons of ships annually, increasing the conserved import tonnage to 1,507,000, of which arrangements were made some weeks ago for saving 1,350,000 tons. The new restrictions become effective May 13 allowing imports, under license, of molybdenum and ferromolybdenum from Canada and Mexico; ferromanganese and spiegeleisen, overland from Canada and Mexico or by lake from Canada; and lead and magnesite under like provisions.

Ferromanganese imports last year amounted to 45,381 tons, a decline of 45,547 tons from 1916, and this year, with the government's agitation for utilization of spiegeleisen and home produced ores, the imported tonnage likely would have been less without restriction being placed. Exportation of ferromanganese, which amounted to only 5468 tons in the last half of 1917, is expected to reflect the oncoming curtailment by decreasing or disappearing entirely.

On last year's basis of 145,000,000 pounds of lead imported, only 19,000,000 pounds will be curtailed. In 1917, Mexico supplied the United States with 115,000,000 pounds of lead ore and bullion. Canada furnished nearly 12,000,000 pounds. Neither of these tonnages likely will be affected by the restrictions, but the 19,000,000 pounds received from Chile and other countries will materially be reduced. Magnesite imports last year reached nearly 8,000,000 pounds, as against 18,500,000 in 1916.

In order to still further increase the vessel tonnage available to pressing military needs, a third list of import restrictions is in process of formation. Those interested in the lines of trade which it is proposed to limit now are being called into consultation.

May Ship New England Coke

WASHINGTON, April 30.—The plan of the fuel administration to make New England a coke zone to supply its own needs now is said to be altered to permit of coke shipments into New England, but still to exclude outgoing shipments. This is believed to be made in an effort to force a reduction in the price now being paid for by-product coke in these states. This price is $13.45, f.o.b., Everett, Mass., the location of the New England Gas & Coke Co.'s plant, the only coke producer in that section of the country. It has been demonstrated to the administration that barge hauls by way of Long Island sound are not practicable. No official orders have yet been placed in this or the McKinney Steel Co. coke zone proposals. Other zoning arrangements will be made.

Further changes in coke prices were announced by the fuel administration last week, effective as of 7 o'clock a. m., April 26. The new prices are:

Coke made at Coalmont, Tenn., $7.25, furnace, and $8.25, 72-hour selected foundry; coke from coal in the Pratt seam, Ala., $8, furnace, and $8.75, 72-hour selected foundry; coke made in Marion and Harrison counties, W. Va., $6.25 and $7.25; in Barbour and Randolph counties, W. Va., $6.75 and $7.75; and coke made in New Mexico, $8.50 and $9.50.

Export Valuation in March Increases Heavily

Washington, April 30.—The country's export business in March showed a decided improvement over the previous months, according to figures announced by the bureau of foreign and domestic commerce. They increased nearly $120,000,000 over February, reaching $531,000,000, and sending the nine months' total up to $4,394,000,000, which is $243,000,000 less than in the same period last year. Imports also increased, gaining $34,000,000 over the February total of $208,000,000. The nine months' import total, however, in larger than that of a year ago, amounting to $2,084,000,000, an increase of more than $225,000,000. Formerly it was customary to blame the falling off in foreign trade to action of the war trade board on one hand and the submarines on the other, but in March, evidently, some other explanation is needed.

Capital Odds and Ends

WASHINGTON, April 30.—The interstate commerce commission last week made two rulings concerning industrial railroads. One was that placing of cars by the Chesapeake & Ohio railroad within the plant enclosure of the Virginia Portland Cement Co., Fordwick, Va., constitutes delivery under the line-haul rate, and that any allowance to the company's own line, the Virginia Portland railroad, for spotting cars after the first placement is unlawful. The other was that the Central Railroad Co. of Indianapolis, providing only trackage for 20 industrial plants, cannot be made a party to the second industrial railways case. This latter line originally was built by the Indianapolis Rolling Mill Co. and later was owned by the Premier Steel Co.

* * *

Pig iron production in Sweden in 1917 reached 837,184 tons, 88,088 more than in 1916. Iron ore exports aggregated 5,702,808 tons, a gain of 135,184 over the year before. There was a decrease of 77,366 tons of various kinds of iron exported, the total being 495,701 tons, and imports of iron fell to 102,006 tons from 303,885 in 1916.

* * *

The war industries board has passed resolutions to discourage construction of public buildings and all new undertakings not essential to or not contributing directly or indirectly to the winning of the war. Such activities need labor, material and capital urgently needed for war work. The board announces that it will withhold priority assistance from such projects.

* * *

The David Kaufman & Sons Co., Elizabethport, N. J., has complained against the Pennsylvania, the Central

Railroad of New Jersey and the Huntington & Broad Top Mountain Railroad & Coal Co. that the rates on mill cinder and roll scale from Elizabethport to Earlston and Saxon, Pa., are unjust, and asks that the interstate commerce commission lower the maximum rates.

* * *

Business men and manufacturers are being appealed to by the bureau of foreign and domestic commerce for suggestions which may be noted in the bureau's proposed reclassification of import and export statistics. Export statistics are compiled from export declarations and import figures are drawn up in accord with tariff classifications. These points should be followed in making suggestions, the bureau says.

* * *

The Nashville Bridge Co. has filed a petition with the interstate commerce commission for reparation of $33.54 as overcharge on a shipment of 21,600 pounds of bridge steel from Nashville, Tenn., to the W. T. Young Bridge Co., McCarley, Miss. The railroads charged at a rate of 35.5 cents per 100 pounds and the Nashville company claims the charges should have been based on a 22-cent rate.

* * *

The Baltimore & Ohio railroad seeks cancellation of the rate of 29½ cents on tin and terne plate from Elwood City, Pa., to points on the Maine Central railroad, also cancellation of rates on iron and steel rails from Gary, Ind., to Hamilton, O., and on iron and steel articles from Hicksville, Hamilton, Willard, Deshler, North Baltimore, O., Albion, Gary, Sycamore, Wellsboro and certain points in Indiana, to points in Illinois, Michigan, Ohio and Ontario.

* * *

The fuel administration has exempted the refractory brick industry from an order curtailing brick and tile companies in the use of coal and other fuel. Fifty per cent restrictions have been placed upon manufacturers of face, common and paving brick, roofing, floor and wall tile, terra cotta and sanitary ware; 25 per cent on sewer pipe and drain and hollow tile, and 15 per cent on stoneware, except those plants producing crucibles for chemicals, etc.

* * *

The department of agriculture has been notified by the implement manufacturers of the northwest that there is vital necessity of farmers ordering their farm equipment at once. The manufacturers say there is plenty of machinery but shipments and supplies cannot be handled promptly for rush orders because of transportation troubles, and that shipment now to transfer houses would be inexpedient without some knowledge of the farmers' requirements.

* * *

Ill will may be created in Chile against firms in the United States because of their failure to notify merchants of their inability to deliver goods or of delays in shipment, John R. Bradley, consul at Punta Arenas warns. He suggests that all exporters adopt a rule to acknowledge receipt of orders at the same time giving information as to the part of the order which may be shipped at once, the part which may be delayed and estimated time of delay, and the part which cannot be delivered at all.

* * *

A resolution asking that the federal trade commission be authorized to investigate the production of farm fertilizers, tools, implements, utensils, machinery and equipment, has been introduced in congress by Senator Hoke Smith. The investigation would be as to the number of plants in the United States, their capacity, available supply of raw materials, increased cost of production, prices and profits now as compared with the three years preceding the declaration of war, and whether or not they are running to full capacity.

Urge Gear Standardization

American Gear Manufacturers in Convention Discuss the Necessity of Standard Methods

STANDARDIZATION in the gear manufacturing industry was emphasized at the second annual convention of the American Gear Manufacturers' association, held recently at White Sulphur Springs, W. Va. Gear manufacturers were urged to fall in line with other industries, which have adopted standards that are proving not only of value to themselves, but to others, but to adopt standards of their own.

B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, R. I., who is chairman of the general standardization committee of the association, presented a report on the work which is being done by the committee.

"There is in the hands of our members enough data of a scientfice nature, which if brought together and analyzed would form the nucleus of a respectable library of standards," the report reads. "One of our first duties should be to collect these standards and data, and from them make revisions of the standards to suit all conditions and develop others."

The report further stated that private standards of merit will lend themselves to general adoption easier than some new ones, and therefore in starting out in this work, those standards already in existence should be accepted.

During the past few years bevel gears have been highly developed due to a great advance in machinery for producing them and formulas for calculating the dimensions of the gears. Many such gears are now being cut with rotary cutters, and the committee impressed the fact that some though must be given to the proper cutters to be used.

Any standard adopted for the production of spur gears must be one that in no way conflicts with the present method of producing them, as this gear is the one most used and has received the most consideration.

Worm gears are now being used to transmit greater powers than was thought possible previously, but even now the design is not based upon complete analysis. A standard specification sheet, where all points will be considered, was recommended.

Standardization was urged for herringbone gears which have recently reached their greatest development and which to perform their work properly must be made extremely well; for sprockets, and for gears made of materials other than metal.

The best and most duable gears are those which are properly heat-treated or hardened, and if standard methods can be developed for handling the various steels, every manufacturer will benefit.

The report ended with a request that members send in suggestions to the various committees, as the standardization work, to be a success, depended upon the co-operation of all.

Routine matters were disposed of early at the convention. At the second session, officers were elected. F. W. Sinram, Cleveland, vice president of the Van Dorn & Dutton Co., was re-elected president. H. E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., was elected vice president, and Frank D. Hamlin, Earle Gear & Machine Co., Philadelphia, was elected secretary-treasurer.

On the last day of the convention, J. H. Dunn, R. D. Nuttall Co., Pittsburgh, presented a paper on "Uniform Cost Accounting". F. G. Hoffman and John Edgar of the Barber Coleman Co., Rockford, Ill., presented a paper on "Hobbs and Hobbing Machines". "Hardening and Heat-Treating of Gears", by C. R. Poole, Frost Gear & Forge Co., Jackson, Mich., is given at length on page 1110 of this issue.

The meeting as a whole was a most successful one. The work accomplished, centered especially about standardization which was given an impetus that promises to be of great benefit to the industry. The association will meet again in September, the time and place to be selected later by the executive committee.

Obituaries

CHARLES J. DONAHUE aged 47, who for seven years was assistant vice president in charge of sales of the American Locomotive Co., New York, died recently at his home in New York, after a long iliness. After serving the Lake Shore & Michigan Southern railroad in various capacities, he was appointed secretary to W. H. Marshall, president of the American Locomotive Co., in September, 1908, and in two years was promoted to the position of assistant vice president in charge of sales. From it he retired in July, 1917, to form a company to handle railroad supplies, but ill health prevented.

James H. Slade, aged 27, erecting engineer for the Bartlett-Hayward Co., Baltimore, died April 25 at his parents' home, New York City.

James D. Swindell, president of the American Furnace & Machine Co., Pittsburgh, died at his home in Pittsburgh recently.

George Windsor, who for many years held executive office in the Farist Steel Co., Bridgeport, Conn., died suddenly in that city, April 23, at the age of 58.

Frank E. Vandercook, well known inventor of Waterbury, Conn., died April 24 in that city, aged 61 years. Among his inventions are a pin-making and chain-making machines.

Charles Francis Proctor, president of the Morandi-Proctor Co., Watertown, Mass., manufacturer of cooking apparatus, died recently at his residence in that city, after a brief illness.

Edwin O. Wood, assistant to William C. Durant, president of the General Motors Corp., and treasurer of the Chevrolet Motor Co., New York, died April 23, at Pasadena, Cal., aged 57.

Charles I. Dailey, assistant to the general superintendent of the American Steel & Wire Co., died at his home in Pittsburgh, April 23, after a continuous service with that company of 35 years. He was 62 years old.

Harrison M. Angle, aged 51, who was secretary of the Metal Block Corp., and president of the American Wood Reduction Co., Chicago, died recently at the home of his father-in-law at Evanston, after an illness of several weeks.

Capt. Harry H. Talon, one of the best known mining men on the Masabi range, died recently at Hibbing, Mich. He was a native of Ishpeming, Mich., and began his mining career as an employe at the Lake Angeline mine of the Cleveland-Cliffs Iron Co.

Thomas Dimond, at one time president of the Thomas Dimond Iron Works, New York, died at his home in that city, April 22, aged 64. Recently however he has been president of the Dimond-Apperson Automobile Co. He was a colonel of the seventh regiment veteran's association.

Charles B. Stanley, who for the past 15 years has been secretary and treasurer of the Stanley Rule & Level Co., New Britain, Conn., died in a New Haven, Conn., hospital, April 20, of heart trouble. He was taken ill on his way home from Pinehurst, N. C. The company was founded by his father, the late Augustus Stanley, with others.

Thomas F. Meek, prominent for many years in foundry circles, who for the last three years has had charge of the steel foundry of the Ford Motor Co., Detroit, died at the Ford hospital in that city recently at the age of 50. Ill health which followed a nervous breakdown several years ago prevented his recovering from an attack of pneumonia.

William Lunney, manager and superintendent of the Hygeia street plant of the Bladwin Chain & Mfg Co., Worcester, Mass., died at Rutland, Mass., recently, after an illness of five weeks. He was 45 years old superintendent of the main plant on and had gone to Rutland to regain his health. For 10 years he was Chandler street before the Hygeia street branch was established.

William Wattie, aged 76, who for 30 years was superintendent of the Crompton & Knowles Loom Works, Worcester, Mass., died at his home in that city April 24, after an illness extending over a period of several weeks. He retired from active work in 1910 and since then has served in an advisory capacity as a member of the company's advisory committee. Mr. Wattie's inventive genius contributed over 60 different patents for textile machinery manufacture. Practically his entire life was devoted to the manufacture of machinery.

George Windsor, president and treasurer of the Bridgeport Steel Co., Stratford, Conn., died at his home in Bridgeport, Conn., April 23, following an attack of pneumonia. He was 59 years old and a native of Jersey City, N. J. He located in Bridgeport in 1880, becoming identified with the Frary cutlery works. Later he became associated with the Farist Steel Co., and was for many years its secretary and treasurer. After the company's dissolution a short time ago, he organized the Bridgeport Steel Co., and continued as its head until his death.

Edward L. Warren, who after 40 years of continuous service with the Washburn & Moen Mfg. Co., and its successor, the American Steel & Wire Co., Worcester, Mass., retired on a pension in 1905, died at his home in Worcester, April 24, after a stroke of paralysis which followed a long illness. He was 79 years old. Mr. Warren had charge of the installation and maintenance of the electrical equipment and was emergency surgeon before the establishment of private hospitals in the works. He also invented numerous improvements in appliances for wire manufacture.

Ambrose Beard, who was at one time manager of the Cambridge Iron & Steel Co., now the Guernsey works of the American Sheet & Tin Plate Co., Cambridge, O., died recently at his home in Detroit, aged 58. Prior to going to Cambridge, he was secretary and treasurer of the Morton Tin Plate Co., and later sales manager of the West Penn Steel Co., Brackenridge, Pa., which position he left to engage in the selling of sheet steel in the Michigan automobile territory. He was the son of the well known British ironmaster, the late George Beard, past president of the West of Scotland Iron and Steel institure of which his son, Herbert Beard, now is president. Another son, Thomas Beard, holds an important position with the Lake Erie Iron Co., Cleveland.

Prepare Bolling Tribute

As a brief testimonial, a resolution of sympathy was passed at the meeting of the aircraft board of the United States held in Washington, April 23, and sent to the family of Col. Raynal C. Bolling, who was killed by the enemy on a French battlefield in the performance of his duty. He was a member of the aircraft production board and rendered valuable service to his country as a member of a mission to Europe to negotiate important military matters between the United States and allied governments.

Britain Uses Iron Board As Model

Plan of Midland Iron and Steel Wages Board in Establishing and Maintaining Amicable Relations Between Capital and Labor Generously Followed—Standing Committee Settles Disputes—Official Intervention Unnecessary

(*Staff Correspondence*)

BIRMINGHAM, Eng., April 10.—Special attention to the recent proceedings of the Midland Iron and Steel Wages board, England, shows that the British iron and steel trade has very largely become the model for all other British industries in regard to the friendly relations of capital with labor. Americans will be familiar by this time with the two consecutive reports of the Whitley committee which has been seeking to give a new lead to British industry in establishing friendly and practical relations between capital and labor The fact was made known at this meeting held in Birmingham, March 18, that the experience of the Midland board probably had more than anything else to do in directing the minds of the committee as to the remedies to be generally recommended. Mr. Macpherson pointed out that when the interim report of the committee on industrial councils was issued by the reconstruction committee 50 manufacturers of pig iron and finished iron and steel sent a signed letter to the committee describing the working of the board, and pointing out that it had existed for 40 years, and that although an independent president had been elected with the special duty allotted to intervene in case of employers and workmen not being able to agree on any subject, he had not been required to act in that capacity in 22 years, so that the position was practically a sinecure. The standing committee of 16 members representing the whole area was almost invariably able to settle disputes. But, apart from this, there was an organization in each works for the settlement of difficulties and this organization or the standing committee was so efficient that only on rare occasions was the entire board called together. The letter continued: "There has been no strike during the history of the board; employers and employed have enjoyed peace for over 40 years, having been able to adjust all difficulties amicably even though on occasions these have been complicated and difficult. Our members are all associated with the wages board and after this long and successful experience they are satisfied that it fully meets the needs of this association in regard to the relations between employers and employed, and they consider it unnecessary and undesirable to form part of a national council."

It will be seen from the latter clause that the ironmasters are strongly averse to becoming part of any general council, preferring to be masters in their own industry. In regard to this they have the strongest backing of the workers themselves.

Interchange of Ideas Encouraged

An important duty which the government is encouraging to the utmost of its power is the maintenance of progress by the fullest utilization of the brains and experience of those engaged in industry. On this matter the ironmasters express themselves with the same note of decision. They say: "At the annual meetings of the board, and at some of the standing committee meetings, general questions are often discussed, and both sides welcome an interchange of ideas with regard to the better utilization of the practical knowledge and experience of the workpeople, and no difficulty will be found in this direction. Recently, as invited by posters in the various works, information was given in connection with puddling research." In conclusion, the letter states: "All such work can be dealt with by the existing machinery which provides for modification and the meeting of new conditions and circumstances. No board could have done more to secure permanent improvement in the relations between employers and employed. It recognizes the difficulty of problems ahead but confidently looks to its organization to deal with them as they arise."

New Methods Are Needed

The chairman made a significant reference to the necessity for new methods. He remarked: "America with its vast resources and its accelerated ability to employ them, and Germany with its determination not to be put out of the world's trade, and others whose iron and steel industries have expanded owing to war demands will be serious competitors. Already supplies have been sent to markets from which our own products have had to be withdrawn. It is for us to see to it that any improvements which can be devised by the closest co-operation and interchange of ideas shall be made. Already the puddling research committee has gone a long way in this work, and when the experimental side has proved successful, both sides must give whole-hearted support to a method which it is believed will lighten the labors and improve the conditions of the men, decrease costs and increase the power to meet greater and keener competition.

Workers Get Free Rides

Upon a request filed by the King county council of national defense, city officials and individual citizens of Seattle, Director General McAdoo has ruled that workers may use the steam trains to solve the transportation problem to shipyards, and for a time at least, the cost will be borne by the plants in proportion to the number of men transported. Workers will not be required to carry identification cards for the present, since it is not likely that anyone but a shipworker will make use of the special trains at the hours they are operated.

Makes Shipyard Ruling

A recent ruling of the labor adjusting board of the Emergency Fleet corporation provides for an 8-hour day, with the privilege of working not more than 12 hours with wages from 40 cents an hour for common laborers to 82½ cents for mechanics at shipbuilding plants in Connecticut and the North Atlantic section, including the Lake Submarine Co., Bridgeport, Conn., the Groton Iron Works, Groton, Conn., and the Housatonic Shipbuilding Co., Stratford, Conn.

The 24-hour strike of all union machinists in the Newport, R. I. district, set for May 1, as a protest against the death sentence of Thomas J. Mooney, in California, was called off since it would have interfered with government work at the United States torpedo station in Newport.

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

FREDERICK W. SINRAM, vice president of the Van Dorn & Dutton Co., Cleveland, recently was re-elected president of the American Gear Manufacturers' association, at the second annual meeting held in White Sulphur Springs, W. Va.. Mr. Sinram is a graduate of the Cleveland Law School of the Baldwin-Wallace university, Berea, O., but has been actively interested in the iron and steel industry for the past 20 years. Besides being vice president of the Van Dorn & Dutton Co., Mr. Sinram is secretary-treasurer of the Van Dorn Electric Tool Co., Cleveland. He is an apostle of the doctrine of standardization and was actively interested in the presentation of the question of standardized gears at the recent meeting of the association.

Donald A. Baker was recently made chief engineer for the Anderson Drop Forge & Machine Co., Detroit.

Fred Clausen has been appointed factory superintendent of the Independent Pneumatic Tool Co., Aurora, Ill.

Lewis Searing has sold his half interest in the Denver Engineering Works Co., Denver, Colo., to the Hardinge Conical Mill Co., New York.

Charles Philip Coleman has been elected president of the Worthington Pump & Machinery Corp., 115 Broadway, New York.

G. W. Akerlow and J. M. Lundquist have opened offices as consulting and mechanical engineers in Denver, Colo. They will specialize in mill design and special machinery.

F. S. Shields, president of the Cleveland Milling Machine Co., Cleveland, has purchased the American Range & Foundry Co., and will continue the business as the American Foundry Co., Cleveland. Mr. Shields' connection with the former company will in no way be affected.

Alfred L. Aicher, formerly chief draftsman of the F. J. Stokes Machine Co., Philadelphia, is now affiliated with the Southwark Foundry & Machine Co., Philadelphia.

E. C. Peck, for 18 years superintendent of the Cleveland Twist Drill Co., Cleveland, has been granted a leave of absence to accept a commission as major in the ordnance division of the war department. Major Peck will be associated with Maj. Gen. Wheeler and Brig. Gen. Rice and will supervise standardization and production of armament and munitions.

Norman O. Aeby, recently resigned as purchasing agent for the Jeffrey Mfg. Co., Columbus, O., coal drills and machinery, and has been made manager of the foreign department of the Liberty Steel Products Co., New York. J. F. Davidson, formerly Mr. Aeby's assistant has been promoted to succeed him as purchasing agent.



FREDERICK W. SINRAM

Walter Brown, vice president and general manager of the Webster Electric Co., Racine, Wis., has been appointed to the war service committee to represent the magneto industries.

William H. Patton has resigned as depot manager for the Electric Storage Battery Co., Philadelphia, to become salesman for the Ironton Engine Co., Ironton, O.

E. L. Sparks, formerly industrial editor of *Engineering News-Record* has been appointed New England representative of the Ball Engine Co., Erie, Pa., manufacturer of steam shovels.

H. L. Cole, for several years the Milwaukee manager for Manning, Maxwell and Moore, New York, has been put in charge of the Milwaukee office of the Federal Machinery Sales Co., Chicago.

Carl T. Hewitt has been appointed metallurgist and testing engineer for the Fafnir Bearing Co., New Britain, Conn. He formerly was with the Remington Arms Union Metallic Cartridge Co. Inc., Bridgeport, Conn.

A. R. Smith, formerly general foreman in charge of the Anderson Forge & Machine Co.'s factory is now supervising construction of the $500,000 drop forge plant of the Pan Motor Co., St. Cloud, Minn., as general superintendent.

Harry D. Barrows for seven years the secretary of the Baron deHirsch Trade School, New York, has been appointed business manager of the American Machinery Exchange, Inc., 217 Centre St., New York.

H. T. Bently, for several years superintendent of motive power and machinery for the Chicago & Northwestern railroad has been granted a leave of absence to join the staff of the director general of railroads at Washington.

J. M. Marty Jr. has accepted a position as service engineer with the Kelly Reamer Co., Cleveland. Mr. Marty was formerly production manager of the Standard Pump & Engine Co., Akron, O.

Fred M. Shaw, formerly with the General Electric Co., has been made president of the Alfred L. Brown associates, Worcester, Mass., electric motors. Alfred L. Brown is treasurer and general manager.

H. N. Oram, foreman and chief patternmaker of the R. K. LeBlond Machine Tool Co., Cincinnati, has been made supervisor of castings and patterns at the new plant of the company at Norwood, O.

Fred B. Crosby, formerly in the power and engineering department of the General Electric Co., where he specialized in electrical equipment for steel mills, has accepted the position of electrical engineer for the Morgan Construction Co., Worcester, Mass.

Harry Stephenson has retired from the firm of Speed & Stephenson, Boston, textile machinery and mill supplies, and the business will be continued by the surviving partner, James Speed, under the name of James Speed & Co., 170 Summer street.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

HERBERT A. JACKSON, who was recently elected president of the Chicago Pneumatic Tool Co., Chicago, to succeed W. O. Duntley, resigned, was born in Bethlehem, Conn, July 7, 1881. After being graduated with the class of 1903, from the Lawrence scientific school of Harvard university, he took a year's course in metallurgical work in the graduate school there. In July, 1904, he entered the employ of the Bethlehem Steel Co., working through various departments to the sales department and spent some months as sales agent in Chicago. When the Bethlehem Steel Co., opened its Boston office, Mr. Jackson was sent to organize the sales and executive forces in that territory, where he remained in charge until elected to his new position at a special meeting of the Chicago Pneumatic Tool Co.'s board of directors in New York, April 19, 1918.

F. H. Otis has been appointed purchasing agent of the Iroquois Iron Co., Chicago, to succeed Ed. Rosen.

George E. Bent was recently made manager of the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y.

J. Stanford Brown resigned recently as director of the Carpenter Steel Co., Reading, Pa., and is succeeded by Charles T. Meily, Philadelphia.

G. W. Ketter has joined the staff of the Electric Furnace Construction Co., Philadelphia, having resigned his position with the British Forging Co. Ltd., Toronto, Ont.

Daniel Bloomfield was recently made head of the industrial service department, division of general service of the Emergency Fleet corporation, Philadelphia.

Thomas H. Beaulac has been appointed superintendent of the foundry operated by the Union Iron Works, Bangor, Me.

T. J. Wetzell, president of the Wetzell-Hall Co., New York city, manufacturers' agent, was recently elected vice president of the Buffalo Pressed Steel Co., Buffalo.

C. A. Miller, who has been assistant purchasing agent for several years at the Carnegie Steel Co., Pittsburgh, was recently promoted to the position of general purchasing agent, to succeed J. M. Taylor who resigned after 25 years of continuous service.

F. E. Whitcomb, who resigned recently as signal engineer of the Boston & Albany railway, has been made special New York city representative of the Federal Signal Co., Albany, N. Y.

A. L. Martin has been made district manager in the recently established of-



HERBERT A. JACKSON

fices at 260 California street, San Francisco, of the Liberty Steel Products Co. Inc., Youngstown, O.

N. M. Garland, who has been district manager of the Ohio Brass Co., at Mansfield, O., for a long time, was recently elected a member of the board of directors.

John S. Agey, employed for 13 years by the Carnegie Steel Co., Youngstown, O., has been made assistant superintendent of one of the mills of the Donner Steel Co., Buffalo.

George W. Hubley became general manager of the Bound Brook Engine & Mfg. Co., Philadelphia, upon his resignation as general manager and chief engineer of the Merchants' Heat & Light Co., Indianapolis.

Louis Snyder, secretary to J. G. West Jr., superintendent, Eliza furnace department of the Jones & Laughlin Steel Co., resigned recently to become advertising manager of the Safety First Supply Co., Pittsburgh.

M. A. Stone resigned recently as general superintendent of the Wolverine Brass Works, Grand Rapids, Mich., to organize the M. A. Stone Mfg. Co., that city, of which he is president, to manufacture small cast parts and stampings.

James M. Smith now has charge of the shipbuilding plant of the Canadian Car & Foundry Co., Fort William, Ont., which expects to turn out 12 trawlers for the French government before the end of the 1918 season.

John Salt is now assistant to E. Talkes, master mechanic of the Federal furnace of the Iroquois Iron Co., Chicago. He formerly was assistant to J. E. Burkett who had charge of the coke ovens.

James C. Redman, affiliated for a long term of years with the A. M. Byers Co., Pittsburgh, has opened offices in the Rialto building, San Francisco, to represent manufacturers of iron and steel products.

R. B. Wallace was recently appointed sales agent of the Bethlehem Steel Co., in charge of the Boston district, to succeed H. A. Jackson, who resigned to become president of the Chicago Pneumatic Tool Co., Chicago.

Lieutenant Victor Garmen has been given a position as safety engineer of the Lebanon, Pa., plants of the Bethlehem Steel Co. Until lately, he was with the machine gun battalion of the Rainbow Division of the American forces in France.

George A. Arms was elected president of the Moore Shipbuilding Co., San Francisco and Oakland, upon his resignation as engineer in charge of construction work in the San Francisco district for the United States shipping board.

M. V. Dreyspool, who has been affiliated with the Vulcan Steel Products Co., New York City, since its formation has become associated with the sales department of the American Steel Co., Pittsburgh. Prior to his joining the Vulcan Steel organization, he was assistant purchasing agent of the Central of Georgia railroad at Savannah and later was metropolitan sales agent of the Phoenix Iron Co., New York.

Iron and Steel Men in War Machine

George N. Peek, Industrial Representative, War Industries Board

GEORGE N. PEEK is known in official Washington circles as industrial representative of the war industries board. This title covers a big job. He was called to Washington the latter part of 1917 to solve one of the leading industrial problems that confronted the government at war; namely that of securing necessary military supplies without too seriously interfering with the production of necessities for the public welfare, and at the same time of insuring industrial strength after the war. His was and is the task of converting peace time factories to war time centers of production. The importance and magnitude of the work as well as the responsibility connected with it, is reflected in a statement made by a prominent man in Washington, who said: "So heavy are the present demands on labor, materials, fuel, capital and transportation that it would be easy for a single order from a government agency to utterly wreck an industry representing invested millions and supporting thousands of families." In addition to his duties as a vice president of Deere & Co., Moline, Ill., manufacturers of farm implements, Mr. Peek is a member of the firm's board of directors, a member of its executive committee and a voting trustee. For some time, he has represented the implement industry on the executive board of the National Implement and Vehicle association..

About 10 years ago, Mr. Peek was a sales agent for Deere & Co., in charge of the Omaha, Neb., territory and when the consolidation of all the Deere interests took place a few years ago, he was elected vice president in charge of sales, with headquarters at Moline.

His many duties in behalf of the government were recently increased when he was placed in charge of the finished products section of the board, practically handling the work previously covered by Robert S. Brookings. Official recognition, however, awaits the final reorganization of the board, along the lines recently announced.

That Mr. Peek has a full grasp upon all that is entailed in connection with his responsibilities as a part of the war machine, is evidenced by a published statement, in which he said: "It would seem to be the immediate duty of the war industries board: "To list, by classes or otherwise, those industries whose operation as a war measure are of exceptional importance, classifying them in the order of their relative urgency, measured by their contribution to the winning of the war.

"To determine what are the less important industries, on the same basis.

"To prepare, present and, if practicable, enforce such concrete plans as will result in stimulating the operation of the industries first named; curtailing the operation of the nonessential industries or changing their operations to produce war needs; conserving the supply of essential raw materials as reserves to be drawn upon to meet the war requirements". He said recently that with co-operation industry should emerge after the war improved for those conditions.



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GEORGE N. PEEK

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Business Still Opposed to Lump Tax

SECRETARY OF TREASURY McADOO has reiterated his opposition to the proposed plan of providing for deferred installment payments of income and excess profits taxes. To defer the payments until fall, when another Liberty loan will have to be issued, Mr. McAdoo said, would complicate the situation. He explained that nearly $2,000,000,000 of treasury certificates already have been sold to mature in June, and these virtually amount to advance payments of the taxes due them. He asserted the continued agitation for deferred tax payments "is doing much harm."

"We should make up our minds," he added, "to pay these taxes when they are due and get the business behind us. I earnestly hope that further agitation may cease and that everyone will co-operate in the patriotic determination to do his duty in the payment of taxes at the time that duty ought to be performed."

War Corporation May Give Relief

Chairman Kitchin, of the house ways and means committee also issued a statement on this subject, in which he said that to postpone collection of taxes past June would make it necessary for the government to issue more bonds to meet the certificates due them. Referring to reports that some manufacturers with important government contracts would be seriously hampered financially by having to pay big taxes in June, he said:

"If a business concern really has a government contract and is really performing a service that is useful to the conduct of the war, and if such concern cannot get relief through its bank, I think in such case the War Finance Corp., when organized, will consider an application from the concern and give relief if found necessary."

Business interests generally have hoped that steps would be taken to prevent the payment of an estimated total of $4,500,000,000 of taxes in one day. It has been believed that this withdrawal would subject the country to a serious financial strain. A number of bankers and business men conferred with Washington authorities just prior to the statements by McAdoo and Kitchin. Members of Liberty loan committees have declared that the forthcoming tax payments have held back subscriptions to the loan in some quarters.

Metal Trades Support Installments

In line with the general movement for the collection of taxes on an installment plan, the National Metal Trades association at its annual convention in New York last week went on record with a resolution, which it is bringing to the attention of the President, Secretary McAdoo, congress and the senate and house finance committees. This resolution in effect said that whereas it was necessary the finances of industries engaged in war work be safeguarded; and whereas financial needs have been increased by higher costs and increased outstanding credits, due to difficulties of moving output; and whereas the payment of the taxes at time now provided still further increases the demands upon financial resources; and whereas it is the earnest desire of the members to contribute to the current and future Liberty loans to the full extent of their ability and the carrying out of this desire is hampered by the financial demands above indicated; be it resolved that the National Metal Trades association respectfully petition that measures looking to the payment of income and excess profits taxes in installments instead of one payment be acted upon as promptly as possible.

Makes Sales Record With No Munition Orders

The General Electric Co. in 1917 sold 47 per cent more goods than its best preceding year, which was 1916, yet it did not have a dollar's worth of war munition business on its books, according to the annual statement. Gross sales were $196,926,317, compared with $134,242,290 in 1916 and $85,522,070 in 1915, when shell orders aggregated $33,980,000 of the aggregate orders booked. The final balance of $26,903,828 available for dividends was equal to 26.5 per cent on the outstanding stock, compared with 18.3 per cent the year before. The outstanding features of the report follow:

	1917	Increase over 1916
Sales	$196,926,317	$62,684,027
Operating profit	29,004,539	13,710,448
Total net income	33,516,829	14,355,846
Excess profits tax	5,500,000	5,500,000
Dividends	11,165,882	3,043,236
Surplus	15,737,946	5,370,064

Chairman C. A. Coffin stated that while a substantial portion of the year's increase in business consisted of government orders for ship propulsion, the increase extended to nearly every line of the company's product.

Canadian Car Earning at New High Rate

The annual report of the Canadian Car & Foundry Co., covering the 12 months ending Sept. 30, 1917, shows net surplus for the year of $1,413,008, which represents practically the net earnings from Russian shell contracts. Net profits from operations in Canada have been only approximately sufficient to pay the fixed charges. The most significant feature of the report, however, is the tentative net profits for the first six months of the current fiscal year of 1918, after payment of fixed charges are approximately $1,500,000. At this rate the company will establish a new record of $3,000,000 for the current year, which after paying 7 per cent on the preferred would leave a balance well up to 50 per cent for the common. War munition and export equipment orders were again the chief factors in 1917 operations, accounting for more than one-half the gross output of $25,000,000. More than 75 per cent of the $36,500,000 unfilled orders on the company's books at the present time, however, represents orders for the regular normal products of the car equipment business. Including the profits on the Russian contracts,

manufacturing profits in 1917 were $2,572,883. Approximately double the total of the preceding year, while the net profits of $1,413,008 were approximately four times the 1916 figures. The profit and loss statements for three years are summarized in the following table:

	1917	1916	1915
Profits	$2,572,883	$1,292,104	$321,839
Deprec.	467,609	350,000	325,000
Balance ...	$2,105,273	$942,104	*$3,160
Interest	692,265	588,848	555,311
Net profit..	$1,413,008	$353,255	*$558,471
Prev. surp....	1,427,054	1,073,798	1,632,269
Surplus	$2,840,063	$1,427,054	$1,073,798

*Deficit.

In his message to stockholders, President Currie says in part: "If unforeseen conditions and contingencies beyond your management's control do not arise your present order book assures continuous and profitable operations during the year of 1918. In fact, the tentative figures prepared by our comptroller indicate that the net profits for the first six months of the fiscal year of 1918, after payment of fixed charges, will approximate $1,500,000."

Tool Companies Merge

The Independent Pneumatic Tool Co., Chicago, a New Jersey corporation, and the Aurora Automatic Machinery Co., incorporated in Delaware, have been consolidated under the name of the former and has been capitalized at $3,000,000. The directors of the company follow: John P. Hopkins, chairman; John D. Hurley, James J. McCarthy, William A. Libkeman, Leonard S. Florsheim, Edward G. Gustafson, Robert T. Scott, Ralph S. Cooper, August Gatzert and Fletcher W. Buchanan. The following officers have been elected: John D. Hurley, president; Ralph S. Cooper, vice president; Fletcher W. Buchanan, secretary, and Edward G. Gustafson, treasurer. The general offices of the company are in the Thor building, 1307 South Michigan boulevard, Chicago. The pneumatic and electric tool plant is located at Aurora, Ill., and motor cycles and gasoline engines are manufactured at 361 West Superior street, Chicago.

Increases Capital Stock

At a special meeting of stockholders of the Liberty Steel Co., Warren, O., held at Youngstown, O., April 29, the capital stock was increased from $900,000 to $1,500,000. The new stock will be $250,000 preferred and $350,000 common. All of the preferred and an indefinite amount of common will be issued at once and the funds will be used for working capital. Decision as to the installation of four additional hot mills was postponed until a later date.

Has Large First Quarter

Gross earnings of the Colorado Fuel & Iron Co. in the first quarter of 1918 were $11,931,230, an increase of $1,099,919 over the same period last year. The net income was $1,724,050, against $1,762,116, which was reduced by depreciation and depletion fund reservations to $1,232,315, an increase of $32,344. After paying dividends a surplus of $935,509 remained.

Issues Stock Dividend

Directors of the Gulf States Steel Co., Birmingham, Ala., have voted a 25 per cent stock dividend, subject to the approval of the capital issues committee, payable June 3 to holders of record May 15. The company has outstanding $7,314,400 common stock, most of which is deposited in a voting trust. It is paying 10 per cent dividends. On receipt by the voting trustees of the new trust certificates representing the dividend stock, they will be distributed to the present owners of trust certificates. Holders of trust certificates for the second preferred stock will be able to participate in the distribution if they convert their holdings into common stock trust certificates, which may be done, par for par, prior to May 15. The conversion privilege has been in effect since the company was formed in 1913, to contain properties of the old Southern Iron & Steel Co.

Lakewood Firm Expands

To finance the purchase of several additional plants, the Lakewood Engineering Co., Cleveland, has increased its capital stock from $300,000 to $1,100,000. Among the purchases to be made are the following: The Dynamic Motor Truck Co., Galion, O., a foundry at Elyria and a large interest in the Milwaukee Concrete Mixer Co., Milwaukee.

Sales Are Heavy

Net sales of the Hale & Kilburn Co., Philadelphia, in 1917 were $4,235,582, an increase of $1,104,772 over the preceding year. The balance for dividends was $262,158, compared with $23,045 in 1916. Joseph A. Bower, president, in his annual report urged stockholders to exchange their stocks in the old Hale & Kilburn Co., if they had not already done so, for stock in the new corporation.

Requisition Sulphate

For Nitrate Manufacture by Government—Phenol Buying is Expected

New York, April 27.—Large quantities of sulphate of ammonia again were requisitioned by the government this week for manufacture into nitrate of ammonia. It now seems quite certain that contracts for the coming year will not be made as in the past. In fact, a number of large consumers have been told that the first duty of the producers will be to supply the government, after which consumers will share on a pro rata basis. Current business, outside of sales to nitrators under government direction, consists of spot carloads at $5.55 to $5.60 per 100 pounds.

Direct intimations are heard that the government is considering the purchase of phenol on a fairly large scale for the manufacture of picric acid. The use of phenol and benzol, however, in making picric acid has gone no farther than the prospective stage. In the meantime, toluol continues to be relied upon principally. In almost all cases the high explosives which now are being derived from benzol and phenol are for either France or England. Considerable additional toluol for commercial consumption was released this week by the committee of the war industries board. Such toluol is going at $1.75 to $2 per gallon. Occasional sales by second hands continue to be made at $5 and $6.

Benzol is weak, and sales have been made in some instances at as low as 28 cents per gallon. Although there is some contracting, most of the current buying is for spot. Solvent naphtha continues at 18 to 22 cents per gallon, while spot ranges from 18 to 25 cents.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.28 to .35
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.55 to 5.60

Contract

Pure benzol	$0.28 to .35
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

How Lake Fleet Will Meet Ore Needs

Vessels on Great Lakes Are Now Going Into Commission—Operators Plan to Handle Required Tonnages of Ore, Coal and Grain With Minimum Strain on Railroads

BY R. V. SAWHILL

AMERICAN ships capable of carrying 3,000,000 to 4,000,000 tons of cargo in one trip have just been released from a blockade more effective than any the allies have succeeded in drawing around their enemies. One by one these ships have been quietly recommissioned during the past few days and within a short time the entire fleet will be vigorously plying its native waters, the Great Lakes. As a war asset this great fleet of bulk freighters far outranks any additions to the American merchant marine made by the wholesale absorption of German or Dutch tonnage or by the new ships built up until this time.

Resumption of navigation on the Great Lakes is always an event surcharged with the highest importance to the iron and steel industry of the United States. Burdened this year with the responsibility of giving force to America's war program and to the plans of our allies, steel manufacturers to a greater extent than ever before are interested in the renewal of activity by one of the most important branches of their industry. The cause of this interest is realized from an appreciation of the fact that the fleet of bulk freighters on the lakes annually brings from the mines of the north to the blast furnaces of the central west and east about 85 per cent of the basic raw material upon which the iron and steel industry rests.

Meeting an Increased Demand

Recognition by the vessel operators of their responsibility in enabling pig iron manufacturers to operate at capacity has always been shown by the satisfactory record made each year. With little increase in vessel tonnage, the operators during the past two years have faced and satisfied a demand which jumped from an average of 45,000,000 to 50,000,000 tons in 1912-1915 up to 60,000,000 to 65,000,000 tons in 1916-17.

This year the estimated minimum consumption of iron ore by blast furnaces tributary to the lakes during the next 12 months will be about 60,000,000 tons and the capacity of the lake fleet to satisfy this need is freely granted provided the complementary agencies of transportation can do their share. This feeling of confidence is all the more notable when it is recalled that dozens of lake boats have been removed from fresh water to participate more directly in the transatlantic war trade and also in view of the repeated delays which consumers dependent upon other forms of transportation have learned to expect during the past year.

Large Ore Chart Sent on Request

Consumers and producers of Lake Superior iron ore, operators of lake vessels, officials of railroads carrying commodities transported on the lakes, and operators of coal mines whose products are shipped on the lakes, are vitally concerned this year in the plan for centralized control of the lake trade which has been worked out and approved. In view of this interest, THE IRON TRADE REVIEW *has prepared in larger form suitable for framing or for desk or wall use—a chart similar to that shown on page 1140. This shows graphically the duties and personnel of each committee together with the major statistics of the lake trade for the last 10 to 15 years such as shipments of iron ore, capacity of the lake fleet, movement of iron ore by railroads both in upper and lower lake districts, and the shipments of coal. The large chart will be supplied free upon request to* THE IRON TRADE REVIEW, *Penton building, Cleveland.*

Efficient operation as developed on the Great Lakes has become a familiar by-word in recent years. An insight into the reasons for this efficiency is given by the elaborate preparations made during recent months by the vessel operators to minimize the effect of railroad congestion at unloading ports and the loss of boats from lake trade, by the adoption of even more efficient methods of operation.

The plan which has been developed is designed to utilize at all times the maximum freight-carrying capacity of all lake vessels. The means by which this is to be obtained is through a centralized supervision over all of the ships. Central agencies are to be charged with the tasks of directing the water and land carriers most effectively while other central committees will supervise the special interests of the iron and coal industries. All of these committees will work through a central clearing station in which the relative importance of the principal component elements of lake trade—iron ore, coal and grain—can be so reconciled that at the end of the season blast furnaces along the lower lakes will have a sufficient but not excessive supply of iron ore; the industries of the northwest which are supplied with fuel from the head of the lakes will have enough coal; and the imperative needs of the United States and its European allies for wheat will have been met by the movement of the greatest possible tonnage during the closing fall months of the season.

Ore to Move Freely

In effect, vessel owners on the Great Lakes have practically turned over their fleets to the central committee to operate. With the railroads of the country under one control, every effort will be made to distribute the ore cars in such a way as to keep the ore moving freely out of all lower lake ports. Each consumer of Lake Superior iron ore had been asked to have someone in Cleveland qualified to represent his interest. The committees have held preliminary meetings and now that the boats are going into commission, the men who will carry on the job feel that every precautionary step has been adopted to insure consumers getting those supplies which lake boats must carry this year.

The accompanying chart shows graphically just how the 1918 organization of lake trade is built up.

The spectacle of an immense fleet of ships, almost in a week's time springing from inactivity to full activity has become so commonplace on the lakes that little attention is given to the means by which such a transformation is made possible.

A few weeks before the season

opens active fitting-out begins and various officers and men board the boats and put them in shape for operation as soon as word is flashed that the channels are free from ice. During the winter months actual repair work has been carried on so that always at the opening of the season the boats are in excellent condition. The recruiting of the crews, even in the face of a scarcity of labor such as obtains at the present time, is a much simpler matter than generally realized. The sailors, who scatter when the boats are laid up in the winter, generally find their way back to the ships when the first sign of spring awakens the men's liking for a sailor's life. Young boys recruited from the farms or from the schools can be relied upon to fill out most of the vacancies resulting from defections on the part of the old crews.

This year the lake boats will carry in addition to their regular crews members of the naval auxiliary reserve. These are boys who will be given instruction in practical navigation and after several months' experience on the lakes will be transferred to an Atlantic port for final drilling before taking their place in the merchant or naval service.

This year for the first time exact information will be held from the opening of the season as to the minimum requirements of iron ore needed by every blast furnace up until June 1, 1919. Every consumer has been asked to specify the minimum tonnage required to keep his plant in operation until new ore begins to arrive at lower lake ports next spring. As a result, the men back of the job know how the exact tonnage of ore that must be carried and the exact amount that must be placed in each individual furnace yard. A better correlation of the efforts of the vessel and railroad interests can thus be obtained. Every effort will be made to give each furnace the exact tonnage required. No surplus tonnage of iron ore will be carried as the vessels not only must be employed during much of the time in the coal and grain trades, but the lower lake railroads must be freed from any additional burden or delay.

The crux of the ore situation today is in the ability of the railroads to move ore from lower lake ports to blast furnace yards and the plan under which the lake trade will operate this year is a measure designed more to aid the railroads than the vessels.

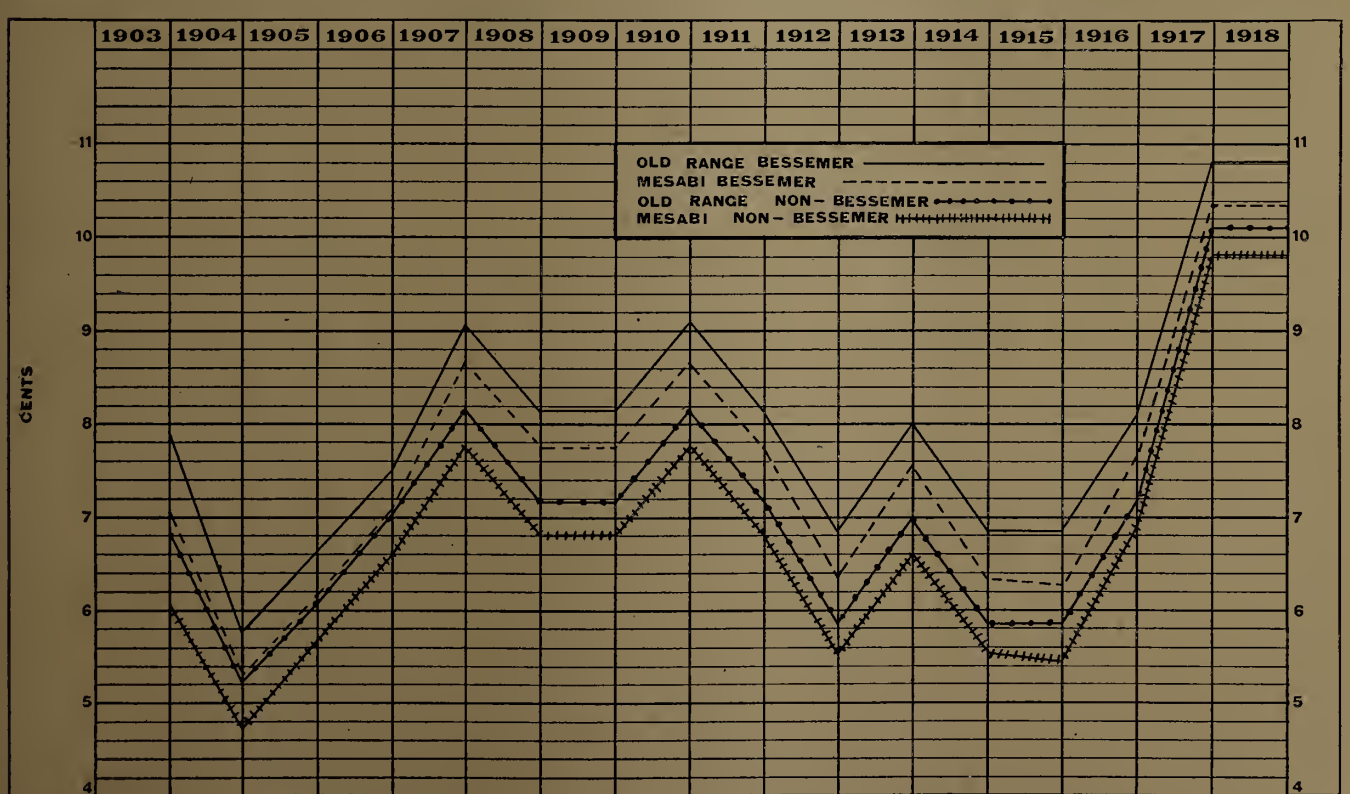
Ore prices are a subsidiary feature as the season opens. Since last fall ore prices have been subject to government regulation. With the normal market closed, the bulk of the ore operators have been giving their attention almost exclusively to the problems of mining and transporting their product. The present scale of ore prices maintains the 1917 quotations with no likelihood of any change until after the end of the second quarter of the year, if at all. The ore trade has been forced to readjust itself from the 12-month basis in which business has always been conducted in order to meet the quarterly adjustment of iron and steel prices, President Wilson put into effect on Jan. 1.

Ore contracts, however, have been adjusted to meet the changed conditions. A clause inserted in all ore contracts written this year provides for the adjustment of the contract price to meet any change in the fixed quotations as set by an authorized government agency. Efforts have been made by a number of iron ore producers to secure favorable action by the government on their request for a higher level of quotations on iron ore. These

Values of Unit of Iron for 16 Years

	Old range		Mesabi	
	Bessemer, cents	Non-bessemer, cents	Bessemer, cents	Non-bessemer, cents
1918.....	10.81	10.10	10.36	9.81
1917.....	10.81	10.10	10.36	9.81
1916.....	8.09	7.18	7.64	6.89
1915.....	6.82	5.83	6.27	5.44
1914.....	6.82	5.83	6.36	5.53
1913.....	8.00	6.99	7.55	6.60
1912.....	6.82	5.83	6.36	5.53
1911.....	8.18	7.18	7.73	6.80
1910.....	9.09	8.16	8.64	7.77
1909.....	8.18	7.18	7.73	6.80
1908.....	8.18	7.18	7.73	6.80
1907.....	9.09	8.16	8.64	7.77
1906.....	7.50	7.01	7.05	6.60
1905.....	6.61	6.06	6.17	5.66
1904.....	5.73	5.21	5.29	4.73
1903.....	7.94	6.82	7.05	6.06

Fluctuations of iron ore prices expressed in values of units of iron in natural state.



RANGE OF LAKE SUPERIOR ORE PRICES BY UNITS OF IRON, NATURAL

PERSONNEL AND FUNCTIONS OF ORGANIZATION DIRECTING 1918 LAKE TRADE

AMERICAN IRON AND STEEL INSTITUTE

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Pickands, Mather & Co.

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W. T. SHEPARD, Rogers, Brown & Co.
FRANK BILLINGS, Tod-Stambaugh Co.
C. D. DYER, Shenango Furnace Co.
H. COULBY, Pittsburgh Steamship Co.
F. B. RICHARDS, M. A. Hanna & Co.
LEONARD PECKITT, Empire Steel & Iron Co.
A. S. MATHER, Pickands, Mather & Co. Secretary

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C. D. DYER, Shenango Steamship Co.
G. A. TOMLINSON,
J. S. ASHLEY, M. A. Hanna & Co.
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GEORGE CAMERON, Pickands, Mather & Co.
C. E. MAURER, Glen's Run Coal Co.
R. S. McVEIGH, Island Creek Coal Co.
J. P. WALSH, Pittsburgh Coal Co.
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E. A. URHIG, Milwaukee-Western Fuel Co.

REGIONAL DIRECTOR OF RAILROADS

RAILROAD COMMITTEE

GEORGE L. PECK,
Pennsylvania Railroad

ADMINISTRATION COMMITTEE

ONE REPRESENTATIVE FROM EACH OF FOUR INTERESTS

ORE	VESSELS	COAL	RAILROADS
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ORE AND COAL EXCHANGE

Manager
H. M. GRIGGS

OPERATING COMMITTEE ORE

CARGO LOADING, UNLOADING AND DISTRIBUTION

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Pittsburgh Steamship Co.

A. E. R. SCHNEIDER, Cleveland-Cliffs Iron Co.
GEORGE H. WARNER, M. A. Hanna & Co.

OPERATING COMMITTEE VESSELS

VESSEL DISTRIBUTION AND SUPPLY

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CARGO ALLOTMENT, LOADING AND UNLOADING

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Reiss Coal Co.

J. H. WOODS, Pittsburgh Coal Co.
J. L. FOREPAUGH, Northwestern Fuel Co.

OPERATING COMMITTEE RAILROADS

CAR SUPPLY AND MOVEMENT

STAFF MEN

Annual Lake Movement of Iron Ore and Coal; Ore Shipments by Railroads; Vessel Capacity

ORE SHIPMENTS BY LAKE

Year	Gross Tons	Year	Gross Tons
1917	62,498,901	1911	32,130,411
1916	64,734,198	1910	42,628,758
1915	46,318,804	1909	41,683,599
1914	32,021,897	1908	25,427,094
1913	49,070,478	1907	41,290,709
1912	47,435,777	1906	37,513,589

CAPACITY OF LAKE BOATS

CARRYING CAPACITY, ONE TRIP

Year	Gross Tons	Year	Gross Tons
1918	3,225,763	1911	3,108,330
1917	3,109,585	1910	2,973,447
1916	3,073,319	1909	2,853,344
1915	3,066,423	1908	2,766,781
1914	3,031,589	1907	2,442,754
1913	3,124,508	1906	2,065,111
1912	3,135,953	1905	1,919,285

COAL SHIPMENTS BY LAKE

Year	Net Tons	Year	Net Tons
1917	31,192,603	1911	25,700,164
1916	28,792,800	1910	26,478,068
1915	26,220,000	1909	18,617,396
1914	27,280,228	1908	19,288,095
1913	33,362,379	1907	21,486,927
1912	27,539,741	1906	17,273,718

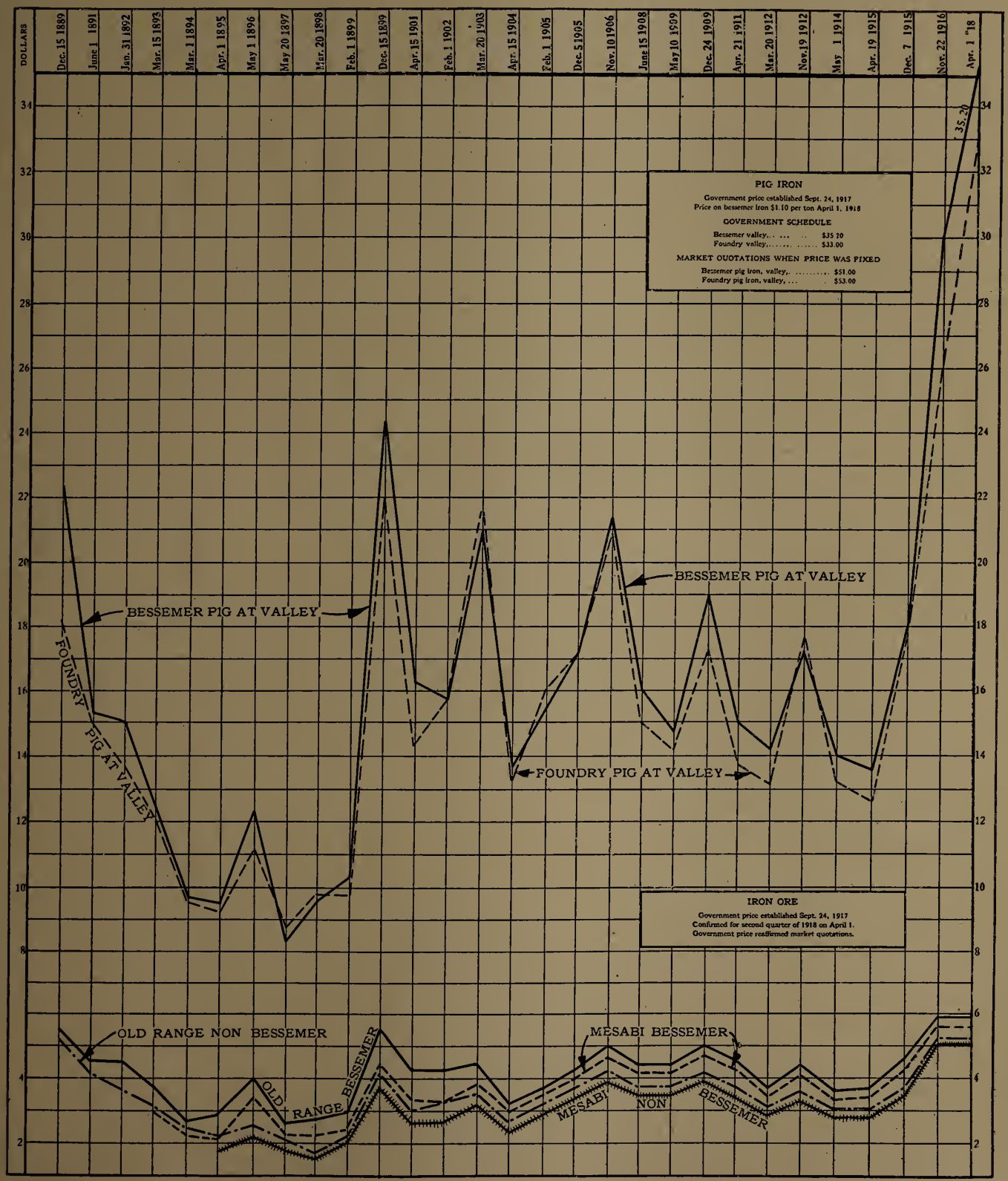
ORE MOVED BY RAILROADS

FROM LAKE ERIE DOCKS TO INTERIOR FURNACES		ALL-RAIL FROM MINES	
May 1-Dec. 1	Gross Tons	Year	Gross Tons
1917	32,758,549	1917	1,938,102
1916	33,941,982	1916	1,974,268
1915	27,027,058	1915	953,947
1914	17,650,073	1914	707,829
1913	23,934,126	1913	876,638
1912	24,884,646	1912	785,769
1911	17,187,072	1911	662,719
1910	29,894,267	1910	813,639

Compiled by and Reserved with the Compliments of THE IRON TRADE REVIEW

efforts probably will be renewed when third quarter prices are taken up for consideration at Washington in June, as some of the operators, particularly those with underground properties, have found their cost line closely approximating the government scale.

At the other end of the ore trade—the iron mining districts around Lake Superior—no doubt is entertained of the ability to place as much ore in the docks at upper lake ports as the vessels can carry. Labor shortage is somewhat more acute now than at any previous time, but even if underground mines experience difficulty in sending forward as much ore as planned, the huge open pits supply an immense reserve which can be drawn upon cheaply and at a moment's notice. The railroads leading from Lake Superior mines to the ports have always proved capable of handling all of the ore offered. While some of the equipment required during the summer for carrying iron ore has been shifted to other districts during the winter, the cars and locomotives are gradually being returned. In view of the clear recognition which govern-



FLUCTUATIONS OF PRICES OF IRON ORE AND PIG IRON, 1889-1918

ment officials have of the necessity of keeping the iron and steel business running at top speed, the injection of government ownership is not expected to curtail the ability of the ore-carrying railroads of the Lake Superior district to satisfy the demands which the vessels will place upon them.

The accompanying tables and charts give briefly the history of the movement of iron ore and pig iron prices in recent years. They permit easy comparison of the relations between iron ore and pig iron prices and show their relative declines and increases.

Prices of Iron Ore and Pig Iron at Date of Buying Movement, 1890-1918

Season	Date buying movement	—Season Iron Ore Prices— Old range Bessemer	Mesabi Bes'm'r	Old range non-Bes'm'r	Mesabi non-Bessemer	—Iron Prices— Valley Bes'm'r	Foundry Iron No. 2
1918	Apr. 1, 1918	$5.95	$5.70	$5.20	$5.05	$35.20	$33.00
1917	Nov. 22, 1916	5.95	5.70	5.20	5.05	30.00	26.00
1916	Dec. 7, 1915	4.45	4.20	3.70	3.55	18.50	18.00
1915	Apr. 19, 1915	3.75	3.45	3.00	2.80	13.60	12.75
1914	May 1, 1914	3.75	3.50	3.00	2.85	14.00	13.25
1913	Nov. 19, 1912	4.40	4.15	3.60	3.40	17.25	17.50
1912	Mar. 20, 1912	3.75	3.50	3.00	2.85	14.25	13.25
1911	Apr. 21, 1911	4.50	4.25	3.70	3.50	15.00	13.75
1910	Dec. 24, 1909	5.00	4.75	4.20	4.00	19.00	17.25
1909	May 10, 1909	4.50	4.25	3.70	3.50	14.75	14.25
1908	June 15, 1908	4.50	4.25	3.70	3.50	16.00	15.00
1907	Nov. 5, 1906	5.00	4.75	4.20	4.00	21.50	21.50
1906	Dec. 5, 1905	4.25	4.00	3.70	3.50	17.25	17.25
1905	Feb. 1, 1905	3.75	3.50	3.20	3.00	15.50	16.00
1904	Apr. 15, 1904	3.25	3.00	2.75	2.50	13.35	13.15
1903	Mar. 20, 1903	4.50	4.00	3.60	3.20	21.50	21.65
1902	Feb. 1, 1902	4.25	3.25	3.25	2.75	15.90	15.90
1901	Apr. 15, 1901	4.25	3.25	3.00	2.75	16.15	14.40
1900	Dec. 15, 1899	5.50	4.50	4.25	4.00	24.15	22.15
1899	Feb. 1, 1899	3.00	2.40	2.15	2.00	10.30	9.75
1898	Mar. 20, 1898	2.75	2.25	1.85	1.75	9.55	9.80
1897	May 20, 1897	2.60	2.25	2.15	1.90	8.35	8.40
1896	May 1, 1896	4.00	3.50	2.70	2.25	12.40	11.15
1895	April 1, 1895	2.90	2.19	2.25	1.95	9.40	9.40
1894	Mar. 1, 1894	2.75	2.35	2.50	no sale	9.65	9.65
1893	Mar. 15, 1893	3.85	3.00	3.20	no sale	12.65	12.15
1892	Jan. 31, 1892	4.50	no sale	3.65	no sale	15.00	13.65
1891	June 1, 1891	4.50	no sale	4.25	no sale	15.15	15.00
1890	Dec. 15, 1889	5.50	no sale	5.25	no sale	22.15	18.15

Coke Output Grows

Statistics of coal and coke production in Alabama in 1917 show an increase of 2,178,216 tons in coal and 483,105 tons in coke. The coal production in the 11 coal producing counties of the state amounted to 20,412,841 tons in 1917 against 18,234,625 tons in 1916. Four counties produced coke, the total being 4,868,598 tons, against 4,385,493 tons in 1916. Two of the 11 counties showed decreases in coal production and one county in coke output.

Completing Tin Smelter

An interesting feature of the annual report of the National Lead Co., just issued, is the statement by President J. Cornish with regard to the company's tin smelting preparations. He said: "The tin smelting works being constructed in Brooklyn by the Williams Harvey Corp. is nearing completion. There have been delays due to war conditions, but operations are expected to begin in July. The National Lead Co. and the former owners of the Williams Harvey Co., Ltd., of England, have sold one-third of the outstanding capital stock of both the English and American corporations to Simon I. Patino, the largest individual tin mine owner in Bolivia. Under the present stock ownership in both companies, the miner, smelter and distributor are equally interested in the success of the enterprise."

Acquire Shafting Plant

Transfer of 65 per cent of the outstanding stock of the Pennsylvania Shafting Co., Spring City, Pa., to the Latshaw Steel & Metal Products Corp., has been completed. H. L. Latshaw has been elected president and chairman of the board; William Parker, vice president; James Taylor, treasurer and director; R. Hueber, secretary and director; and R. Grass, assistant secretary. The first four named with Alfred C. Harmer form the board of directors. The shafting company is being reorganized and the plant will be fully operated. General sales offices have been transferred to 220 Broadway, New York. On May 1, larger offices will be provided at 261 Broadway which will become the general offices and the sales headquarters for both companies. The new Chicago office of the Latshaw Steel & Metal Products Corp., Railway Exchange building, will serve the same capacity for the Pennsylvania Shafting Co. Marvin W. Singer, vice president of the Latshaw corporation will represent the new organization in the Chicago territory.

All Ways Now Filled

The Submarine Boat Corp. April 17 laid the twenty-eighth keel at its shipyard at Port Newark terminal, N. J. The company now has all of its 28 ways in use in the construction of 5500-ton steel freighters for the government. Henry R. Sutphen, vice president of the Submarine Boat Corp., announced that the number of men employed at the plant would be increased to 15,000, and that when the maximum capacity is reached, a complete ship will be produced every two working days.

Gambling Evil Increases

In many manufacturing establishments in England, gambling is prevalent and the evil is on the increase particularly in Sheffield. Plant managers have gone to court, but in view of the time and trouble that it involves, are endeavoring to deal with the proposition themselves. To some extent the practice gained impetus through the introduction of men from other trades as "dilutees" and while executives are at a loss to know what to do to correct the tendency, they are appealing for the development of a strong public opinion to eliminate the vice.

Percentages of Advances and Declines in Ore and Pig Iron, 1903-1918

Year	Old range bessemer	Advance or decline in price	Advance or decline in per cent	Bessemer pig iron Valley	Advance or decline in price	Advance or decline in per cent
1918	$5.95	.....	.....	$35.20	+$ 5.20	+17.33
1917	5.95	+$1.50	+33.7	30.00	+ 11.50	+62.2
1916	4.45	+ .70	+18.7	18.50	+ 4.90	+36.0
1915	3.75	.....	.....	13.60	— .40	— 2.9
1914	3.75	— .65	—14.8	14.00	— 3.25	—18.8
1913	4.40	+ .65	+17.3	17.25	+ 3.00	+21.1
1912	3.75	— .75	—16.7	14.25	— .75	— 5.0
1911	4.50	— .50	—10.0	15.00	— 4.00	—21.1
1910	5.00	+ .50	+11.1	19.00	+ 4.25	+28.8
1909	4.50	.....	.....	14.75	— 1.25	— 7.8
1908	4.50	— .50	—10.0	16.00	— 5.50	—25.6
1907	5.00	+ .75	+17.6	21.50	+ 4.25	+24.6
1906	4.25	+ .50	+13.3	17.25	+ 1.75	+11.3
1905	3.75	+ .50	+ 1.54	15.50	+ 2.15	+16.1
1904	3.25	— 1.25	—27.8	13.35	— 8.15	—37.9
1903	4.50	.....	.....	21.50	.....	.....

Speeding Up Brings Tool Business

Momentum Imparted to Munitions Work and the Continuing Development of Shipbuilding Supplies a Large Aggregate Volume of Machine Tool Inquiries—Additional Business is Expected from Impending Shell Orders

INCREASED momentum impelling the ship construction program and the urgent demand for more speed on all classes of munitions work have furnished the dominant force back of machine tool requirements during April. A number of new shipbuilding companies have entered the field, and others have brought their preliminary work to the point where new equipment was made necessary by additional contracts from the Emergency Fleet corporation. The requirements of the yards are varied, ranging from drills, lathes, etc., for the plate shops at the yards to a wide range of pneumatic tools, and welding apparatus used in assembling the fabricated ships. Cranes, however, form the major item in the needs of shipbuilding up to the present. The American International Shipbuilding Corp., Philadelphia, has been a steady purchaser of various types and sizes of cranes, and during April placed twenty-four 10-ton and four 35-ton locomotive type gantries with the McMyler Interstate Co., Bedford, O. An additional requirement of 30 cranes is at present in the market from the same company. The stupendous proportions of modern shop and shipyard work, involving the problems of handling and placing heavy equipment has resulted in the construction of cranes far surpassing any previously conceived.

War Work Gives Impetus to Market

A CONCERTED effort has been apparent to speed production in all classes of war work. Whether this has been the logical result of the developing war program, or an industrial reaction from the hammering of the German drive, the machine tool situation has been materially affected. While no exceptionally large requirements have come on the market during April, a steady demand has been noted from those manufacturers who are already actively engaged in munitions work. In a number of instances the pressure applied to speed up has resulted in duplicate orders for a large share of the equipment in active shop use at the present time. In other cases, a few individual tools have been inquired for to be used where they would be effective in increasing output. The request for speed on motors for airplanes has had an appreciable effect and has been reflected in the machine tool market. Liberty motors have supplied a share of this impetus, and the undertaking of new contracts for Hispano-Suiza, and Rolls-Royce airplane motors have furnished an inquiry for equipment which is in most cases, however, supplementary as contracts have been placed with established and operating concerns.

Miscellaneous Subcontracts Furnish Steady Demand

A WIDE distribution has obtained with reference to orders for shells and guns which had previously been alloted in quantity. Subcontract work absorbed by smaller concerns has resulted in a steady demand for small lots of tools which while insignificant individually has furnished a large volume of machine inquiries in the aggregate. The middle west has profited in particular by this class of inquiry, and machine shops even in the smaller communities have absorbed a volume of munitions work which in turn has furnished tool business. In the larger centers a few sizable contracts have made their appearance and lists have been put out. The Standard Steel Car Co., Hammond, Ind., the Willys-Overland Co., Toledo, O., and the Pullman Co., Pullman, Ill., have furnished the largest individual requirements in the central west during the past month. In the Detroit, Dayton, O., and Cleveland districts and from points throughout Ohio, Indiana, Michigan and Illinois there has been a steady volume of small-lot orders. Moline, Rock Island and Davenport forming a tri-city group on the Illinois-Iowa line are developing an important munitions center. The Rock Island arsenal has been given a further appropriation, but has not issued a list up to the present. The Japanese navy is inquiring for a number of miscellaneous tools.

Deliveries Show Little Improvement

LABOR shortage is the prime reason for the fact that deliveries continue slow on many classes of machine tools. Large lathes and boring machines are particularly difficult to obtain. The best that can be done on some makes of these machines is six months, while in some cases the earliest delivery is from eight to 10 months. Milling machines except for specials show some improvement and small lathes and drills appear plentiful. Prices have been advanced on shapers and lathes and a general upward trend is predicted. Dealers handling milling machinery exclusively, however, expect little advance in this line before the first of next year. In general price advance has been in accordance with the increase in labor and material costs. Machine tools for private commercial purposes are becoming increasingly difficult to obtain. Even the railroads are finding the problem of necessary replacements hard to meet. One mechanical engineer for a middle western division reported ordering a wheel and axle lathe for a shop where a replacement was badly needed. The order was accepted but when an inspector for the company called to accept the tool, he found that it had been taken for use in the locomotive works built for the government in France. In general, machine tool dealers welcome the offices of the government in assigning or designating equipment for urgent government work, as it removes the responsibility when old customers must wait.

Large Volume of Shell Work is Expected

WITH the huge tonnage of shell steel now going to the mills, machine shop activity on finishing work is anticipated. Considerable of this shell work it is anticipated will be handled by western companies, and will necessitate a great amount of additional machinery and equipment. Forging capacity for this will involve the purchase of a large number of heavy presses, and some inquiries are already in the market. During the past week the government has awarded some heavy shell work to Canadian companies already equipped to handle such work. Heavy gun manufacture is receiving attention, and plans looking to the establishment of an ordnance manufacturing plant larger than either the Watertown or Watervliet arsenals are under consideration. When this plan is carried out, an unprecedented demand for heavy equipment is anticipated.

Tool Market Shows Temporary Lull

Light Buying Reported From All Districts—Miscellaneous Small Lot Inquiries Continue to Bridge the Gap Preceding Large Requirements Which Are Expected From Impending War Contracts

THE present lull which marks the machine tool situation this week has been aptly likened to the deep inhalation which precedes the plunge into an active market to result from the volume of war orders in sight. No large lists have emanated recently, but some of the requirements which have been noted from time to time are as yet unclosed. The Wright-Martin Aircraft Corp., New Brunswick, N. J., has awarded some tools, but the greater part of its requirements still are open. The government will place orders soon for a number of miscellaneous tools, which are required for navy yard and arsenal work. An appropriation has been given to the Rock Island arsenal for new equipment, but up to the present time no list has been issued. Dealers in general state that a fair volume of business obtains, but the replacement orders and the inquiries for small lots are not as plentiful as during the past few weeks. The immediate future, however, seems to promise an active demand. The shell steel which is going through the mills will demand a large amount of forging equipment. As it proceeds through the finishing processes, much additional machinery will no doubt be essential, as speed of production will be the governing factor. With the machinery resources of the country at present fully engaged to capacity, and with the pressure for increased output, this new shell manufacture will prove a burden to be met only by additional facilities. Some heavy projectile work has been awarded in Canada. Deliveries are still slow on a number of machines, notably shapers and heavy boring machines, but in other lines an improvement is noted. Inquiries for drills, and lighter lathes and shears, are being promptly supplied. The demand for cranes shows an increase due to the activity along shipbuilding lines. Cranes for terminal service and in a number of foundries and machine shops handling government work also are in more active demand. Hoisting and conveying machinery is expected to be active as a result of the educational campaign having for its object the summer storage of next year's coal.

Sub-Contractor and Shipyards Furnish Inquiries

WITH miscellaneous demand now assuming better proportions, eastern machine tool dealers are viewing the situation in the equipment market with more optimism. During the past week a considerable improvement from manufacturers of brass specialties has been noted, and inquiry from shipbuilders and companies holding government subcontracts has been of more substantial volume. A development of much interest, and one which is expected to result shortly in considerable new business, was the award by the government this week of several large contracts to Canadian companies for the production of 12-inch shells. These, it is stated, are soon to be followed by contracts for 14 and 16-inch projectiles. Several companies in this district are figuring on equipment in anticipation of further shell contracts. The American Can Co., it is understood, has already started purchasing tools needed in this work for its plant at Edgewater, N. J.

Wright-Martin List Remains Open

The Wright-Martin Aircraft Corp., New Brunswick, N. J., has recently purchased several grinders and lathes, but has not as yet taken any decisive action on the large list issued several weeks ago. The government is in the market for 62 milling machines for the Washington navy yard. Bids will be opened May 10. Additional tools have been purchased during the past few days for the Watervliet arsenal. Further equipment also is being bought by the Virginia Shipbuilding Co. for its machine shop at Alexandria, Va. It is stated that tentative inquiries for punching and shearing equipment have been put out by the Carolina Shipbuilding Co., which was recently organized by the George A. Fuller Co., New York City, to operate the proposed government plant at Wilmington, N. C. Offices have been established by the Carolina company at 415 Broadway, New York City. The Foundation Co., 233 Broadway, New York City, is expected to act shortly on a sizable inquiry recently issued. The Groton Iron Works, Groton, Conn., is buying a few lathes. With the railroad administration now placing orders for rolling stock, a resumption of buying by car and locomotive builders is expected. Tools needed in the manufacture of mechanical stokers for locomotives will amount to several hundred thousand dollars.

The Morse Dry Dock Co., Brooklyn, has purchased a 1000-ton hydraulic press for its proposed forge shop from the United Engineering & Foundry Co., and is understood to be in the market for some small miscellaneous tools. Included in plant construction now contemplated is $150,000 foundry for the Pratt & Letchworth Co., Buffalo. Work soon will be started by the Crescent Insulated Wire & Cable Co., Trenton, N. J., on a $100,000 addition. Dougherty & Bachran, Philadelphia, will build a $70,000 machine shop. The Continental Can Co., Syracuse, N. Y., is drawing plans for a $60,000 power house. The Arrow Electric Co., Hartford, Conn., will build a large addition to its plant.

Demand for cranes, while an improvement over that of a month ago, continues relatively quiet. An important inquiry out at this time is that of Fay, Spofford & Thorndike, Boston, calling for 30 special cranes for the new



SALES OFFICES:

Detroit Office — 326-27-28 Ford Bldg. F. Walter Guibert, District Representative.

Cleveland Office—Hickox Building. The Hamill-Hickox Company, District Representative.

Chicago Office—1370 People's Gas Bldg., 122 S. Michigan Blvd. C. H. Beach, District Representative.

Philadelphia Office—603 Widener Bldg. Frank Wallace, District Sales Manager.

Syracuse Office — 621 University Block T. B. Davies, District Sales Manager.

J. E. Dockendorff & Co., 20 Broad Street, New York, General Export Agents.

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government terminal in that city. These cranes will be of the boom type and will range in capacity from 1½ to 2 tons. It is expected that the proposed $40,000,000 government plant to be built at Brooklyn will also require a large number of cranes. The Arthur C. Harvey Co., Boston, dealer in iron and steel products, is contemplating the purchase of three or four traveling cranes. The Gilbert & Barker Mfg. Co., Springfield, Mass., is inquiring for a 5-ton electric loading crane. The Eagan Rogers Steel & Iron Co., Crum Lynne, Pa., is also in the market for a 5-ton electric crane. The Carolina Shipbuilding Co., 415 Broadway, New York City, is making tentative inquiries for conveying equipment for its proposed plant at Wilmington, N. C. It is understood that only electric hoists will be purchased at this time.

Included in business recently placed are eight 35-ton locomotive cranes for the American International Shipbuilding Corp. These are to be built by the Industrial Works, Bay City, Mich., and make a total of 36 cranes to be bought by the American International within the past few weeks. The E. I. du Pont de Nemours Co., Wilmington, Del., has bought a 10-ton electric crane from the Case Crane & Engineering Co., Columbus, O. The Philadelphia Rapid Transit Co., Philadelphia, placed a 15-ton electric crane with Alfred Box & Co., of that city. The Merrill-Stevens Shipbuilding Corp., Jacksonville, Fla., has closed on its recent inquiry for one 25-ton and two 50-ton cranes. It is understood that at least two are used cranes. The government has purchased a 30-ton crane from the Shaw Electric Crane Co., Muskegon, Mich., and a 5-ton used Pawling & Harnischfeger, Milwaukee, crane for its naval base stores in Brooklyn. The Cleveland Crane & Engineering Co., Cleveland, received 17 cranes, including one 100-ton crane, of those recently allotted by the government for the Washington navy yard. A 200-ton electric crane is to be purchased for the gun shop at this yard. The Ludin Steel Castings Co., Neponset, Mass., is expected to close on a 5-ton electric crane this week.

War Requirements Dominate Chicago Market

AS in practically all departments of the iron and steel business, war requirements dominate the machine tool industry in the Chicago district. This is true of the small buying, which forms the larger portion of present activity, as well as in the larger buying which comes out from time to time. The only important cause for adding to machine shop equipment is an endeavor to provide for increased demands by the government, both direct and indirect. The Rock Island arsenal has been given a further appropriation but no list has yet been issued covering the material for which this will be expended. The large list recently issued by the Burlington railroad is still open and nothing definite has been done during the past week. The Winslow Bros. Co., Chicago, which has a large munitions order, has been a heavy buyer of equipment but has covered all its needs for its present plant. The Davenport Mfg. Co., Davenport, Iowa, which recently took a government contract, has bought considerable general equipment and has covered its present requirements. The Hackett Motor Co., Grand Rapids, Mich., will build a plant to manufacture gasoline engines. The Astoria Marine Iron Works, Astoria, Oreg., will build a machine shop, foundry and forge shop. The Hall-Scott Motor Co., Berkeley, Cal., is adding to its plant to enlarge its production of war motors. The Climax Engineering Co., Clinton, Iowa, will build a machine shop. The United States Auto Gear Shift Co., Eau Claire, Wis., is building a four-story shop. The Liberty Foundry Co., Portland, Oreg., is building a foundry and machine shop for which new equipment will be required. An addition is under construction at the plant of the Diamond T Motor Car Co., 4517 West Twenty-sixth street, Chicago, for which considerable equipment will be purchased.

Comparative Quiet Prevails in Cleveland Market

A DIMINUTION of the volume of single inquiries is noted in the vicinity of Cleveland, and few lists are out. Dealers, however, are optimistic and assign the condition to a breathing spell previous to orders which are anticipated from government work in sight. Used tool and supply men report more inquiries than they are able to handle as little equipment is being disposed of at the present time. Heavy tools in particular are wanted in many quarters. It is stated that the Japanese navy is in the market for miscellaneous machines including engine lathes, milling machines, boring mills, slotting machines, radial drills, planers and some horizontal boring machines. The Miami Machinery Co., Toledo, O., is inquiring for milling machines and a shaper. The Michigan Malleable Mfg. Co., Detroit, will purchase a large pulley lathe. The Sharon Hardware Co., Sharon, Pa., are in the market for a surface grinder.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The Towar Textile Mills Corp. has been incorporated with $2,500,000 capital by E. Maynard Thompson, L. A. Stevens and I. S. Kearney.

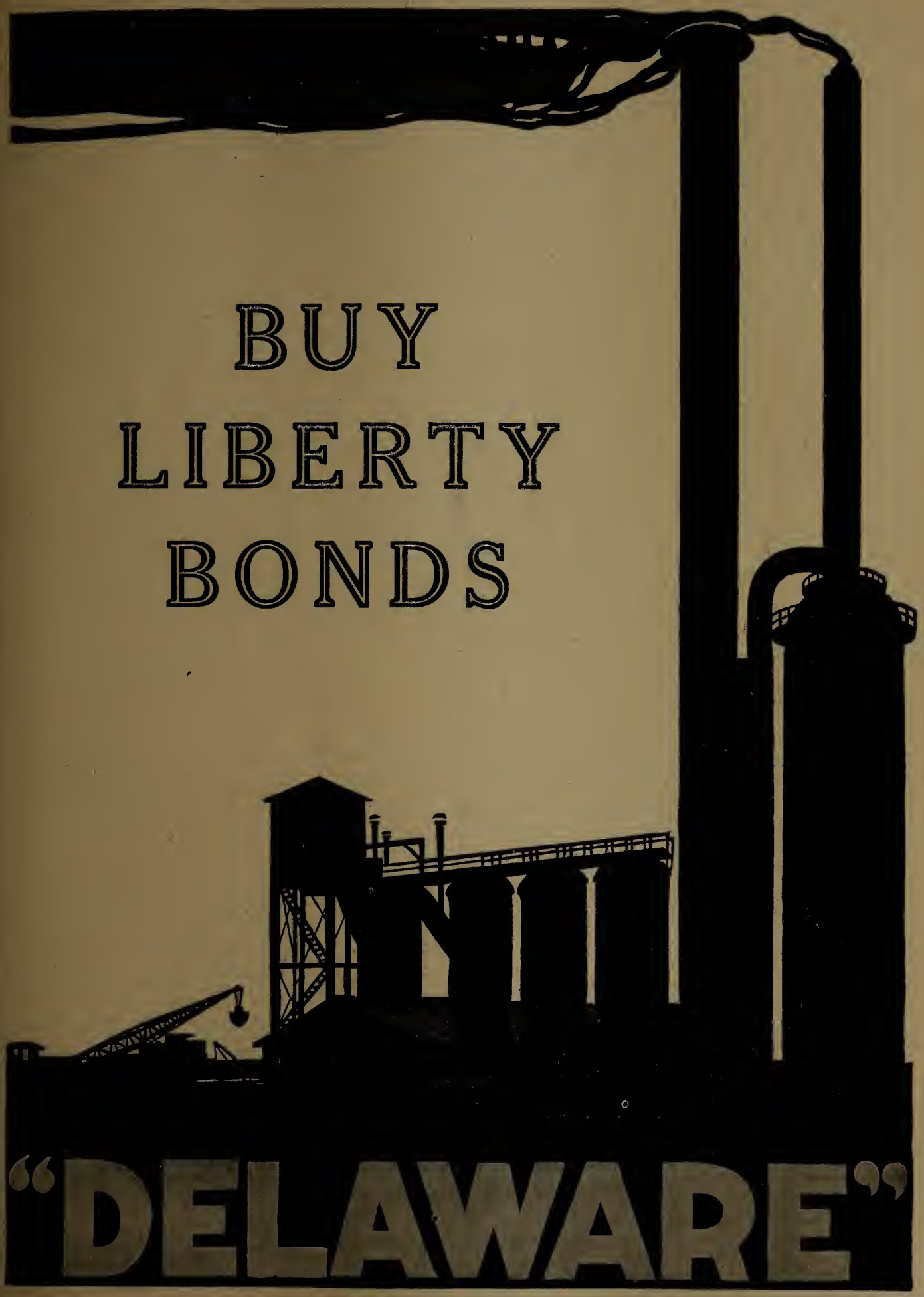
BRUNSWICK, ME.—The Texas Steamship Co., of Bath, Me., has acquired the title to a track of land of about 7¼ acres at Hardings, which will be used for a freight yard and the storage of raw materials. The land is being graded and double tracked so it can be put to use within a short time. Most of the material to be stored is steel.

BUCKSPORT, ME.—A New York syndicate has purchased property on the Penobscot river and will establish a shipyard under the name of the Penobscot River Shipbuilding Co. It will make ocean-going tugs.

OLDTOWN, ME.—The foundry of the machine shop of the T. M. Chapman's Sons' Co. was damaged by fire April 15.

PORTLAND, ME.—The plant of the Bancroft & Martin Rolling Mills Co. has been sold to interests identified with the Cumberland Shipbuilding Co. It will be operated in co-ordination with the Cumberland plant, which will later be enlarged by the erection of several new buildings.

PORTLAND, ME.—At the annual meeting of the Maine Central railroad stockholders voted to leave the matter of a $3,000,000



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bond issue in the hands of directors, with authority to act when they see fit. The money will be used largely for new equipment.

BENNINGTON, VT.—The Holden, Leonard Co., woolens and worsteds, is completing a 4-story building to hold five sets of carding machines and spinning machinery of equivalent capacity; also 20 broad looms.

BEVERLY, MASS.—The Reid Bros. Co. has been incorporated to manufacture machinery and tools with $20,000 capital by Robert Reid, Andrew S. Reid and F. H. Leonard.

BOSTON.—The Mosstwin Co. has been incorporated to manufacture fasteners of all kinds with $150,000 capital by Isidor Moss, Louis J. Stern, Mattapan, Mass., and I. R. Bailie.

BOSTON.—The Utilities Mfg. Co. has been incorporated with $200,000 capital by Richard J. Reeves, Arthur C. Putnam and W. S. Douglas.

BOSTON.—Edgar T. Ward & Sons, South Boston, have awarded the general contract for the construction of a 1-story addition to their annealing shop.

BOSTON.—The Premier Machine & Press Co. has been incorporated to manufacture machinery, with $1,000,000 capital, by Fisher H. Nesmith, Cambridge, Mass.; J. S. Stone, Wayland, Mass., and Alexander G. Grant.

CAMBRIDGE, MASS.—The Worthington Pump & Machinery Corp. as agent of the United States government, has let the contract for a brick and structural steel, 1-story, 140 x 140 x 59-foot factory to cost $35,000 on Rogers street.

CAMBRIDGE, MASS. — The Cambridge Electric Light Co. has let the contract for a brick and stone, 1-story, 44 x 69-foot extension to its boiler house on Western avenue, to cost $20,000.

CHICOPEE, MASS.—The Page Needle Co. has been incorporated with $300,000 capital by W. S. Page, Irving H. Page, Chicopee Falls, Mass.; and C. O. Orne.

EAST CAMBRIDGE, MASS.—The oil storage plant of the Alden Speare's Sons Co. was damaged to the extent of $100,000 by fire, April 15.

EAST LONGMEADOW, MASS.—The New England Castings Co., recently incorporated with $99,000 capital has acquired the stone cutting plant of the Norcross Brownstone Co., Worcester, Mass., and will make small, high grade steel castings by an electrical process.

FAIRHAVEN, MASS. — The Fairhaven Shipbuilding Co. has been incorporated with $150,000 capital by C. G. Whiton, David L. Kelley and I. N. Babbitt.

FALL RIVER, MASS.—The Narragansett Shipbuilding Co. has been incorporated with $150,000 capital by H. C. Wood, Westfield, Mass.; A. B. Murdough, Watertown, Mass., and H. J. Ashe, North Adams, Mass.

FRAMINGHAM, MASS. — The Framingham Forge Co. has been incorporated with $25,000 capital by James S. George, William B. Arnold, Newtonville, Mass., and H. H. Ballard Jr.

FRAMINGHAM, MASS.—A stone church will be erected at the corner of Concord and Lincoln streets, here, for the Framingham Methodist Episcopal society. The building will be 60 x 100 feet and cost about $40,000. John Ferguson, Boston, has the contract for the building.

HYDE PARK, MASS.—The Mason Regulator Co. will build a reinforced concrete, fireproof, 3-story, 80 x 160-foot factory on Hyde Park avenue.

MAYNARD, MASS.—The Concord, Maynard & Hudson Street Railway Co. has let the contract for a brick, 1-story, 150 x 78-foot car barn at Main street and Great road, to cost $20,000 and to replace that recently burned.

NEW BEDFORD, MASS. — An addition will be erected at the plant of the Continental Wood Screw Co., plans for which are being drawn by C. Hammonds & Son.

NORTH ATTLEBORO, MASS.—A 2-story brick high school building will be erected on South Washington street at a cost of $200,000. The building will be 117 x 160 feet. The contractor is J. A. Monroe, of this town.

PEABODY, MASS.—The A. C. Lawrence Leather Co. will build a reinforced concrete, 7-story and basement, 90 x 80-foot, extension to its storage building at Crowninshield and Endicott streets.

SAUGUS, MASS.—A public library for this town has been started. The building, which will be 1-story, of brick and stone, fireproof, 75 x 25 feet, will cost $15,000. Edward D. Dearborn, Lynn, is the general contratcor.

SOMERVILLE, MASS. — The American Tube Works has let the contract for a brick, 1 and 2-story, 49.11 x 29.3-foot machine and blacksmith shop at 440 Somerville avenue.

SOUTH SOMERSET, MASS. — The Crowninshield Shipbuilding Co. will build a reinforced concrete, 1-story, 75 x 100-foot machine shop and let the contract for a marine railway of 2500 tons ship capacity.

SPRINGFIELD, MASS. — Tremblay-Hathaway, Inc., has been incorporated to manufacture automobiles, trucks, etc., with $50,000 capital by D. J. Tremblay, Theodore B. Hathaway, Fall River, Mass., and A. B. Hathaway.

SPRINGFIELD, MASS.—The Moses Ehrlich Iron & Coal Co., Inc., has been incorporated with $85,000 capital by Moses Ehrlich, H. M. Ehrlich and Simon Ehrlich.

WORCESTER, MASS.—The M. D. Holmes & Sons Co., steamfitter and plumber, will build a brick, 4-story and basement, 100 x 50-foot office, show room and warehouse building at Portland and Federal streets.

WORCESTER, MASS.—The United Toy Mfg. Co. has been incorporated with $20,000 capital by Solomon Stayman, Jacob L. Goding and Louis Nestor.

WEST SPRINGFIELD, MASS. — Plans are being drawn for an 80 x 370-foot addition to its factory and a concrete 370-foot long loading platform for the Gilbert & Barker Mfg. Co. on Cold Spring avenue.

WORCESTER, MASS.—The B. F. S. Mfg. Co. has been formed to manufacture electric valve grinders and special machinery at 54 Hermon street, by Bror F. Stenman, Carl W. Fors, Charles E. Mattson and J. Henry Lindberg.

PROVIDENCE, R. I.—The town of East Providence has granted the necessary permits for the erection by the Standard Oil Co. of New York of 300 oil tanks, of all sizes, and buildings for a distributing station to be located there.

PROVIDENCE, R. I. — The Greenwich Mill at East Greenwich, has awarded the contract for a weave shed addition, construction of which is to commence immediately. The building is to have temporary wooden ends to permit of further expansion. The company has ordered twenty-four 82-inch worsted looms to be installed in the addition.

HARTFORD, CONN.—A plant to cost about $100,000 to extrac toluol from the city's gas supply will be erected immediately near the Hartford City Gas Co.'s works, under the supervision of government officials. It is estimated that the new plant will produce about 50,000 gallons of toluol a year. It is reported that similar plants will be erected soon in New Britain, Meriden and Middletown.

NEW BRITAIN, CONN.—Landers, Frary & Clark will build a brick, 2-story, 45 x 227-foot addition to its factory on Center street, to cost $35,000.

NEW HARTFORD, CONN.—The factory of the Standard Brush Co. was damaged by fire, April 11, with a loss of $50,000. It was engaged on government contracts.

NEW LONDON, CONN.—A $13,000 machine shop will be built by the navy department in this city.

SPRINGDALE, CONN. — The British-American Mfg. Co. has let the contract for the erection of a 60 x 200-foot, one-story, factory addition. When this building is completed, another 50 x 100 feet will be erected. The estimated cost of the two buildings is about $125,000.

STAMFORD, CONN.—The Stamford Electric & Mfg. Co., which recently completed a 2-story factory in this city, now plans to enlarge this building, and also erect another structure of similar proportions.

Trade Announcements

The American Zinc Products Co., Greencastle, Ind., has opened an office in Chicago, 1029 McCormick building, with D. S. Oskin as western sales representative. He formerly was sale manager for the Trumbull Steel Co., Warren, O.

E. Kaufman & Co., Farmers Bank building, Pittsburgh, dealers in high grade steel and alloys, will move into larger quarters of the same building on May 1.

The Federal Machinery Sales Co., of 12 North Jefferson street, Chicago, has opened a branch office at 1320 Majestic building, Milwaukee, under the supervision of H. L. Cole. After May 1, the business of Clarke & Harrison, machinery and equipment, will be conducted under the name of George W. Clarke Co., 149 Broadway, New York. The Ott Grinder Co., Indianapolis, Ind., has purchased the controlling interest held by Albert J. Ott and his son Conrad. Russell Fortune is general manager.

The Sprague Electric Works of the General Electric Co. has removed its Boston office from 201 Devonshire street to 84 States street.

D. J. Crowley, manufacturers' representative, has removed from 183 Whitney avenue to 823 Dime Bank bulilding, Detroit.


A PERFECT START—
A PERFECT FINISH
A successful offensive manoeuvre must gain its objective. Tanks, planes, and motors must be able to make a perfect finish as well as a perfect start. They must have, not only power and endurance enough to buck the inferno of a modern defence, but also reserve power enough to carry them through to the victory.
Vehicles of war or peace, in order to gain their objective—in order to give the satisfaction or produce the results for which they were intended, must have invulnerable vital parts.
Whether you are manufacturing Tanks, Airplanes, Motor Trucks, Automobiles, Farm Tractors or other farm machinery you should have castings of a quality and strength fit for that particular service.
The Ohio Steel Foundry Co.
Plants
Springfield, Ohio Lima, Ohio Bucyrus, Ohio
Quality PLUS Service

Along the Middle Atlantic Seaboard

BATAVIA, N. Y. — The Massy Harris Harvester Co. will start work shortly on the construction of a 1-story warehouse, 144 x 168 feet.

BINGHAMTON, N. Y.—C. E. McGill is having plans prepared for a $15,000 machine shop.

BROOKLYN, N. Y.—Julius Kayser & Co., 45 East Seventeenth street, New York City, have awarded the general contract for a $30,000 factory building to the White Fireproofing Construction Co.

BROOKLYN, N. Y.—A $45,000, 4-story factory building will be erected by Cornelius Wiess, 226 Henry street. Carlson & Weisman are architects in charge of the work.

LONG ISLAND CITY, L. I., N. Y.—Plans are being drawn for warehouses at the new barge canal terminal in this city by Frank M. Williams, state engineer, Albany, New York.

MOHAWK, N. Y.—Frank M. Williams, state engineer, Albany, N. Y., is drawing plans for a hydraulic power plant, which is to be erected in this city.

TOMPKINSVILLE, S. I., N. Y.—A $95,000 machine shop will be erected here shortly by the government ,this being one of the items mentioned in the lighthouse bill which was recently favorably reported in congress.

AMBRIDGE, PA. — The Parker Woolen mills, Second National Bank building, let a contract to Kemena and Ehrheart, Eleventh and Melrose streets, for a $25,000 addition to its plant.

LITITZ, PA.—H. B. Workman & Co., manufacturer of halters, trunk straps, and other webb goods, on Pine alley, this city, has arranged to build a 2-story addition, 25 x 50 feet to its plant, this city.

PITTSBURGH.—The South Pittsburgh Water Co., 238 Brownsville road, let a contract to Walker & Curley Co., East End Savings and Trust building, for a 1-story addition, 48 x 118 feet to its power plant.

POTTSVILLE, PA.—The Bob & Baskind Co. will double its capacity of the factory at Railroad and Morris streets. Mr. Dubinsky is manager.

WARREN, PA.—The Ill Will Creek Oil & Gas Co., capitalized at $30,000, to operate wells in the state of Kentucky, was chartered by S. E. Pryor, W. J. Eagan, A. Krupp, George A. Krupp, George B. Brenneison, Warren; and X. L. Conn, Meadville, Pa.

BELLEVILLE, N. J.—Lloyd Chemical Co. will erect several 3-story brick buildings on Holmes street to cost $2,000,000.

CAMDEN, N. J.—Standard Projectile Boring Machine Co. has been chartered with $100,000 capital to manufacture projectile machines. Samuel S. Williams, W. W. Williams and Edward L. Parker are the incorporators.

CLIFTON, N. J.—Clifton Milling Co. will erect a 4-story concrete factory to cost $250,000.

HARRISON, N. J.—Plans are being drawn for the erection of a $50,000 addition to the plant of H. R. Worthington Co. The Austin Co., Philadelphia, will be in charge of the work.

JERSEY CITY, N. J.—DeRosa & Pereira, New York City, has awarded a contract to I. A. Hoppers Sons, New York, for a 2-story factory addition on Hudson boulevard to cost $100,000.

NEWARK, N. J.—A power house 40 x 60 feet in size, to cost $9000, will be erected at the plant of the Northern Leather Works & Products Co. E. Havemann is president, with offices at 377 Broadway, New York.

NEWARK, N. J.—De Meese & Heyman, Inc., has been incorporated with $10,000 capital to manufacture engines, etc. Fred De Meese, I. E. Heyman and Emanuel Heyman are incorporators.

NEWARK, N. J.—Simmons Co. has been chartered with $13,000,000 to manufacture mattresses, etc. Z. G. Simmons, A. H. Lane and George H. Milne, all of Kenosha, Wis., are the incorporators.

NEWARK, N. J.—Martin Dennis Co., 170 Sylvan avenue, will erect a 1 and 2-story brick and steel factory, 82½ x 125½ feet in size, to cost $29,401.

NEWARK, N. J.—Oxweld Acetylene Co., 646 Frelinghuysen avenue, will erect a 1-story steel storage house, 40 x 100 feet in size.

PLAINFIELD, N. J.—International Motor Co. has awarded a contract to F. T. Ley & Co., New York, for a 4-story addition, 78 x 288 feet in size, to cost $200,000.

TRENTON, N. J.—William R. Thropp Sons Co., East State street, is rebuilding its burned machine shop and pattern shop and is in the market for planes and other machinery. Joseph W. Thropp, secretary-treasurer.

FORT PENN, DEL. — It is understood that the ordnance bureau contemplates the erection of a plant in this city.

WILMINGTON, DEL.—New bids are being received by Architect George F. Pawling on a foundry, pattern storage shop and pattern shop addition, costing in all $200,000, for Pusey & Jones.

BALTIMORE.—Work will soon be started on a $100,000 boiler house for the Consolidated Gas & Electric Power Co.

BALTIMORE.—Bids are being received by Architect Joseph Evan Sperry for a $50,000 addition for Mt. Vernon Woodberry Mills, Inc.

BALTIMORE. — A $100,000 coal tipple will be erected by the United States Industrial Chemical Co.

Activities in the Central States

APPLETON, WIS. — C. D. Thompson, secretary, Industrial School board, took sealed bids until April 22 for the construction of the first unit of the new vocational training institute. The unit will be three stories high, 100 x 100 feet, of reinforced concrete, brick and steel, and was designed by Architects Child & Smith, 1261 Peoples Gas building, Chicago. The estimated cost is $85,000, including manual training and other equipment.

ASHLAND, WIS.—The L. E. Meyers Co., 58 West Jackson boulevard, Chicago, has been awarded the general contract to design and construct a $100,000 hydro-electric power plant for the Ashland Light, Power & Street Railway Co. at Superior Falls, Wis. Preliminary work now is under way.

BARABOO, WIS.—The Protheroe & McGinnis Auto Co., manufacturer of hoisting apparatus for motor dump trucks, will build an addition to its machine shop.

GREEN BAY, WIS.—Hudson & Sharp, 1207 Main street, will build a 2-story machine shop to cost $95,000. C. H. Williams is architect.

EAU CLAIRE, WIS.—The Gillette Rubber Co., tire manufacturer, has awarded the following contracts for the erection of a 2-story brick and steel addition, 65 x 145 feet in size: Steel, Northwestern Bridge & Iron Co. and Lakeside Bridge & Steel Co., Milwaukee; mason and concrete, R. L. Rickman, Eau Claire; elevators, Kieckhefer Elevator Co., Milwaukee. Edward Hutchens is vice president and chief engineer.

MADISON, WIS.—The Madison-Kipp Lubricator Co., manufacturer of lubricating devices, is building an addition for light machine work and assembling to cost $35,000.

MADISON, WIS. — The Municipal Appliance Co., capitalized at $150,000, has been chartered to manufacture direction signals, by H. R. Martin, A. R. Earle, and L. B. Martin, of Edgerton, Wis.

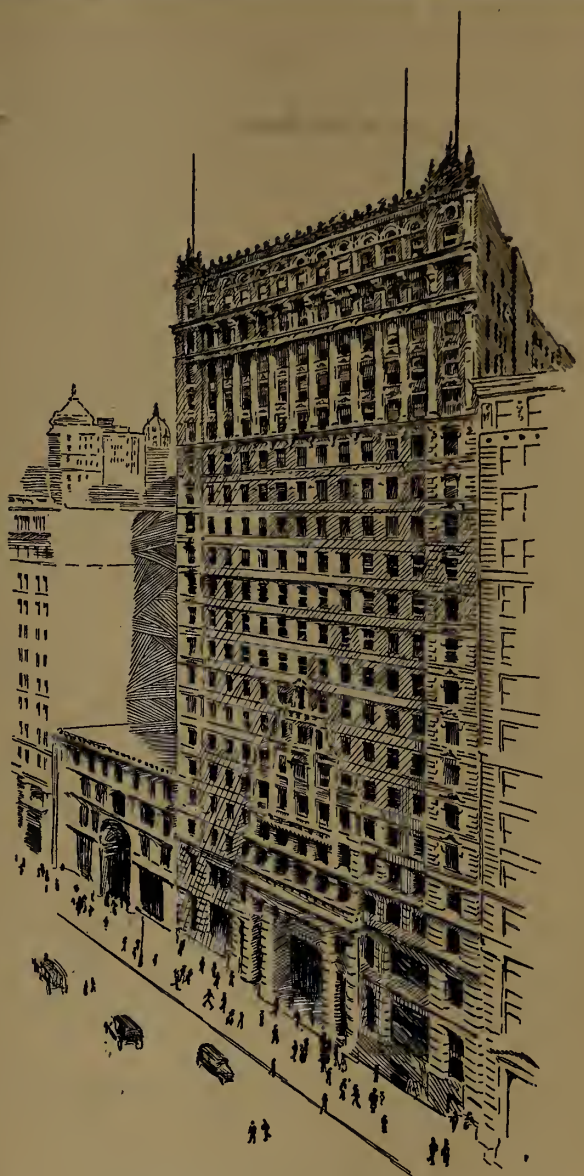
MARATHON CITY, WIS.—Architect H. T. Liebert, Wausau, Wis., is taking bids for the erection of a $200,000 monastery, 150 x 170 feet, two stories and basement, at Marathon City for the Province of St. Joseph, Capuchin Fathers.

MILWAUKEE.—The Harley-Davidson Co., 160 Clinton street, manufacturer of motorcycles, will build a plant at Fortieth and Chestnut streets, to cost $50,000.

MILWAUKEE.—The J. C. Thielacker Co., capitalized at $10,000, has been chartered to manufacture architectural and ornamental iron work by Benjamin J. Sommers, George G. Cromlie and Julius C. Thielacker, 937 Twenty-second street.

MILWAUKEE. — The Milwaukee-Western Fuel Co., Milwaukee, through Klug & Smith,

Service And Growth



FEDERAL EXPORT BUILDING
42 BROADWAY NEW YORK

The character of service given by the Federal Export Corporation has increased its business to a point where larger headquarters were necessary; hence the Federal Export Building at 42 Broadway, New York, where more space is available for the immediate needs of the organization and its future expansion provided for.

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The "Fedex" organization at headquarters includes a number of men who have lived and traveled in the principal trading countries of the world and are able to advise manufacturers of true conditions there and the best methods of meeting them. The "Fedex" organization abroad is made up of men chosen for their ability to produce business and their willingness to co-operate in making our service satisfactory to both the foreign buyer and the American producer.

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42 BROADWAY - - NEW YORK

WATERTOWN, WIS. — The Monarch Tractor Co. will build additions to its machine shop and assembling building to cost $20,000.

WEST ALLIS, WIS.—The Universal Machinery Co., E. C. Devine, president, 784 Thirtieth street, will build a factory 150 x 250 feet, a foundry 100 x 150 feet, and a power house 50 x 50 feet to cost $250,000.

DETROIT.—The Ford Motor Co. is building a plant for the assembly and testing of the Liberty motor. The addition comprises 16 shops, 18 x 360 feet, and will form an extension to its Highland Park plant.

RACINE, WIS. — The Jos. Miller Shoe Co. will erect a 3-story fireproof factory addition, 42 x 110 feet, costing $50,000 complete, to provide facilities required to handle government orders for army shoes. The power plant also will be enlarged. The work is in charge of Architect Albert S. Hecht, 143 West Randolph street, Chicago.

SUPERIOR, WIS.—Bids for the construction of a new courthouse and county jail costing $400,000 at Superior, Wis., are being received until May 13, at 2 p. m., by the building committee of the Douglas county board of supervisors at the office of E. S. Radcliffe, architect, Superior, and Associate Architect J. W. Royer, Urbana, Ill. As previously noted, the building will be of stone, brick, steel and concrete, 200 x 175 feet, three stories and basement. W. J. Leader is county clerk.

CAIRO, ILL.—The Tideman Electric Mfg. Co. is building a plant at Cairo.

CHICAGO.—The Diamond Motor Car Co., 4517 West Twenty-sixth street, is building a machine shop.

CHICAGO.—The North American Railway Construction Co. has increased its capital stock from $100,000 to $250,000.

CHICAGO. — The Lonergan Cutting Die Co., 4517 Lexington street, will build additions and install machinery.

CHICAGO.—The Reliance Die & Stamping Co., 501 North La Salle street, manufacturer of dies, gages and jigs, has increased its capital and will install additional equipment.

CHICAGO.—R. C. Wiebold, 1534 West Van Buren street will build a 7-story factory, 77 x 150 feet, at Ashland avenue and Van Buren street.

CHICAGO.—The International Harvester Co., 606 South Michigan avenue, is having plans prepared for foundry buildings at Thirty-first and Rockwell streets, to cost $1,000,000. Pruch & Perrine, Keystone building, Pittsburgh, are architects and engineers.

CHICAGO.—The Benjamin Electric Co., 126 South Sangamon street, will build two 1-story factory buildings, 76 x 100 feet and 80 x 192 feet, at Des Plaines, Ill.

CHICAGO.—The Standard Forging Co., East Jackson boulevard, will build an engine house and other buildings in connection with its plant at Indiana Harbor, Ind., to cost about $15,000.

ELGIN, ILL.—The Woodstock Typewriter Co. has increased its capitalization to $1,000,000 and will build an addition.

GRANITE CITY, ILL. — The Commonwealth Steel Co., Pierce building, St. Louis, will build a 1 and 2-story addition to cost $500,000.

KANKAKEE, ILL.—The American Truck & Aeroplane Co. has bought the plant of the Unifile Co., at Riverview, Ill., and will equip it for automobile motor trucks and airplanes.

MOLINE, ILL.—Deere & Co. has let contracts for four reinforced concrete factory buildings, 40 x 65 feet, 60 x 200 feet, 75 x 200 feet and 80 x 200 feet, to cost $300,000.

OTTAWA, ILL.—The Ottawa Pianophone Co., Joliet street, will rebuild its burned plant at a cost of $100,000.

ROCK ISLAND, ILL.—The Rock Island Bridge & Iron Works will build a $3000 addition to its shops.

ROCKFORD, ILL.—Bids will be taken this summer for a reinforced concrete bridge over Rock river at Main street to cost $100,000. C. Olden, state bridge engineer, Springfield, is in charge.

SPRINGFIELD, ILL.—The Lipman Refrigerator Car & Mfg. Co., South Beloit, Ill., has certified to an increase in capital stock from $12,000 to $60,000.

FT. WAYNE, IND.—The American Fuel Saving Engineering Corp., capitalized at $1,000,000, has been chartered to manufacture smoke-consuming and fuel-saving devices, by Bruce M. Wylie, Austin W. Stutz and Charles H. Hall.

HAGERSTOWN, IND. — The Teetor-Hartley Motor Corp., capitalized at $1,000,000, has been chartered to manufacture motors and metal devices by Charles N. Teetor, Ralph R. Teetor and Frank M. Tatman.

HAGERSTOWN, IND.—The Indiana Piston Ring Co., capitalized at $100,000, has been chartered to manufacture metal products by Charles W. Teetor, Ralph R. Teetor, Henry W. Keagy and Blair Hartley.

HAMMOND, IND.—The Liberty Tractor Co., capitalized at $50,000, has been chartered to manufacture tractors and farm implements by Max Salmon, Herman Rettig, Frank E. Gossett and Cornelius Moor.

HUNTINGTON, IND.—The wrecking of the Cincinnati, Bluffton & Chicago railroad has begun, the final efforts of different parties to reorganize the company and to resume business having failed. G. W. Farmer will superintend the dismantling. Herman Sonken, Huntington, Ind., is the present owner of the property.

INDIANAPOLIS.—The C. Fussner Mfg. Co., capitalized at $150,000, has been chartered to manufacture machinery by Peter F Fussner, Harry B. Cobb and Charles J. Fussner.

INDIANAPOLIS. — The Will-Do-It Mfg. Co., capitalized at $10,000, has been chartered to manufacture metal containers by Darwin A. Medaris, Edward F. Jones and Harvey W. Taylor.

KOKOMO, IND.—The Standard Sanitary Mfg. Co. will build a warehouse, 100 x 120 feet, to cost $35,000. Dunlap & Co., Kokomo, are architects.

LOOGOOTEE, IND.—The Loogootee Face Brick & Tile Co. has changed its name to the Loogootee Fire Clay Products Co.

MARION, IND.—The Bollstrom Motors, Inc., will build a plant to cost $3,000,000.

RICHMOND, IND. — The Empire Brass Foundry Co. has been incorporated with capital of $10,000 to manufacture metal products. Albert C. Hurel, James E. Jones and Joseph H. Hill are the directors.

TERRE HAUTE, IND.—The Up-to-Date Mfg. Co., manufacture of wire fencing and fire escapes, will rebuild its burned plant.

TERRE HAUTE, IND.—The Rott Glass Co. will build an addition to its machine shop. Johnson & Miller, 105 South Seventh street are architects.

DAYTON, O.—Farrell, Stoneham & Thompson Co. has been incorporated with a capital of $6000 to manufacture tools and special machinery. The incorporators are James P. Farrell, Walter A. Stoneham, William A. Thompson, W. S. McConNaughey and Jay Leach.

CENTERTOWN, KY. — Centertown Coal Co., P. O. McKinney, president and general manager, has started development work on 1700 acres of coal property, planning daily production of 3000 tons. Capital amounts to $160,000. Part of machinery requirements has been placed.

LEXINGTON, KY.—Marion Coal Co., to operate mine property at Indian Bottom, has placed orders for machinery for electrically operated coal mining plant, 1000 tons daily capacity, Harry R. Smith is manager.

LOUISVILLE, KY.—Charles Powell, head of Powell Coal Co., capital $300,000, will install electrically-operated mining plant, costing about $250,000, including mining town, tipple, etc. The company has a capital of $300,000 and several thousand acres of coal land under lease.

MADISONVILLE, KY.—The O. & R. Coal Co., recently incorporated, capital $20,000, will build a tramway to connect its mine with Louisville & Nashville railroad.

WINCHESTER, KY. — The Cumberland Pipe Line Co. is building several miles of additional oil carrying lines in eastern Kentucky, and has placed heavy orders for 2, 4 and 6-inch pipe, pumps, compressors, etc., but will require some additional equipment.

Western and Intermountain Territory

DULUTH.—The Modern Cotton Machinery Corp., capitalized at $500,000, has been chartered in Delaware to manufacture machinery, by M. H. Allen, L. A. Barney and F. M. Hunter.

MINNEAPOLIS, MINN.—The Pence Automobile Co., 800 Hennepin avenue, will build a 4-story warehouse, 75 x 140 feet, to cost $100,000. H. E. Pence is president.

CEDAR RAPIDS, IOWA.—The Denning Tractor Co., G. M. Averill, Security building, president, will build an addition.

DAVENPORT, IOWA.—The Emeis Mfg. Co., Iowa street, will build an addition to its machine shop.

DES MOINES, IOWA. — The Whitnell Mfg. Co., Inc., will build a plant to cost $25,000.

OSKALOOSA, IOWA.—A special election will be held May 20 on the proposition of building a waterworks plant to cost $400,000



Say you saw it in THE IRON TRADE REVIEW

T. H. Carlin is city clerk. Burns & McDonnell, Kansas City, Mo., are engineers.

SIOUX CITY, IOWA. — The Woodbury Co., Inc., will build a pipe manufacturing building, costing $350,000. H. Metz is president.

KANSAS CITY, MO.—The Butler Mfg. Co., 1324 Grand avenue, will build a 1-story factory, 126 x 270 feet.

NORTH KANSAS CITY, MO.—The Illinois Silo & Tractor Co., care D. T. Garber, Bloomington, Ill., has bought a site for a tractor assembling plant, 4 stories, 118 x 305 feet.

ST. LOUIS.—The Johnston Tinfoil & Metal Co., 6020 South Broadway, will build a 2-story plant, 80 x 107 feet, to cost $50,000. C. F. Dietering, 1320 Central National Bank building, is architect.

ST. LOUIS.—The Skinner Bros. Mfg. Co., capitalized at $150,000, has been chartered to manufacture ventilating equipment by Merrill G. Skinner, Charles W. Skinner and Fred Skinner.

EUREKA SPRINGS, ARK.—The city of Eureka Springs is planning to install oil engines and pumps in the waterworks plant.

SAN ANTONIO, TEX.—An election will be held soon on a bond issue of $150,000, for bridge construction. Hans Helland is city engineer.

BOWBELLS, N. DAK.—Bids will be received until May 1 by G. K. Melby, county auditor of Burke county, for metal culverts for county use in 1918.

LOS ANIMAS, COLO.—The board of county commissioners of Bend county, J. W. Nelson county clerk and recorder, will build a combination timber and steel bridge over Mud creek.

MOSCOW, IDAHO.—The Western Irrigation & Development Co., capitalized at $50,000, has been chartered to manufacture a water-lifting device and will build a plant near Moscow.

PROVO, UTAH.—The Salt Lake, Fillmore & Kanosh railroad has been incorporated to build a railroad from Lynndyl to Kanosh, 50 miles. George W. Craig, Provo, is president.

Up and Down the Pacific Coast

HOQUIAM, WASH.—The Lamb Machine Works is building a machine shop and foundry, each 80 x 140 feet, and will install an electric furnace.

KANASKET, WASH.—The county commissioners, Seattle, are planning a bridge over Green river with three alternatives: A Luten design and three concrete arches, one 90 feet and two 40 feet; a steel structure with one 129-foot span and two pony trusses of 40 feet; a timber and steel Howe truss 13 feet long and two 48-foot spans.

TACOMA, WASH.—The Atlas Foundry Co. will build a machine shop.

TACOMA, WASH. — The Seaborn Shipyards will build a machine shop, to cost $15,000.

BELL, CAL.—The Western Forge & Mfg. Co. has bought a site for a forging and drop forging plant to cost $50,000.

LONG BEACH, CAL.—The Long Beach Sheet Metal & Auto Works, 330 Locust avenue, is building an addition, 50 x 150 feet.

LOS ANGELES. — J. C. Coleman, 749 Maple avenue, will build a machine and assembling plant 120 x 209 feet.

LOS ANGELES.—The Staggard Radiator Corp. is soon to be in the market to purchase machinery, material and equipment with which to manufacture honeycomb radiators.

LOS ANGELES.—Wilbur O. Lusk proposes to build a combination ditch and pipe line 6½ miles long near Round Mountain, Shasta county, to develop 7500 kilowatts. It is proposed to use the same water for irrigation by means of a ditch and pipe line 30 miles in length, according to an application to appropriate waters filed with the state water commission. The cost of the combined projects is estimated at $250,000.

LOS ANGELES.—John Hays, 117 West Thirtieth street, secured a contract for the construction of the Second street tunnel for $956,882.73, of which $911,010 is for the tunnel proper and the remainder for the street work on the approaches. Among the individual items is one for steel reinforcement, $25,330.

NEVADA CITY, CAL.—The state highway commission has been authorized by the county supervisors to build a bridge across South Wolf creek on the state highway lateral at the county's expense.

OAKLAND, CAL.—The Rosenburg Iron & Metal Co., San Francisco, has bought a site and will equip a scrap yard including a locomotive crane.

OAKLAND, CAL.—The Scandia Pacific Oil Engine Co. will build a machine shop costing $18,000.

SAN FRANCISCO.—The board of public works will receive bids until April 24 for the iron work in connection with the yard at the southeast wing of the San Francisco hospital, estimated to cost $14,000. The bond has been fixed at $3500.

SAN FRANCISCO.—Palmer & Peterson, Monadnock building, have the contract for the construction of a concrete and steel building for the Union Iron Works in Alameda, Cal., for $60,000.

SAN PEDRO, CAL.—The board of education will build a machine shop, 70 x 100 feet, at the San Pedro high school.

STOCKTON, CAL. — The Samson Sieve Grip Tractor Co., 1104 South Aurora street, will build two additions costing $30,000.

STOCKTON, CAL.—The Harris Mfg. Co., Park and East streets, manufacturers of agricultural implements will build additions.

STOCKTON, CAL. — The county supervisors will receive bids until May 7 for alterations in the offices of the county treasurer and tax collector. A considerable amount of steel furniture is included in the proposed work.

YUBA CITY, CAL.—The construction of a movable span in the west end of Long Bridge over Butte Slough and the extension of 500 feet of new work on the eastern end of the same structure will be started at once as an emergency measure. The span was demanded by the state reclamation board to permit the passage of dredgers engaged in drainage and reclamation work. The improvements are expected to cost approximately $20,000. Supervisor Schellinger, of Sutter City, is in charge.

New Business in Eastern Canada

BLENHEIM, ONT.—E. W. Knight, Talbot street, has secured a site on which he will build a 2-story, brick and concrete garage and auto repair shop, to cost $10,000.

ORILLIA, ONT.—The E. Long Mfg. Co., manufacturers of sawmill machinery, tools, etc., Queen street, will build a 2-story factory, to cost about $60,000. W. W. McBain is secretary-treasurer of the company.

PORT ARTHUR, ONT.—J. Stirrett & Sons, 401 Eleventh avenue, is making preparations for the erection of a sawmill to cost including machinery, etc., approximately $60,000.

SAULT STE. MARIE, ONT. — R. O. Wynne-Roberts has been appointed consulting engineer to the town in connection with the installation of new electrically operated pumping plant.

TORONTO, ONT.—The Northlight Motor Co., Wesley building, will establish a plant in Toronto, for the manufacture of marine engines and is in the market for screw cutting lathe, large drill, planer, milling machine, 30-inch band saw; wood turning lathe, and universal wood trimmer.

TORONTO, ONT.—The Chapman Double Ball Bearing Co., 347 Sorauren avenue, will build an addition to its plant to cost $5000.

TORONTO, ONT. — Milton & Prentiss, Traders Bank building, are in the market for two vertical steam engines, 250 horsepower.

HALIFAX, N. S.—The Halifax Vulcanizing Works, 52 Argyle street, proposes to build a vulcanizing plant on Grafton street at a cost of $40,000. Albert Chappell is manager.

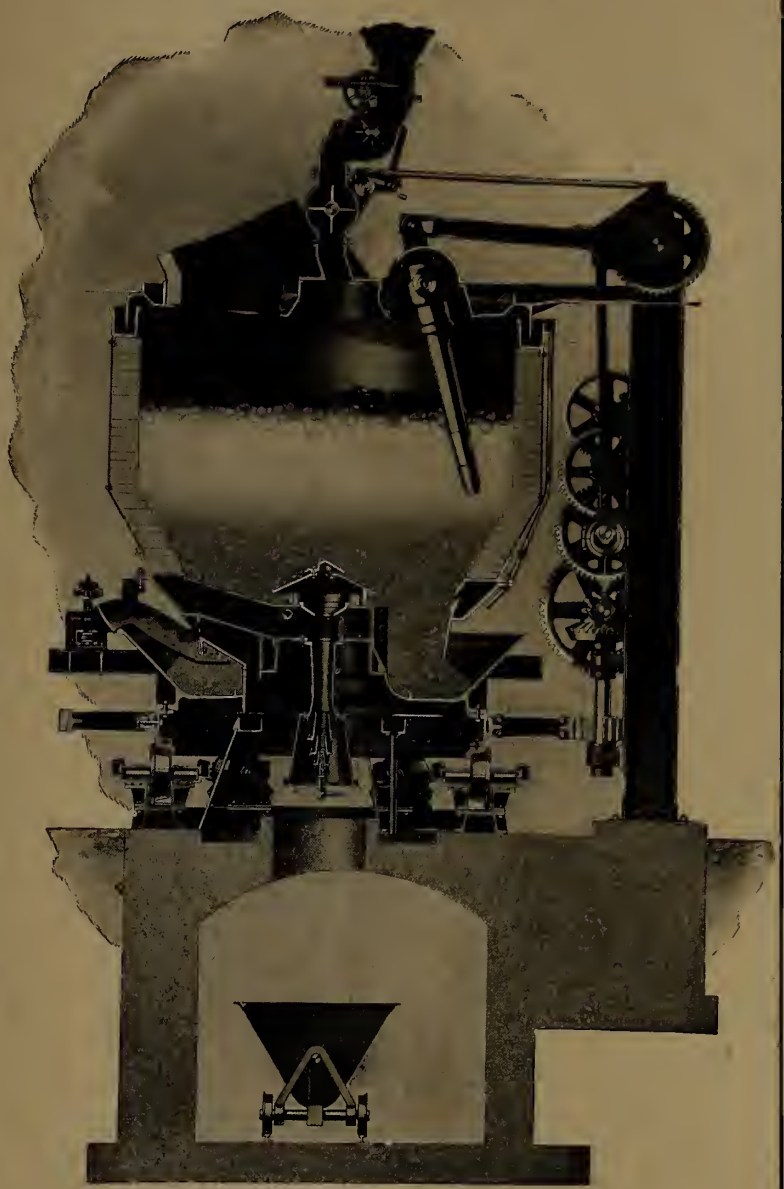
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A 4

Bulletin A 4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	28.50 to 29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	26.50 to 27.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	26.50 to 27.00
Heavy melting steel, Birming.	23.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. steel, eastern Pa.	39.00
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	25.00 to 27.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.50 to 25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	38.50 to 39.00
Angle bars, steel, St. Louis	35.00 to 35.50
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	29.00 to 29.50
Busheling, No. 2, Chgo.	19.75 to 20.75
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	15.50 to 16.00
Cast borings, eastern Pa.	19.00
Cast borings, Cleveland	16.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 13.00
Cast borings, Chgo.	17.50 to 18.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chicago	31.00 to 32.00
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	45.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	16.00
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	15.50 to 16.00
Machine turnings, Pitts.	19.00
Machine turnings, east. Pa.	16.50 to 19.00
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago	17.50 to 18.00
Machine shop turnings, St. L.	18.00 to 18.50
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	25.50 to 26.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 2, Chgo.	31.00 to 32.00
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	45.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 28.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.50
Cast No. 1, Cincinnati	29.00 to 29.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	25.00 to 25.50
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	32.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.00 to 31.50
Malleable railroad, St. Louis	28.00 to 28.50
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	34.00
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	42.00 to 43.00
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

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Industry Drives At War Business

Production For Government Purposes Reaching 100 Per Cent Pledged—Commercial Market Suspended—20,000,000 Tons of War Needs Apparently in Sight —Put Pig Iron Distribution on Systematic Basis

POSSESSED for the first time through official advice of an exact understanding of the tremendous scope of war demands, iron and steel makers are acting swiftly to carry out their pledge of 100 per cent output for government purposes. All orders not of a strictly war character are being set aside and plants are being concentrated exclusively on priority tonnage. The steel director's amazing statement at the recent New York meeting of steelmakers indicates that direct and indirect requirements for the government and its allies, as at present defined, are approximately 20,000,000 tons. This, it is figured, is equivalent to between seven and eight months' full output based on the recent rate of mill operations. Projectile steel needs this year are placed higher than previously given, or at about 5,000,000 tons; plate orders already in hand at 2,500,000 to 3,000,000 tons; rail replacements at 2,000,000 tons; and the material for the 100,000 car order at 1,300,000 tons.

War Tonnage is Broad

Commercial business in steel has been put out of mind at present under the sobering influence of these impressive estimates. In sizing up the true dislocation of normal consumption, it is pointed out, however, that those requirements now listed within the war category include certain branches of demand which always have been prominent in an ordinary commercial market. The case of the railroads, usually the largest single buyer of iron and steel, is a notable case in point. The farming implement industry which has been given a war rating, is another. This is important in giving many manufacturers essentially related to these lines of consumption, a war footing.

An important development calculated to provide an increased tonnage of steel castings for ordnance department work is the decision of the government to liberalize the exacting chemical and physical specifications. This is in consequence of the petition of the manufacturers. The lifting of the phosphorus requirements especially is significant since through it limitations of the supply of low phosphorus pig iron will be avoided.

Survey Iron Conditions

Plans have been worked out to insure a full supply to the government for its rapidly increasing war needs in pig iron. Preliminary to complete control over distribution to be exercised by the subcommittee on pig iron, iron ore and lake transportation, a comprehensive canvass of producers to determine current output and obligations and of consumers to ascertain direct and indirect war business booked, has been inaugurated. This data will form the basis for systematic regulation of production and distribution in accordance with essential demands. Attention also is to be given to the distribution of coke, so that full production by the furnaces may be secured. The war industries board now believes as far as railroad transportation goes, the difficulties of the furnaces have been practically obviated. Commandeering by the government of surplus iron wherever found continues. In addition to a tonnage recently seized in the Pittsburgh district several thousand tons recently sold to Italy and on the banks of an eastern producer probably will be taken. Melters of foundry iron are making fresh organized efforts to keep their part in the war work clearly before the government. They view with apprehension the change to steelmaking grades which will be made July 1 by various furnaces now producing foundry metal. It has been estimated that the country has been losing steel output at the rate of 6,000,000 tons annually due to shortage in steelmaking grades.

April's Iron Output Good

Substantial evidence of the more adequate coke supplies that now are reaching the furnaces is shown by April's record in pig iron production. The tonnage of 3,272,172, an increase of 62,176 tons over March, is the best in 11 months, or since May, 1917. It represents the first month of 1918 to exceed its corresponding 1916 tonnage. Daily production in April was at the rate of 109,072 tons, compared with 103,548 tons in March.

MAY 9, 1918

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Will There Be Steel For Sale?

NO ONE perhaps has been more surprised than steelmakers themselves at the tremendous requirements of steel which the government already has incurred for itself and allies or has in sight. All, of course, have realized that the tonnage would be exceedingly heavy and that it was growing daily at a rate which was almost beyond comprehension. It was certain, therefore, that the statement of Steel Director Replogle at the recent historic meeting of steelmakers at New York which clearly and specifically set forth the exact conditions as to the country's war needs, would have a clarifying and salutary effect. The steelmakers, once they were acquainted accurately with the exact situation, immediately put the combined output of their plants unrestrictedly at the disposal of the government and set aside all thoughts of commercial business. The remarks made by the various steel men present at the New York meeting indicated that the steel industry has been working more or less in the dark as to the full extent in the way of tonnage that the government was depending upon it. This no doubt explains away some of the recent complaints of consumers that receipts of material were not keeping pace with the current rate of demand for work of a war character, notably shipbuilding. The big service and importance of the New York meeting is that it wiped away all misconceptions or hazy ideas of the tonnage immediately needed for government requirements. From this time on the steelmakers and Washington authorities should be able to work to closer purposes with benefits to the whole situation.

The chief interest at present of iron and steel consumers in general and the producers as well, is how long 100 per cent production of steel will be required to carry forward the war program at the speed demanded. There is rather a wide difference of opinion on this important point, the correct solution of which it is clear will determine the time and extent of a restoration of a commercial market in iron and steel.

The steel director holds out no definite hope to the users of either iron or steel for work of a normal character for the near future at least. Analyzing his remarks at the New York meeting, it is indicated that finished steel production has been running at the rate of 33,500,000 tons, according to reports made to him covering the first three months of 1918. This is practically the same as in the full year of 1917 and a little more than in 1916. It is, of course, apparent that this tonnage is divided up much differently at present than in prewar times. For instance, the plate mills today are being driven hard to their full capacity, while the shape mills are not so fully occupied, the ingot steel thus saved being sent elsewhere. The 32 weeks of plate bookings which the steel director says now are on hand, undoubtedly amount to a heavier tonnage than under ordinary commercial scheduling of the mills. Of this 26 weeks are of direct government and allied tonnage. A few weeks ago the steel director stated the total tonnage of plates on order for the government and its allies was 2,374,711 tons. If this, with some additions since, represents approximately 26 weeks of rolling, it is evident that the plate mills have been averaging a production of close to 100,000 tons weekly. This discloses that a much larger proportion of ingot steel is going into plates than usual, which, of course, was understood. The structural bookings of 14 weeks are about in keeping with expectations. The 92 weeks of bookings on rails at the recent rate of production reflects the light output in this line. This in turn is explained by the steel director because the rail mills have been rolling shell steel, of which 5,000,000 tons are wanted this year. The 19 weeks of wire business are interesting in view of the recent reports that some of the steel capacity connected with wire mills may be diverted to shell material.

However these figures may be construed, it is now certain that the steelmakers under their pledge will put commercial orders in the discard so long as they have government requisitions to be filled. Until the time comes when the government's requirements are so satisfied that capacity will be left free for other purposes, if that occasion ever arrives, the open market on steel will be negligible. Working 100 per cent on

war work, the mills will be capable of supplying a tremendous tonnage. It is not improbable that from time to time, there will be gaps in their schedules against which private shipments may be made without breach of faith. Much depends upon the way in which the government assorts its orders among the mills to absorb all going capacity at a given time and on the rate at which new tonnage is placed, so that this diversification may be maintained.

Penny Wise---Pound Foolish

A LITTLE over a year ago the department of commerce sent a number of trade commissioners to the Far East to investigate commercial conditions in the Orient, thus paving the way for the extension of American commerce after the war. Recently, from motives of economy, all of these men with one exception were recalled, although in no case had their work been completed. In view of what may be expected in the way of competition for trade after the Germans are defeated, this action seems, on its face, but little short of suicidal. Business men in a position to know say that the life of our future commerce in the Orient is at stake right now. Japan is on the ground and busy every hour of the day. England, in spite of her tremendous exertions in the war, has not relinquished her activities in the eastern field. Only in the United States is there lack of vision; while other nations are moving forward, we are withdrawing our commercial envoys from one of the most important fields in the world. In a recent letter from Hongkong, a skilled observer has the following to say on this subject: "It is too bad Americans do not get out here just now to look over the field. We have wonderful opportunities and grave responsibilities, but we are as unprepared for Far Eastern trade as we were for war." Practical advice, such as this is, seems to cut but little figure among the bureaucrats at Washington. In this problem, however, the iron and steel industry should be deeply interested since the Far East seems destined to consume large quantities of iron and steel products in the future. What proportion of this tonnage will bear the label, "Made in U. S. A."?

Working Out the Railroad Problem

THAT in view of all the circumstances, government assumption of railroad control was the only possible solution of the problems of the transportation interests seems to have become the conviction of level-headed, clear-thinking railroad men holding important executive positions. In speaking to a prominent Ohio manufacturer, several of these railway officials made the statement "Washington is handling the situation very well indeed and gradually is restoring order out of chaos". In their minds, clement weather alone is not responsible for the increasing improvement in railroad conditions. To those in charge of the railroad administration in Washington is given no small measure of credit for what already has been accomplished. They see much advantage to the country in the elimination of cross hauls, competition, etc., with the accompanying and resultant economy.

It is true there are some railroad men who refuse to view the proposition in this light. These are in the minority, however. It is evident that without some such action on the part of the government, still greater confusion than obtained during the past winter would have blocked the efficiency of our effort in transporting troops, ammunition and supplies.

While trained railroad men are praising the operating methods being pursued by the government they are not so sanguine over the plans for replacements. The standardization of cars and locomotives is looked upon with some doubts. It is a question on the part of some railroad experts if the effort of the railroad administration does not presage many difficulties. They express the belief the government should go slow and give closer study to the ramifications of the car and locomotive building industry as it applies to the country's varying conditions, and to the situation existing on various railroad lines. They question whether the increased operating expense and maintenance cost will make the saving by contracting for standard cars and locomotives worth while.

There are many problems to be overcome and concrete demonstration to be given before the country will feel ready to judge the real merits of federal operation of the railroads. It is gratifying, however, that the present railroad administration is open to and is receiving the constructive criticism of the country's ablest talent developed under the regime of private ownership.

Steel Needed for All Classes of Ships

STEEL manufacturers know that their product will be required for ship construction in the future regardless of whether the steel, wood or reinforced concrete vessel is in highest favor. Knowledge, however, of just what proportion of steel would be needed in shipbuilding programs calling for each of these types of ships is not so exact.

For that reason, comparative figures brought out at a recent meeting of the Institution of Naval Architects of Great Britain are of interest. A vessel of 300 tons deadweight capacity, built of steel, would be 105 feet long and would require 110 tons of steel. A wooden vessel of the same size would be 108 feet long and the steel would weigh 15 tons. A reinforced concrete ship of the same capacity would be 125 feet long and would have 28½ tons of steel. The steel boat would displace 455 tons; the wood, 495 tons, and the reinforced concrete, 640 tons.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1220

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00
Spiegel, contracts, furnace	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	170.00 to 185.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. & small., Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products May 8, average for April, 1918, average for February, 1918, and average for May, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 8, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Bessemer pig iron, Pittsburgh	$36.15	$36.15	$37.25	$44.95
Basic pig iron, Pittsburgh	32.95	32.95	33.95	42.15
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	43.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	43.20
Lake Superior charcoal, Chicago	37.50	37.50	37.50	49.25
Malleable, valley	33.50	33.50	33.50	42.70
Malleable, Chicago	33.50	33.50	33.50	43.20
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa	32.00	32.00	33.00	40.75
**No. 2X Virginia, furnace	33.50	33.50	33.50	41.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	43.25
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	425.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	85.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	88.00
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	88.00
Open-hearth billets, Pitts	47.50	47.50	47.50	85.00
Steel bars, Pittsburgh	2.90	2.90	2.90	3.50
Steel bars, Chicago	2.90	2.90	2.90	3.84
Iron bars, Philadelphia	3.50	3.50	3.50	4.109

	Prices May 8, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Iron bars, Cleveland	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill	3.50	3.50	3.50	3.39
Beams, Chicago	3.00	3.00	3.00	4.34
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.185	3.185	4.659
Tank plates, Pittsburgh	3.25	3.25	3.25	4.50
Tank plates, Chicago	3.25	3.25	3.25	5.49
Tank plates, Philadelphia	3.435	3.435	3.435	7.559
Sheets, blk., No. 28, Pitts	5.00	5.00	5.00	7.00
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	6.65
Sheets, galv., No. 28, Pitts	6.25	6.25	6.25	8.80
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Connellsville furnace coke	6.00	6.00	6.00	8.00
Connellsville foundry coke	7.00	7.00	7.00	8.50
Heavy melting steel, Pitts	29.00	29.00	30.00	28.40
Heavy melting steel, eastern Pa.	28.50	28.30	30.00	26.00
Heavy melting steel, Chicago	29.00	28.65	30.00	28.70
No. 1 wrought, eastern Pa	34.00	34.00	35.00	40.75
No. 1 wrought, Chicago	33.50	33.50	35.00	36.40
Rerolling rails, Chicago	34.00	34.00	35.00	36.80

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1220)

Plan to Apply Iron to War Work

Careful Survey Being Made of Position of Producers and Consumers by Institute Subcommittee, Preliminary to Dividing Up Tonnage—Many Demands For Allocation—New Inquiry Still Considerable

Cleveland, May 7.—Definite plans have been laid whereby distribution of pig iron will follow lines insuring 100 per cent supply to consumers for war business irrespective of the present obligations of the furnaces. These have been formulated as the result of a conference between officials of the American Pig Iron association representing the producers and the subcommittee on pig iron, iron ore and lake transportation of the American Iron and Steel institute in this city May 3. As previously stated, the government's interests will be handled through the subcommittee which will allocate tonnage where and as needed. Preliminary to putting the system into effect a careful and comprehensive survey is being made of both producers and consumers to determine the exact conditions of present output and the war or nonwar character of furnace bookings. The producers have been asked for data showing orders on hand, to whom the iron has been sold, the deliveries required, estimated output for the balance of the year from May 1, the unsold tonnage and the grades being made. The furnaces in turn are asked to make a survey of their customers, to determine the amount on hand, their probable consumption for the year dating from May 1 and the percentage of their business directly or indirectly intended for government use. If direct war business, the government department is to be shown, and if indirect, the purpose to which the iron is to be used. This data is to be tabulated and the direct and indirect requirements for the Emergency Fleet corporation, the navy and the war department are to be given preference in dividing up the tonnage. Later other government needs such as for the railroads, the implement trade, the oil well supply manufacturers, builders of essential equipment and miscellaneous users are to be listed according to their importance and supplied through the subcommittee. The formal methods by which this allocation is to be made will be determined later. It is felt by means of this plan all war demands will be speedily accommodated. Nonwar business now on furnace books, of course, will be displaced to the extent necessary, to fill war requirements. In the meantime, various allocations continue to be made as in the past. For the Norfolk navy yard, 2400 tons of foundry and for a Houston, Tex., consumer with Emergency Fleet orders, 200 tons of foundry have been directed to Virginia makers. A Chester, Pa., steelmaker wants 3500 tons of prompt basic which may be supplied from a tonnage in stock covering an Italian order with an eastern Pennsylvania producer. A large steelmaker in the Pittsburgh district wants 3000 tons of June basic for ordnance orders; a Washington ordnance company 1000 to 1200 tons of May bessemer; a company with plants at Bucyrus and Willoughby, O., 1200 tons of foundry for three months and a Seattle interest 300 tons of early foundry. An Erie, Pa., ordnance maker is endeavoring to buy 4000 tons of last quarter basic. A large steel foundry interest wanting 9000 tons of basic has obtained some tonnage in this district. The General Electric Co. has bought some off bessemer. There is considerable new inquiry in the open market which is being ignored. Many

northern consumers who have never used Alabama iron before are buying in the south where shipments continue to improve rapidly.

Basic Tonnage Placed

Boston, May 6.—There have been no really important changes in the local pig iron situation since a week ago. Deliveries on contracts continue good from all producing sections save Virginia and there are still a good many inquiries for nearby iron, which for want of free supplies necessarily go unrequited. In the matter of business, there has been accepted by an eastern Pennsylvania furnace an order for a moderate sized block of basic for last half delivery; the buyer is a Connecticut melter. Now that the government has got first say on the steel output of the country, the local trade is looking to Washington pretty sharply for news concerning a possible similar course with regard to pig iron. There is nothing new concerning the coke situation and Washington also is being watched for developments concerning the course of the government with regard to this product.

Second Half Foundry Sold

New York, May 6.—Only one transaction of consequence featured the pig iron market in this district during the past week. This was the placing of an order for 10,000 to 15,000 tons of foundry for second half shipment by a Pennsylvania maker to a large eastern consumer. This business was rather unusual in that it originally was quoted on about two months ago and had been pending since. The market otherwise has been practically barren of business. A southern furnace which regularly each week of late had sold round tonnages in this district, both for second quarter and last half shipment, now has withdrawn. Even small spot lots of off-foundry and other grades which have been sold in at least some volume in preceding weeks, have not been noted during the past week. It is reported that as a result of their ability to increase their coke receipts slightly, some two or three eastern Pennsylvania furnaces which have been idle because of lack of fuel, will be blown in shortly.

Plan to Speed Production

Philadelphia, May 7.—A detailed investigation of conditions surrounding pig iron production and consumption preparatory to taking steps to insure that the latter shall equal all essential requirements has been undertaken by representatives of the government. Steel production now is being lost, it is estimated, at the rate of 6,000,000 tons a year because of insufficient supplies of pig iron. The chief cause of this is attributed to the inability of the railroads to move sufficient coke. The remedial measures in contemplation by the government, especially concern steelmaking iron. In foundry iron it is pointed out that there is a liberal tonnage to be had in the south which may be sent north if transportation conditions are cleared up. The shortage of steelmaking iron is very noticeable in the east. All consumers need it but it cannot be had. An understanding has been reached whereby producers of steelmaking iron hereafter will not make sales until they have first taken up the matter with the subcommittee on pig iron, iron ore and lake transportation. Although no iron has been requisitioned in this district by the government much tonnage has been shipped of late at the request of the latter. Such requests have involved during the last several weeks round lots of foundry and malleable and a large tonnage of basic. A Chester, Pa., steelmaker has asked the government's aid in obtaining 3500 tons of prompt basic. To fill this order, commandeering of a tonnage of basic on the banks of an eastern Pennsylvania maker which originally was sold for export to Italy may be resorted to.

Consumers Still Inquiring

Pittsburgh, May 7.—Despite the acute shortage of both steel-making and foundry grades, inquiries continue to come out in this district. During the past week they have principally in bessemer. One steelmaker in the Pittsburgh district is seeking 5000 tons of this grade, and scattering inquiries from steel foundries and makers of ingot molds involve approximately 7500 tons additional. Practically all merchant furnaces are sold up and some are oversold for both the first and last halves and the only transactions involve limited lots of off-grades. So far as known, no tonnages are going to consumers who are engaged in the manufacture of less essentials. The furnaces therefore are in shape to be shifted readily to a strictly war footing, plans for which were worked out last Friday in Cleveland. Merchant furnace operators, it is confidently expectely, will quickly supply the data asked by the committee. The plan in mind will call for a rearrangement of shipments and perhaps the entire elimination of deliveries for manufacturers who are not engaged either directly or indirectly on war work. The April sales averages for basic and bessemer, according to W. P. Snyder & Co., were the government figures of $32, valley, and $35.20, valley, respectively.

Little Trading Done

Buffalo, May 7.—The demand for iron keeps up strongly here though most users now understand that there is none to be had in this district at this time. One interest here which recently received an inquiry for 12,000 tons of malleable, foundry, manganese and special high silicon, had to report back that it was unable to supply a pound of any grade named. All activity is centered on getting out shipments, and interests report themselves still behind schedule. So long as they are behind in shipments they will not enter the market for anything. About the only trading that is being done is when occasionally a southern furnace has a little high sulphur iron for which it wants orders, and some of the northern jobbers place it for them. This business does not amount to more than occasional carload lots. Part of the original inquiry of the American Car & Foundry Co., for malleable iron is said to have been satisfied outside this territory and the inquirer is in the market for an additional heavy tonnage. The Buffalo Union Furnace is again in capacity operation, and plans to put its leased furnace at Troy, N. Y., on ferromanmangese within six weeks or two months.

Chicago Inquiry Less

Chicago, May 7.—Pig iron consumers have found the impossibility of placing further tonnage with producers in this district and inquiry now is practically absent. Local producers are sold for the remainder of this year, the only factor promising any possibility of further tonnage being a new stack which will go into blast about midyear. As an offset to this addition is the always-present possibility that some stack now active may be forced to go out for relining. Most stacks now active have been running on their present linings for about three years. The government is placing orders for additional tonnage constantly and makers are seeking to have this iron applied on regular contracts wherever possible, but are not always successful. Such tonnage taken in this way reduces the total of iron available to apply on contracts and in the event of heavy requirements for the government all other melters will suffer proportionately.

Foundries Accumulate Stocks

Cincinnati, May 6.—More than passing interest is taken in reports from

all sources that shipments from the south are moving more promptly. Embargoes against shipments to many places are still in effect, but there has been such a general relief over conditions as existing a month ago that not many complaints are heard. The foundries are now able to accumulate stocks of iron, but none has more than a sufficient amount on hand to carry them through the remainder of the second half. Contracting for last half is not in evidence, although inquiries for that delivery are received by all selling houses. Careful inquiry fails to reveal any large tonnage of iron that can be disposed of this year, and those foundries that are not protected for the last half will probably find it difficult to obtain a supply.

Find Inquiry Useless

St. Louis, May 4.—The demand for pig iron here is scattered, but of large volume. Actual transactions were confined to a small tonnage, under 1500 tons, of off grade southern foundry. Announcement that this iron was for sale brought a rush of purchasers. Dealers here say the reason for the disappearance of inquiries for round tonnages is the fact that users know there is no use to put them out. Producers in this district are sold up entirely over the last quarter, and state they will not have a ton to spare over their contract commitments. The movement from the south continues to improve, and is nearer to normal than at any time since the cold weather started. These increased arrivals have permitted loaning operations on a small scale.

Selling Slowly in South

Birmingham, Ala., May 7.—Southern manufacturers of pig iron still are selling iron slowly, and there is little change in the market as compared to recent weeks. Small-lot orders from regular customers for the last half are being accepted right along, but there is no large business. No comment is heard on the announcement that the government is to commandeer pig iron and steel for industries working on war necessities. Good shipments of pig iron continue and accumulated stocks are being reduced. Production has been increased by the blowing in of the Trussville furnace, which has been rehabilitated by the Birmingham-Trussville Iron Co. The furnace soon will be producing upward of 225 tons daily. The work of repairing of the second Gadsden furnace of the Alabama Co. is being rushed and it is not improbable that iron will be manufactured at this place also this month.

Assures Furnaces of Coke

Pig Iron Committee to Lend Assistance in Keeping Up Full Fuel Supplies—Rush Cargo to Peru

Pittsburgh, May 7.—By order of the government, a 100 per cent supply of cars for loading coke before setting cars for coal, was placed on the Monongahela railroad in the Connellsville coke region the latter part of last week and will continue at this rate over tomorrow. This order was issued to enable operators to expedite loading of a cargo of coke for shipment to Peru without affecting or reducing shipments of coke to blast furnaces. It is understood that in return for this coke for Peru, the government is to obtain a cargo of copper. Shipments from the Connellsville region, which for some time have been at a good rate, are further improved and with the exception of one steel works in eastern Pennsylvania and another in western Pennsylvania no complaints are heard about shortages. Merchant furnaces are in a much better shape than they have been for a long period and some are said to have good-sized stocks on hand. In connection with the plan to keep up pig iron supplies for government work, the committee on pig iron, lake ore and transportation will endeavor through the war industries board to keep furnaces constantly in receipt of 100 per cent coke requirements. Some ovens in the Connellsville region were affected by way of a reduced labor supply Monday owing to the Russian Easter holiday. The average supply of cars on the Monongahela railroad last week was 73 per cent and on the Pennsylvania it was 93 per cent. The irregularity of car supply makes it necessary to draw coke which has been burned too much or not enough and the quality therefore is not up to the regular standard. Based on present operating conditions in the Connellsville region, it is estimated that producers cannot load more than 75 per cent of a full supply of cars. Production during the week ended April 27 totaled 343,865 tons, as compared with 336,876 tons for the preceding week, according to *The Connellsville Courier*.

New England Now Covered

New York, May 6.—The large coke-buying movement in New England which was reported a week ago, has tapered off. Relatively small tonnages have been sold during the past week. Present indications are that practically all New England consumers now have closed for their coke either to the end of 1918 or up to July 1, 1919. Although the fuel administrator has not yet put into effect the prospective enbargo against shipments of coke from outside points into New England, it is generally believed in the trade that this order, if necessary, will be issued. It is believed, however, that New England consumers cannot count upon receiving much coke from external producing points as long as conditions remain as they are at present. Hence, there is great satisfaction that the output of the New England Coal & Coke Co., at Everett, Mass., is large enough to take care of the requirements of the entire New England district.

New Business Slight

Cincinnati, May 6.—As far as new business is concerned a quieter week this year could not be imagined. A little Pocahontas and Wise County foundry coke was sold last week, and a few Connellsville foundry coke contracts were renewed. New River operators are not soliciting any business, and shipments from this district are very disappointing. Rumors will not be downed that the coal supply will be curtailed on account of labor shortages to a point where it will be extremely difficult to obtain coke for either furnace or foundry consumption.

Movement is Erratic

St. Louis, May 4.—The coke movement and supply is reported as erratic and unsatisfactory, though receipts of contract material are holding up about as well as the April average. Early in the week there were signs of betterment, which, however, disappeared entirely during the past three days. The recent new price fixations have had no effect. Recent advices from the southwest indicate the situation in that region is even more acute.

Prompt Delivery Requested

Birmingham, Ala., May 7.—Coke producers are being urged by consumers to make prompt deliveries. The maximum production in the south has almost been reached. The production during the first four months of the year shows but little increase over the same period of last year as inclement weather as well as lagging coal production played havoc with the output.

Scrap Market Brightened

Effect of Commission Ruling Continues Salutary—More Activity Shown in Some Districts—Buyers More Interested

FOR COMPLETE SCRAP PRICES SEE PAGE 1220

Pittsburgh, May 7.—The allowance by the war industries board of 3½ per cent on sales to scrap dealers and brokers has given a better tone to the market. While no actual sales of size are reported in this district since the ruling the latter has had the effect of creating an incentive for sellers to find supplies of which there is a shortage in this district. Stocks are exceptionally low. It is the understanding here that the 3½ per cent is to be paid where this is agreed upon between the dealer and the consumer so that it is a voluntary agreement and the compensation can be allowed regardless of whether or not scrap is sold at or below maximum levels fixed by the government. Producers of mixed scrap are understood to have held tonnage on hand at higher prices than the demand justified. Dealers now are in a position to get and market this material. Good demand exists for heavy melting steel. One consumer recently bought a large tonnage of bundled side and end sheets. Another sale involved 1000 tons of heavy cast at the maximum of $29, delivered, the consumer aggreeing to pay the dealer compensation for his services in the event it was allowed. Another sale of 1000 tons of borings similarly was made at the maximum of $19, delivered. The market for machine shop turnings is firmer and a sale of 1000 tons was made at the maximum of $19, delivered, without any commission agreement. Previously this consumer had bought machine shop turnings at $18 and $18.50, delivered.

Activity is Resuming

Boston, May 6.—With the question of commissions definitely out of the way, business in scrap iron and steel in the local market is once more assuming some activity. Not only have there been good-sized sales since the announcement of the decision, but the decision automatically confirms not a little business that had been placed subject to the allowance of commissions. Local foundries are hungry for cast scrap and all lines in this class are moving off promptly. Aside from this, however, the demand is no more pronounced in one direction than in another, the inquiry being described as broad and general. Shipments are reported to be fairly good in most directions, but for some reason not known at this time, permits for shipments over the Pennsylvania are not so readily obtained as they could be recently. This, of course, to some extent restricts what for many local dealers is their best market. Prices for the present remain unchanged.

Cast Scrap is Scarce

New York, May 6.—Prices on iron and steel scrap in the New York market are holding firm and reflect a situation practically unchanged from last week. Cast scrap continues in heavy demand, and, consequently, is exceedingly scarce with quotations at the maximum set by the government. City wrought, long stock, also is scarce, but nevertheless is still obtainable by dealers at $31, New York. Other grades, particularly heavy melting steel, appear plentiful. The announcement last week that dealers will be allowed a commission of 3½ per cent has clarified the situation appreciably. While a number of consumers have been paying this commission in anticipation of such a decision and many contracts have been made since April 1, carrying a proviso clause, there have been a number of consumers not in urgent need of supplies who have held off for a definte settlement. It is expected these latter interests will come into the market more freely. The transportation situation is steadily improving.

Situation is Cleared

Buffalo, May 7.—No changes in the present price schedule in scrap have appeared. The demand continues good for all grades. The awarding of the 3½ per cent commission has cleared the situation considerably and it is felt that the restrictions in connection with the decision effectually will prevent any abuse, principally for the reason that it centralizes the situation with the mills. It is now felt that it is up to the scrap trade to work out its future salvation on the lines indicated. Violation of contracts will not be tolerated and that this has been a serious fault is indicated by the fact that most of the mills in this district are cluttered with unfilled orders against which they have not been able to secure deliveries. In the matter of cast scrap, malleable and No. 1 busheling, consumers believe the present prices are too high. Another item, up for notice, is relaying rails. The government since the war has been a heavy buyer of relaying rails for use at different cantonments and shipyards. This item comes under the heading of steel rails and no price has ever been set by the government for their use for relaying purposes. The fixed price for new steel rails is $55. Relaying rails are quoted at $90. This matter is expected to come up next July 1 when the prices come up for further revision. The matter of scrap is receiving a great deal of attention in this territory and outside, consumers having been convinced that they had not given the subject sufficient attention.

Tentative Business Closed

Philadelphia May 7.—The closing of considerable business in heavy melting steel in this territory has developed closely upon the allowance of a commission on sales to dealers. This was done at $29, delivered, having been previously arranged for subject to the granting of the commission. Consumers in this district are not showing much new interest in steel scrap, being pretty well covered. Cast scrap demand is sufficient to absorb all offerings. Wrought scrap is scarce and consumers are glad to pay the maximum price plus the commission. Forge scrap is up $1.

Little Business Moving

Cleveland, May 7.—Both dealers in and consumers of scrap iron and steel are pleased that the war industries board has restored the 3½ per cent commission. Because, however, scarcely any grade outside of heavy melting steel is level with the government maximum, its use has been restricted. Most grades of scrap are weak. Rolling mill products are a drug on the market. Foundries are not seeking cast. Borings and turnings are a trifle firmer than a week ago, but still are more soft in the Cleveland district than in others. Tonnages of melting steel are unknown, and dealers are glad to be able to get hold of carload lots. A big list of the Pennsylvania Lines West closed today. Plants that are not working for the government, directly or indirectly, are finding it harder to operate and are buying less scrap.

Supply More Plentiful

Chicago, May 7.—Quiet continues to rule the iron and steel scrap mar-

ket in Chicago, although steel and malleable grades are in strong demand and are being marketed readily. Steel is being sought to apply on former contracts rather than new tonnage bought by consumers. Other grades are fairly quiet although a fair general demand is met without the market being called active. Railroad offerings are considerably better and lists are larger than have been offered recently. The Wabash has offered 2650 tons, including 500 tons of steel rails. The Northern Pacific offers 2500 tons, including 250 tons of rails. The Santa Fe has issued a list containing 2200 tons, of which 200 tons are No. 1 wrought. The Union Pacific offers 2200 tons and the Michigan Central recently closed, tonnages not being given.

Market is Firmer

Cincinnati, May 6.—All dealers are elated over the end of the commission discussion that has been a source of annoyance for some time past. It was thought that prices would be advanced as a result of the decision, but this has not yet come about. The market is undoubtedly firmer and changes of some consequence may be looked for, but the maximum prices fixed will preclude any speculative advances that might be expected in ordinary times.

Commission Ruling Pleasing

St. Louis, May 4.—The scrap market remains quiet. Transactions are light, for the main reason that most of the big users are well provided for, and their contract material is coming along in excellent shape. Some buying between dealers is reported, but even these operations are light. Prices of all grades remain steady, barring a slight shading in machine shop turnings. General expressions of satisfaction have greeted the decision to allow dealers a commission of 3½ per cent. The effect of the ruling, it is thought, will be to loosen up business during the next few weeks.

Market in South is Soft

Birmingham, Ala., May 7.—The iron and steel scrap market in the south remains soft and the dealers are uneasy. The local consumers of scrap are not yet willing to pay maximum prices fixed by the government. Stocks on hand still are dwindling as new material comes in slowly. Old material dealers are getting railroad cars freely and are making deliveries on old contracts. Pipemakers are not taking much scrap, while other interests in this section are willing to buy when they can name prices.

Semifinished All For War

Valley Makers Filled With Shell Steel Can't Take British Tonnage —Sheet Bar Situation Becomes More Acute

Youngstown, O., May 8.—Mills in this district are heavily booked with government orders for 6 and 8-inch shell bars and are unable to take on any of the tonnage which the British now are anxious to place. The mills here were alloted considerable tonnages of the 1,200,000-ton government order which was recently placed among the various makers throughout the country. Part of the allotments are now in process of rolling. Shipments of shell steel have been going forward to consumers faster than the latter can handle it on account of the limited capacity of heat-treating equipment. As a consequence, the steel is piling up in their yards. A few mills are shipping shell bars direct to heat-treating plants. From here the bars are being forwarded direct to the fabricator of shells. The leading maker here operated at reduced capacity for two days last week on account of the open-hearth trestle which had to be torn down and re-erected in order to place two new units in operation. This company also is installing two hot-cut saws and is adding additional equipment in the 16 and 21-inch merchant bar mills. When this new installation is completed, the production of these mills which at present are rolling 4 to 8-inch shell bars, will be greatly increased.

Consumers of sheet bars here find it extremely difficult to locate even small tonnages. One maker operating 28 sheet mills is in the market for several hundred tons. The scarcity of this material is daily becoming more alarming. One maker contends that in the near future, sheet mills not self-contained will be compelled to close down for lack of sheet bars. The leading maker has not rolled open-hearth sheet bars for months and does not expect to roll any until after the war unless he receives advice from the government to the contrary. Bessemer bars are being produced in limited quantities and when the government allocates orders for bessemer rails and car plates, the production of sheet bars from this grade of steel will be further curtailed. A large maker of sheets in the upper part of the valley had only two out of 12 mills active last week due to scarcity of steel.

Slabs Are Requisitioned

Philadelphia, May 7.—Requisitioning of a slab tonnage by the government for an eastern plate mill represented practically the only activity in the semifinished material market in the east during the past week.

Entire Output for War

Pittsburgh, May 7.—Insistent inquiries for billets, sheet bars and slabs continue to come to makers but there are no offerings whatever. The output is being devoted entirely to government demands and it is considered that these requirements will take the maximum output for the next two months or longer after which the commercial market probably will develop. Makers of sheets have been especially urgent in trying to obtain tonnages of bars. Some inquiries also have come to makers of tin plate, although the latter have been well supplied as a general thing, owing to the priority given to their output. Eastern plate makers have been trying to get slabs in this district but without success. Small offerings of 4 x 4 discard billets have been made but even this market has become unusually narrow. Offerings have been made at $47.50, Pittsburgh, which is the government price for soft 4 x 4 billets. Raw steel is being supplied by certain plants, not altogether committed on government work, to plate mills in this district.

Strip Market Inactive

Pittsburgh, May 7.—The market for cold rolled strip steel is inactive. Manufacturers are operating heavily but the tonnages are almost altogether for the government. The automobile trade still is expected to buy rather freely, although not to the extent previously looked for because of the reduced output of pleasure cars. Some cold rolled mills are engaged in producing steel for airplanes. Stocks on hand have been reduced considerably and some of them are almost entirely exhausted. Some manufacturers also do not have as large supplies of billets and slabs as they desire.

To Build More Ovens

To increase production of toluol and ammonia for the government, the Indiana Coke & Gas Co., Terre Haute, Ind., will double its by-product coke plant capacity. It originally planned an addition of 15 Koppers ovens, but 30 ovens now are to be built.

Implement Needs Are Rated

Understood Will Be Placed in Third Priority Classification—Believe Government May Specify Discard Steel Bars

Pittsburgh, May 7.—Makers of iron and steel bars are heavily committed on contracts and for the present are devoting their entire output to government requirements. It is understood that in the case of steel bars the government has worked out a plan by which the manufacturers of implement machinery will be given preference, being placed in the third priority classification along with other consumers. Makers of iron bars are obtaining some new business at prices which are said to range from 3.30c to 3.40c, Pittsburgh, for shipment at their convenience. The government is buying iron bars also at approximately the same levels.

May Specify Discard Steel

New York, May 6.—In view of the shortage of steel, it is believed here in some quarters that the government before long may begin to specify shell discard steel for certain purposes. Contractors on government work have received permission in numerous instances to buy bars rolled from shell discards when they could not secure mild steel bars. In most cases bars bought in connection with government work have been for use on reinforced concrete jobs. However, shell discard steel during the past few months has been found satisfactory for much commercial work for which it previously was regarded as unsuitable. Such work, aside from concrete reinforcing, consists mostly of machine work. For instance, a manufacturer of lathes in this district successfully is using rounds rolled from shell discards, for making feed rods and other lathe parts. In some cases, bars rolled from shell discard steel even are being used for making forgings. Bars which are rolled from shell discards in all cases are going at prices based on 2.90c, Pittsburgh.

Bar Iron Not Restricted

Philadelphia, May 7.—No restrictions, it is understood, have been placed on the receipt of commercial bar iron orders. This is because iron bars are in plentiful supply. The demand is quiet. The only sizable order placed in the week was from the American International Shipbuilding Corp.

Hard Bars in Demand

Chicago, May 7.—Manufacturers of hard steel bars rerolled from rails continue to turn down many inquiries, which involve a large tonnage in small individual lots. This inquiry is coming from wide territory, indicating that conditions are similar in all parts of the country. Most present inquiry is from implement dealers and the government and the latter's demands, of course, are being met first. Among the latter is a fairly large tonnage of material for posts to carry wire entanglements at the front in France. Manufacturers of bar iron are waiting for allotment of material for the freight cars the government recently distributed among builders. It is believed in the present need for steel that as much bar iron as possible will be used in the construction of cars, to relieve steel mills to the extent possible. It is believed also that the iron required for this purpose will be considerable and will keep mills busy well through the remainder of the year.

Bolt Inquiry Heavy

Chicago, May 7.—Manufacturers of bolts and nuts are unable to handle the inquiry now coming to them, general demand for bolts by manufa turers being excellent and on top of this is unusually heavy requirement by the government and for export. The government's list involving about 129,000,000 bolts has not yet been fully acted on and an inquiry from an engineering company for 26,000,000 carriage and machine bolts for export is now pending. This is well scattered as to time of delivery and is an attractive piece of business.

Few Bolt Orders Placed

Pittsburgh, May 7.—The government has apportioned the 129,000,000 bolts among makers, but the actual orders placed have gone only to those who had stocks on hand. These stocks are small. The remainder is expected to be placed within the next few days. Makers are operating practically at 100 per cent of capacity but some find it difficult to readily obtain steel bars. Virtually the entire output of the nut, bolt and rivet industry is going to the government, either directly or indirectly.

Hoop Steel in Demand

Pittsburgh, May 7.—Makers of oil barrels continue to put out inquiries for hoop steel and while mills are well booked on contracts, they have been able to take limited tonnages for this business which is an important industry in connection with the conservation program. The market for bands is extremely dull.

Heavy Shafting Orders Awaited

Pittsburgh, May 7.—Makers of cold rolled shafting are engaged altogether on government work. It is taking both small and large sizes but the tonnages involved have not been large. According to reports, orders for a heavy lot are to be placed soon. Deliveries are being made in from 30 to 60 days.

Pipe Business

Comes Mainly from Government—Private Inquiry for Cast

New York, May 6.—While the eastern cast iron market is void of large inquiries, a steady volume of demand from private and governmental sources continues to make for a good aggregate tonnage. Prices as a result are very firm. Miscellaneous tonnages still are being placed by the government for cantonment work, and several new projects of this description now in prospect will undoubtedly keep up this demand for some time. The new explosive plant to be erected in Ohio is also expected to make new demands for pipe shortly. Buying for the government's housing program is not yet under full swing. Public inquiries at this time are scarce. Bids on a small tonnage—100 tons of 4 and 6-inch pipe—are to be closed May 8 by Medford, Mass. The Warren Foundry & Machine Co. was low on 700 tons of 24 and 42-inch pipe for Hartford, Conn. Buffalo closed bids May 1 on 2100 tons of 36-inch pipe, but has not as yet made an award.

Cities May Buy More

Chicago, May 7.—Although demand for cast iron pipe on the part of cities is absent and nothing involving more than a few tons is pending, with nothing placed during the past week, it is the hope of manufacturers that a change may come about soon. One of the obstacles preventing cities making water main extensions has been the practical impossibility of marketing municipal bonds while the Liberty loan held the stage. With that completed, it is believed other securities will have a better chance and that some improvements now held up may come forward.

Makers Are Sold Up

Pittsburgh, May 7.—Makers of iron and steel lap weld and butt weld pipe

are sold up and in the case of the former grade are greatly deferred on shipments. Their commitments on butt weld also have reached large proportions and some makers have withdrawn altogether from the market on this kind of pipe following action taken with regard to lap weld sizes some time ago. Oil country interests are among those who are to be given special consideration by the government, it is said, in view of the fact that tonnages for them are needed in connection with the production and conservation of fuel.

Few Orders Being Received

Birmingham, Ala., May 7.—No improvement in the cast iron pipe trade is noted in this section of the country and the prospects are a big loss in the iron melt for the year will be shown as compared with last year. At some of the plants other classes of work are being done.

Better Output

Continues to Grow in Tin Plate—No Last Half Offers

Pittsburgh, May 7.—The tin plate industry is operating at the rate of between 90 and 95 per cent of capacity. Production at some plants has been curtailed owing to a scarcity of sheet bars. Shipments are heavy and stocks in warehouses again are almost normal, representing about one week's production. The American Sheet & Tin Plate Co., which had expected to open its books early in May for second half business, has concluded not to do so in view of the tremendous demands being made by the government which make it impossible to allot tonnages with any knowledge as to when the orders could be filled.

New Mill Started

Youngstown, O., May 8.—Two of the Liberty Steel Co.'s tin mills at Warren, O., were placed in operation Monday followed by three more Wednesday. The remaining three mills are expected to go in soon. Most of the valley tin mills are operating irregularly on account of a sheet bar shortage. The leading maker had the most of his mills idle last week for this reason. Demand for tin plate is so heavy that the mills are sold up for two months ahead. Practically all overage and wasters have disappeared. In view of the rapidly advancing tin market, makers say that unless the government fixes the price for next quarter in advance of $7.75 per 100 pounds base, they will either have to make tin plate at cost or shut their mills down.

Simplify Ship Plate Needs

Fleet Corporation Works For Closer System Between Mills and Yards —90,000 Tons Up in East—90,000 Tons Let on Lakes

Philadelphia, May 7.—Large government plate orders continue to flow to eastern mills. The Baldwin Locomotive Works has let about 5000 tons to the Lukens Steel Co. and to the Midvale Steel & Ordnance Co. for government locomotives. This is about half the requirements of the order recently placed. Eastern mills have been allotted round tonnages for water tube boilers for the Emergency Fleet corporation. Other tonnages have been placed and even larger business is in sight, including some heavy new shipbuilding requirements. It is expected that about 90,000 tons of plates and 45,000 tons of shapes will be distributed about May 15 for the American International Shipbuilding Corp. By its new system, the Emergency Fleet corporation, as far as possible in order to simplify and expedite its program, will have each shipyard get its steel from certain and nearest mills. The shipyards are to furnish the mills with schedules showing their exact requirements two or three months in advance. Thus plates will be furnished as needed instead of ahead of time, as in some cases at present. The plate mills are taking only priority orders, and only from the government or through the American Iron and Steel institute, so that it is certain they are not being imposed upon. The Lukens Steel Co. expects to have its new 204-inch mill in operation in June or July. This will increase the eastern output by 500 or 600 tons daily. Industry has been surprised to learn that the war industries board, at the instance of the war trade board, has licensed 300 tons of plates to Argentine. It is learned that each ton is expected to repair 30 tons of Argentine shipping.

Car Tonnage is Large

New York, May 7.—Bessemer steel largely is to make up the 1,300,000 tons required for the 100,000 cars recently ordered by the government, according to the statement made by Steel Director Replogle at the recent New York meeting of steelmakers. This was to the effect that it was left optional with the producers whether bessemer or open-hearth steel or sheared or universal plates would be used.

Are Awaiting Allotments

Pittsburgh, May 7.—Plate makers are waiting for the government to allot tonnages under the car building program. It has been estimated that it will total about 1,400,000 tons and will consist of both bessemer and open-hearth steel. The orders are to be placed directly by the car builders themselves but the latter will be advised by the government of the plants where they are to get the steel. The car building program has been given second preference, ranking next to the shipping and shell steel program, and it is believed car builders will be able to get required tonnages of plates in ample time. Plate mills are rolling exclusively government requirements and commercial inquiries are not being considered. It is not believed there will be any domestic market for two or three months. During April the mills of the Carnegie Steel Co. produced 110,929 tons of plates, comparing with 121,076 tons manufactured in March, when all previous records were broken. The Liberty mill at the Homestead works again broke its record in April, turning out 18,025 tons as against 17,241 tons in March. The April showing is impressive in view of the 30-day month.

Fleet Tonnage Placed

Cleveland, May 7.—Official distribution of the hull steel for the 66 boats recently placed by the Emergency Fleet corporation with the American Shipbuilding Co. has been made. The material for 53 boats will be supplied by Pittsburgh mills and for 13 by Chicago. The boiler steel still is to be allotted. Only war tonnages are being accepted by the mills. Local producers will supply the plates for 45 watertube boilers for the Emergency Fleet corporation placed with a Cleveland shop, which with the tubes calls for about 1000 tons.

Await Car Material

Chicago, May 7.—Steel companies at present are mostly interested in the division of material to be furnished to car builders for use in producing the cars recently distributed by the government. Inasmuch as a considerable tonnage of plates is involved in this order and demand for plates for shipbuilding is not diminishing but rather on the increase, mill men are wondering how the matter will be arranged to produce the car material without interfering with ship plates. It is understood the same plan will be followed as in the case of ships.

Cut Out Ship Steel Delay

Director Schwab of Fleet Corporation Pushes New System to Concentrate Attention on Individual Boats—Big Tonnage Wanted

Philadelphia, May 7.—In its efforts to expedite work and cut out lost motion the Emergency Fleet corporation is inaugurating its new system for the distribution of steel. Heretofore fabricators have been following practically their own initiative in the order of the work with the result that some steel has been shipped to the yards which will not be used for months. Past methods also included other avoidable complications such as the dispatching of messages to the Fleet corporation to fabricators to rush shipments as these requests frequently included steel already shipped and material not even ordered. Fleet director Charles M. Schwab met with shipbuilders, fabricators and mill representatives in this city today to discuss the new system which is calculated to concentrate atentnion on steel for individual boats. Tenders are being asked for about 135,000 tons of fabricated steel for 60 freighters of 7500 tons each for the American Shipbuilding Corp. The shape mills are adhering literally to the pledge not to accept orders without priority numbers. Most mills refuse all business not placed directly by the government or the American Iron and Steel institute. Eastern mills are remelting overlength sections and are keeping for future government orders material not now specified by the government so that no shapes are going to commercial use. No bids yet have been asked for the 56,000 tons of fabricated steel for the government warehouse authorized for South Brooklyn. The airplane plant at the Philadelphia navy yard is to be quadrupled in size.

Big Tonnage for Warehouse

New York, May 6.—The pledge under which the steel industry generally now is operating to furnish the maximum portion of the output to the government, has resulted in the practical elimination of the already attentuated structural market. There is a total lack of commercial structural lettings and of inquiries for steel for commercial structural work. The only activity is reflected in demand for steel for war purposes. Interest is centered in the statement of Steel Director Replogle at the recent meeting of steelmakers in this city that the great government warehouse planned for Brooklyn will require 56,000 tons of steel. The largest contract let this week was one for 3500 tons of structural steel for buildings for the Atlantic Loading Co., at Hammonton, N. J. Several smaller government jobs have been placed and a number are pending.

Fill Only War Needs

Chicago, May 7.—Contracting for structural shapes for other than war purposes is practically unknown in this district and the only two tonnages of importance closed recently are for projects to aid in the prosecution of the war. The International Harvester Corp. has awarded 1187 tons to the McClintic-Marshall Co. for a gray iron foundry at its tractor works in Chicago to aid in filling a large contract.

Steel Only for Government

Pittsburgh, May 7.—Fabricators are taking government business exclusively and are unable to get steel, no matter how small the tonnage, from mills for any other purpose. Some fabricating plants during the past week endeavored to get limited lots of shapes for domestic work but were advised by steel mills that they were under orders not to furnish any material except that for the government. The readjusting of government orders placed with fabricators by which tonnages are shifted from one plant to another so that ship steel will be furnished in sequence to yards and transportation will be minimized has been begun. The policy gradually is becoming more general.

CONTRACTS AWARDED

Gray iron foundry for the International Harvester Corp. at the tractor works, Chicago, 1187 tons, to McClintic-Marshall Co.

Two 141,000-gallon sulphuric acid tanks, for the Illinois Steel Co., at Gary, Ind., 134 tons, to American Bridge Co.

Buildings for Atlantic Loading Co. at Hammonton, N. J., 3500 tons, to Bethlehem Steel Bridge Corp.

Warehouse building for government at Lake Denmark, N. J., to Austin Co.

Drydock for Galveston Drydock & Construction Co., Galveston, Texas, 1700 tons, to an independent fabricator.

CONTRACTS PENDING

Pier shed and trucking bridges, Boston, 3200 to 3300 tons. New England Structural Co., low bidder.

Bridges for Chesapeake & Ohio railroad, 400 tons, bids being taken.

Government aviation school buildings, San Diego, Cal., 700 tons, bids being taken.

Bridges for Pennsylvania railroad, 300 tons, bids being taken.

Steel Need Pinches Sheets

Mills Struggle Against Shortage of Sheet Bars Which Grow Worse Daily—Last Half Offering Dropped

YOUNGSTOWN, O., May 8.—Operation of sheet mills in this territory for the past week was exceedingly irregular on account of the scarcity of sheet bars. A maker in the upper part of the valley had to suspend 10 out of 12 mills for this reason. Shortage of labor due to Russian Easter also affected the output. Most of the valley mills are in operation now. Sheetmakers not self-contained are becoming alarmed over the sheet bar situation, which has been exceedingly critical the past month and is becoming more so daily. Open-hearth bars are a thing of the past, and only small tonnages are to be found in the bar banks. Even the supply of bessemer sheet bars is becoming low. Unless conditions take a turn for the better, sheet mills not self-contained may be compelled to close down.

Inquiry for all grades of sheets never was so heavy as now, according to sales managers. Buyers are eager for any grade, but especially galvanized. The mills are booked heavily for this grade for war purposes. Government specifications have such a small spread that mills roll a fair amount of overage to provide for the sheets which are only slightly defective but are condemned by government inspectors. At times this overage amounts to several tons. One salesmanager states that no sooner is the overage and waster list of sheets issued than consumers snap it up. Formerly mills were compelled to pile odd sizes and gages of sheets in their storeroom; but few mills here have sheets of any grade or size in stock now.

Take Only Priority Orders

Philadelphia, May 7.—Eastern sheet mills are taking only priority orders placed by the government or by the subcommittee of the American Iron and Steel institute.

Steel Bar Scarcity Interferes

Pittsburg, May 7.—Scarcity of sheet bars continues to interfere greatly with the production of sheets. The independents produced at approxi-

mately 80 per cent of capacity during April, but the operations of the leading interest were and are considerably below this percentage. Heavy requirements are being placed by the government. Despite the handicaps, all sheet mills are bending every effort to the end that the government program not only will be brought up to date but as far in advance as authorities at Washington consider advisable. Only those unable to get immediate delivery of sheet bars are handicapped in this direction. In the event some plan is devised whereby greater tonnages of sheet bars are available, not only will the needs of the government be met but some offerings of sheet tonnages by private consumers may be available by July 1. The American Sheet & Tin Plate Co., which had expected to open its books early in May for last half has concluded not to do so.

Turn Down Much Inquiry

Chicago, May 7.—Manufacturers of steel sheets in the Chicago district are accepting orders for the government and are turning down all others. This is in line with the policy of steel makers to devote their entire output to the nation as far as it is needed and steel thus freed from sheet mills will be diverted to other departments where need may be greater. Export inquiry still continues and recently a local maker was offered 7.25c, Chicago, for No. 28 gage galvanized, but was unable to take the business.

Rail Tonnage

Wanted by General Pershing—Russian Sections Will be Shipped

Philadelphia, May 7.—A cabled request for 100,000 tons of 80-pound rails has been received from General Pershing, of the American expeditionary forces. It is understood 76,000 tons of 67½-pound sections originally rolled for the Russian government will be sent him. The remaining 24,000 tons have not been awarded, although the Cambria Steel Co. has offered to supply bessemer rails for July-September delivery. The period of shipment wanted by Pershing is September. Numerous small domestic orders for bessemer rails have been placed recently.

Taking No New Business

Pittsburgh, May 7.—Makers of steel rails, being committed heavily on contracts, are taking no new business, but are waiting for the distribution of tonnages by the government in connection with its railroad building program. It is expected that these orders will be placed soon at fixed prices. Both open-hearth and bessemer rails, according to reports, will be bought.

No Decision on Specialties

New York, May 6.—Interest in the eastern car market centers almost entirely in the allotment of cars by the government. During the past week, the remaining 70,000 cars were definitely allotted. No decision has yet been made by the government relative to the specialties which are to be used on the cars and locomotives, nor has the basis of profit to these manufacturers been settled.

Included in miscellaneous inquiries out at this time are 25 to 50 tank cars for the Midwest Iron Co., Kansas City; 10 to 25 tank cars for the General Chemical Co., New York; five tank cars for the Certain-Teed Products Corp., St. Louis; three to five tank cars for the King Chemical Co., New York. Among recent awards are 50 hopper cars to be built for the American Steel Co. by the Pressed Steel Car Co.

The Lackawanna Steel Co. has ordered two switching locomotives from the American Locomotive Co. The Cambria & Indiana has ordered two mikado locomotives from the Baldwin Locomotive.

Alloy Consumers

Meet in Pittsburgh to Consider Plans for Greater Conservation

Pittsburgh, May 7.—About 100 steelmakers and others interested in the subject were present today at a meeting held in this city, which was called by the subcommittee on ferroalloys of the American Iron and Steel institute to discuss the question of conserving ore for making alloy steel. In the absence of James A. Farrell, who is chairman of the subcommittee, the meeting was presided over by President E. A. S. Clarke of the Lackawanna Steel Co. Plans were discussed to carry out the conservation program and all of those present agreed to co-operate fully. While no details were given out as to methods, it was reported that these may call for a change in manufacturing practice so that the new and lower standards of ferromanganese and spiegeleisen may be used to more practical purposes. The latter alloy also may be used in greater and the former in less quantities. The market for ferroalloys in this district is quiet. The only sale of importance reported during the past week involved a sizable lot of 70 per cent ferromanganese which was sold for last half shipment at $250. Small tonnages of 50 per cent ferrosilicon also have been sold. The price of this alloy ranges from $165 to $175, delivered, for prompt shipment and for contract it is quoted at $155. There is a scarcity of spiegeleisen. Spot shipment of 16 per cent are made at $75, furnace, and tonnages on contract are sold at $70, furnace.

Buying Awaits Meeting

New York, May 6.—Business in ferromanganese and spiegeleisen is held up temporarily pending a result of a meeting which will be held in Pittsburgh tomorrow by leading consumers of these metals. The meeting is to be held to discuss difficulties which are being encountered by some consumers in changing from the old to the new standards of ferromanganese and spiegeleisen. Business of the past week, therefore, involved only a few purchases. The principal sale involved a round tonnage of 18 to 22 per cent metal for shipment over the next few months, which went at a delivered price equivalent to about $77 eastern furnace. Some spot 16 per cent spiegeleisen has been sold during the week at $77, eastern furnace. There still are sellers of 16 per cent metal at $75 furnace for prompt and $70, furnace, for future. The ferromanganese market continues unchanged at $250, delivered, for 70 per cent.

The market on 50 per cent ferrosilicon again has eased off materially.

Nail Orders

In Large Amounts Placed by War Department—Schedules Closed

New York, May 7.—A large quantity of wire nails approximating 48,000 kegs has been distributed by the quartermaster general of the war department for extended deliveries. This business was not allotted but was placed after bids were called for and received. Some large orders for nails for shipment to France also have been placed. A new inquiry calls for 3000 kegs for the navy.

Government Orders Distributed

Pittsburgh, May 6.—Large orders for nails have just been distributed by the war department. Details are being withheld at its request. Makers of wire and wire products who up to recently were able to take limited bookings for private consumers now have closed their schedules to them altogether and are devoting 100 per cent of their output to requirements for the government.

Steel Casting Standards Modified

Ordnance Department Grants Important Concessions in Chemical and Physical Requirements—Sulphur Maximum Raised to 0.08 and Phosphorus to 0.06 Per Cent—Expected to Greatly Increase Accepted Output

WASHINGTON, May 6.—After three months of discussion and deliberation, the ordnance department of the army finally has yielded to the demands of the steel casting manufacturers for a revision in its exacting specifications which have greatly retarded the manufacture of castings for gun carriages and other ordnance requirements. The greatest concession is in the sulphur maximum, which now may run as high as 0.08 per cent where the carbon does not exceed 0.035 per cent and the phosphorus 0.06 per cent. The increase in the phosphorus limit, though slight, will permit the use of a large tonnage of metal heretofore eliminated by the restrictions of the ordnance department. The physical requirements also have been revised downward, with the exception of the elastic limit of cast steel No. 1, which has been increased from 25,000 to 27,000 pounds per square inch, while the tensile strength remains unchanged at 60,000 pounds.

Metal	Elastic limit, pounds per square inch		Tensile strength, pounds per square inch		Elongation after Rupture, per cent		Contraction of Area, per cent	
Cast Steel	Revised specifications	Former specifications	Revised specifications	Former specifications	Revised specifications	Former specifications	Revised specifications	Former specifications
No. 1	27,000	25,000	60,000	60,000	22	16	30	24
No. 2	32,500	35,000	70,000	75,000	18	15	25	20
No. 3	42,000	40,000	80,000	85,000	15	12	20	18

New Physical Requirements

The order was issued to the inspection departments of ordnance by Brigadier General J. H. Rice and is another revision to the specifications for steel castings, last changed March 15, 1917. The revised physical requirements compared with those provided for by the previous specifications are shown in the accompanying table.

The order also provides that cast steel No. 2 may be used in place of cast steel No. 1 in all cases where the latter is specified. From the foregoing table it will be noted that the elastic limit for cast steel No. 2 has been reduced 2500 pounds and for No. 3, 2000 pounds, while the tensile strength of both grades has been reduced 5000 pounds. The elongation and contraction, of course, have been proportionately increased. The elongation of cast steel No. 1 has been increased 6 per cent and that of Nos. 2 and 3, 3 per cent, respectively. The contraction of area of No. 1 has been increased 6 per cent; No. 2, 5 per cent and No. 3, 2 per cent.

The most vital paragraph of the order refers to the changes in the chemical constituents and is as follows: "In cases when the carbon does not exceed 0.035 per cent phosphorus may run as high as 0.06 per cent, with sulphur, 0.08 per cent. In the case of cast steel No. 3, phosphorus may not exceed 0.05 per cent, nor sulphur, 0.07 per cent."

The increase in the phosphorus limit is a big concession and in a measure will help to solve the difficulties experienced by steel casting manufacturers due to the existing scarcity of low phosphorus pig iron. An effort was made to have the phosphorus maximum raised from 0.05 to 0.06 per cent on the three grades of steel, but the ordnance department refused to consent to a change on steel No. 3, where it may not exceed 0.05 per cent. Foundrymen operating side blow converters have been unable to meet the sulphur limits of the former specifications, and even the standard of the American Society for Testing Materials specifies not over 0.05 per cent. With the sulphur limits placed at 0.07 and 0.08 per cent, it will be possible for converter steel foundries to have a large amount of cast steel accepted that heretofore has been rejected.

Members of the Steel Founders' Society of America, who formulated the demands for revised specification, are pleased with the concessions granted, but they are of the opinion that the inspection of castings could be greatly expedited by the establishment of a central bureau and the elimination of the provision involving the stamping of the heat number on each casting, regardless of its size. Furthermore, the inspection of the castings as shaken-out is considered to be a needless precaution that serves no other purpose than to retard subsequent cleaning, chipping and grinding operations, thereby materially restricting the output.

Foundrymen Awake to Pig Iron Shortage

WASHINGTON, May 7.—The present condition of the steel market, which has necessitated steel manufacturers pledging 100 per cent production for the government to the exclusion of commercial requirements, likely cannot be abated for weeks and months to come. This is the view held by the government and steps are to be taken by which pig iron production partly responsible for the decline in steel output, is to be kept from falling off and to be brought to as near full capacity as possible. It is generally recognized that the 1,500,000 tons already lost in production cannot be retrieved. And with fuel, labor and transportation factors, uncertain, it may be further increased.

Danger Previously Pointed Out

Government officials met last week to go into the iron question, but consideration of the problem was sidetracked at the last moment for deliberation on another important matter. It is probable the meeting will be called again this week with attendance of representatives from railroad, fuel, labor, shipping and other interested government departments. All recognize the vital importance of pig iron. Production now is somewhat better than it was five or six weeks ago and earlier, but it is still far from meeting requirements. Less than two weeks ago production was little better than a rate of 33,000,000 tons annually. That was an increase of about 415,000 tons over the week before. Two or three weeks still

earlier the rate was only approximately 27,000,000 tons annually.

Followers of the pig iron situation are not just waking up to the position in which the producers are placed. THE IRON TRADE REVIEW has continually pointed out the likelihood of such a shortage and crystalized the whole matter in its issue of Feb. 28, 1918. Within the next week J. Leonard Replogle, director of steel for the government, in a letter to the capital issues committee of the federal reserve board, urged curtailment of building construction, saying "owing to curtailment of operations of blast furnaces and steel mills, due to shortage of fuel and inadequate transportation, the pig iron situation is becoming acute." It is the present shortage of iron which is responsible for the present system of allocation of pig iron tonnage and which has led to some commandeering in the past.

The fact that many furnaces producing foundry iron are being converted to steelmaking grades, which is to be augmented by increased conversions after July 1, indicates the enormous demands being made by the steel mills for pig iron and some of the steps which are being taken to meet the requirements. This action, however, is cutting short the tonnages required in foundries and has led to a movement which will bring foundrymen to a full realization of their position and the importance of calling their predicament to the attention of the steel division of the war industries board through which pig iron is handled.

Foundrymen Are On Guard

This movement on behalf of the foundrymen was inaugurated in a letter from C. E. Hoyt, secretary of the American Foundrymen's war service committee, 918 F street, Washington, D. C., to foundry operators throughout the country. This letter says:

"A serious shortage of pig iron faces the foundry industry through changes of blast furnace production from foundry pig iron to steel producing grades. Some furnaces have already changed; many have announced they will change on July 1; many others are contemplating the change. Such furnaces, in bringing their next 12 months' supply of ore down the lakes this summer will stock up with steelmaking ore until the navigation season of 1919. This change, therefore, will last an entire year. Herein lies the gravity of the situation.

"One of the chief reasons for the change appears to be the greater ease with which a furnace producing basic iron gets coke, or obtains assistance from the government in getting it. This is due mainly to two factors: First, the government buys much steel directly, and in large quantities. It buys little gray iron directly, but gets it mostly in the finished product from contractors who have sublet their casting work; Second, the steel men, already more prominent than the gray iron foundrymen, have presented their case at Washington well and persistently; the foundrymen have not been heard so easily or so often."

The geological survey's latest report on coke production and shipments has a more encouraging outlook, both as to car supply and as to coke production.

Reorganize Bosch Plants

The Bosch Magneto Co., whose plants in Springfield, Mass., and Plainfield, N. J., recently were taken in charge by A. Mitchell Palmer, federal controller of alien property, has reorganized by the election of the following officers: Joseph A. Bower, New York, president; Christian Girl, Cleveland, vice president; George A. McDonald, Springfield, Mass., treasurer; William G. Fitzpatrick, Detroit, secretary; A. T. Murray, Allentown, Pa., general manager; A. D. Altree, New York, assistant treasurer. Do mestic business will be carried on as formerly, it is announced, under government supervision. Mr. Palmer believes both plants can be concentrated to produce equipment exclusively for the army, navy and aircraft boards. The Plainfield plant, which is equipped for the manufacture of electrical apparatus, but which has not been in operation for some time, will be utilized exclusively by the government.

Will Build Steel Ships

To build steel vessels immediately for the United States navy and eventually all types of steel craft, the Ferguson Steel & Iron Co., Buffalo, has broken ground for a shipyard on the Buffalo river. Plans at present call for the first keels to be laid by July 1. Capt. James E. Ferguson, president of the company, was recently detached from the United States signal corps at the request of the navy department to undertake steel boat building. Standardized boats, 151 feet long and of 1000 tons burden, with engines capable of generating 1800 horsepower, will be built. Parts not fabricated in the Ferguson shop will be worked up in other Buffalo plants. Edward P. Butts, Springfield, Mass., consulting engineer, will be manager of the shipbuilding department. The shipyard will occupy about seven acres, which will give the Ferguson works about 30 acres for operations.

Milwaukee Will Entertain Many Metal Men

The fall meeting of the iron and steel section of the American Institute of Mining Engineers will be held at Milwaukee during the week of Oct. 7, concurrent with the annual conventions of the American Foundrymen's association and the American Institute of Metals. Throughout this week also will be conducted an exhibition of foundry equipment and supplies and machine tools and accessories. It is also probable that several trade organizations of casting manufacturers will schedule their monthly meetings at Milwaukee for this week. Indications point to the simultaneous gathering of five great associations affiliated with the metal trades in Milwaukee during the week of Oct. 7.

The American Institute of Metals has accepted the invitation of the American Institute of Mining Engineers to become a part of that organization as its metals division.

A. I. M. E. Meeting

A tentative plan for the Colorado meeting of the American Institute of Mining Engineers, which will be held Sept. 2-7, has been formulated. One day will be spent in Denver, one day at Colorado Springs, one day at Cripple Creek, one day at Pueblo at the plant of the Colorado Fuel & Iron Co., and one day at Leadville. An automobile trip to the top of Pike's Peak also will be scheduled. All of the principal mines and mills in the districts mentioned will be visited. Special attention will be paid to the production of ferromolybdenum in electric furnaces at Leadville. A large number of papers on various mining and engineering subjects will be presented at the meeting.

Name Institute Directors

At the annual business meeting of the American Iron and Steel institute at New York May 6 the following directors were re-elected for the term ending 1921: James A. Burden, James A. Campbell, Thomas Cantley, Eugene G. Grace, William A. Rogers and J. F. Welborn. Thomas K. Glenn, president of the Atlantic Steel Co., Atlanta, Ga., was elected to succeed Col. J. C. Maben, who retires because of ill health.

Ore Movement

On Lakes Gains Strength—Dock Balance Cut During April

Cleveland, May 7.—Iron ore shipments are increasing. Delays have been encountered owing to the bunching of boats at upper lake loading ports, but the docks are rapidly handling ore and better dispatch is expected soon. Lower lake docks are handling arriving cargoes without difficulty. The coal movement is heavier than last year, although not sufficient to engage all of the vessel tonnage offered.

Receipts of iron ore at Lake Erie ports in April were only 15,184 tons, against 51,988 tons in April, 1917. Shipments from upper lake ports last month were 235,870 tons, against 211,532 tons in April, 1917. Shipments of iron ore from Lake Erie docks to interior furnaces increased during April. The total was 2,346,624 tons, against 2,020,903 tons in April, 1917. The dock balance May 1 was 5,624,587 tons, against 4,772,239 tons on May 1, 1917.

Will Conserve Manganese and Chrome Ores

Pittsburgh, May 8. (By wire.)—Following the meeting here yesterday of steelmakers and government representatives who discussed plans to conserve manganese and chrome ore, operators making ferroalloys will take up the question from the producing end at a conference they are to hold in New York tomorrow. The session yesterday dealt with methods of making steel by which less manganese ore will be used, thus conserving shipping space. Spiegeleisen will be used to a greater extent and ferromanganese to a less extent. Also it was suggested that the use of chrome ore be curtailed and, when used as a refractory, that not more than 1½ pounds should be used for each ton of ingots. The average now is approximately 1 4/5 pounds.

Scrap Commission Ruling Officially Announced

Official announcement of the allowance of the 3½ per cent commission by the war industries board on scrap sales was made by Chairman Gary of the committee on steel and steel products of the American Iron and Steel institute under date of May 2. The news of this allowance was published in THE IRON TRADE REVIEW in its last week's issue. Judge Gary's full statement is as follows:

Referring to the statement made by me under date of March 28, 1918, the war industries board has authorized the following ruling in respect of scrap iron and steel:

Consumers of scrap iron and steel employing an agent to purchase scrap for them may, at their discretion, pay as compensation for such service a sum not exceeding 3½ per cent of the agreed price at which such material is to be delivered, in cases where the agent guarantees the quality and delivery of an agreed tonnage of the material. This compensation shall be shown as a separate charge in billing; the material may not be invoiced at any price in excess of the maximums announced.

Under no circumstances may a dealer or broker split or divide this extra sum which may be allowed him by a mill with any other dealer, broker or producer, and the highest price that any one under any circumstances may pay is the maximum price as stated in the announcement of the war industries board under date of March 26, 1918.

Will Make Improvements

Youngstown, O., May 8.—J. A. Campbell, president of the Youngstown Sheet & Tube Co., announces that his company has authorized an expenditure of approximately $500,000 for improvements at the Youngstown and Hubbard plants to be completed as rapidly as possible. The ore bins at the Hubbard plant will be improved so as to increase the production of the two blast furnaces there. At the East Youngstown plant a coaling station for the plant locomotives and a thaw house with a 20-car capacity will be erected. This past winter many cars loaded both with frozen ore and coal stood for many weeks in the company's yards on account of inadequate thawing facilities. The thaw house will obviate the repetition of such a condition this winter.

Has Record Month

New York, May 8.—The Bethlehem Steel Corp., like the United States Steel Corp., has provided for its war income and excess profits tax payments by purchasing treasury certificates, making it unnecessary to borrow money for this purpose. At the company's meeting yesterday President Eugene Grace said that the Bethlehem corporation had produced more steel in March than in any previous month in its history. Plants are now working 90 to 95 per cent of capacity. At the corporation's shipyards more than 50,000 men are employed and it is expected that 60,000 will be the total force by July 15. The average number of employes in all plants of the corporation during 1917 was 64,782.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	**Aluminum	Spot antimony
May 1	23.50	.....	6.80	6.62½	32.00	12.25
May 2	23.50	.....	6.80	6.67	32.00	12.25
May 3	23.50	.....	6.70	6.72	32.00	12.50
May 6	23.50	.....	6.60	6.72	32.00	13.00
May 7	23.50	.....	6.60	6.90	32.00	13.00

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
**Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 32.10c; one to 15 tons, 32.20c.

New York, May 7.—With prices well above $1 a pound, the tin market again held first place in the attention of the non-ferrous market during the past week. Chinese tin for spot delivery sold all the way from $1 to $1.15. At the same time, May, shipment from the orient has advanced from 95c to $1. The shipment of Dutch tin from Batavia again is held up after a report that shipments were to be resumed. It is now said the licenses will not be granted for 30 days. Wild jumps in the London market give further indication of the tightness of the tin market all over the world.

Spelter, after a long period of weakness has again turned strong, and is now quoted around 6.75c to 6.92½c for prompt and May delivery. One of the factors back of this strength is the agreement between Joplin miners and makers of sheet zinc for a $75-market on high grade ore. This ore is to be allotted on orders given by the sheet zinc makers through a special allotment committee appointed by the government. Indirectly, second grade ores also have been affected.

Copper producers will meet with the war industries board May 22 in regard to revising the price effective June 1. It is generally believed in the New York trade that no change will be made, although there does seem some possibility of an advance of 1c to 1½c.

Lead has shown little change in the past week. Other metals have been generally quiet.

Junk Pile Transformed Into Gold

Modern Cinderella of Iron and Steel Industry, the Scrap Trade, Gains Place in Proud Family Circle—How Chemistry Has Reclaimed Outcast and Made Old Material Prime Factor in Metallurgical Plants

BY GEORGE H. MANLOVE

RECOGNITION of the increasing importance of iron and steel scrap as an industrial factor is becoming more widespread in the United States at present and the business of collecting, preparing and marketing the tremendous tonnage of old material is assuming a new dignity. From the junkman of other days to the scrap dealer of the present is a long journey. One was primitive and little regarded; the other performs a recognized function in the mechanism of the iron and steel machinery which is, in fact, a most important and essential part.

Although the American Iron and Steel institute has been in existence many years and has discussed almost every phase of production from the ore to finished product, it was not until late in 1917, at the Cincinnati meeting, that the subject of scrap was given a place on its program. It seems likely that this subject will be studied and analyzed further at later sessions as one of the important items of raw material of the iron and steel industry.

Scrap has had no literature. No book ever has been written on it, though practically every other phase of iron and steel production has had volumes devoted to it. Trade publications for the most part have contented themselves with market reviews and quotations of the day. In the immediate past a change has come about. Even the popular magazines have carried stories, written in non-technical language, telling of the recovery of scrap on the battlefields of Europe, for use in making new implements of war. Trade publications are awakening to the importance of the subject and a literature of scrap seems to have been born. The government has recognized the ranking of iron and steel scrap by fixing a maximum price on various important grades as part of the federal program of market regulation. A board has been formed among the leaders of the industry to provide more effective regulation from within and do away with some of the abuses which have been as a millstone about the neck of the business.

The growth of iron and steel manufacturing into the colossus of today, has been witnessed from almost its infancy, by men yet alive. Individuals still in touch with active affairs can remember when the entire production of this country was less than that of many single companies at present. In those days scrap was not a factor. Demand for iron and steel was small and it seemed easier to use ore and make new iron. Little metal was in use compared with the present and consequently scrap production was light. With improved processes, bringing enlarged production, attention was called to scrap. The tonnage available increased with the greater production of steel and its wider use.

Prejudice had to be overcome, for until chemistry came into its own and demonstrated that iron and steel are just as valuable, strong and useful when made from old material as from virgin pig iron, such products were deemed inferior. It is stated that foundry foremen in the older days went so far in preventing scrap entering their cupolas that they painstakingly removed nails from wood used for kindling the cupola fires.



MOUNTAIN OF IRON AND STEEL SCRAP AS UNLOADED FROM CARS, BEFORE BEING SORTED AND GRADED

Now every foundry uses scrap to a large percentage and it has been demonstrated that it may be melted without pig iron if its quality is carefully inspected.

Once chemistry opened the way, scrap entered a larger field and began to assume its important place. Yet, even after it had been admitted to the family of raw materials of the iron and steel plant, it did not wholly come into its own since there was lack of knowledge of its full possibilities. Its users did not know how to handle certain grades and new prejudices arose. These prejudices, which do not date so far back, gradually have been overcome one by one, until there remain few descriptions of scrap iron and steel for which there is not a market. These few will find their place within a short time.

Enlargement of the sphere of the steel industry has assisted in giving new importance to some grades. An instance of this is to be found in the growing use in the past few years of the electric furnace for the production of high quality steel, refined in the electric arc. This has caused a demand for low phosphorus scrap. Electric steel is produced almost entirely from low phosphorus scrap. Formerly crucible steel was almost the only outlet for this grade at its intrinsic value. The same scrap is used in the production of special alloy steels and in the few acid open hearths operated in this country.

For many years sheet clippings from tin plate were almost valueless and were wasted in large degree. Then processes were found by which the tin could be removed by detinning and used again as pure tin or in the form of some of its salts. This gave a residue of steel sheet scrap, free from coating. Yet this was difficult to utilize because of its bulk. It was compressed into bundles and tied with wire, giving it some value for melting. But still it was too bulky for its weight. In the past few years hydraulic presses capable of compacting sheet scrap almost to the exclusion of voids has enlarged its sphere of use and now it is a recognized factor in open-hearth practice under the classification of hydraulically compressed sheet scrap.

Borings and turnings for a long time were considered of little value since they were oxidized in the cupola or sifted through the bed and were wasted. Many experiments were tried with more or less complicated means, but now, enclosed in lengths of stove pipe stopped at each end or in wooden boxes, they are heated to softness before the container gives way and are melted economically. They have been briquetted under tremendous pressure with some success, though the latter process is not yet commercially successful or in wide use. Borings and turnings are being charged into blast furnaces and give a ton of pig iron for a ton of scrap, or approximately so.

Open-hearth practice has been expanding its use of scrap steadily and now employs a wide range of specifications. In fact, it has been found that while pig iron in the furnace loses almost 8 per cent in the removal of carbon and metalloids, heavy steel scrap returns almost ton for ton. On the books of a large steelmaker, scrap is figured as giving 105 per cent when pig iron is taken as the base at 100 per cent.

Good steel scrap in sizes and shapes that permit of reheating and rerolling in a bar mill yields new material of high value without remelting. Steel rails are rerolled into bars and shapes. Crop ends of steel billets are reheated and rolled into sound soft steel bars. A larger percentage of discards from steel required for war purposes has enlarged this source of scrap during the past two or three years and has added largely to the output of rerolled bars. Steel and iron axles are treated as billets, reheated and rolled into other and smaller shapes. Locomotive tires are cut into three or four equal parts, heated and rolled into bars. All these processes are more of the nature of reclaiming than of scrap consumption, since the material is not remelted.



SOMEBODY THOUGHT THIS WAS SCRAP BUT SLIGHT REPAIRS IN RECLAMATION PLANT OF RAILROAD SAVED IT

Railroads are the largest users of iron and steel and, as a result, they produce more scrap than any other source. In the heyday of railroading, when money was plentiful and experience was scarce, materials were scrapped in a wasteful way and without much thought. One railroad found on careful inspection that 60 per cent of its scrap sent out for sale could be made usable by a slight effort to reclaim it. It has worked out methods by which it reclaims



ALLIGATOR SHEAR, TYPICAL OF SCRAP YARDS, CUTS LONG SCRAP TO BUSHELING AND SHOVELING SIZES

material valued at $1,000,000 per year, at a profit varying from $300,000 to $500,000 per year. It sells nothing as scrap until it has been passed through its reclaiming plant and has been found beyond the possibility of being reclaimed. Galvanized sheets, because of the presence of the zinc coating, for which no removal process has been perfected, are of little value. They are melted for sash and elevator weights, where weight is the only consideration. Yet one railroad manufactures at a profit from galvanized car roofs all the containers, buckets, oil cans and cups it needs, and gets a better product than it can buy in the market.

Car Wheels in Demand

Car wheels, because they are practically pig iron cast into the shape of wheels, and of a known analysis, are eagerly sought to replace pig iron when the latter is scarce. In the present situation, when pig iron is difficult to obtain, car wheels are in such demand that for months practically no tonnages have been on the market. They are being sold direct to melters. In many cases, exchange contracts are made by railroads with wheel manufacturers, the former furnishing old wheels and receiving an equal tonnage of new wheels, paying a certain differential. In such arrangements, prices are not a factor since it makes no difference to either railroad or manufacturer what the market is for the old or the new wheels.

Blast furnaces are using more scrap than formerly since from two tons of ore charged only one ton of iron is obtained and this is possible only by the use of a ton or more of coke. With scrap the furnace delivers practically a ton of iron for a ton of scrap. It is possible also to use grades that have small demand elsewhere. Skulls containing much iron, runners and spilled metal cooling into fantastic shapes, go back into the furnace. These are forms of scrap produced at the furnace. Borings and turnings are used, and recently annealing boxes from malleable foundries have come to be an article of scrap trading for blast furnaces. Mill scale and cinder also go into the stack and the iron contained in them is reclaimed.

The value of scrap is something outside itself. It is extrinsic. There is no intrinsic value. It is not manufactured, except in the narrow sense that its preparation in a scrap yard, where it is cut or broken to proper sizes, is a manufacturing process. Its value lies entirely in its ability to replace some other material at a saving. Its value is also affected by the supply of the material it can replace. If the latter is not obtainable scrap may command a higher price.

Government Fixes Maximums

It is found by comparing quotations that heavy steel scrap, which replaces basic iron in the open-hearth furnace, usually ranges about 10 per cent lower than basic. Yet in periods when basic is scarce, heavy melting may sell higher. This relation was maintained in the maximum fixed by the government. Basic iron was fixed at $33 and heavy melting steel at $30. This differential is sufficiently constant as to be regarded as a rule, with variations from time to time as conditions temporarily change. A certain relation is also established between all grades of scrap, based on their supply in relation to demand and on their availability compared with pig iron. Some of these differentials are almost absolute, while others are relative. All scrap dealers and users have a sort of "rule of thumb" by which they have classified the scrap they use in its relation to other grades and to pig iron. They know when quotations are out of line. There is no normal relation which can be relied on to fit all conditions, since local and momentary changes in the market continually act to disturb the situation. Yet, when these conditions pass, the affected grade unerringly returns to a certain relation, close to the average.

At the beginning of the war steel axles were a drug on the market.



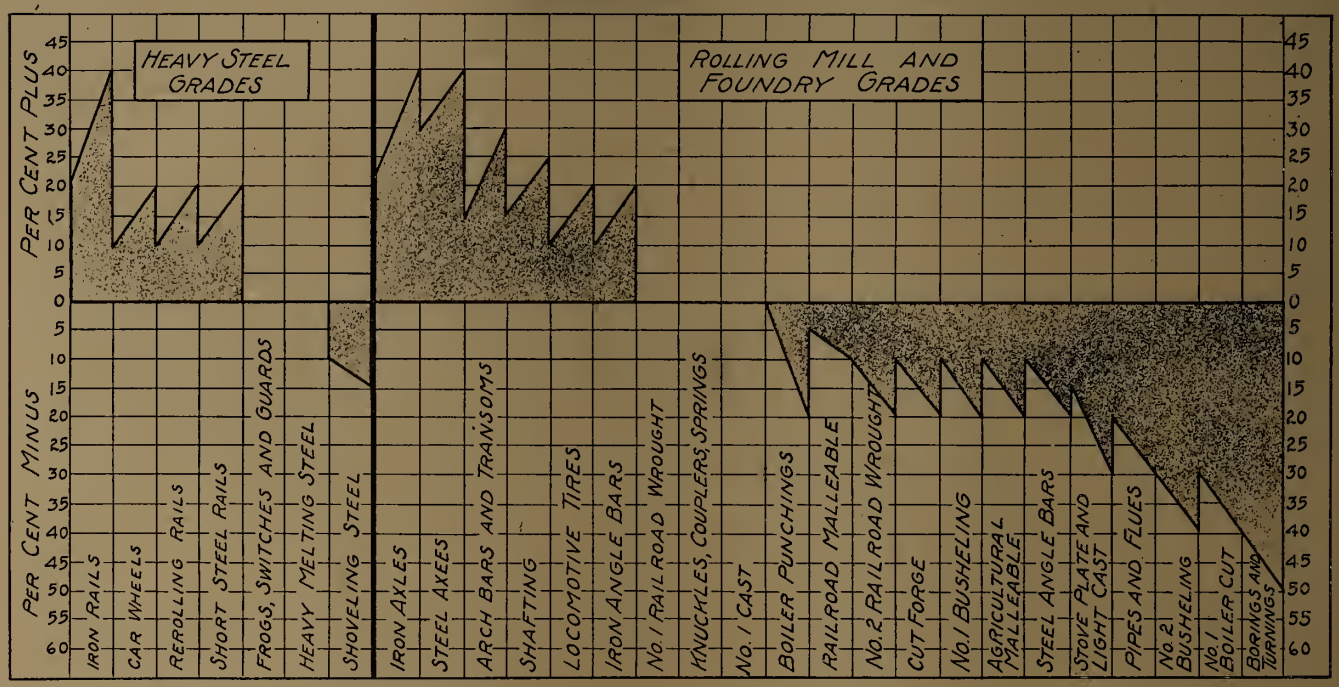
ELECTRO-MAGNETS UNLOAD CARS AND MEN SEPARATE THE MASS INTO ITS CLASSIFICATIONS

New steel was begging for buyers and there was no call for material rolled from axles. Italy wanted billets about the time the rest of Europe began to buy steel here and steel axles at once became the highest priced scrap item on the list. They were exported to Italy for use in place of billets. They have remained at about the topmost level ever since and now are snapped up as soon as they appear.

In the accompanying presentation of the differentials existing between the several grades of scrap it must not be assumed that at any given period all quotations will fall within the percentages given. Varying supply and demand may move any

regularity and several years ago an association of railway storekeepers was formed. This association met with representatives of a large number of steelmakers and a standard classification was worked out to meet the needs of the consumer. It has been altered somewhat since its original draft and now serves as the basis of scrap classifications. Under this a dealer buys from the railroad, secure in his knowledge of what the shipment contains. He sells to the consumer on this knowledge and the latter knows what he is getting. Thus the interests of all are protected. Other producers have found they must conform to this rule in order to market their material profitallied grades on the gross ton basis, they have demanded bids on rolling mill and foundry grades on the net ton basis, a ton of 2000 pounds. This causes some confusion and it is believed that in the course of time the gross ton will be the only basis. To facilitate the conversion of one value to the other, tables have been prepared where the equivalent of any tonnage may be determined instantly, from net to gross or vice versa. Most scrap dealers, having to make this conversion constantly, however, have it well in mind without reference to the table, except to prove accuracy.

The scrap industry is the most primitive of the departments of iron and steel. It gets close to the earth.



DIAGRAMMATIC STUDY OF SCRAP VALUES SHOWING HOW MARKET QUOTATIONS ADHERE TO WELL DEFINED DIFFERENTIALS

given item above or below its normal relation. Yet in the long run it will fall into its proper place as given. At present, with maximum prices fixed on only a portion of the list and with the allied grades prohibited from rising above the limit, many natural and usual relations have been destroyed and scrap grades normally selling several dollars a ton apart, are at the same figure. Efforts are being made now to remedy this condition by a wider fixing of prices.

Irregularities exist in scrap nomenclature and practice in different parts of the country, though these are being reduced as time passes. Inasmuch as the buyer knows what he wants, he dictates what sort of scrap shall be furnished him. At the beginning it was difficult to determine this accurately. There was great confusion. The railroads, being the largest producers of scrap, sought some basis of

ably. Recently the American Foundrymen's association has formulated a classification which has made considerable headway, the basis being the cross section of the scrap. This is regarded as an excellent guide to the analysis of the material, under the standard practice of mills and foundries.

Individual consumers have their own variations from the so-called standards, to meet particular operating conditions as to size of charging box or analysis. The dealer usually knows where his clients' requirements differ from the usual standard.

Gross Ton Becoming General

Most scrap is bought and sold on the basis of the gross ton, of 2240 pounds. Most mills figure costs on the same basis. But western railroads have differed from this practice and while they sell heavy steel and

Its commodity is subject to more influences than any other. Unless it is wanted it has no value. When it is essential, its value will soar. It started in the wagon of the peddler who traded cheap tinware to the housewife for her accumulation of old iron, or paid the schoolboy a few pennies for what he could find thrown away. Now its traders deal in tons by the thousand; they buy entire railroads, dismantle them, sell the serviceable equipment as second hand and scrap the remainder. It has risen from nothing to a position of full dignity and is just now coming into its own, a recognized member of the iron and steel family. Great profits have been made and are being made in gathering and selling old iron and steel. It rewards its workers royally in return for careful business practice. Scrap represents true conservation of the nation's resources.

How Huns Destroyed Belgian Plants

Germany's Self-Aggrandizement By Seizing Great Belgian Iron, Steel and Machinery Industries is the Outgrowth of Dr. Rathenau's Plan Suggested in August 1914—Similar Tactics Employed Elsewhere

THE world is familiar with the tactics employed by Germany in its invasion of Belgium to render that country a nonentity in trade after the war. Only recently however, have the full details of her effort to seize the iron, steel and machinery industries of the country and deliberately cripple them in order to forestall future competition, come to light. These details establish the fact that Germany's dealings with Belgium industry were all the outgrowth of a well-defined, systematized plan, fostered and developed by Dr. Walter Rathenau, president of the General Electric Co. of Germany and first suggested by him early in August, 1914. This plan had for its purpose the establishment of a bureau of raw materials for the war, which was made a part of the ministry of war "to work out the difficult and new problem of arranging that there shall be no lack of raw materials for the conduct of the war and the economic life of the nation," according to a published statement by Dr. Rathenau. He was placed at the head of this organization and associated with him were leading German men of science, manufacturing and commerce, with a military colleague. Questionnaires were sent to the 900 contractors of the ministry of war in Germany and within three weeks, complete and accurate figures were obtained as to supplies, how long they would last, as well as the extent of the raw material supply. It soon became evident that if the war was to be continued, the raw material reserve must be increased. The occupation of Belgium and other countries furnished the solution and as Dr. Rathenau stated, "the difficulties met with in keeping to the rules of war while monopolizing and seizing materials in enemy territory, have been overcome."

More Scraps of Paper

How they were overcome is a story of setting aside by Germany of every regulation of the Hague conventions, to which she had subscribed, particularly those of the fourth convention, dealing with confiscation of private property and the payment for material seized. These plainly state that private property cannot be confiscated and no requisitions shall be demanded from municipalities or inhabitants except for the needs of the army, and then sufficient reimbursement must be made. So complete was Germany's devastation of such occupied territory that not only was she able to maintain her army, but trainload after trainload of seized material, iron, steel, machinery, tools, etc., was sent back to Germany. Not only was the German army benefited but German industry, commerce and agriculture as well. By meeting the army's needs in conquered territory, Germany saved herself on an average of 3,500,000 to 4,000,000 marks a day and the seizure of Belgian materials in her economic war, effected a further saving of between 6,000,000 and 7,000,000 marks daily. This furnishes one of the explanations as to why Germany has been able to carry on the war until this late date, since her practices in Belgium were her practices in all other conquered territories.

Belgian plants were invaded, machinery and tools were taken to pieces and sent to Germany and often no receipt was given the owners. Many heavy machines were dynamited and wantonly destroyed with hammers, because they could not be conveniently moved. In a

Belgium Stripped by Germany's Gleaning

WHEN Germany invaded Belgium, she went over the country with a fine-tooth comb. Everything became grist to her mill. No item capable of rendering the slightest aid to the fatherland or its soldiers was inviolate. A category of all things seized for the use of the gray Hunnish hordes or commandeered to be sent back to Germany would cover a wide range from everything used in the conduct of general industrial establishments to everything used in private homes, on farms, etc., manufactured, in course of manufacture, or raw materials. Food, clothing, textiles, household articles, oils, explosives, medical supplies, live animals as well as hides, all received the Hun's attention. An idea of how the iron, steel and machinery industries were affected can be gained from the following partial list:

Minerals and Metals

Iron, and steel
Gold, silver and platinum
Tin, lead, copper and zinc
Antimony, nickel and cobalt
Tungsten, ferrotungsten and tungsten steel
Manganese, ferromanganese and spiegeleisen
Chrome, chrome iron and chrome steel
Molybdenum and ferromolybdenum
Vanadium and ferrovanadium
Titanium and ferrotitanium
Alloys of all metals, especially brass, tombac, bronze and alfenid
Ores and slag: Nickel, manganese, tungsten, chrome, molybdenum, vanadium, titanium, cobalt, ground Thomas slag, graphite, pyrite, ferrosilicon, ferrophosphorus, silicospiegel, silicomanangaluminum and hematite pig iron
Scrap: Iron, copper, tin and other metals

Chemicals

Toluol and coal tar dyes
Copper sulphate and mercury
Phosphates and nitrate of lime
Salts of tin, chrome, vanadium, titanium, cobalt and nickel
Acids: Sulphuric, nitric, muriatic and vanadium
Sulphate of ammonia, liquid ammonia and saltpeter

Machinery

Iron and steel tools: Complete and partially so
Electric condensers, conductors, transmission and insulated cables
Belts, trolley wires, copper wires and cables
Ingots, blooms, billets and sheet billets
Machines and copper parts of machines
Rails and rail connections, injectors, cocks and valves
High speed steel
Used machinery from all industrial establishments

communication to the United States government, the Federation of Belgian Iron & Steel Manufacturers stated that up to Jan. 22, 1915, machinery to the value of 16,000,000 francs ($3,000,000) had been taken away. Millions of dollars worth of raw materials belonging to private persons were likewise seized and sent to Germany, including flax, cotton, rubber, wool, nickel, copper, etc. Every scrap of metal that could possibly be seized was confiscated. The president of the Antwerp chamber of commerce valued the goods requisitioned by the Germans at 83,000,000 francs and stated that less than 25 per cent had been paid for. Some pretense of paying for commandeered material was maintained but in the *Frankfurter Zeitung,* Dec. 21, 1914, the promise was worded, "pay shall be made in such a manner that no money shall be sent from Germany to Belgium during the war." Upon Brussels was levied a tax of 50,000,000 francs and the province of Brabant had to pay 450,000,000 francs by Sept. 1, 1914, and in December, 1914, the provinces had to turn over 480,000,000 francs at 40,000,000 francs a month.

Forced Sales Mask Thievery

Between October, 1914, and March, 1917, ninety-two distinct ordnances had been drawn up declaring forced sales or confiscations, as a result of which the country is now practically bare of almost every common commodity in use or in process of manufacture, as well as every ounce of raw material. In their completeness, these ordinances are samples of German efficiency, if that word which means so much to American industry may be used in connection with anything so demoniacal as the carrying out of Dr. Rathenau's plan. As an example, one ordnance issued at Brussels, Dec. 13, 1916, states: "The following designated objects are hereby seized and must be delivered: Movable and fixed household articles made of copper, tin, nickel, brass, bronze or tombac, whatever their state; kitchen and household utensils, metal ware, wash basins, bath tubs, water heaters, reservoirs, individual or firm nameplates in and on houses, door knobs, knockers and metal decorations on doors and carriages, curtain rods and holders and other fixtures, scales and all other tin household articles or adornments."

Trade Secrets Stolen

Not being satisfied to carry off all the machinery in sight, the idea of so crippling the great Belgian iron, steel and machinery industries so that a long term of years will be required for recovery caused the Germans to visit the factories and plants to extract trade secrets. Dr. Bronnert is a director of a German factory making artificial silk. On Dec. 9, 1916, he visited a factory at Obourg which competes with his plant and carried away designs and parts of the machinery.

Beumer Makes Boast

So thoroughly did the Germans do their work of devastation that in February, 1917, Deputy Beumer boasted in the Prussian diet, "anybody who knows the present state of things in Belgian industry will agree with me that it must take at least some years—assuming that Belgium is independent at all—before Belgium can even think of competing with us in the world market."

When Von Hindenburg stated that Belgium had been accorded all the rights of belligerents, he neglected to define the phrase a la Germany. He neglected to give the Hun's interpretation of those rights. He should have explained that this meant the "right" not only for Belgium to have its men, women and children violated but the "right" as well to have the country methodically despoiled and wantonly stripped of every vestige of that which could render the slightest aid to Germany. He should have told how the invasion resolved itself into a systematic exploitation to lead eventually to the starvation of the population and the elimination of Belgium as a trade factor.

Oxy-Acetylene Aids Ship Fabrication

FABRICATION as a practical method of ship construction is distinctly American, and remarkably effective in attaining speed. The plates are rolled at the rolling mills. The castings are produced and finished to standard dimensions at the foundries. The structural shapes and plates are made ready formed to templates, sheared and punched at the fabricating shops. The various units are then assembled at the shipways, and the final fitting together, riveting and welding is performed at the shipyards. This system embodies the practical application of the fundamental principle of efficiency, expressed as, "every man to his own job."

New methods and devices to aid in the actual putting together of the ships have met the demand for increased speed. A notable instance of the adaption of an important labor-saving device to broad general service in ship fabrication, is found in the oxy-acetylene method of cutting and welding. Although fully developed prior to the breaking out of the war, this process has received much stimulus under the stress of ship demand.

Oxy-acetylene apparatus has been adopted as standard equipment at practically all shipyards and its field of application in shipbuilding is constantly being enlarged. A typical shipyard which has adopted this method for cutting and welding with remarkable results in the saving of man power is that of the Sun Shipbuilding Co. at Chester, Pa. This company now is using the oxy-acetylene torch in actual construction, in its fabricating department, its ladders and gratings shop, its boiler shop, and its sheet metal shop. In the ladders and gratings shop, the torch is used extensively for fitting floor plates and cutting holes in them for the passage of pipes. The apparatus also effects tremendous economies in cutting V's out of the flanges of angles which may be bent as desired. Its use in this connection saves cutting by a special shear and also in many cases eliminates gusset plates. In the sheet metal shop the torch is used extensively for butt welding seams on ventilator cowls.

Shearing Minimized by Flame Cutting

In the fabricating department one of the most important employments for the oxy-acetylene torch is the cutting of gusset plates from whole plates, particularly where the gusset plate is too irregular to admit of shearing. This use not only eliminates the necessity for shearing, but also a great deal of hand punching in sections which a shear could not reach. In the angle-smith shop, which is a subdivision of the fabricating department, the torch is used extensively for cutting and welding angles, which is work that otherwise would have to be done in the forge shop. In the engine department recently a 10-inch section was cut out in order to remove the eyes of a connecting rod.

In the actual construction of ships, great savings are effected by using the oxy-acetylene torch for cutting holes for the passage of pipes after the bulkheads are up. This particular work is greatly facilitated by means of a mechanical device known as the radiagraph, which enables the operator of the device to cut perfect circles. This tool saves a tremendous amount of handwork, since these holes formerly were caped out, or were cut with special tools. In addition, a great deal of miscellaneous cutting and welding necessary in actual ship construction is done with the aid of oxy-acetylene. It is esti-

mated that 50,000 cubic feet of oxygen are consumed in building a ship.

The torch is used extensively in boiler work, particularly in patching boilers, and in burning off the ends of staybolts. It is calculated that one man with the flame apparatus at the latter task does the work of five men working with chisels. Great economy also is effected through cutting pipe flanges out of scrap plates. The flanges, which otherwise would have to be forged, are roughly cut from the scrap plate by a torch equipped with a radiagraph, after which they are finished on a lathe. The oxy-acetylene process is employed extensively for building up bosses on the sides of pipes for manifolds. Another example of the variety of work which is done at the Sun plant is the recent tapping of a pipe line in order that a branch might be welded on. To take the piping system apart and make the connection in the usual manner would have required about five days, whereas this job was done with an oxy-acetylene torch in less than one day.

The equipment is employed on a large scale for local heating of all kinds, for instance, when bumps have to be flattened out of plates and also in heating laps and setting up flanges. By careful preheating and slow cooling, the Sun company regularly and successfully uses the oxy-acetylene torch for welding gray-iron castings of all kinds and especially for repairing broken machinery parts, such as broken steam-hammer cylinders and housings.

New Method of Separating Slag

A novel method and apparatus for tapping open-hearth furnaces has been patented by Melton A. Smith, Vandergrift, Pa. A brick-lined box is placed between the tapping spout of the furnace and the upper edge of the ladle. This box, shown in the accompanying illustration, receives the molten metal as it flows from the furnace. It is provided with a hole in the bottom, the flow of metal through this hole being governed by a manually-operated stopper. An overflow outlet in the upper edge of the box forms a spillway for the overflow of the molten slag.

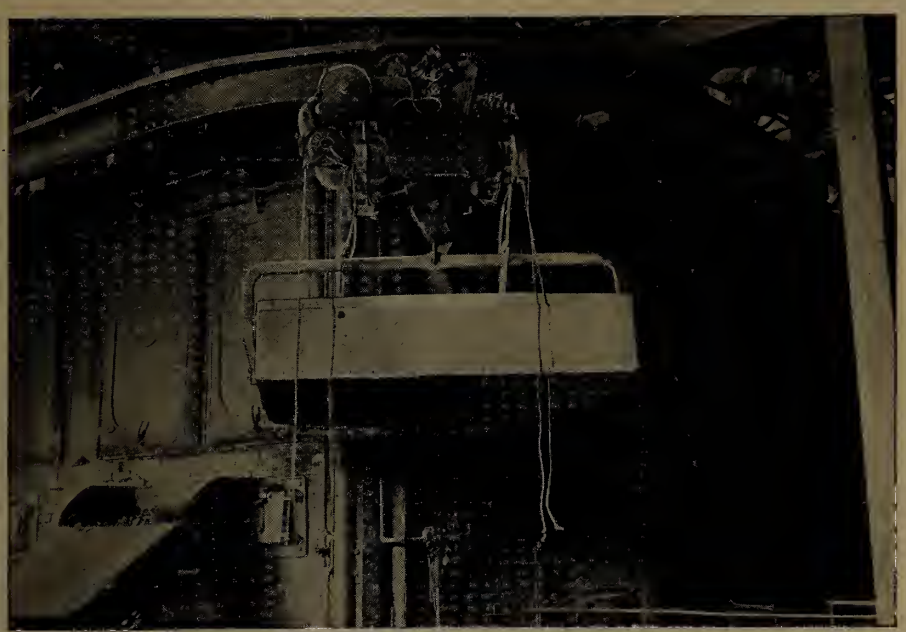
The receptacle is portable and is suspended from an auxiliary trolley of an overhead traveling crane which is used to transport the ladle. The box is of such size that the steel will not overflow from it. After the metal begins to flow from the furnace the stopper is kept in a closed position until a pool of metal forms in the box. The slag being lighter than the steel, rises and floats on the surface of the pool. The level of the latter is controlled by means of the stopper so that the slag which collects in the box will overflow through the outlet. When all of the steel is tapped from furnace the slag box is kept in position until the steel from it flows into the ladle. The stopper on the box is then inserted in the bottom outlet which prevents any slag from flowing into the ladle. One of the advantages claimed for this method of slag separation is that additions such as manganese, chrome, etc., can be made to the steel in the ladle without the slag interferring with the reaction.

Monorail Crane for Boiler House

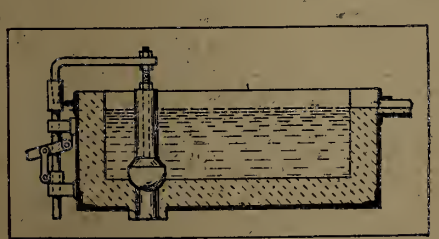
An ash-conveying system which was recently installed at the Pennsylvania State college, State College, Pa., has placed the power plant on a more efficient operating basis. A 10-inch I-beam is suspended from cross-ties which are securely riveted to upright steel girders spaced approximately 10 feet apart. An electrically-driven hoist operates on the lower flanges of this I-beam. The hoist, shown in the accompanying illustration, was built by the Link-Belt Co., Philadelphia. It is equipped with a copper trolley wheel which operates on the lower surface of a trolley. The latter is of the bus bar type and extends out approximately 8 inches from the upper right-hand flange of the monorail.

The gears are enclosed in metal housings and operate in a bath of oil. The conveyor is equipped with two direct-current motors, one for hoisting and one for forward and reverse travel. They were built by the Crocker-Wheeler Co., Ampere, N. J., and are controlled from below by means of cords attached to the controller drums. The hoisting motor is provided with a dynamic brake which prevents the load from falling whenever the power fails. An automatic upper limit switch is also provided to prevent over-hoisting.

Approximately every eight hours the ashes which accumulate on the dumping grates of the stokers are transferred into a steel tray 6½ x 3¾ x 1½ feet. This tray is equipped with a bail and is mounted on a four-wheel truck which operates on a narrow-gage track. The tray of ashes is hoisted from the truck by the monorail and transferred to the ash pile about 300 feet from the boilers. The speed of the conveyor is from 125 to 250 feet per minute. It requires about 10 minutes from the time the ashes are placed in the trays until the latter are dumped and returned to their position under the grates. Approximately 5000 pounds of ashes are disposed of every 24 hours.



MONORAIL CRANE USED FOR TRANSFERRING ASHES FROM BOILERS TO STORAGE PILES



DEVICE FOR SKIMMING OPEN-HEARTH SLAG

The D'Arcy Spring Co., Kalamazoo, Mich., recently purchased the business and equipment of the Perfection Coal Spring Co., Jackson, Mich., and will remove the equipment to Kalamazoo.

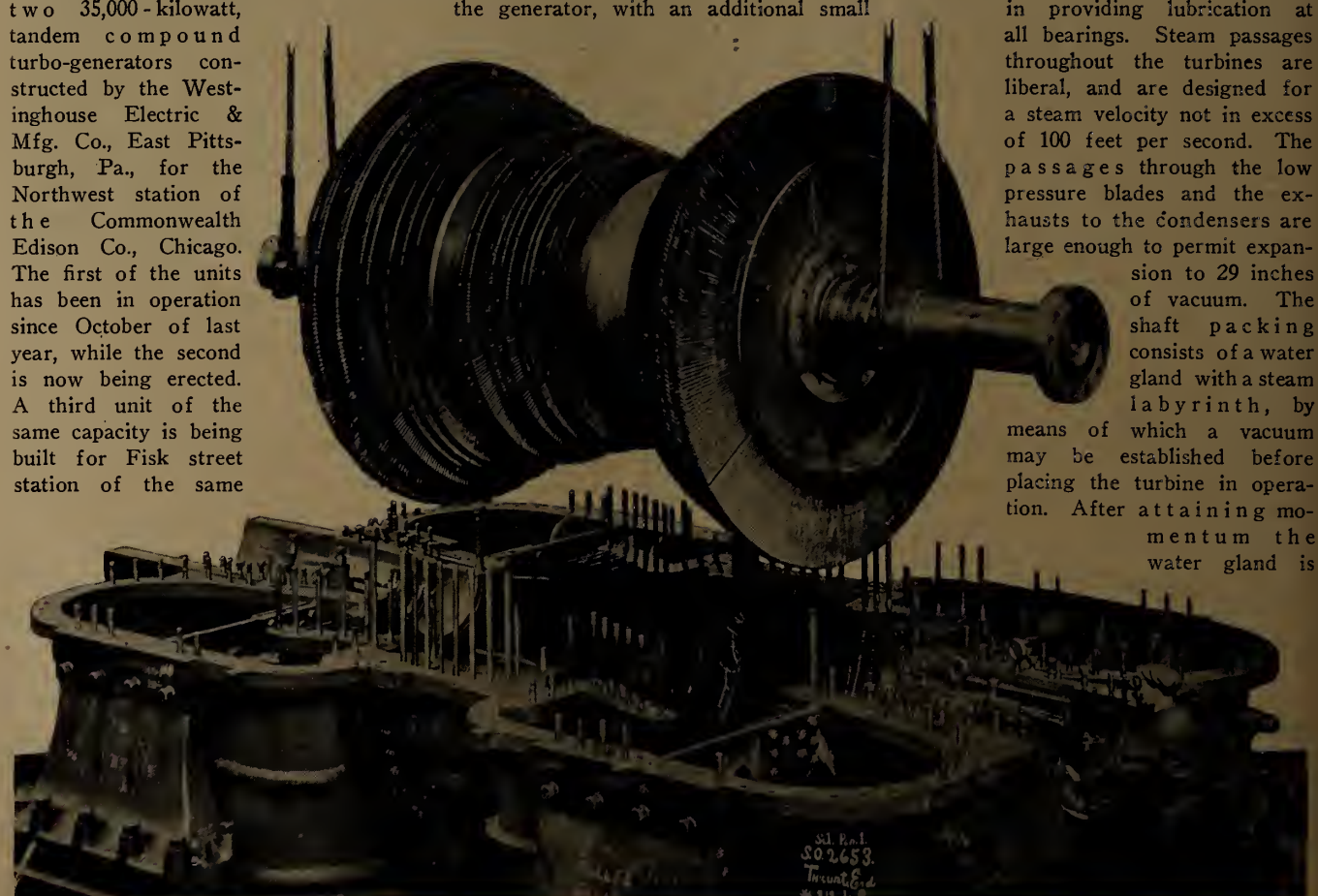


Turbo-Generator Unit from the Generator End, Showing the Direct Connected Exciter

Power Needs Met By Super-Turbine

QUALITY of materials and accuracy in manufacture are prime essentials when the product is a turbo-generator of nearly 50,000 horsepower. Reliability and high efficiency must be assured in a power unit of such surpassing size. The installation shown in the accompanying illustrations is one of two 35,000-kilowatt, tandem compound turbo-generators constructed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for the Northwest station of the Commonwealth Edison Co., Chicago. The first of the units has been in operation since October of last year, while the second is now being erected. A third unit of the same capacity is being built for Fisk street station of the same company. Each unit comprises a high-pressure turbine element, a low-pressure turbine element, and a 35,000-kilovolt-ampere current generator. The two elements are connected by a solid flange coupling so that all three rotors turn as one unit. There are five main bearings, three on the turbine and two on the generator, with an additional small bearing on the outboard end of the direct connected exciter shown in the illustration above.

Low blade speed and safe stresses governed in the design. The maximum mean blade speed is 510 feet per second. The bearing speeds and pressures are low and extreme care was exercised in providing lubrication at all bearings. Steam passages throughout the turbines are liberal, and are designed for a steam velocity not in excess of 100 feet per second. The passages through the low pressure blades and the exhausts to the condensers are large enough to permit expansion to 29 inches of vacuum. The shaft packing consists of a water gland with a steam labyrinth, by means of which a vacuum may be established before placing the turbine in operation. After attaining momentum the water gland is



LOW PRESSURE SPINDLE BEING LOWERED INTO THE CASING—DETAILS OF THE CONSTRUCTION OF THE STATOR, AND THE GREAT SIZE OF THE MACHINE MAY BE NOTED

put in operation and the labyrinth is shut off.

The high pressure rotor has only one bearing, as the end of the spindle next the low pressure side is rigidly connected by means of a solid flange coupling to the low pressure element, the bearing of which carries half the load of both rotors. A small dummy bearing is provided to carry the free end of the spindle when it is necessary to disconnect for adjustment.

The high pressure spindle consists of a hollow steel drum carrying the necessary blades and two small dummies to balance the end thrust. The two separate shaft ends are attached rigidly to it by means of long press fits and held in place by bolts or shrink links. At the governor end there is a thrust bearing inside the main bearing which carries a small portion of the thrust and maintains the proper longitudinal alignment of the rotor and stator. The outer cylinder or stator is made of cast steel designed to withstand the temperature and pressure of the entering steam. Most of the blading is carried on blade rings rigidly attached to the main cylinder, which permits the use of a plain sound casting, free from shrinkage stresses.

The low pressure spindle is built up from a central hollow carrying the intermediate stage blading and labyrinth packing, and is rigidly attached to the two shaft ends. Upon each of these shaft ends are mounted two discs carrying the low pressure blading. The low pressure stator is made of cast iron and consists of a central section and two end sections bolted together. Each of these sections is split and the top half of all three is handled as one piece.



DETAILS OF THE TURBINE CONTROL MECHANISM WHICH IS OF THE TYPE STANDARD IN MODERN PRACTICE



MAIN CIRCULATING PUMP AND CONDENSOR TO WHICH EACH LOW PRESSURE STAGE HAS A SEPARATE EXHAUST



TURBINES FROM THE STEAM END, SHOWING THE OVERHEAD STEAM PASSAGE FROM THE HIGH PRESSURE TO THE LOW PRESSURE ELEMENT

Safe Storage For Bituminous Coal



TWENTY-FOUR HOUR OPERATION IS ASSURED WITH AN ADEQUATE RESERVE OF COAL

Heat Loss From Storage is Negligible—Under-Water Storage Absolutely Prevents Spontaneous Combustion—The Dangers of Self Ignition Can Be Greatly Minimized by Correct Methods of Air Storage—Coal Storage a Patriotic Necessity

BY J. F. SPRINGER

THE coal crisis through which the United States recently passed undoubtedly has impressed a large number of consumers with the necessity for taking adequate measures to prevent stringent conditions next winter. It is now understood that transportation congestion was a leading if not a controlling factor in the coal shortage which has passed into history. Insufficient production no doubt was also a large factor, but this difficulty is not to be regarded as independent of transportation.

The mines pursue a hand-to-mouth policy. When empty cars are available, the mine works; when they are not available, operations stop. No doubt this policy has grown up because of a desire to avoid the cost of rehandling which would be a consequence of storage at the mines. Consumers would pay this small additional charge rather than be subjected to the fear of a shortage, but doubtless competition in selling has tended to prevent the mines from adopting storage systems as a means of maintaining continuous operation. A coal crisis next winter will not be prevented simply by storage at the mines. Mines cannot ship coal, even if cars are available, unless they have orders from dealers and consumers. The dealers and consumers avoid ordering coal too far ahead, because they do not have the necessary storage facilities to handle it pending consumption.

There will be a big rush of orders at the mines this spring, for the reason that many consumers will elect not to depend upon the co-ordination between the mines, railroads, dealers and consumers, which the fuel administration may be able to effect. Consumers will put their trust in their own efforts and many will order coal and provide storage when it arrives.

Some serious mistakes will be made in the rush to store coal, as few have had adequate experience in or knowledge of storage methods. As a matter of fact coal storage is not only cheap but good practice besides. The coal will perhaps lose something of its calorific value; but this may be put down as part of the cost.

Bituminous coal piled up in the ordinary way, regardless of whether it is under roof or not, is subject to spontaneous firing. That is to say, the coal catches fire on its own initiative, deep down in the mass. The weather has little or no effect as the danger is too deep-seated to be seriously affected by temperature, rainfall or barometric changes.

It is not long since some people disbelieved in spontaneous firing. They thought that it did not occur, or if a fire originated that it was due to some overlooked accidental cause. Today no one who is well informed doubts that spontaneous ignition takes place and that it occurs frequently. The causes underlying the phenomenon were for a time obscure and probably all have not yet been uncovered. Sufficient knowledge exists, however, to enable the consumer to take care of coal in any quantity. Two well established facts are recognized in connection with spontaneous combustion: Anthracite coal is practically immune, whether stored in

Coal Storage a Duty

INDIANS lived from hand to mouth. With them sufficient unto the day were the provisions thereof, and the morrow was in the far distant future. A somewhat similar policy has governed coal consumers. The fear of loss through storage deterred many from attempting to accumulate a coal reserve, and as a result last winter brought famine conditions. Transportation proved inadequate under the added burdens of war, and industries depending upon a steady delivery of coal suffered. In the accompanying article, J. F. Springer discusses a timely subject in an authoritative manner. He explains the proper methods to be observed in caring for next winter's coal supply, and presents conclusive evidence that the waste incident to storage is negligible if spontaneous combustion is prevented. Suggestions are offered which will forestall the peril of self-fired coal piles, the only logical barrier to the accumulation of a reserve for future needs. Coal storage this summer is one of the most imperative patriotic duties of every manufacturer.

large or small quantities; and practically the only safe storage for deep piles of bituminous coal is that which depends upon the actual submergence of the coal in water. Wet storage is depended upon by the United States navy. A large part of the coal at the government plants at the two entrances to the Panama canal is stored in wet basins supplied with water from the Atlantic and the Pacific. The saturated mass may extend slightly above the water level at times; but probably one or two feet is the most that is allowed to remain uncovered by water.



CRISTOBAL COAL STORAGE AT THE ATLANTIC TERMINUS OF THE PANAMA CANAL

If a coal pile is built up not merely to the water level but 30 to 40 feet higher, two storage conditions result. There is one pile in wet storage, extending from the bottom of the basin to from one to two feet above the surrounding water level; and from this point on up is another pile which is not benefited by the presence of the water. These two conditions are recognized at the coaling stations on the Panama. It is understood that coal piled above the water is practically in the same condition as coal piled on the land. The tidal fluctuation at the Pacific terminus to the canal, which may amount to 20 feet, has probably no effect, as the coal is soon fully submerged again after an ebb tide. The wet storage capacity of the Cristobal plant on the Atlantic side is 100,000 tons. While this plant, as well as the one at Balboa, is for public as well as governmental use, the wet-storage coal is reserved for navy purposes.

The effect of wet storage upon coal has been investigated. New River, W. Va., coal of ¼-inch size was stored under water for two years. The experiments were made in three different latitudes, some of the coal experimented upon being stored at Portsmouth, N. H., some at Norfolk, Va., and some at Key West, Fla. After the two-year period, it was found that the coal had lost in calorific value less than 0.5 per cent. These were all cases of salt water storage carried on at naval stations. The same coal of the same size was experimented upon at Pittsburgh by submergence for two years in fresh water. There was no calorific loss in this case. In these experiments what are perhaps the best qualities of

Consider now the case of an inferior Illinois coal. In investigations at the University of Illinois, Parr and Hamilton found that nine months' storage under water had practically no effect upon the B. t. u. rating of the coal.

The government's results previously given in connection with New River coal are preliminary statements which were offered after the coal had been under test for two years. Further information recently has become available, covering three, four, and even five years. The figures are confirmatory, as



PACIFIC COALING STATION AT THE ENTRANCE TO THE CANAL. SHOWING WET STORAGE PITS AND HANDLING EQUIPMENT



ACRES OF COAL IN DRY STORAGE AT DULUTH, MINN.—A COMPREHENSIVE SYSTEM FOR HANDLING AND LOADING IS NECESSARY

the maximum heat losses experienced were 1.2 per cent. The next highest were 1.0 and 0.9 per cent respectively. What has been said relative to New River coal applies to both fresh and salt water storage and to the same four localities at varying latitudes referred to previously, except that the wet storage figures for Key West stop at 3¾ years. The conclusion is that in respect to this coal, at least, wet storage has an almost inappreciable effect upon the calorific value whether the water be fresh or salt. It also is independent of the climate. It should be borne in mind, however, that the figures resulting from the foregoing experiments have reference only to the coal itself and not to any moisture, sulphur or ash content. As between salt water and fresh water storage, the fresh water system would seem to be the better as no Pittsburgh loss was higher than 0.7 per cent.

Other Submergence Tests

In experiments on Pittsburgh gas coal, one sample was taken from Baird Station, Washington county, Pa., and another from Monongah, Marion county, W. Va. Samples of both varieties of coal were submerged for periods running up to 4½ years. The maximum calorific loss experienced was 0.6 per cent. In both cases, the coal was crushed to ¾-inch size.

Combining the results given in the foregoing as to New River, Pittsburgh and Illinois coals it may be affirmed with a reasonable certainty that the submergence of bituminous coal results in negligible losses of heat value. This statement applies to the coal itself and not to any associated substances such as sulphur, moisture and ash. It should also be borne in mind that the experiments concern the effects of wet storage on losses of heat value only and do not take into account any possible losses in gas-making or coke-making value.

The next consideration of importance is that wet storage will frequently mean wet firing. The amount of water retained by high-grade eastern coal from wet storage after it has been allowed to drain is probably not



OVERLOOKING THE SHADYSIDE, N. J., STORAGE YARD OF THE NEW YORK EDISON CO.

more than 2 or 3 per cent by weight. This may well be regarded as a not serious matter. However, it is understood that with Wyoming and Illinois coals the ultimate retention of water after drainage may amount to from 5 to 15 per cent. Consequently, users of these fuels must consider whether such excessive retention of water is prohibitive. Whether it is practicable to drive out the water is also a question which will turn upon local conditions.

It is probable that in a boiler plant the coal in the feeding bins, pockets and chutes is exposed to heat for a considerable period before it is placed in the firebox. No doubt, some loss of calorific value results from such conditions. G. G. Bell, borough electrical engineer, Hammersmith, England, made the following statement: "The arrangement of boiler room storage which has found most favor in electric generating stations up to the present is the system of overhead coal bunkers supported on stanchions above the firing space in front of the boilers. The coal is delivered to the top of the bunkers, and gradually works its way downwards as the coal below it is drawn off through the chutes and delivered to the stokers. The time taken by each delivery to reach the stokers may be long or short, but during the delay the coal is subjected to a certain amount of artificial heat from the boilers, and any ventilation it receives is by means of the hot air from the boiler house, such conditions being ideal for the rapid deterioration of the fuel, and it is probable that such a system is responsible for an increase of more than 5 per cent in the fuel bill."

It would seem as if these conditions would offset any objection made to the firing of wet or damp coal. A thoroughgoing investigation should be made of the deterioration of coal after it gets to the boiler house and before it arrives in the firebox. To be of far-reaching value, such an investigation should take into account an adequate variety of coals, and might be performed by some university experiment station.

Kinds of Air Storage

In what is known as air storage, the coal may be piled in the open and exposed to the vicissitudes of the weather or it may be stored under a roof. In both cases the system is styled air storage. The preliminary report previously referred to, took account of this type of storage as well as the wet system. New River, W. Va., coal of ¼-inch size stored *inside* at Portsmouth, Norfolk and Pittsburgh suffered a maximum loss in B. t. u. of 0.8 per cent. Stored *outside* at the same points and at Key West in addition, the heat losses ranged from 0.77 to 1.85 per cent, Key West showing the maximum. In all these cases, the storage period was two years. Run-of-mine size showed negligible loss when stored inside, and very moderate loss (1.29 per cent) when stored outside. Sub-bituminous coal from Sheridan, Wyo., suffered considerable loss, whether stored as slack in a closed bin 15 feet deep or as run-of-mine in a closed bin 5 or 15 feet deep. Run-of-mine stored in an open, shallow, 5-foot bin suffered considerable loss in heat value, though the loss was less than in the other cases of Sheridan coal. All these instances refer to a 2-year period.

Air Storage Loss Varies

From the preliminary report mentioned it is indicated that a high-grade steam coal like New River will suffer but little from air storage, whether it is put under cover or not. It is noted, however, that indoor storage is better than outdoor, and that run-of-mine size loses less than the small coal.

More complete reports now available show that New River coal of ¼-inch size stored indoors lost a maximum of only 1.2 per cent of heat value in the course of one year. A second year, however, increased this maximum to 2.1 per cent, the coal now being outside. Similar results were realized at Key West. The coal stored at the other three stations, all of which are further north, lost little, whether stored inside or outside. Tests for a month or for five years gave proportionately low results so that the statement is warranted that New River coal loses little, provided it is not exposed to excessively warm climatic conditions.

A test of open storage of Pocahontas coal from Virginia was made at Cristobal coaling station at the Atlantic terminus of the Panama canal. Here 120 tons. left in an open pile for a period of two years, showed a loss for the whole period of only 0.81 per cent. Not only is the climate warm, but the amount of rainfall is extraordinary. In November, 1910, during the period of the test, 2½ feet of rainfall was noted, over an inch a day. The following January experienced less than 1 inch in the whole month, and the January succeeding witnessed a precipitation of only 0.28 inch. The average mean temperature for a month never fell below 79.3 degrees, Fahr.

Coal from the Pittsburgh bed at Baird Station, Pa., and Monongah, W. Va., was tested in open air storage by the government for periods running up to five years. The losses of calorific value were negligible. The only instance running close to 1 per cent was that of a West Virginia sample from the surface of an open bin where it had been for the full 5-year period. This sample showed a calorific loss of 1.1 per cent.

Illinois coal stored outside are reported separately by Professors S. W. Parr and A. Bement as suffering a loss of heat value ranging from 1 to 3 per cent for one year. Mr. Bement found also that small samples showed a marked tendency to reduce from lump to slack. There is reason to believe, however, that outdoor air storage would not cause slacking to any considerable depth in a big pile.

Wyoming (Sheridan) coal tested by



DETAILS OF CONSTRUCTION OF THE STORAGE BASIN OF THE OMAHA LIGHT & POWER CO.



COAL HANDLING EQUIPMENT AT THE DRY-STORAGE YARD OF THE NEW YORK EDISON CO.

the government showed considerable losses from air storage. Some of the coal was exposed to the weather in an unroofed bin; and some in bins with covers. The exposure in the open bin did not seem to affect the loss of heat value in excess of the air exposure in covered bins. For the group of cases, the heat loss after nine months was from 3.93 to 4.88 per cent. This coal is sub-bituminous and has a calorific content in the neighborhood of 13,200 B.t.u. per pound of coal.

Calorific Loss is Not Important

From the investigations summarized, it would appear that with the highest grades of American steam coal it makes little difference whether wet or dry storage is used insofar as calorific loss is concerned. Nor does it matter if the coal is stored indoors, as the effects of weathering constitute a minor consideration. With certain inferior coals the weathering losses of air storage rise to higher levels, but in few cases are they larger than 4½ or 5 per cent. With large piles the effects of slacking are not considerable, as in the cases of all the foregoing coals, from dry storage, indoors or out, only a moderate calorific loss and a moderate loss from slacking is experienced.

Spontaneous combustion is a more serious consideration. All these coals when air stored may be expected to catch fire of themselves, unless properly stored. Paymaster George R. Crapo, U. S. N., indicates the serious character of the problem in storing high grade steam coal for the navy. He says: "From Nov. 15, 1914, to Feb. 20, 1915, a series of fires of a spontaneous nature, 16 in all, took place in the coaling plant under my charge at the naval station, Key West, Fla." This plant had a storage capacity of about 16,000 tons. There were two steel sheds, one with an area of 100 x 150 feet, and the other 75 x 250 feet. The height to the eaves in both cases was 20 feet. Paymaster Crapo appears to think that these sheds were too high and that 14 feet to the eaves would have been better. Perhaps Pocahontas and New River coals may be stored safely in piles 14 feet deep; but there are other coals which it would not be safe to submit to such deep storage.

Consider the experience of the Chicago & Alton railway. There were three piles of run-of-mine Springfield, Ill., coal, two of which were six feet high and one, 10 feet. The lower piles did not catch fire spontaneously, but the 10-foot one did. There was a goodly percentage of slack coal in all three piles. No one can well say just what the safe depth of a coal pile is, for it depends upon various factors, some of which are scarcely understood. Take the case of the coal mined on Cape Breton island, Nova Scotia, which is good bituminous coal. As the St. Lawrence river is closed to navigation a part of the year, this coal is conveyed largely by barges in the warm season. At Montreal, the Canadian Pacific railway stores this coal in an enormous pile or group of piles. The same coal is stored at the mines while awaiting shipment, but at the mines the piles have been twice as high as at Montreal. And yet the coal was found to fire spontaneously at the latter point, but not at the mines. Possibly, this was because the coal was chilled at the moment of storage in the one case and comparatively warm in the other.

An experimental pile of slack coal some years ago was arranged so as to have a range of heights from 0 to 20 feet. The change in height was gradual and the length of the pile was about 130 feet, with a top the width of about 3 feet. A French investigation recorded the rise in heat near the bottom of the pile for a period of about three months. The temperature rose steadily for all points except those near the zero end of the pile. "Through that part of the pile where the depth was about 13 feet or less, the heat recorded never rose higher than about 160 degrees Fahr. Beyond this height, the temperature continued to rise until the pile caught fire. Atmospheric temperature and dry or wet weather had no appreciable influence on the temperatures within the pile, except at the extreme low end."

All Bituminous Coal Heats

The practical lesson that is to be learned from the foregoing in respect to air storage is that *all bituminous coals,* whether of high or low grade, are liable to spontaneous ignition. The height of the pile seems to be a large factor, as also is the presence of fine coal. A safe maximum height for slack coal is probably much lower than a safe maximum height for run-of-mine or lump. This height probably varies with the coal itself, its chemical composition and physical condition. The Chicago & Alton 10-foot pile of part slack caught fire, while the French pile of all slack refused to ignite in a region of greater height.

Spontaneous ignition, it has been fairly well determined, results from a progressive oxidation of the coal due to its contact with the atmosphere. First, the oxidation will be slow, but since this chemical reaction adds to the temperature and a rise of temperature tends to more active oxidation, it is not difficult to understand the high resultant heat. In this way, the temperature rises to 400 or 500 degrees Fahr. Another stage of combustion then commences. The coal oxidizes independently of support from external heat, and the temperature goes on up until finally it reaches the ignition point (700-900 degrees Fahr.) and the coal catches fire. All this goes on deep down in the mass. The air to support the continued oxidation comes from a considerable movement of air through the mass. This circulation is stated to take place at the rate of a complete change in 10 or 11 hours.

Why Fine Coal Fires

The foregoing explanation is regarded as a fair approximation of what goes on in a coal pile up to the point of self-ignition. Accepting it as substantially correct, it is not hard to see that fine coal is especially dangerous because of the relatively great amount of surface exposed to contact with the air in the voids in a coal pile. This theory also explains why a deep pile is susceptible. In a deep pile, it seems reasonable to assume that there are locations where the air circulation keeps up at such a rate that it has but little cooling effect and for the most part merely contributes oxygen for oxidation purposes. Some have proposed to prevent spontaneous ignition by promoting air circulation. Doubtless, this will be successful, provided everywhere in the pile the cooling effect overbalances the heating from oxidation.

Freshly mined coal seems to be especially dangerous. Doubtless, the same conditions exist where coal is much broken up in handling, the result being the presentation of fresh surfaces to oxidizing influences.

Some practical suggestions for storing may be given. If coal must be air stored, let the piles be as low as possible. Probably a 6-foot pile would have to contain some extremely fine coal to be subject to spontaneous combustion. If the coal is all lump and is not subject to slacking in the pile, then that maximum height may be increased somewhat without danger. Store the coal where, if possible, no trouble to buildings will result if the pile does take fire. The storage should be provided in such way that there will be no heating from steam pipes or furnaces or other outside sources in the neighborhood. While the temperatures caused by such outside influences may be small, they act in the direction of facilitating the initial heating and oxidation of the coal. Some favor the plan of rehandling after a period all coal that is received shortly after it is mined. It may be doubted whether this is effective, as is shown by the example of the Cape Breton coal which fired at Montreal although twice rehandled after its first storage at the mines.

It is best to watch the internal

temperatures of air stored coal. This may be done by the use of long steel rods provided with crooks or handles at one end. Stick the straight ends of such rods deep down into the coal pile at a number of points and leave them until the temperature of the surrounding coal is communicated. Once or twice a day, pull out each rod and determine from its "feel" whether the coal is beginning to heat. If a rod is getting decidedly hot at any point, measures should be adopted to check heating at this part of the pile.

Arresting Temperature Rise

Perhaps the best thing to do, when coal is found to be getting hot, is to dig out the affected region. This is undoubtedly true when actual firing has taken place. A water jet from a hose is not the remedy. The fire should be dug out together with all the coal around it. The practice of the New York Edison Co. at Shadyside, N. J., where it maintains a big storage yard, is to dig out the affected coal, load it on a barge, and send it to the Waterside Power Station to be burned. The coal at Shadyside is stored in piles that at times reach up to a level of 35 or 40 feet. Spontaneous ignition is so frequent that it has necessitated the lining of wooden tram cars with sheet steel to prevent damage to the wood while transporting the affected coal along a route that requires only a few minutes to cover. The use of a jet of water in cases of spontaneous combustion seems to be inadvisable for the reason that it facilitates the creation of a protective hood of coke over the fire. Experience is against the water-cure for self-fired coal.

The best and most certain preventive of spontaneous combustion is the total submergence of stored coal in water. The loss in thermal value may be regarded as negligible, but there may, perhaps, be some loss in coking or in gas-making value. The great objection to wet storage is the cost which is principally due to the construction of a water-tight storage reservoir. In addition it may cost a little more to recover coal from a submerged pile and the water itself may cost something.

In some cases the construction cost may be lessened by taking advantage of a natural or semi-natural depression in the ground surface. An abandoned quarry may be suitable, if it is close by and is water-tight or capable of being made so. A nearby stream may supply the water, or it may be obtained from the water department. The question of water will naturally turn on local conditions. It is not really necessary that all the coal be submerged. The top may be left in the dry to a depth of 4 or 5 feet, for the reason that the water level within the pile will be a foot or more higher than outside because of capillary attraction. The stoppage of leaks in the storage basin may often be made by the use of clay.

Construction of Storage Basin

A pit or reservoir may be constructed of concrete; steel has also been found serviceable. A recent example of concrete construction for a wet storage basin is the pit on Brunot island just below the city limits of Pittsburgh. The island is in the Ohio river and the pit forms part of the plant of the Duquesne Light Co. at the main generating station. The bottom of the basin is horizontal, 800 x 150 feet with a depth of 25 feet. The sides slope at an angle of 45 degrees giving a capacity of 100,000 tons of coal. The pit is partly an excavation, but embankments sloping one to two on the outside were necessary in part in order to provide the full depth. The pit is lined with concrete with a floor 15 inches thick. On the sides, the concrete varies from 20 inches at the bottom to 8 inches at the top. The reinforcement of the sides is furnished by a double layer of expanded metal extending half way up the slope and a single layer extending to the top. Where the sides and bottom come together rods of ¾-inch size are used as an additional reinforcement. The surface connection between the sides and the floor is given a curve of 10-foot radius.

Preventing Expansion Failure

Such an extended piece of concrete as the lining needs sub-division to provide against rupture from expansion and contraction due to temperature variations. Three expansion joints were provided to make longitudinal divisions. These run from one end of the pit to the other, down one end slope and up the other and one is placed centrally like an axis. Fifteen transverse expansion joints about 50 feet apart cut across the longitudinal ones and rise on both sides to the top of the pit. The series of transverse joints ceases about 10 feet from the ends of the floor. This division of the lining results in breaking the basin lining into blocks about 40 x 50 feet in area.

The joints in the floor are supported on concrete footings, provided with an upward projecting ridge which separates slab from slab. Between ridge and slab is a filling of pitch which varies in thickness with the expansion and contraction. When the floor was laid, an allowance of 1 inch was made at the joints. That is, the floor slabs were poured into the space fenced in by forms on the sides, so set as to leave the required 1-inch space.

Preparing the Forms

Some trouble occurred in arranging for the forms which was ultimately taken care of by using steel plates of ⅛-inch thickness and 6 feet in length. These were set vertically and parallel to the face of the upward projection of the concrete support. The distance of the outer face was made 1 inch by using steel rods ⅞-inch in diameter which were set vertically at intervals of 1 foot. These rods served as distance blocks. The plates were held to position by clamps reaching over the concrete projection already mentioned. The plates were greased to prevent the concrete from adhering either to the steel plates or to the hardened concrete of the supports located at expansion joints. The adherence of the undersurface of a slab along the region of an expansion joint was prevented by putting a double thickness of tar paper laid in pitch on the horizontal surface of the old concrete in the support.

Automobile As War Factor

BY JOHN N. WILLYS
President, The Willys-Overland Co., Toledo, O.

SURELY no industry in this country can be considered of any greater importance that the automobile industry, with its giant capacity for production. It has supplied the motor transport trucks, officers' cars, ambulances, tractors for guns, tanks, especially equipped vehicles for the airplanes and balloon service, surgeon general's department, automobile kitchens, shoe repair shops, dental trucks, and so forth, and in addition has taken contracts for the manufacture of many kinds of military and naval articles. These include airplane engines and parts, submarine chasers, marine bomb anchors, gun recoil checks, artillery wheels, shells for guns and numerous other things foreign to the automobile trade.

War contracts already undertaken by the industry aggregate more than $600,000,000. Modern automobile plants, with their extensive equipment of machine tools and hundreds of thousands of expert workers in special

From a paper presented at the annual meeting of the National Foreign Trade Council, Cincinnati, April 18-20.

trades have unequalled facilities for doing much of the war work required at present.

After commandeering most of the motor trucks and many of the passenger cars in Europe, the French, English and Russian governments turned to the United States to supply the deficiency. During the first three years of the war the United States exported 45,308 motor trucks to England, France and Russia—that is, during the three fiscal years ending June 30, 1915, 1916 and 1917. Nearly all of these were for war purposes, as the exports for the two preceding years amounted to only 410.

It is not known how many trucks have gone to Europe for the American Army. These do not figure in the summaries of exports as published by the Department of Commerce. But approximately 2000 trucks had been bought by the United States Army and 10,000 more ordered up to the first of last February, at which time requirements were in sight for from 10,000 to 15,000 more for which orders had not been placed. A considerable part of the first 20,000 had been delivered and sent to their destinations. With the resumption of the German offensive in March the need for redoubled efforts by America indicated the likelihood of heavy increases in orders for army trucks.

The number of commercial motor vehicles operating in this country is approaching half a million. It is estimated that they have an average capacity of two tons and can easily average fifty miles a day, including time spent in loading and unloading. Thus they have combined capacity of 50,000,000 ton-miles daily, or 15,000,000,000 ton-miles a year. This is a considerable load to take off of the overburdened railroads. If all shipments originating within a distance of even twenty-five miles of cities are handled by trucks, which make deliveries direct to consignee, the railroad freight houses will be relieved of all this miscellaneous small freight that now causes so much terminal congestion.

Chemical Industry in War

BY HENRY HOWARD
Vice President, Merrimac Chemical Co., Boston

LET US not forget the year of delays and many failures that England and America experienced in developing their numerous high explosive plants, while Germany, with its highly developed dye industry, was able almost over night to adapt its dye plants with their skilled labor to the manufacture of high explosives, so similar are the two lines of manufacture.

There is no doubt that a permanent coal tar dye industry is a matter vitally affecting our national safety in times of peace, because in no other manner can the necessary plant and skilled workers, easily and quickly convertible to use in munition manufacture, be kept available for emergency calls in times of need.

After January, 1915, *potash* importations from Germany practically ceased. Our chemical industry has already succeeded in producing a substantial tonnage of American potash, ranging from the low grade material suitable for fertilizers to that of the greatest purity necessary for use in the manufacture of optical glass such as was formerly made in Jena, Germany, for the use of Zeiss glasses. The importance of this glass at the present time for the manufacture of range finders and high power field glasses can hardly be overestimated. Although the crude potash tonnage now produced is far below the imports before the war, yet very substantial progress is being made. The most important deposit is Searles Lake, San Bernardino county, California, which contains brine testing 4 per cent potassium chloride, from which the potash is recovered and purified.

The rapid growth of the American potash industry is shown by the following production figures all calculated on the basis of 100 per cent potash.:

Twelve months, 1915—970 tons.
Twelve months, 1916—9720 tons.
First six months, 1917—14,000 tons.
Second six months, 1917—28,000 tons.

The above figures are from Mr. Hoyt S. Gale, Geological Survey.

At the present time production is probably at the rate of more than 60,000 tons per year, a remarkable showing for an industry only three years old, a result by the way which could not possibly have been attained if price regulation had been practiced in the manner that we have seen in some of our important products. The result is due to almost superhuman efforts of manufacturers to get the benefit of the fabulous prices that potash has been bringing in this market.

From a paper presented at the annual meeting of the National Foreign Trade Council, Cincinnati, April 18-20.

British Works Combine

The great car building and repairing companies of Great Britain have come to the conclusion that a great deal of labor, time and money is being wasted by the needless multiplication of repairing depots at various railway junctions and centers. They have therefore formed a combine, so that repairing will be done co-operatively in the future. With this object Wagon Repairs, Ltd., has just been registered at Somerset House by Messrs. Parker, Rhodes & Co., 14 Moorgate street, Rotherham, with a nominal capital of £1,250,000 in £1 shares. The signatories to the memorandum of association are: The Birmingham Railway Carriage & Wagon Co., Ltd.; the British Wagon Co., Ltd.; S. J. Claye, Ltd.; the Gloucester Railway Carriage & Wagon Co., Ltd.; Harrison & Camm, Ltd.; Hurst, Nelson & Co., Ltd.; the Metropolitan Carriage, Wagon & Finance Co., Ltd.; the Midland Railway Carriage & Wagon Co., Ltd.; and the North Central Wagon Co., Ltd. Each corporation, which is registered as holder of not less than 20 per cent of the issued capital may appoint two directors. Subject thereto, each corporation joining the company and not entitled to appoint two directors may appoint one director. Every director or member of a committee must be a British subject and free from foreign control. The general office will be in John Bright Street, Birmingham.

The Risdon Stoker Co., 5219 Morgan street, Seattle, has been organized to manufacture and sell the Risdon stoker, an invention of Ivan Risdon, president. It will burn almost any kind of coal, but lignite must be mixed with biuminous. The coal feeds in and the ashes are carried out mechanically. All but one of the four moving parts work in an oil bath.

Freyn & Co., engineers, 643 Peoples Gas building, Chicago, have shipped fifty 3-inch Birkholz-Terbeck gas pressure burners for the war department, to be used at the new nitrate plant at Sheffield, Ala., operating on clean producer gas.

The Bayview Foundry Co., Sandusky, O., producer of gray iron castings is about to extend its plant.

Iron Production Hampered

Lack of Cars and Motive Power Keep British Furnaces from Full Output—Army Taking Workmen

Bureau of The Iron Trade Review,
Prince's Chambers, Corporation St.,
Birmingham, Eng., April 18.

BLAST furnace operations continued fairly well through the holidays, but production is hampered by slow handling on the railways, for which not only scarcity of trucks, but insufficient locomotive power, is said to be responsible. Many furnaces find it quite impossible to make full production. At the Birmingham meeting some Derbyshire & Northamptonshire houses accept orders rather more freely than of late, and were ready to book lots of 100 to 250 tons at maximum prices. As a rule, this was the outside limit of tonnage which furnace owners would undertake. Consumers have found it possible to obtain small lots of iron from the basic furnaces not commandeered for war requirements. For this they have had to pay the full price, although it is very well known that the quality of this material is very unequal. Output in the Staffordshire district will be improved shortly by the restarting of two furnaces. But the shortage is great, and every available ton of scrap is eagerly utilized to make up for the deficiency. All the foundries are very eagerly inquiring for material, and many of them cannot possibly obtain adequate supplies.

In the Cleveland district, the truck shortage has kept an unusual quantity of the pig iron made, available for use in the district, so that the foundries in that neighborhood are better off than they were. The demand there is chiefly for standard iron. The position in Cleveland has improved a little, and the supply is very much nearer the demand than it has been for some time. A fair proportion of business has had to be brought over from March to April, owing to the inability of many makers to give delivery at the proper time, with the result that this business has had to be reallotted. Shipments are somewhat quiet, partly through scarcity of tonnage. The warrant stock in that district amounts to 292 tons. The charges are, to home consumers for No. 3 95s ($22.80), No. 1 99s ($23.76), to allies No. 3 114s ($27.36), No. 1 119s $(28.56). There is increased activity in the East Coast hematite trade, the Control Committees having issued licenses for shipment to allies. The improved output in the north of England is now making itself felt, so that home consumers get their needs supplied and there is a better margin available for shipment to allies. The prices for mixed numbers are 122s 6d ($29.40) to home consumers and 147s 6d ($55.40) to allies. The fuel question promises to be difficult, in view of the considerable demands for men by the army authoritities.

Want Steel for Aircraft

Easter holidays have been rather short at the forges and mills, resumption being general by Wednesday night at latest. As a rule, the government did not ask for the sacrifice of holidays in the iron trades, the call being chiefly for finished war material and munitions. But orders are plentiful in all branches, a very keen demand existing for high class material used in aircraft production. This is a line in which very rapid progress is being made, some well known works making six or seven times the output secured some time ago.

There has also been a very keen call for gas strip, but there is some indication that this has received a stimulus from the government announcement that the price is to be controlled. Some makers of gas strip make no secret of the fact that, within the past fortnight, they have booked large orders. Glasgow is a great tubemaking center, and works there, as well as in other Scotch districts, have been very keen buyers. It need hardly be said that the terms arranged are considerably above the figure so far suggested by the controller. It seems that discussion with the ministry ranged around the proposed figure of £14 7s 6d f.o.t. ($69.00), makers' works. That price is very unsatisfactory to manufacturers, who state that they have succeeded in inducing the ministry to re-open the discussion, with regard to the selling price. Makers for the time being are selling their gas-strip at about £16 ($76.80) per ton, which is at least 10s ($2.40) below recent selling rates.

Generally the tone is very strong and in all uncontrolled departments the maker can command very satisfactory prices. Nut and bolt iron, for example, realizes £14 10s ($69.60), as compared with £13 17s 6d ($66.60). The great boom in shipbuilding maintains an immense demand for this kind of material.

The German offensive has already had an effect on the question of manpower, and, unfortunately, "combing out" activities have been renewed at the iron and steel works in the Birmingham district. Ironmasters are being given examples of some rather drastic action. It was stated that there were men who within two hours of their leaving the iron works had been re-enrolled as soldiers. Some of these men were brought back from the colors some time ago to assist in relieving the scarcity of puddled bars, and finished material. A number of skilled men are included in the enrollments, while a very strong case will have to be made out for any of military age whom it is desired to retain. Naturally, the matter is causing concern. There is a great demand for chain and cable iron, as well as for steel for tanks, and for material required in the building of war rolling stock of various descriptions.

Naturally the full weight of the shipbuilding demand is felt on the Clyde, where all the mills are in arrears with deliveries; but new mills are being rapidly pushed forward, and the output in Scotland and on the northeast coast, as well as in Sheffield, is steadily increasing. The demand for shell steel is not quite as keen as it was, and this has enabled a proportion of the steel output to be diverted to meet shipbuilding requirements.

The bi-monthly return of selling prices in connection with the Midland Iron & Steel Wages Board has been issued for January and February. The average net selling price is £15 12s 3d per ton ($74.94), as compared with £15 10s ($74.40) for the previous two months. The output of the 17 selected firms was 31,260 tons, as compared with 31,034 tons in the previous two months. The alteration in the selling price is not sufficient to give the men an advance in wages which will therefore continue at 19s 6d ($4.68) per ton for puddlers. There are slight fluctuations as between bars, angles, plates and sheets and hoop, strip and miscellaneous. The only considerable advance was a rise of 6d ($1.44) in plates and sheets.

The Fuller Steel & Iron Co., Park building, Pittsburgh, formerly operated under the name of James R. Fuller, advises that it represents the Betz-Pierce Co., Cleveland, and various mills as well as steel fabricators who carry stocks of steel, shapes and plates. The company specializes in billets, bars, shapes, plates, and fabricated steel and plate work; also cold rolled steel nickel steels, special alloy steel, tool steel and brass and bronze.

Women in Machine Tool Industry

Their Employment in Large Numbers in Leading Machine and Tool Manufacturing Plant is Problem of Adaptation Rather Than Reconstruction—Proposition Viewed in Broad Way as War Measure

BY WILLIAM A. VIALL

WOMEN in industry is such an old story that at times undue stress is laid upon this special phase of the economic problems of the day. The Brown & Sharpe Mfg. Co., represents that large class of employers which has not employed women in the manufacturing end, but under pressure of present conditions has felt itself compelled to resort to measures that will increase its output.

Prior to the war women were employed very largely in European machine shops, doing classes of work that have always seemed foreign to the work women should do. But, if the situation is analyzed, certainly it is no worse for women to work in machine shops and core rooms than it is for them to be employed in textile and other mills, as they have been right along, to say nothing of the drudgery imposed upon them in thousands of homes where hard work, occupies every moment.

Fuse Plant Becomes Source

The city of Providence with 250,000 inhabitants, has conditions which are particularly helpful in this matter of employing women. It has a variety of industries, a number of which has always employed women in large numbers. The jewelry and textile industries afford abundant opportunity for women workers and some of the metal trades have employed women as attendants on automatic machines for many years.

A few months before we undertook this step, the American Locomotive Co.'s Walco plant had concluded a large fuse order and had closed down, throwing many women out of work who had become accustomed to shop employment. We were thus able to select excellent workers as a nucleus and others added since do not compare at all favorably with them.

We manufacture not only machinery, which entails the ordinary machine-shop operations, but have a line of small tools and have manufactured sewing machines for over 50 years. The shop therefore presented a variety of opportunities. Many have employed women in their works on operations requiring a deftness of hand seldom if ever attained by men, and our experience is offered as a suggestion as to how to start in, for those who would do so.

When we decided that it was necessary to employ women, our first questions were, where we could best employ them; what provision could we make to take care of them, and what hours should they work. We decided that we would endeavor to place them in considerable numbers in the small tool, screw machine, and sewing machine departments. Small piece operations for the entire factory are performed in the sewing machine department which has many milling machines, drill presses, etc.

Proper Surroundings Are Essential

An essential in taking care of this class of help is that proper dressing and rest rooms shall be provided. We have arranged such quarters as best we could and individual lockers have been provided. Rooms for noon luncheons have been arranged. It is important that some woman shall be designated to have charge of these rooms, to see that they are properly taken care of. She should have the confidence of the others, so that they can obtain help and advice in matters not strictly confined to business, as well as in strictly business affairs. For employment purposes we fitted up a waiting room for the women, with a separate entrance from that used by the men, since it is not advisable to compel women to wait with a mixed crowd of men.

As to hours, it was decided that a 9-hour day would be the schedule with hours from 7 to 11:45 and from 1 to 5:15 daily except Saturdays, when they are 7 to 12. By closing the 15 minutes earlier at noontime the rush with its accompanying danger of bodily harm is eliminated.

Effort Aided by the Men

We began to place the women in departments as indicated and found that in this effort we were aided by the attitude of the men. Perhaps the fact that we have not been replacing men with women has had a great deal to do with their kindly feeling. We have added women to our forces to replace the young men who had been called, but there has been no attempt to throw out men in order to replace them with women. To a great extent the employment of the women has been an addition to our forces rather than a replacement. To use the women to the best advantage, our plan would be to have them perform the work for which they are best fitted and make the change one in operations rather than of industry.

Having decided upon the departments in which the new help was to be employed the instruction problem then needed solution. Women were placed among the men, the same as male beginners were placed and instruction was given by the men who formerly did the work. As a general rule, we found this method effective.

While we employed these women upon an hourly base of wage during the instruction period as soon as they became at all proficient they were placed upon piecework. The period between their employment and their being placed upon piecework compared favorably with that required

Studies Subject Broadly

AS SECRETARY of the Brown & Sharpe Mfg. Co., Providence, R. I., Mr. Viall speaks with authority on and from thorough familiarity with the subject of women in industry. His company's plant was originally built and organized to employ men only, but within 10 months it has recently placed over 800 women at productive work.

Operations in which women have proven their worth include the following: Inspection, drilling (cylindrical as well as tool), lathe work, screw machine work (hand and automatic), planing on small machines, polishing and tooling work on hand lathes, gear-cutting machine work, blueprint room work, stamping, filing, assembling of small tool parts and general bench work.

This article is abstracted from a paper presented before the twentieth annual convention of the National Metal Trades association, at the Hotel Astor, New York City, April 24 and 25.

by men. Results were so satisfactory in the work they commenced upon we began to increase the field in which female help could be employed. We finally placed them in various other parts of the plant where their services have proven effective. In the screw machine department women are running automatics and hand machines. Up to this time they have made little or no progress in the way of setting up either of these machines, but they keep the machines running and gage the work in a satisfactory manner. In the gear-cutting department they have taken hold of the work well, and in some cases they not only attend to the ordinary running of the machines, but take the work with the blueprint, and set up the machines, doing all that any first-class operator would be called upon to do. Women have been placed in tool rooms with more or less satisfaction, where it isn't so much a question of ability that makes for efficiency, as it is a question of the women's attitude toward her work and fellow employes. A tool room is notably a place where visiting can be carried on, and it is incumbent upon the attendant to see that this is discouraged. We have placed some women on lathes, doing light work, which is well within their capabilities.

Woman's Scope is Widened

Much could be said in detail as to how they have been successfully employed on various kinds of work. With us, they have showed their worth on the following: Inspection, drilling, cylindrical as well as tool; lathes, screw machines, hand and automatic; small planing machines, hand lathes, doing polishing and hand tooling work; gear cutting machines, blueprint room, stamping, filing, assembling of small tool parts and general bench work. All of these lines of activity are well within the physical power and the ability of the average woman. We were also able to replace many of the shop clerks with women, a thing that is not so easy to do when no other women are in the department. There is safety in numbers in a machine shop as well as in other classes of work, and the more the women work in groups the better the general results.

Success in employing women depends largely upon the attitude of the management as well as upon the attitude of the foremen in the shops. In departments where the foremen work for the firm's best interests, they impart to their subforemen the attitude that it is to be observed toward the women. If they show they expect the women to do well and encourage their teaching they obtain the desired results.

Our people feel that in running certain types of machines, where continued physical labor is demanded, the staying power of women is not sufficient to carry them through; consequently we keep them away from that class of work. In many cases they would require more attention in running those machines. If anything goes wrong they are not inclined to do anything but wait until somebody comes along to fix it. While this has its advantages, it also possesses disadvantages. Many have had disastrous experiences with young men who have attempted to "fix" things and know that their help is not always desirable. The possession of a little ingenuity, however, and the exercise of it, helps to develop the skilled workman and keep the production continuous.

Safety Appliances Help

Not long ago the machine shop would have been no place for women to work, but with the modern safety appliances, accidents are reduced to a minimum. We insist that all women wear a sort of cap to protect the hair, and those who work among the machines must wear short sleeves. In our class of work the danger of skirts being caught in the machinery is not sufficient to demand the wearing of a uniform of the overall type, and we have not followed the example of other employers in this respect.

That women are able to perform many machine shop operations and that the work is suitable for them, is beyond question. There are other operations in which we shall be forced to use women since the work will have to be done and men will not be obtainable. The question of employing women must be considered as a war-time necessity. As to what will be the result after the war, that can better be left until we are nearer that point than appears to be the case at present.

Doubtless all will look at this question in a broadminded manner and while many have shops that are not properly fitted for the employment of women, with some study and care they can be adapted in such a way that they will be made comfortable and safe. Words of mine are not required to prove that women are valuable workers in plants and shops. The experience of foreign countries in normal times and of England particularly, in these abnormal times, have proved it.

Moral Tone Is Good

Possibly to the mind of everyone comes the question, namely, what about the moral aspect? In this connection I think that conditions are no worse in shops than they are on the main streets of our cities. If the management will set its face strongly towards the repression of all indications of careless and undue familiarity on the part of the men, a high standard can be maintained.

What has been stated shows that it does not necessarily mean a revolutionizing of methods to make use of the services of women, but even in plants not constructed with the employment of women in mind, provision can be made to render the employment of such services possible and helpful. With the arrangement of proper quarters and surroundings for this class of help, a careful plan should be worked out for the overseeing and for the proper selection of work. We shall then find it possible to make extensive additions to our depleted forces when demands for men for war service and for the heavier classes of work have sorely crippled our industry.

England Leads U. S.

TO MAKE the proportion of women employed in the United States on the same basis as England, it would be necessary to have the number employed 11,800,000, *which would mean an increase of* 8,152,135, *according to the following table prepared by the council of national defense:*

ENGLAND	
Total number of women in England	17,623,992
Number employed, not including domestic servants, saleswomen and women on farms, or nurses in military, naval or Red Cross hospitals	4,538,000
The percentage of women employed in proportion to the female population is, roughly	25¾%
UNITED STATES	
Total number of women in the United States (census-1910)	45,289,671
Number employed, not including domestic servants, agriculture, etc., but including clerks, 111,594, *and saleswomen,* 257,720	3,647,865
The percentage of women employed in proportion to the female population is, roughly	8%

The Union Drawn Falls Co., Beaver Falls, Pa., manufacturer of an extensive line of cold drawn steel products and steel specialties, has filed a statement and designation with the secretary of state of New Jersey and has received a certificate of authority to transact business in New Jersey. This does not represent a reincorporation of the Union Drawn Steel Co., which will continue as a Pennsylvania corporation.

War Needs Surprise Steel Industry

Steel Director's Summary of Government's Requirements at Historic New York Meeting Shows Tremendous Absorption of Mill Capacity—Program Still Growing Rapidly. —Makers Resolve to Meet Every Demand—Proceedings Made Public

NOW advised accurately of the requirements of the government and its allies, the steelmakers of the country may be counted upon to furnish supplies to the full limit of their productive capacity, and to the exclusion of all commercial interests.

This is the response which the leaders of the industry with a demonstration of spirited unanimity gave to the government at the historic meeting held in the offices of the Steel Corporation in New York, April 26, when they pledged 100 per cent of their works capacity to the war. The stenographic report of this meeting, which has been made public in full, displays the patriotic zeal with which the manufacturers matched the appeal to their unrestricted support voiced by Steel Director J. Leonard Replogle.

The report of the meeting is replete with interesting data relating to the government's plans and needs. Steel Director Replogle laid before the steelmakers in concise and definite form what the government expects and must have from the industry. It was made readily apparent that even the best-informed of the producers were not clearly advised of the enormous extent of the war program. A striking exhibit submitted by the steel director gave the extent to which orders for essential tonnage already placed will absorb the output of the mills. In plates, these are equivalent to 32 weeks full capacity, in rails to 92 weeks, in sheets to 24 weeks, in seamless tubes to 27 weeks, in tin plate to 23 weeks, in pipes and tubes to 28 weeks, in wire products to 19 weeks, in merchant bars to 28 weeks and in structural shapes to 14 weeks. The all-steel summary shows 31 weeks filled.

Judge Gary presided at the meeting. What developed is told in the following transcript of the proceedings:

Judge Gary: Gentlemen, this is an important meeting. It is a patriotic meeting. The steelmakers are called together to consider very important matters, at a time and under conditions which are somewhat critical. We have come together to counsel with one another. It is unnecessary to emphasize the fact that the allies engaged in the battle of all ages are calling upon this country for all the help that can be given. The allies themselves are doing everything possible to provide the essentials for war purposes, but they are still lacking in the quantities necessary. And this country is therefore called upon to furnish more and more steel and more and more men and supplies of all kinds that are requisite under the conditions which obtain on the battle lines. They need more men, more food, more munitions of war, more guns, and various other things, and ships to carry them across the seas when needed. And all these things must be provided at the very earliest moment. The furnishing of necessary supplies promptly means the saving of millions of lives. So far as I am personally concerned, while I have great hopes for the future and a feeling of grim determination to win this war, yet I have a feeling of fear for catastrophes, a fear for results that we cannot recover from. And that arises not from the fact that we have not enough men or money or materials, but rather from the fact that there is danger that these will not be provided as promptly as they might be and as appears to be absolutely necessary if we are to do everything we ought to do and that we can do.

Commandeer Surplus

THIS is a crisis, and commercialism, gentlemen, must be absolutely sidetracked. There is just one thing that we have to do, win the war; and we must give them sufficient steel to do that. That is your job and my job. And I must speak frankly to you because those are my instructions. The government will not tolerate any more the procedure of some steel companies. We have a force of men now checking up the ingot production. We want to know where every ton of ingots goes, and where there may be a surplus of ingot capacity or pig iron capacity. And some of you gentlemen say, we have a surplus of this or that and can put that in this commercial order. We are going to go into your plants and take that pig iron under government commandeering order, or we are going to take that steel and give it to another steel manufacturer who is short, if that other steel manufacturer is working on government material. That has been determined absolutely. There is too great a percentage of non-war material being produced.—Steel Director Replogle.

Gentlemen, we are here today to consider whether or not we can do more in providing the requisites for winning the war. We have a general committee representing the iron and steel industry, which means you, and that has a subcommittee of distribution and other subcommittees; and all have been very diligent in attending meetings, in ascertaining facts and figures, in securing data as to capacity and as to shipments, and generally in regard to the details of the business of different lines of manufacture. We all recognize that one of the first essentials is steel, that it is almost as important as food; that the soldier can do nothing without steel, and that nothing can be taken to the soldiers except by the use of steel. And we have been endeavoring to ascertain what more if anything could be done, what negligence if any there has been with respect to the performance of duty up to the full measure by any of the manufacturers. We believe that more can be done.

When the committee ascertains that the total capacity of the country is being used for the benefit of the military, and that it is insufficient then we are willing to increase capacity. But that requires a good deal of time. The building of a mill or a furnace occupies too much time, except as a last resort in the endeavor to furnish supplies. It is obvious that every furnace, every mill, every facility for production must be used for the purpose of carrying on the war. And in this connection that war's necessities must always be at the top and in front, that nonessentials must be dominated by military necessities, nonessentials of all kinds and in every particular must be subservient. If the mills need more pig iron, pig iron must not be utilized for nonessentials until the military necessities are fully supplied. And the same is true of ore; and the same is true from the pig iron down to the finished product which the government needs. The question of making money, while always important and necessary for the nation, is of no importance when compared to the immediate necessities of the government for the production and delivery of the things which it demands and finds necessary for military purposes.

Therefore our whole business must be managed in such a way as to secure the best results for the government, even though at times at the expense of production in some lines less essential and the making of money for the owners' property.

War Crisis Is Reached

We have reached perhaps a crisis in this war's history. We are called upon by the government for more and more work and more and more material. And the government has placed Mr. Replogle, as director of steel supply, in the immediate and absolute control of this situation. Mr. Replogle has been requested, if not directed, by the war

industries board and at the request of other high departments in Washington, to take any and every step he considers would be of advantage in securing what is so much needed at this time in the lines which we represent. We have not yet approached the position which is occupied by Great Britain and perhaps other nations. And one of the things which has been suggested, and which Mr. Replogle has delayed putting into effect at our request, is the question of enforcing a rule or an order for the application of a license to sell and ship our materials not included in those which are called preferential and which are on the preferential list, so as to make it necessary that a mill shall not be operated or the business of manufacture conducted in such a way as to ship the products less essential which directly or indirectly may be to the prejudice of those which are essential.

Now this step may become absolutely necessary. If it does, if so decided by the department, then we must gracefully submit, even though we might be of the opinion that as a total net result it might not be to the general interest of the country. As I take it this does not mean that if in the manufacture of essentials there are certain discards which can be utilized for other purposes not essential and without interference with the full supply to the government of what is necessary and what can be furnished, there would be any objection. But it does mean that in our operations we must do nothing which is calculated to reduce the supply of steel for military purposes for this country and for its allies who are engaged with us in the defense of their rights and in the defense of our rights, in the defense of civilization itself.

And so, gentlemen, we have called you together today, not for the purpose of attempting to lecture, not for the purpose of telling you what you duty is —because you know that—but rather for the purpose of expressing in a few words the situation as we see it, and with the expectation that today we shall hear from you representative men who are in control of these lines of manufacture so necessary, an expression of what you think in regard to the situation, which expression should amount to a pledge all of us must give, that we will devote our works, our time and our money, as requested by the United States government, to aid in this time of extremity.

And now I am going to ask Mr. Replogle to speak to you on the subject with respect to the necessities of the government, what it is getting, what it is not getting, what is lacking in any particular or at any point, and with respect to any suggestions for improvement in these conditions. I am going to ask Mr. Replogle to be very plain. I consider it is his duty to be explicit. Occupying the governmental position which he has been filling, and is filling so acceptably, I believe it to be his duty to be plain, to be matter of fact, to call names, to speak of plants, and to tell us one and all what more we can do. And at the beginning I pledge the United States Steel Corp. and all its subsidiaries and all its interests to do everything to the utmost to accede to his requests and to assist the government at this time.

Replogle Emphasizes Shortage

Mr. Replogle: Gentlemen, Judge Gary has stated the general conditions so wonderfully well that it is superfluous and would be more or less foolish for me to attempt to elaborate on them. It is my firm conviction, and it is a proven fact, contrary to the general impression, that there is a surplus of steel, that there is a very decided and acute shortage, which is delaying the war program. I do not say that in most lines there is not sufficient capacity, if that capacity was fully utilized. If they had 100 per cent fuel and 100 per cent labor conditions, and 100 per cent transportation conditions, I feel that in most lines of steel products the war necessities could be fully met. But that is not the condition. We do not have 100 per cent fuel, transportation or labor, and we are not going to have. Transportation conditions are not materially improving in a general way; some places they are and other places they are getting worse. And when we consider the situation as it is today, with the wonderful weather conditions and transportation conditions, we are shuddering when we contemplate the winter season before us. The building construction and plans of the United States government, incidentally, are some 20 per cent right now in excess of the total building construction of the United States for the three year period, 1915, 1916 and 1917—the United States construction program alone, 20 per cent. They are advancing into 1919 and 1920. There was just authorized yesterday the construction of the South Brooklyn warehouse, for instance, at an expenditure of $45,000,000, and that job requires 56,000 tons of steel. And that is only indicative of the plans that are in contemplation. We need hundreds of millions of dollars' worth of hospitals; they are commandeering summer hotels and eliminating some of that work in that way; but the United States construction program is enormous, I think far beyond the impression of almost any of you.

100 Per Cent Patriotic

I DO NOT think there is any industry in the United States that has more 100 per cent Americanism than the steel business. I think it is only a question for the steel industries to understand the situation. What is it that the situation needs of us? We have been groping around in the dark, and it has not been easy for everybody to find himself. We started out with the idea in this war that the government was only going to need about 15 per cent of the product of the steel companies. That is where we began. The situation is so enormous that it is hard for any set of men to grasp it. The needs have been great and we have been coming along pretty fast. Now we are placed in the situation today that Mr. Replogle tells us, that civilization needs practically the production of the steel business of this country. Now with the intelligence of the men in this business, with the understanding of this term as we have it today, it would be not only absurd, it would be asinine, for any manufacturer to do anything less than do what he had in his power to do to bring about what Mr. Replogle wants. In the interest of ourselves now and after the war there is nothing to do but to get behind this with our whole force, not quibbling about details, get in and do what he can find for us to do.—George M. Verity, President American Rolling Mill Co.

Eight Months Plate Orders

I have made a little statement here showing in a general way the present situation as regards the principal steel products. On plates, which is one of the most important, if not the most important, product we have, at the rate of production of the past three months there are now 32 weeks rolling, about eight months rolling, on the books; and the business is being entered almost every week at a greater rate than it is being produced. Eight solid months. And with the exception of some emergency fleet material—and practically all that will be wanted before the expiration of that time—practically all of this is wanted immediately. An enormous percentage of it is needed now. It is not only needed for our own operations but for those of our allies. We have 52,000 tons to place this last week for the Italian government, very urgently needed for ship construction. We ought to give the Italian government 52,000 tons, and yet we do not know where to get it without seriously affecting our own shipbuilding and necessary railroad construction.

We received yesterday 15,000 tons additional from the British, and that is coming in right along, and that will be 300,000 to 400,000 tons of plate. Some of the plates which we have for Great Britain are now four or five months overdue. They are furnishing General Pershing an enormous tonnage of materials, which at the last report approximated 1,000,000 tons, which General Pershing has agreed to replace from this country, in the lines like plate, and some pig iron. We are getting 60,000 tons of iron which we have to send over there, and then other material. But there are 32 weeks, of which 26 weeks is direct United States and allied governments. I want to impress that on you, 26 weeks right now.

Shell Steel Needs 5,000,000 Tons

On projectile steel we have 36 weeks rolling, all of which of course is for the United States and allied governments. And the forging manufacturers, according to the last report that Mr. Mackie has just received here, we have gone into it very thoroughly with him in the last week, Mr. Mackie is handling the projectile end for us very well—shows that they have just reached the point in their program where their consumption of projectile steel is going to be enormous. We will have to have at least 5,000,000 tons this year.

Mr. Topping: Is that for all sources, allied and our own government?

Mr. Replogle: Yes, for all sources. We are rolling so much projectile steel on rail mills, and the rail situation is becoming so acute—the director general

of railways says he will have to have 2,000,000 tons—and any increase in rail production will necessarily increase our trouble so far as projectile steel is concerned.

On rails at the rate we have been rolling in the last three months we have 92 weeks' work ahead of us, 92 weeks, almost a year and three-quarters at the rate we have been going. On sheets we have less tonnage probably comparatively than the others; but we have 24 weeks' output at the production of the past three months on sheets. And the United States government—I have here some details which I will give some of you a little later in reference to the particular orders, some of which have been delayed for several months. And we have additional orders for sheets, some 30,000 tons there, that we don't know where to place right now without affecting the delivery of other important orders now on the books.

On merchant bars we have 28 weeks. On seamless tubes there are 27 weeks at the rate we have been running. And on structural shapes it is the general impression that owing to the curtailment of building construction, structural shapes will be comparatively easy. But the emergency fleet and new car construction, which involves 1,300,000 tons, and the fact that on many heavy shape mills we are now rolling projectile bars, means that we are having a good bit of difficulty in getting the required tonnage of structural shapes, notwithstanding the heavy curtailment of general building construction.

By the way, on structural shapes the direct government requirements alone today are 14 weeks. On tin plate they are 23 weeks, on pipes and tubes 28 weeks, wire and wire products 19 weeks, and on the all-steel product report as taken from your records we have 31 weeks' operation at the production of the past three months, which has averaged about 640,000 tons per week, a little over 30,000,000 tons annually.

The Canadian government has ship yards, and very good ones. We had a particular case up a week ago where they had one 7000 ton boat, another 5500 ton boat, for which we were unable to give them steel, and unless they received the steel immediately they would be unable to get those boats out on the high seas before the closing of navigation on the St. Lawrence.

The allied council in Paris has asked for material for some Canadian government cars to relieve the congestion at American ports, United States ports, and to utilize to the greatest extent the ports at Sidney, and Halifax, and thereby giving better ship movements, where there is about four days' difference, which is a big factor. We have to give them some steel.

No Steel for Nonwar Work

Now the immediate cause of this meeting was a direct and positive order which I have received from the war industries board and from Mr. Baruch personally, who has, under the authority of the President of the United States, commander-in-chief of the army and navy, delegated to him the powers as to priority of material and other things. And after consultation with the transportation people and the fuel people it was decided to go practically to the English system of an absolute prohibition on the consumption of any iron or the manufacture of any steel except for absolute war necessity. That has been done in England for several years, and I was just showing Judge Gary this morning that a concern over there was fined £156 in the last current issue of the *Ironmonger* because they made two tons of steel without a license from the directors for the production.

Now the idea was that the manufacture of iron and steel should be limited to Class A and Class B priorities, except under special permit. And that applied also to discard steel. We appreciate, and particularly under present conditions when such a large percentage of your product is government material, with the rigidity of inspection and specifications, that there is off-grade material, there are plates that do not meet this test or that, and which of course must go into other lines, they may be suitable for tanks or other purposes. And of course under those conditions, where you do not have a priority certificate, it would be necessary to apply to Washington for that permit. We appreciate that that is pretty drastic and involves great trouble to everyone concerned, and I was in hopes frankly that that could be avoided. I received a positive order to do that, and I have asked permission to withhold that until I learned the results of this meeting. Because unless we are given very definite information from you gentlemen here that the war necessities will have a greater order of preference and priority than it has been given, why that order will be put into effect immediately. We are not satisfied—I had two hours before the senate committee a couple of weeks ago, and I received a pretty drastic examination, and I stated then that the steel industry had met the situation, and without exception they were co-operating; but the more I get into it, gentlemen, it requires a considerable stretch of my imagination to be able to say that, because some of you have not played the game. As a general rule you have. But we run against the proposition that you are short of steel for this and that, and you are short of fuel and cannot operate but somehow that shortage seems to fall on government necessities. There are a great many of you—practically all I will say of the contractors who have British shells are far behind in delivery; some of them for three or four months. And we find that forge plants have been shut down and we could not get steel. I will mention in this case Mr. Dupuy of the Crucible Steel Co. as one of the most glaring cases.

As General Haig says, their backs are against the wall, and the kaiser is not going to wait, and we are not satisfied to wait on those shells if there is any way of getting those shells. If there is a shortage of fuel, if there is a shortage of ingots, it must fall on the less essential product, and the more essential and direct government necessities must have such a degree of priority that that material must come. We do not like the expression "doing your bit," we want you to do your all. It is past the point where doing our bit is satisfactory.

Garfield Order Was Justified

The Garfield order of Jan. 17 has been severely criticised by all of us, I think, as being very drastic. And when we study the charts at Washington and see the trend of steel production at that time, that many of the more important products fell off over 50 per cent, and see the improvement in the shipments of that same products immediately after that order, why we cannot help but believe that under the conditions it was the only thing to do. Several hundred ships tied up for lack of coal. We don't want you on steel, and we dare not reach the same position on steel that Dr. Garfield did on coal. And incidentally my opinion and the opinion of people far better qualified to judge of that than I am, the situation on fuel this winter is going to be far worse than it was the past winter. The fuel people feel that, and the railroad people, many of them, feel that.

Judge Gary: Will that be on account of railroad deficiencies?

Mr. Replogle: Yes, and the general railroad condition down in the east particularly, the rapid expansion of necessary industries and big warehouses, and things of that kind that are going to complicate the railroad situation.

The automobile manufacturers are going to be called to Washington within a week, probably Monday of next week. At that meeting there is going to be a definite determination as to what percentage of their capacity they will be permitted to operate. Indications are that there must be a decided and very drastic cut. At a conference which I attended yesterday, called by Mr. Baruch, he had Mr. Hurley and P. A. S. Franklin, and the war trade board and other representatives there, the shipping situation was found to be so acute that very drastic measures must be taken as to restricting imports of other than war materials. I feel personally that they have gone too far on their restrictions as to manganese.

Big Things Are Coming

There are things coming up, gentlemen—there is one matter involving an enormous tonnage of steel that is yet in a very confidential state, and I cannot touch on it; but I can tell you that the government program in practically all lines of steel is so far in advance of the estimates which I have seen in the trades papers that if you were all in possession of that information you could readily see the acute necessities of the occasion.

And I am coming here to make a plea to you that commercialism—I do not say that you have not today reached that point, but if you have not reached the point where commercialism is absolutely sidetracked, I am making a plea that you do that. And I believe that if we have the assurance here of every one that they are going to devote all of their energies absolutely to war necessities until the steel situation improves to such an extent that other less essential demands can be taken care of, that we might avoid the necessity for doing something which, gentlemen, is going to make us take control of your industries away from you. The railroad people have in a measure lost theirs. And while I am not actively in the steel business today, I would very much regret to see action taken which I am positive will be taken unless every steel manufacturer just puts his nose right up against it and devotes absolutely all of his energies to the one thing of winning this war.

Mr. Campbell: Mr. Replogle, I would like to ask if you are trying to use bessemer steel wherever you can.

Mr. Replogle: On this new car program they wanted this 1,300,000 tons, and we told them they could go ahead with that program if they would use bessemer—that it be left optional with the steel manufacturer whether bessemer or open-hearth plates could be used, and they have agreed to that. They have also agreed that it will be optional with the plate manufacturer whether sheared or universal plates will be used. And they have also agreed to keep plate mills running 100 per cent in order to secure sufficient steel to carry out this car program. We are also now in the matter of rails, they have that under consideration, and they have agreed to make a pretty heavy tonnage of the rails now on order of bessemer steel, although there is a decided prejudice against that by the railroad people, but they realize that under the conditions it is the thing to do, and they have so agreed; except on some of the larger trunk lines the main running track, on which they insist on open-hearth steel.

Inquiries About Labor

Mr. Dupuy: You stated the case of the Crucible Steel Co. being more derelict in their duty than anybody else.

Mr. Replogle: I said a glaring instance of that was in regard to projectile steel. I said practically all of the manufacturers of projectiles are behind, and there are many others that are in the same position on plates and other necessities of that kind which are just as urgent or possibly more so than your steel.

Mr. Dupuy: The reason I mentioned it was because men have been at our gates within 24 hours and taking our men away. Should not the government commandeer that labor and make those fellows work?

Mr. Replogle: That is a condition that is more or less true in normal times.

Mr. Dupuy: That is one of the reasons you are not getting material all over the country.

Mr. Replogle: Labor will be supplied to the essential industries in such quantities as will permit the maximum operation.

Mr. Dupuy: I am talking about skilled labor. We had a man at our gate yesterday from one of the concerns in Newark, hiring our men at 62 cents an hour when we pay them 33.

Judge Gary: Let me suggest, Mr. Dupuy; you are not responsible for those conditions, and if there is less production because of conditions which you cannot prevent you are not to be blamed.

Mr. Dupuy: It won't tell it in our case. We make tool steel for all plants; and how are we to know whether they are required in government orders?

Judge Gary: You must inquire and use your conscience. And if you have any doubt about it make inquiry. We all have the same thing.

Mr. Replogle: Mr. Dupuy, I want to say, about the case that you speak of on shell steel—if the shell steel for the British in the particular size that you are making there happens to be the one for which they are in the most urgent need at this minute, if in the last offensive that particular size went in such quantities that they are in great distress—now that is several months behind—if you had that steel, you say it is transportation, why did you not take it up with us and show us what was being delayed, because the railroad situation was never in such a shape that we could not in an acute case like that have gotten that material pushed forward.

Mr. Dupuy: Our traffic manager wore his shoes out in Washington trying to get transportation.

Mr. Replogle: We have those cases before us continually, dozens of them every day; and while in all cases they could not get relief, in case of an acute emergency of that kind I do not know of any case where we failed to get results after it was taken up with the railroad people in the proper way. That is what I criticise as a lack of effort. I do not want to point out the Crucible company particularly, because that is indicative of many, many others. This happened to be the last case that was before us.

Judge Gary: My principle and my policy when the public complains is to study the question to see if the criticism is not deserved, and if it is, to correct what is being done. It depends upon the angle from which you look at these questions. We are all selfish and we are all human, there is not much difference between us.

Judge Gary then had the roll called and every manufacturer present pledged his 100 per cent output to the government.

Judge Gary: I think the motion of Mr. Topping now is in order, and it is that an opportunity be given to all steel makers who are not here, and to such other officials of corporations that are represented here, and also to employes, to sign this pledge, and that the same be printed and distributed for that purpose. This will put it in such a manner that our committee can control it and secure as many other pledges as possible.

The motion was seconded and unanimously carried.

Mr. Replogle: I just want to read you a resolution of the war industries board which was approved by the secretary of war and the secretary of the navy. It is probably a great mistake, but it is a resolution. It has a bearing on certain other matters. Now when that was put up to me it was the original thought that we would create our own organization at Washington. And at my suggestion, I felt that it was a mistake, I felt that you gentlemen in the industry could regulate that and allocate that to much better advantage than we in Washington could; and that a committee of the industry, in daily touch and contact with all the conditions, would be in a better condition to properly handle that work than we could there, although the authority was put up to us. Now the American Iron & Steel institute, following those suggestions, appointed a committee of which Mr. Farrell was chairman, and which has been represented in Washington, and in a very wonderfully capable way, by Mr. Bonner. I cannot emphasize that too strongly, I think Mr. Bonner has handled the situation, and the committee have, Mr. Bonner the details of it, down there in a perfertly wonderful way. We have had a great many of the manufacturers come to us, feeling that the responsibility was up to us, and making objections from time to time on minor matters. The authority probably was up to us as given under this resolution of the war industries board and the approval which it had by the secretary of war and the secretary of the navy. But we have felt that we could not get the proper results by interfering with the work of this committee. And I want to make a plea that the heads of the various companies work in close touch and harmony at all times with this steel committee.

Mr. Bonner: One of the things that we have discovered here that I think requires attention of the executive is that Mr. Replogle has received complaints of delays in the delivery of fabricated work, particularly for ships, and asking us to take the thing up with the mills specifically and bring about a satisfactory adjustment. And investigation shows, as I diagnose it, that while the executive themselves of all the steel companies appreciate very thoroughly the situation, and when we appeal to them and bring matters to their personal attention we get almost instant and satisfactory response; but down along the line, the men who have to do with the orders and the execution of them, they do not respond quickly and freely, and they do not follow the things up as carefully as they should, and that in turn involves the industry in criticism and makes delay in construction. I have been hopeful that the mills themselves would avoid a great deal of that, which I think they could do if each of the steel companies having orders for shipyards or for fabricators for ship materials, if they would constitute themselves a committee of one to see that the orders which they have from shipyards or from fabricators are executed to the satisfaction of the man from whom the order was received.

Judge Gary: Gentlemen, it is our work. These needs are our needs. This is our government. We are asking for this steel for ourselves, for the protection of ourselves and our boys and our friends and our business. We cannot agree to the proposition of Mr. Replogle, although it was only stating literally the situation, that the government is on one side of the table and we are on the other. We have got just as much responsibility and just as much duty concerning this whole thing as anyone, and we are not doing something because we are required to do it; it is our business and our duty, and we must not neglect anyselves. But I think this already has thing, because we are protecting ourbeen emphasized. I think the action of every one here today makes a record that we all of us ought to be proud of.

Mr. Replogle: I just want to say that in view of the unanimous expression here of help and assistance, that despite the fact that I have a definite order to put out definite instructions, to put out the order to which I have referred, that I am going back to Washington with the feeling that that is entirely unnecessary, and I am going to try to have the order rescinded, because I believe in view of what I have heard here that it would work a hardship. We know that in many cases it would work a hardship which we do not want to put on any manufacturer unless it is absolutely necessary. And I am rather convinced that I can induce the war industries board to rescind that motion. And that is going to be my attempt.

Pig Iron Output Continues to Rise

Production in April Was Highest in 11 Months, Showing Gain of 5 Per Cent Over March—More Stacks Relight, 351 Now Being in Blast

PRODUCTION of pig iron continues to increase. During April the blast furnaces improved 5 per cent on their March record which in turn had shown a gain of 25 per cent over February.

As a result of the steady improvement during the past two months, pig iron production is now rapidly approaching the 1917 rate and has passed 1916. April was the first month this year to exceed the corresponding month of 1916 and last month's record excelled that of any month since May, 1917. The drop in output in January and February this year, however, holds the total output for the first four months to 11,203,637 tons, or 1,190,000 tons less than in the same period of 1917.

MONTHLY PRODUCTION

	1918	1917	1916
January ...	2,403,227	3,159,839	3,171,878
February ...	2,318,242	2,649,935	3,078,548
March	3,209,996	3,255,813	3,327,630
April	3,272,172	3,328,061	3,225,496
Total 4 mos.	11,203,637	12,393,648	12,803,552
May	.....	3,413,677	3,364,584
June	.....	3,260,234	3,213,818
Total 1st half.	.....	19,067,559	19,381,954
July	.....	3,337,442	3,221,127
August	.....	3,238,970	3,197,838
September .	.....	3,140,742	3,208,041
October	.....	3,296,286	3,508,180
November ..	.....	3,198,597	3,317,805
December ..	.....	2,885,380	3,184,178
Total 2d half	.....	19,097,417	19,637,169
Grand total	11,203,637	38,164,976	39,019,123

The actual output of coke and anthracite pig iron last month was 3,272,172 tons against 3,209,996 tons in March, a gain of 62,176 tons. The average daily production affords a clearer idea of the improvement in April, owing to the unequal number of days in the two months. In March the furnaces averaged daily a production of 103,548 tons, and in April 109,072 tons, an increase last month of 5524 tons.

The steel works or nonmerchant furnaces produced 2,404,284 tons in April and 2,338,306 tons in March, an increase last month of 65,978 tons. On the basis of average daily production, these furnaces jumped from 75,429 tons in March to 80,143 tons in April, a gain of 4714 tons. The production of merchant pig iron last month was 827,921 tons against 823,914 tons in March, a gain of 4007 tons. The average daily production of merchant iron increased from 26,578 tons in March, to 27,597 tons in April, or 1019 tons.

More furnaces continue to relight, 351 being in blast on April 30 compared with 338 on March 31. In April eight merchant furnaces were relighted and two blown out, a net gain of six. Ten steel works furnaces were blown in and three blown out, a net gain of seven. In all, 18 stacks were relighted and five blown out, a net gain of 13.

Spiegel production in April was 10,431 tons against 13,965 tons in March, a loss of 3534 tons. Ferro output dropped from 33,811 tons in March to 29,536 tons in April, a loss of 4275 tons.

The following merchant furnaces were blown in during April: Bessemer No. 2, Tennessee Coal Iron & Railroad Co., April 24; Musconetcong, Musconetcong Iron Works; Wharton No. 2, Wharton Steel Co., April 1; Niagara A, Donner Steel Co., Inc., April 28; Buffalo A, Buffalo Union Furnace Co., April 1; Genesee, McKinney Steel Co., April 2; Lebanon B, Bethlehem Steel Co., April 17; and Thomas, Thomas Furnace Co., April 26. The merchant furnaces blown out were: One Dunbar, American Manganese Mfg. Co., April 6; and Bird Coleman E, Bethlehem Steel Co., April 17.

AVERAGE DAILY PRODUCTION

	1918	1917	1916	1915	1914
Jan.	77,523	101,930	102,319	51,323	60,624
Feb.	82,794	94,641	106,157	59,521	67,450
Mar.	103,548	105,026	107,343	66,009	75,534
Apr.	109,072	110,936	107,517	70,484	75,383
May	.....	110,119	108,535	72,747	67,646
June	.....	108,675	107,127	78,998	63,486
July	.....	107,659	103,907	82,687	63,075
Aug.	.....	104,483	103,156	89,510	64,403
Sept.	.....	104,691	106,935	94,478	62,757
Oct.	.....	106,332	113,167	100,656	57,007
Nov.	.....	106,620	110,593	101,174	50,042
Dec.	.....	93,077	102,715	103,278	48,236
Av'ge	93,364	104,562	106,610	81,022	62,934

The nonmerchant or steel works stacks relighted during the month were: Emma, American Steel & Wire Co.; Haselton No. 1 and Hall, Republic Iron & Steel Co.; Neville Island, one Isabella and one New Castle, Carnegie Steel Co.; one Paxton, Central Iron & Steel Co.; Soho and one Aliquippa, Jones & Laughlin Steel Co.; and one Cambria, Midvale Steel & Ordnance Co. The following nonmerchant stacks were blown out: Alabama City, Gulf States Steel Co., April 1; Donner No. 1, Donner Steel Co., Inc.; and one Central, American Steel & Wire Co.

The Lorain No. 3 furnace of the National Tube Co. was blown out in April for relining and repairs.

The American Manganese Mfg. Co., Dunbar, Pa., blew out one of its Dunbar furnaces on April 6, for relining.

The Northern Ore Co., Philadelphia, is planning to light its furnace at Keystone, Pa., during the latter part of May or early in June.

APRIL PIG IRON

States	No. of stacks.	No. in blast last day of month. Apr.	Mar.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— Apr.	Mar.
Pennsylvania	160	134	127	234,868	1,039,338	1,274,206	1,246,729
Ohio	79	70	69	162,229	572,055	734,284	716,575
Alabama	47	31	31	112,176	95,069	207,245	225,862
Virginia	21	13	13	39,510	.....	39,510	46,561
New York	28	22	20	86,092	115,780	201,872	175,842
New Jersey	5	5	3	21,558	.....	21,558	15,489
Illinois	25	23	23	61,781	240,511	302,292	290,392
Colorado	6	4	4				
Indiana	15	15	15	24,332	290,702	315,034	307,396
Maryland	4	3	3				
Wisconsin	6	4	3				
Kentucky	7	5	5				
West Virginia	4	3	3	52,072	25,035	77,107	76,407
Tennessee	17	11	11				
Washington	1	1	1				
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	3	3	3	33,303	25,794	59,097	60,967
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						10,431	13,965
Ferro—All states....						29.536	33,811
Total	437	351	338	827,921	2,404,284	3,272,172	3,209,996

Speed Teamwork For War

Manufacturers in Cleveland District Inaugurate Plans to Bring Government and Producer of War Materials Closer Together

TEAMWORK leading to increased production is the aim of an organization formed in Cleveland recently. A number of war contractors constituting the nucleus of a production organization which will eventually include 10,000 manufacturers met in Cleveland on May 1. For the purpose of co-ordinating the facilities of all manufacturers engaged in producing war materials under supervision of the Cleveland district, a number of zones were designated under the cities listed as follows:

Toledo—Lucas, Williams Fulton, Ottawa, Defiance, Henry, Wood, Sandusky, Seneca, Hancock, Putnam and Paulding counties.

Lima—Allen, Van Wert, Hardin, Logan, Champaign, Auglaize, Shelby and Mercer counties.

Columbus—Union, Delaware, Franklin, Madison, Knox, Licking, Muskingum and Guernsey counties.

Mansfield — Wyandot, Crawford, Huron, Richland, Ashland, Marion and Morrow counties.

Canton—Stark, Wayne, Coshocton, Holmes, Carroll and Harrison counties.

Youngstown — Trumbull, Mahoning and Columbiana counties.

Cleveland—Cuyahoga, Lorain, Medina, Summit, Portage, Lake, Geauga, Ashtabula and Erie counties.

Erie, Pa.—Crawford, Mercer and Erie counties.

R. T. Skinner, Toledo; A. R. Leonard, Columbus; J. R. Montgomery, Youngstown; S. G. Karkhuff, Akron; H. L. Goeman, Mansfield; Charles E. Eshleman, Canton, and the chambers of commerce of Lima and Erie, have taken up the work of preliminary organization.

The Cleveland district includes parts of Ohio and western Pennsylvania. The cities listed will form centers where local organizations will gather information of value and aid in speeding production. All plans and specifications and copies of contracts to be awarded will be sent to the headquarters at Cleveland. This information will be immediately sent to the zone centers and by them to all manufacturers in their districts who can handle the work desired. By this means every manufacturer will have opportunity to bid on material desired, and the government will be aided in directly reaching the proper firms to handle the work in question. In each district local societies and existing organizations will be asked to aid in the work.

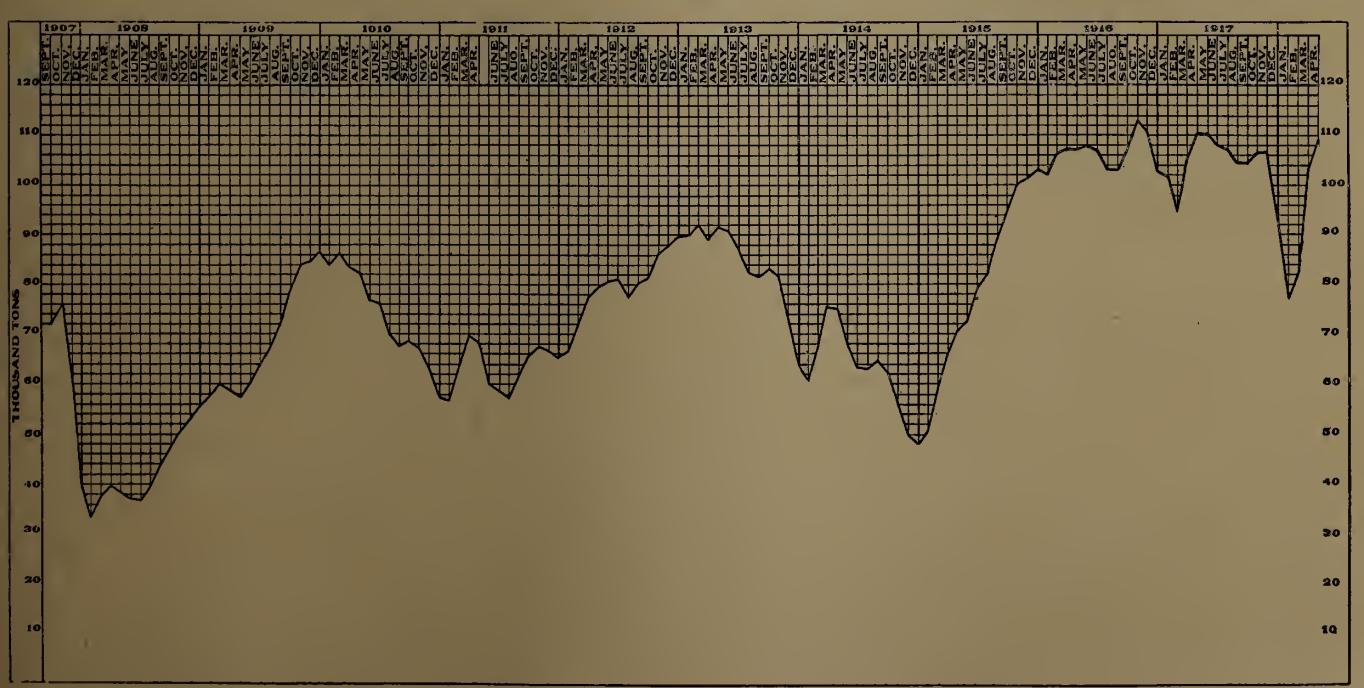
The first step in the suborganization in each district will be the selection of a committee. A survey will then be made to ascertain the production capacity and other shop information including labor capacity, in order that the government may know what to expect from the district. The chairmen of the various zones will meet periodically to exchange useful experience and general meetings will be held for the manufacturers. The first meeting of the new organization will be held in Cleveland on May 8 and 9.

Connecticut Engineers in Spring Meeting

The spring meeting of the Bridgeport, Conn., section of the Connecticut branch of the American Society of Mechanical Engineers was held at the Stratfield hotel, April 24, with war production as the key note of the proceedings. More than 200 members and guests sat down to the dinner, which was followed by speaking and motion pictures dealing with factory work. Among the speakers were Henry B. Sargent of the Sargent Hardware Co., New Haven; Calvin W. Rice, secretary of the American Society of Mechanical Engineers; Judge John S. Pullman; Clinton E. Woods of the Woods-Keller Co.; Harry E. Harris, chairman of the gage committee of the American Society of Mechanical Engineers; A. L. Riker and Allan B. Lincoln, associate director of the United States department of labor.

Works Are Merged

While the adjoining plants of the Lehigh Foundry Co. and the Lehigh Car Wheel & Axle Works, Fullerton, Pa., have been under the same management for a number of years, final arrangements for a merger of the two properties have been completed. J. W. Fuller, president, announces that the organization will be known as the Fuller-Lehigh Co., and its office and works are located at Fullerton, Pa., the executive personnel remaining as heretofore.



AVERAGE DAILY PRODUCTION OF COKE AND ANTHRACITE PIG IRON

Exports Decline as Imports Improve

Month of March Demonstrates Further Effect of Embargoes and Heavy Domestic Consumption Despite Increased Shipping Facilities—Reduced Pig Iron Exports Reflects Shortage—Ore Imports Increase Nearly Fourfold

MATERIALLY reduced iron and steel exports in March, despite increased shipping facilities, show that not only is the licensing system having a sweeping effect, but that the greater portion of this material now is being consumed in the domestic market. Figures recently published by the bureau of foreign and domestic commerce, indicate that the total tonnage of these products shipped in March was 379,924, a little over half what they were in March, 1917. In February the total was 438,848 tons, a reduction in the month of 58,924 tons. The tonnage for February, 1917, or 449,100, almost equalled the 1918 figure, so a much greater discrepancy is noted in March.

A falling off is indicated in practically every product except barbed wire, shipments of which increased in March to 12,243 tons from 6282 tons in February, a little less than 100 per cent. A slight increase in structural iron and steel is likewise apparent with the tonnages for March and February, 20,283 and 18,680 respectively. Nails, spikes, bolts, nuts, etc., likewise show slight increases. On the other hand, a continued reduction in the amount of pig iron exported would tell a story of continued pig iron shortage. From 10,540 tons in February, the figure descended to 9849 in March. Semi-finished material or shell steel likewise shows a reduction, due to embargoes, the difference being 28,829 tons in the month. Scrap exports were negligible. In the nine months ending with March, only 21,826 tons of scrap were exported as against 203,561 tons in the same period a year ago, while less than half the tonnage of pig iron shipped in the nine months ending March, 1917, was shipped in a similar period to March 31, 1918. As to semifinished materials, a slight increase is noted in the last nine-month period with 1,502,962 tons against 1,414,996 tons the preceding year. While sheets and plates in March gained over February, the nine months ending March, 1918, shows a grand total of 4,352,910 tons compared with 5,144,682 tons for the period ending March, 1917.

Imports of iron ore in March increased nearly four-fold, the chief sources of supply being Cuba and Canada. Spain's shipments to this country have fallen off almost 50 per cent from what they were in February. In March, 1918, we obtained 2623 tons of iron ore from Spain, and in February 4663 tons, as compared with 33,785 tons in March, 1917. Cuba shipped 62,200 tons in March as against 11,000 in February and 53,325 in March, 1917. The total imports of ore in March were 65,372 tons as against 15,743 in February. For March and February a year ago, the comparative totals are 95,989 and 86,314 tons respectively. In the nine months ending March, 1918, 630,630 tons were imported as against 970,600 tons in the nine months ending March, 1917.

Imports of pig iron slightly increased in March with 3982 tons against February's 3435 tons, while scrap was reduced from 4934 tons

IMPORTS AND EXPORTS, GROSS TONS.

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,949
September	23,345	382,115
October	34,318	349,845
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,885	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,219
December	44,134	580,988
1917		
January	40,192	608,105
February	24,379	449,099
March	37,280	606,559
April	48,213	519,397
May	26,013	588,514
June	28,419	614,600
July	28,859	357,776
August	22,635	519,518
September	20,196	482,311
October	14,225	557,138
November	13,995	473,549
December	13,769	654,867
1918		
January	12,875	495,057
February	12,941	438,848
March	14,345	379,924

IRON AND STEEL IMPORTS

	March,		Nine months ending March,	
	1918	1917	1918	1917
Pig iron	3,982	7,405	42,048	98,674
Scrap	3,849	26,809	55,574	157,183
Bar iron	189	158	2,299	4,148
Ingots, blooms and billets	2,809	2,459	36,965	15,500
Structural shapes	64	54	6,721	730
Rails	1,235	193	7,611	11,029
Sheets & plates	290	181	1,917	1,386
Tin and terne plate	32	21	32	574
Tin scrap	453	663	6,095	5,984
Wire rods	1,442	.....	2,877	2,063
Total	14,345	37,943	162,139	297,271

IRON AND STEEL EXPORTS, GROSS TONS

	March,		Nine months ending March,	
	1918	1917	1918	1917
Scrap	307	38,506	21,826	203,561
Pig iron	9,849	69,629	319,076	645,629
Steel billets, ingots and blooms	144,443	193,469	1,502,962	1,414,996
Wire rods	11,063	12,914	149,080	102,629
Steel rails	24,600	52,323	314,317	474,666
Steel bars	48,135	52,367	469,665	561,960
Iron bars	2,590	5,336	38,605	47,377
Struc. iron and steel	20,283	29,655	191,755	258,776
Hoops, bands and scroll	5,878	3,691	46,600	32,338
Sheets and plates	51,503	62,711	580,691	442,104
Tin and terne plate	16,335	21,679	158,842	164,268
Barbed wire	12,243	16,079	130,932	263,523
All oth. wire	11,490	16,161	134,076	184,118
Cut nails	347	240	3,529	3,560
Wire nails	6,160	6,823	91,108	97,723
All oth. nails incl. tacks	854	1,482	10,703	13,412
Pipes and fittings	10,307	18,121	142,900	190,947
R. R. spikes	754	1,822	12,054	14,687
Bolts, nuts, rivets and washers	2,275	2,756	23,747	22,397
Horseshoes	377	166	8,104	3,244
Cast radiators	131	628	2,338	2,767
Total	379,924	606,558	4,352,910	5,144,682

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,606
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555
1918		
Jan.	20,581	195,385
Feb.	10,540	173,272
Mar.	9,849	144,443

IRON ORE IMPORTS, GROSS TONS

	March,		Nine months ending March,	
	1918	1917	1918	1917
Spain	2,623	33,785	28,082	174,639
Sweden	.....	3,960	17,718	127,336
Canada	549	4,919	159,039	88,871
Cuba	62,200	53,325	424,157	519,920
Oth. countries	.....	.....	1,634	59,834
Total	65,372	95,989	630,630	970,600

in February to 3982 tons in March. Steel ingots, blooms and billets increased slightly in the month from 2672 to 2809 tons. A total of 14,345 tons of iron and steel was imported in March against 12,941 tons in February, 37,943 tons in March, 1917, and 24,947 in February, 1917.

March exports of iron and steel were valued at $79,366,629, against $111,703,454 in March 1917, while imports in March totaled $2,725,454 against $2,153,194 in March, 1917. The nine months valuation of exports was $257,868,058 as compared with $803,900,523 in the nine months ending March 31, 1917.

Industrial Research

Will be Notably Reviewed by Testing Material Society

A notable discussion on co-operation and industrial rerearch in which the various topics will be formally introduced by some of the leading scientists of the world will feature the twenty-first annual meeting of the American Society for Testing Materials to be held at the Hotel Traymore, Atlantic City, June 25-28. This topical discussion will be held on Wednesday evening, June 26, and the subject will be introduced by Dr. Henry M. Howe, chairman, engineering division, National Research council. Dr. John Johnston, secretary of the National Research council, will discuss "Recent Developments in Great Britain". "Organization of Industrial Research" will be discussed by Dr. A. D. Little, president Arthur D. Little, Inc., Boston. "Developments in Industrial Research", by Dr. Charles L. Reese, chemical director, E. I. du Pont de Nemours & Co., Wilmington, Del., and "Some Benefits of Industrial Research to the American Canning Industry", by Frank E. Gorrell, secretary of the National Canners' association.

The provisional program provides for the consideration of 60 papers and committee reports in a total of 10 sessions. Two of the meetings will be devoted exclusively to ferrous metals at which the following committee reports and papers will be presented: "Wrought Iron", by H. E. Smith, chairman; "Cast Iron", by Richard Moldenke, chairman; "Methods of Testing", by G. Lanza, chairman; "Steel", by J. A. Capp, chairman; "Corrosion of Iron and Steel", by S. S. Vorhees, chairman; "Magnetic Properties", by C. W. Burrows, chairman; "Revision of Pipe Threads", by H. V. Wille, chairman; "Magnification Scales for Micrographs", by W. H. Bassett, chairman; "Preservative Coating for Structural Materials", by P. H. Walker, chairman; "Coke", by Richard Moldenke, chairman.

The following papers of interest to iron and steel manufacturers are scheduled: "Cast Steel Anchor Chain", by James French; "Grain Growth of Cold Wrought Metals", by D. J. McAdam Jr.; "Changes Within the Critical Range of a Given Steel", by J. G. Ayers Jr.; "A Simple Type of Brinell Testing Machine for 500-Kologram Load", by A. V. deForest; "A New Type of Brinell Machine", by J. G. Ayers Jr.; "Sumner Elastic-Limit Recorder", by J. L. Jones and C. H. Marshall. The testing of aircraft materials also will be discussed and papers on this subject will be presented by I. H. Cowdrey entitled "Transverse Testing Under Non-uniformly Distributed Load as Applied to Airplane Wing Ribs", and G. B. Havens will discuss the "Effect of Moisture on the Strength of Aircraft Fabrics".

The most important subject to be considered under the head of nonferrous metals is "Season and Corrosion Cracking of Brass: Its Prevention and Means for Testing the Tendency Thereto". L. A. Wilson will discuss "The Valuation of Zinc Dust and a Proposed Method of Analysis" and the "Report of the Committee on Nonferrous Metals and Alloys" will be presented by William Campbell.

G. H. Clamer, Ajax Metal Co., Philadelphia, has been nominated for the office of president and George S. Webster, director, department of wharves, docks and ferries, Philadelphia, for the office of vice president. The nomination for members of the executive committee follow: G. Aertsen, Midvale Steel Co., Philadelphia; G. K. Burgess, Bureau of Standards, Washington, D. C.; G. B. Heckel, editor *Drugs, Oils and Paints*, Philadelphia; and K. W. Zimmerschied, metallurgical engineer, General Motors Co., Detroit. The total membership of the association is 2203, a net increase of 36 for the year.

Obituaries

PHIL PIDGEON, president of the Pidgeon-Thomas Iron Co., Memphis, Tenn., iron and steel jobbers, died recently at his home in that city, after being confined to his bed but four days. He was born in Memphis and his entire business career was spent in the same line of effort. Upon being graduated from Christian Brothers college, he became collector for the John Manogue Iron Co., and when the firm was changed to the Livermore Iron Co., Mr. Pidgeon was made manager. Five years later, Mr. Manogue recovered his health and re-entered the company and the name was again changed to the Manogue-Pidgeon Iron Co. About 15 years ago, Mr. Manogue retired on account of advanced years and Mr. Pidgeon formed a partnership with W. Thomas, and was made president of the Pidgeon-Thomas Iron Co., which position he held until his death. Civic affairs interested him greatly and at one time he was president of the Memphis chamber of commerce, doing much for the city. He was a director in the Memphis Street Railway Co., and of many other large enterprises.



PHIL PIDGEON

Frank E. Young, general manager of the Muerer Steel Barrel Co., Long Island City, N. Y., died recently at his home in Brooklyn, aged 68.

Henry P. Cormerais, aged 59, died May 1, following an attack of pneumonia. He was assistant treasurer of the Ames Shovel & Tool Co., Boston.

Matthew M. Lawler, vice president of the Standard Gage Co. and United States Gage Co., New York City, died May 1 at his home in Brooklyn, aged 47.

Pacific Ship Riveters Lead Country

Shipping Board Officials Reveal Progress Made in Individual Yards and Districts in Driving Rivets—Definite Figures Will Be Given Out Regularly as a Spur to Ship Construction

WASHINGTON, May 7.—Success in shipbuilding depends largely upon increasing the rate at which rivets are driven. It has been openly confessed for week that the driving of rivets has lagged so seriously as to threaten the success of the government's program. Rivalry between the various yards as to which can hold the record for rivets driven has brought about an improvement in recent weeks. In an effort to stimulate still further betterment, the Emergency Fleet corporation has decided to keep careful records of this work and publish the results regularly.

The first complete record has just been issued and it shows that the shipyards in the Pacific coast section are leading all others. The records are based on figures compiled for March. The North Atlantic division ranks second, the Great Lakes third, and the Gulf and South Atlantic fourth.

The records take into account only rivets driven into ships actually under construction in the yards. Some yards are driving rivets in steel which enters into the building of ships for the Emergency Fleet corporation, but these ships were not under actual construction at the time the figures were compiled and credit was not given for this fabricting work.

In the Pacific coast division, which includes shipping board districts 7, 8 and 11, rivets were driven during the week ending March 30 at the rate of nearly 30,000 a way. This district is far ahead of all competitors. The North Atlantic section includes districts 1, 2, 3 and 10, and the fabricating plants. Figures show that this section during the same week drove rivets at the rate of only 9000 and 10,000 per way. Thus the Pacific coast riveters are setting a pace almost three times as fast as those of the North Atlantic.

The Great Lakes region stands third in the compilation with approximately 9000 rivets per way, while the Gulf and South Atlantic section is fourth with less than 4000 rivets a way.

District 8, which includes the state of Washington, except the Columbia river yards, leads all competitors with nearly 32,000 rivets a way. The seventh district, consisting of California and Oregon, with the exception of the Columbia River yards, is a close competitor with about 27,000 rivets a way. District 3, which comprises the yards of Maryland, Virginia and Delaware, stands third with 21,000 rivets a way. District 10, which includes Philadelphia, southern New Jersey and vicinity, is fourth with 13,000 rivets a way. District 1, which takes in the shipyards of New Hampshire, Maine and Massachusetts, stands fifth with slightly less than 13,000.

The remaining contestants in their order are district 2 which includes Rhode Island, Connecticut, the Atlantic coast in New York and New Jersey with the exception of southern New Jersey; district 9 which takes in the Great Lakes region; and district 4 which includes North Carolina, South Carolina, Georgia and Florida with the exception of Pensacola; and the fabricating plants. These districts drove respectively between 11,000 and 12,000, 9000, between 3000 and 4000, and 2500 rivets per way in the week mentioned.

District 5 which includes Pensacola, Fla., Alabama, Mississippi and Louisiana with the exception of Morgan City, failed to report the rivets driven in its yards. In district 6 which includes Morgan City, La., and Texas, and district 11 which includes Oregon and the Columbia river yards in Washington, none of the plants were building steel ships when the data were compiled.

Ratings of yards on the basis of rivets driven per way show that the Skinner & Eddy plant, Seattle, which leads the country in the delivery of ships, also leads all yards in rivet driving. This plant is credited with 43,000 rivets a way in the week ending March 30. The Bethlehem Shipbuilding Corp. (Union Iron Works plant), is second with 39,000; the Northwest Steel Co.'s plant third with nearly 35,000; the Columbia River Shipbuilding Co. fourth with 33,000 and the Ames Shipbuilding & Drydock Co., fifth with approximately 30,500.

From then on the list runs from the Bethlehem Shipbuilding Corp., Sparrows Point, Md., yard, with about 29,000 to the American International Shipbuilding Corp. fabricating plant at Hog Island, with approximately 1000 rivets driven per way.

Western Shipyards Make Best Showing

EFFORTS of the Emergency Fleet corporation to speed up the shipbuilding program has resulted in the decision to give the public regularly complete information regarding the actual progress in ship construction made by each yard. Officials of the corporation expect in this way to arouse a rivalry between yards, districts and geographical divisions that will result in putting ships into the water more quickly.

The first complete figures have just been issued and show that the Pacific division comprising shipping districts 7, 8 and 11 leads with a percentage of 63; the Great Lakes division which comprises district 9 is second with 48 per cent; the North Atlantic division including districts 1, 2 3 and 10 is third with a percentage of 46; the Gulf and South Atlantic division is fourth with a percentage of 12.

The several districts rank as follows: District eight, 73 per cent; district two, 58 per cent; district three, 55 per cent; district seven, 52 per cent; district nine, 48 per cent; district one, 38 per cent; district ten, 35 per cent; district four, 13 per cent. District 5 had no task in March, while districts 6 and 11 were building no steel ships.

In the rating of yards on the basis of rate of construction for March the Tampa Shipbuilding Co., Tampa, Fla., set a mark of 128 per cent; the Staten Island Shipbuilding Co., New York, was second with 105 per cent, and the Moore & Scott Iron Works, San Francisco, third with 102 per cent. No other steel shipyard reached 100 per cent.

These figures, the corporation points out, must not be interpreted in terms

of delivered ships, because the records are based on actual erection, no account being taken of preliminary work.

The records are based on the percentage of completion of task. The task will be considered as starting in general with the laying of the keel, the task per period being the total task of creating a 100 per cent completed ship divided by the number of time periods between the keel laying and contract delivery dates. If the keel is not laid more than six months in advance of delivery date then the task automatically will be charged against the yard. This will prevent a yard making a showing on some of their contract ships at the expense of others, which should be started. Bimonthly reports are to be made to Washington of the progress made on each ship and the task completed will be credited and charted, the shipyards notified and the results made public.

To Limit Farm Tool Types

WASHINGTON, May 6.—Recommendations that manufacturers of farming implements eliminate various types and sizes of their product which may be dispensed with as a war measure, are about to be formulated by the commercial economy board of the council of national defense. The object is to conserve materials, labor, capital and manufacturing facilities for war work. This movement is being carried out in co-operation with the implement manufacturers.

At the request of the board, following a conference in Washington with the war service committee of the implement industry four divisional committees of the National Implement and Vehicle association met in Chicago in March to formulate suggestions to the board. These committees had to do respectively with steel plows and tillage implements; chilled plows; grain drills, seeders, etc., and farm tractors. Each recommended various styles and sizes for elimination, totaling nearly 2000. The list was made up of types which had been gradually added by the manufacturers in the course of peacetime competition. In the report of the committee meetings it was stated that special regard had been given to the needs of the farmer, and nothing recommended for discard which was believed to be necessary to modern, economical agriculture. The wagon department of the association recently met in Louisville and has made similar suggestions.

Such of these recommendations, together with others from different sources, are to be brought to the attention of all implement manufacturers and jobbers and as many retail dealers as it is practical to reach, through questionnaires. The first of the questionnaires, addressed to the manufacturers of portable grain elevators, has just been sent out by the board; others are in preparation. It is pointed out that the simplification of implement lines will not only save labor in the implement plants and steel mills by making possible longer runs on the machinery, but will also release a portion of the machinery for work on munitions, ship's parts, etc. In addition it will cut down the amount of stock the jobbers and retailers will have to carry thus releasing capital.

All Car Orders Allotted

WASHINGTON, May 6.—Some additional scattered orders having been placed during the past few days, the entire government order for 100,000 freight cars of standardized type now has been allotted. Some of the additional orders not previously noted include 3000 to the Bettendorf Co., Bettendorf, Iowa; 2000 each to the Lenoir Car Works, Lenoir City, Tenn., and to the Pacific Car & Foundry Co., Seattle, Wash.; 1000 each to the Laconia Car Co., Laconia, N. H., to the Keith Car & Mfg. Co., Sagamore, Mass., to the Liberty Car & Equipment Co., Chicago, to the St. Louis Car Co., St. Louis, and to the Magor Car Corp., Passaic, N. J.; 1500 additional to the Standard Steel Car Co., Pittsburgh; 1000 additional each to the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., and to the Ralston Steel Car Co., Columbus, O.; and 500 additional each to the Haskell & Barker Works, Michigan City, Ind., to the Pressed Steel Car Co., Pittsburgh, and to the Pullman Co., Chicago. An order for 2000 cars also has been practically closed with the Barney & Smith Car Co., Dayton, O.

The railroad administration states that it is possible that there may be some modification in the number and types of cars apportioned among the different builders before the final detailed contracts are executed. The 70,000 cars which were placed after the original lot of 30,000 cars, include 15,000 forty-ton double sheathed box, 16,000 fifty-ton single sheathed box, 15,000 fifty-ton composite gondolas, 19,000 fifty-five-ton hoppers and 5000 seventy-ton low side gondolas. These represent the five types of standardized cars adopted by the railroad administration.

It was stated by the railroad administration that the aggregate cost of the 200,000 will be between $250,000,000 and $300,000,000. The orders were all placed upon the basis of the minimum bids as to cost for labor and overhead charges. As stated in last week's IRON TRADE REVIEW, the understanding is that any reduction in cost which may be obtained from these fixed prices will be divided equally between the railroad administration and the car builders. Any increase in these costs, however, will be borne exclusively by the dealers. The government will have supervision or control as to prices of the materials required in construction.

Capital Odds and Ends

WASHINGTON, May 6.—A special committee has been appointed by the railroad administration in conjunction with the post office department, to handle the problem of the transportation of mail. "It is expected the committee will accomplish important economies and efficiencies in the handling of mail on the railroads," the announcement said. On this committee have been appointed Guy Adams of the Union Pacific, formerly of the government mail service; J. C. McCahan Jr. of the Baltimore & Ohio; H .T. Mason of the Frisco; H. L. Fairfield of the Central of Georgia; G. P. Conard, secretary of the Transportation Officers' association, and Rudolph Brauer, superintendent of the fourteenth division of the government mail service.

* * *

Increase of from $4.39 to $4.61 per ton in carload rates on manganese ore from McCormick, S. C., to Temple, Pa., is sought by the Charleston & Western Carolina railroad.

* * *

A transfer charge of 8 cents per 100 pounds is sought by the Chicago, Rock Island & Pacific railroad on less than carload lots of agricultural implements, other than hand, machinery and structural steel, and 5 cents per 100 pounds on all other freight between stations on its line and the Minneapolis & St. Paul railroad at Grinnell, Iowa.

Great Lakes Shipyard Wages Fixed

Shipbuilding Labor Adjustment Board Places Lakes District in Same Competitive Area as North Atlantic Yards With Same Wage Scale and Rules Applying—Open Shop Principle Upheld

EFFECTIVE May 1, the same wage scale fixed for the Delaware river and Baltimore districts shipyards by the shipbuilding labor adjustment board has been made to apply to the shipyards about the Great Lakes. Similar hours and rules for workers apply, since with the easy means of transportation about the lakes and from the lakes to the seaboard, the Great Lakes region now constitutes a part of the same competitive area as the North Atlantic coast. The shifting of employes from yard to yard, which has been found to be one of the most serious influences retarding the progress of shipbuilding is thus checked by making the conditions uniform over the entire competitive area. The scale advances materially the wages previously paid in these yards to nearly all craftsmen, but to make certain that no reduction in wages will accrue to any employe, it was been provided in the ruling that such wages shall not be altered or affected by this decision of the board.

It has also been ruled that the hourly rates of wages and piece rates thus fixed for the Great Lakes shipyards shall be retroactive to April 1, except where otherwise agreed upon in writing by yard owners and their employes prior to April 1, the date on which wage changes were made effective in these yards with the authorization of the Emergency Fleet corporation.

An eight-hour day from Monday to Saturday inclusive has been established, with the provision that in the summer months of June, July and August, the working day on Saturday shall be four hours. Work on ship construction in excess of these periods on week days, shall be counted as overtime, with time and one-half pay. Similar work performed on Sundays and on holidays shall be paid for at the rate of double time.

Night Work Carries Bonus

Hours of employment after 5 p. m. and before 8 a. m. shall be counted as time on the night shift which carries a bonus of 5 per cent over the amount paid day workers. Work in excess of 12 hours a day or 60 hours a week is prohibited, except when it is ordered by the navy department or Emergency Fleet corporation.

As to the settlement of disputes, shipyard owners are directed to arrange that the employes of each craft or calling in a shop or yard shall have the right to select three of their number to represent them as members of a shop committee, with one of the three serving as chairman. The committee is to be elected by majority vote through secret ballot. The grievance is to be taken up with the shop or general foreman. If no settlement is possible, the question is to be taken up by the joint shop committee, first with the superintendent and then if necessary, with the higher officials of the company. If the matter cannot thus be adjusted, the joint shop committee has the right to select and call into conference another representative. In case such conference fails, the grievance is to be submitted to the examiner appointed by the shipbuilding labor adjustment board.

Open Shop Upheld

Because in the present crisis, past differences between employers and employes must be forgotten in the common determination to produce the maximum possible number of ships, the board states that it will not tolerate any discrimination either on the part of employers or their workmen, between union and nonunion men.

Because in certain departments such as riveting, shipping, caulking, etc., a preference for the piece-wage system prevails, a uniform piece-rate scale is to be agreed upon and recommended to this board by representatives of the shipyards and pieceworkers of the district, who will be called together by the examiner of the district when he is appointed. Such piece rates will apply to all the Great Lakes yards.

The board holds jurisdiction only over those yards which have direct contracts with the navy department or with the Emergency Fleet corporation, other than lump-sum contracts with the navy department, and to employes engaged in work in connection with such contracts.

Discuss Labor Problems

Three days are to be devoted to the war-time problems which confront employers at the second national conference of the Employment Managers' association in Rochester, N. Y., May 9, 10 and 11. Thursday afternoon will be given over entirely to the consideration of "Labor Recruiting and Kindred Problems", which will be handled under several subtitles. Among the many interesting papers to be presented are the following: "Absenteeism", by S. R. Rectanus, of the American Rolling Mill Co., Middletown, O.; "Standardizing Rates and Occupations", by W. D. Stearns, of Westinghouse Electric & Mfg. Co., Pittsburgh; and "Basing Wages on Cost of Living", by Dr. Royal Meeker, United States commissioner of labor statistics. Secretary of Labor Wilson and Assistant Secretary Louis F. Post have been invited to talk on "A National Labor Policy" at Friday night's session. Officers of the Emergency Fleet corporation will likewise occupy a prominent place on the program.

Will Index Workmen

The state of New Jersey, after July 1, in an effort to solve the shortage of labor problem in all industries, will demand a card for the state, federal and municipal employment bureau, from every man, showing where he was employed last and the reason why his employment ceased. Colonel Lewis T. Bryant, state commissioner of labor, and Warren C. King, president of the manufacturers' council of the state of New Jersey, are responsible for the inauguration of this card system. The plan is aimed at the remedying of present conditions in the labor market, especially in industries engaged in important war work in which the state of New Jersey abounds. Another part of the scheme calls for the suggestion to the federal authorities of the regular enlistment of workers in shipyards, for a stated period of time, similar to enlistment in the army or navy but with the regular shipyard rate of wages. This would insure the stability of labor in important plants, at the same time give the workers a sense of the patriotic importance of their work. Another suggestion is to train women for the lighter and more delicate mechanical work in industries as well as employing them for the skilled industries.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

CLYDE BROOKS resigned recently as secretary and manager of the Pittsburgh Iron & Steel Foundries Co., Pittsburgh, in order that he might devote his entire time to services in behalf of the government. On May 1, he assumed his duties as a civilian in Washington in an important capacity. For nine years, Mr. Brooks was affiliated with the Schoenberger Steel Co., now the Schoenberger works of the American Steel & Wire Co., as assistant to the sales manager Upon his resignation from that capacity, he became connected with the Midland Steel Co., as assistant to the vice president and general manager. After six years in that position, he became associated with the Pittsburgh Iron & Steel Foundries Co., as secretary and manager and May 1 marked the end of seven years' service with that company.

Robert Coe, Plainville, Conn., has been made construction engineer with the Bristol Brass Co., Bristol Conn.

Arthur L. Shipman, Hartford, Conn., has been appointed receiver for the Pope Mfg. Co. to succeed the late Col. George Pope.

W. J. Hanna has been appointed district sales manager, with headquarters at 523 Ford building, Detroit, of the Trumbull Steel Co., Warren, O.

M. C. Lias, chief clerk of the Pittsburgh office of Rogers, Brown & Co., recently enlisted for miltary service and has been assigned to Fort Thomas, Ky.

Paul B. Morgan was recently elected president of the Economic club of that city. He is president and treasurer of the Morgan Construction Co., Worcester, Mass.

P. T. Reese became associated with the Driscoll-Reese Steel Co., Hamburg, Pa., manufacturer of electric steel castings, upon his recent resignation as plant manager of the Superior Steel Corp., Carnegie, Pa.

David L. Ward, general superintendent of the Federal furnace of the By-Products Coke Corp., Chicago, will address the Chicago Foundrymen's club at the City club, May 11, on the manufacture of pig iron.

Alvin C. McCord, president of McCord & Co., Chicago, railway supplies and steel foundries, recently purchased several parcels of land, adjoining the company's present plant, which will be used for additions.

Henry M. Leland, president of the Lincoln Motor Co., Detroit, addressed the Manufacturers' association of Hartford county, Conn., at the Hartford club, April 30, going into details of the building of Liberty motors.



CLYDE BROOKS

W. S. Raudenbush has been made manager of the Juniata Furnace & Foundry Co., Newport, Pa., to succeed R. M. Marshall who has enlisted in the United States tank service.

William A. Viall, secretary of the Brown & Sharpe Mfg. Co., Providence, R. I., has been designated Rhode Island chairman for the second American Red Cross war fund campaign during the week of May 20.

L. M. Hartzell has been made assistant manager of sales in the Cincinnati, O., office of the Carnegie Steel Co., under J. G. Caruthers. Mr. Hartzell has been manager of the bessemer department at the Homestead works of the Carnegie company.

Robert H. Dunbar became affiliated with the Providence Engineering Corp., Providence, R. I., engaged in government shipbuilding, upon his resignation as mechanical and safety engineer of the American Tube & Stamping Co., Bridgeport, Conn.

P. L. Maher has been made assistant to the president of the Damascus Brake Beam Co., Cleveland, and will specialize on shop operation and efficiency. For some time he has been business manager of the Eastern Car Co., Ltd., New Glasgow, N. S.

Winthrop Ingersoll, president of the Ingersoll Milling Machine Co., Rockford, Ill., received notice that his son, Lieut. Clayton C. Ingersoll, aged 22, who sailed for France Feb. 25, met his death in an airplane accident there April 26.

Charles A. Gehman has been made general manager of the Standard Machine Co., Philadelphia, which was recently organized to deal in machines and tool supplies. He formerly was affiliated with the L. M. Meisen Helter Machinery Co., that city.

John Braxi, who has been affiliated with the Chase Metal Works, Waterville, Conn., for some time has been made superintendent of the movement shop of the Seth Thomas Clock Co., Thomaston, Conn., succeeding Fred Hoffman, who resigned.

E. W. Young succeeds William Seymour, resigned, as assistant superintendent of the Northampton plant of the Bethlehem Steel Co., in charge of by-products. J. A. Beaty formerly general foreman has been made assistant superintendent of the oven section and R. L. Martin succeeds him.

Le Roy Clark, who recently was made a member of the war industries board, will serve as chief of the wire and cable section of the finished products division. He is president of the Safety Insulated Wire & Cable Co., New York. Mr. Clark resigned as chairman of the wire and cable committee of the advisory commission of the council of national defense, and has been succeeded by George B. North of the Hazard Mfg. Co., New York City and Wilkesbarre, Pa., wire rope.

Col. C. O. Monsarrat, chairman of the Quebec Bridge commission, has been appointed consulting engineer to the railways and canals department of the Canadian government. The Mon-

treal offices of the commission have been moved to Ottawa, where they will be wound up.

P. M. Weinstein, formerly in the plant of the Luitwieler Pumping Engine Co., Rochester, N. Y., has been placed in charge of the recently opened Chicago office, 1657 Monadnock block.

William L. Hoffman has recovered from an illness extending over a period of several weeks and is able to resume his work in charge of the Washington office of the Brier Hill Steel Co., Youngstown, O. He is Philadelphia district sales manager for the Brier Hill company.

H. G. Flury has become affiliated with the Kansas City Structural Steel Co., Kansas City, Mo., in an important capacity. He formerly held a position in the bridge department of the Kansas City Terminal Railway Co., but latterly has been with the American Bridge Co., at its Gary, Ind., office.

Paul W. Wendt, of the Paul W. Wendt Co., Chicago, railway supplies, has been made assistant production manager in charge of steel, of the Emergency Fleet corporation in the Chicago district, which comprises Michigan, Indiana, Illinois, Wisconsin, Minnesota and Iowa.

George M. Hendee, who has been serving as secretary in charge of the postal, cable and telegraph branches of the Y. M. C. A. service in France for six months has returned to his home in Suffield, Conn. He formerly was president of the Hendee Mfg. Co., Springfield, Mass.

Valentine Browning, Hartford, Conn., son of J. M. Browning, inventor of the Browning machine gun, who has been connected with its manufacture in that city, has been appointed a second lieutenant in the army and will sail soon for France, where he will work as an expert in an instruction camp for machine gunners.

Russell Fortune will manage the manufacture of small plain and universal cylindrical grinders, for the purchasers of the controlling interest in the Ott Grinder Co., Indianapolis, sold recently by Albert J. Ott and his son, Conrad. The latter have agreed not to manufacture small cylindrical grinders for five years, but have the privilege of building large swing machines, which they will probably commence in the near future.

Charles F. Lang, president of the Lakewood Engineering Co., Cleveland, addressed the Cleveland Advertising club at the Hotel Statler. May 3, on "Business Papers From a Manufacturer's Standpoint". He said that most of the young engineers of today are receiving their training and keeping. The Lakewood Engineering Co., is sending railroad tracks to France at the rate of six miles per day.

August Mertes, who for several years has been superintendent of the Pittsburgh Machine Tool Works, Pittsburgh, resigned recently to accept a similar position with the Bradney Machine Co., Middletown, N. Y., builder of locomotive cranes, elevating machinery and machine shop tools.

H. Cole Estep, editorial director of the Penton Publishing Co., Cleveland, addressed the Newark Foundrymen's association, Newark, N. J., May 1, on the German interned ships in the United States and the methods used in repairing and fitting them for service under the American flag.

Major Warren R. Roberts, quartermaster's reserve corps, president of the Roberts & Schaefer Co., Chicago, contractors for coal mining plants, was recently promoted to the rank of lieutenant-colonel. At present he is an executive officer for the constructing branch of the construction division of the United States army.

F. W. Boltz, traffic manager of the National Petroleum association, Guardian building, Cleveland, has been appointed a member of the advisory committee on tank cars of the petroleum war servece committee, which acts in an advisory capacity to M. L. Requa, director of the fuel administration's oil division.

Herbert A. Johnson, who entered service with the rank of captain in the ordnance department of the army with charge of saddlery production, has been promoted again from the rank of major to that of lieutenant-colonel. He was formerly general superintendent of the North & Judd Mfg. Co., New Britain, Conn., hardware.

J. C. Armer, recently appointed sales manager of the Dominion Forge & Stamping Co., Ltd., Walkerville, Ont., will spend a considerable portion of his time in the recently-opened office of the company at 510 Lumsden building, Toronto, Ont. Mr. Armer until about 18 months ago was vice president and manager of the *Canadian Manufacturer* and other technical papers.

P. J. Donohoe, naval architect, has been made superintendent of the new shipyard to be established at Ruskin on the Fraser river by the Standard Shipbuilding Co., Dominion building, Vancouver, B. C. Contracts have been closed with the imperial shipping board for 10 composite steamers which will have reinforced steel keels and steel knees.

V. Horton, formerly connected with the U. S. Metal & Mfg. Co., New York, has been placed in charge of the New York office in the Woolworth building of the J. Lipsitz Co., Inc., Chelsea, Mass., scrap iron, steel and metals. D. M. Howell, formerly connected with the New York office has been transferred to the home office in Chelsea.

W. D. Baldwin, president of the Otis Elevator Co., New York, was recently made chairman of the board. He is succeeded as president by Floyd C. Furlow. Stockholders at the recent annual meeting increased the board membership to 11, and the following were elected: Charles D. Hilles, Karl G. Roebling, Thomas L. Chadbourne and E. V. R. Thayer.

Capt. James E. Ferguson, president of the Ferguson Iron & Steel Co., Buffalo, was transferred recently from the aircraft production branch of the signal corps of the army to the navy department. His new work will be in the naval construction section. Edward E. Butts of Springfield, Mass., will have active charge of the shipyard at the Ferguson plant in Buffalo.

P. H. Joyce, Chicago, who owns controlling interest in the Illinois Car Mfg. Co., Hammond, Ind., and the Indiana Car & Equipment Mfg. Co., Indiana Harbor, Ind., is president of the newly organized Liberty Car & Equipment Co., which purchased the Hicks plant of the Central Locomotive & Car Works, Chicago Heights, Ill. The locomotive plant of the latter is being utilized for the manufacture of farm tractors.

David Bradley Carse, formerly a member of the advisory committee of the United States Steel Corp., has opened offices in the Oliver building, Pittsburgh, as an industrial engineer. His offices in the Empire building, New York, will likewise be maintained. Mr. Carse is a well known industrial engineer, having represented large banking houses in important financial and industrial deals in the last 25 years.

W. A. Carson, vice president and general manager of the Evansville railways, Owensboro City railroad and the Henderson Track Co., with associates, has bought the Schroeder Headlight Co., Evansville, Ind., manufacturer of locomotive oil and electric headlight and turbo generators. Mr. Carson has been made vice president and general manager of the Schroeder company.

Cecil H. Bacon has bought the entire capital stock of the Westerman Iron Works and has resigned as a member of the firm of Galbraith, Bacon & Co., Seattle. W. Scott Matheson, who has been manager of the Westerman Iron Works for the past four years, retains his interest in the business and continues in the same capacity. The business wil be conducted under the same name as heretofore.

Iron and Steel Men in War Machine

Howard Coonley, Vice President, Emergency Fleet Corporation

HOWARD COONLEY is the latest business man to be drafted into government service and while his headquarters are not at Washington but in Philadelphia, he is none the less an integral part of the war machine. When Charles M. Schwab became director general of shipping, he immediately began to exercise his characteristic penchant and skill for surrounding himself with men capable of doing things. He wanted a man who could help assume some of the rapidly-growing administrative duties of the Emergency Fleet corporation. His mind's eye fell upon Howard Coonley, president of the Walworth Mfg. Co., Boston, manufacturer of steamfitters' supplies, wrenches, etc., for this position—that of vice president of the fleet corporation. He telegraphed Mr. Coonley and received his immediate acceptance. Within a few days, the Boston man had wound up his affairs and he had established himself in Philadelphia. Before leaving Boston, more than 1500 employes of the Walworth Mfg. Co. gathered outside the plant in South Boston to pay him a farewell tribute and to extend their best wishes. Mr. Coonley's position in the fleet corporation organization is an important one. He will have full charge of the general administration work, including contracts, purchasing, finance and accounting. In importance, the position is on a par with that filled by Charles Piez. These two will serve as Mr. Schwab's first assistants in the all-important work of supplying ships to the government.

Upon his graduation from Harvard in 1899, Mr. Coonley located somewhere in Texas. There he established a town and developed land and railroads, all of which flourished. Later, he returned to Chicago, the city of his birth, and founded the Coonley Mfg. Co. Under his management the company prospered and grew. Five years ago, in March, 1913, he was called to Boston and offered the position of president of the Walworth Mfg. Co. He accepted and remained in that capacity up to the present time. He has seen the company grow sixfold, until it now has sales offices in different parts of this country, in Johannesburg, South Africa, Havana, Buenos Aires, Santiago, Sydney, London, Paris and Sao Paulo. It was Mr. Coonley who, in July, 1917, arranged with Hayden, Stone & Co., New York, for the purchase from the United States Steel Corp. of the Kewanee, Ill., plant of the National Tube Co. As vice president of the Boston chamber of commerce, he has been identified with most of Boston's important civic activities, since in that body is incorporated all the boards of trade, city commissions, committees, etc. Had he remained in Boston, he doubtless would have been elected president for the next term. In 1917, he served as chairman of the board of directors of the chamber. Mr. Coonley is still a young man, being in his thirty-ninth year. While he has spent most of his time in and about Boston, he is well known in various industrial communities.



HOWARD COONLEY

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Steel Company Earnings Are Encouraging

INITIAL quarter financial reports by iron and steel companies would seem to indicate two striking and important things. First, since a gradual increase in profits is manifest, government prices have not been framed to unduly reduce or eliminate profits, as may at first have been feared, but on the contrary are calculated to bring in a fair measure of return to producers and to shareholders. The reason for this is obvious. Without profits and dividends there would and could be no income and excess profits taxes and thus would the government be deprived of a rich source of revenue. Neither could additions to plants be made or new plants erected to produce greatly-increased governmental requirements. With the elimination of profits, the government would be confronted by the necessity of subsidizing industry, which with the many calls upon the nation's resources, would be a real burden at this time. In the second place, with a gradually ascending profit scale in the first three months of the year, it is shown that the steel companies are steadily emerging from the adverse conditions of the winter, with its labor and transportation difficulties and its forced shutdowns, etc., accompanied by a curtailment of production.

That the low point was reached in January and February, when many factors militated against large gains, is the hope and belief of many iron and steel producers. There would seem to be some ground for this belief in view of the fact that March earnings were almost double those for January in many instances, while February shows a slight increase. A chief exhibit of this kind is the United States Steel Corp., whose earnings for March were $26,471,304, while in January, they were but $13,176,237 as against $17,313,883 in February. It is true that the final quarter in 1917 made a better record than the first three months of 1918, but this is due to the poor showing made in the struggle against odds in January and February's business. The first quarter showings of the Republic Iron & Steel Co. and of the Lackawanna Steel Co. also are encouraging. In the case of the Steel corporation, the decrease from the final quarter was only $2,762,701, while with the Midvale Steel & Ordnance Co., $3,081,696 represents the difference between the first quarter of 1918 and the last quarter of 1917, which was the best three months' period of the year for that company.

March Shows Upward Tendency

While reduced earnings for the initial quarters seems to be the universal rule, as compared with the same period in 1917, the tendency upward, manifest in the month of March, augurs well for the future. No predictions are being made, but on the whole there is a feeling of easiness in financial circles, which already is evident in the stock market, despite the near approach of the time for turning over to the government three or four billions of dollars in excess profits and income taxes. If the rate of earnings in March is maintained, 1918 will make a good showing, as to profits, in spiet of pessimistic expectations to the contrary. As to gross volume of business transacted,it is confidently expected to be the biggest year of the war.

Midvale's Initial Quarter Gains Over 1917

A slight increase in net earnings marks the first quarter of 1918, for the Midvale Steel & Ordnance Co., over the first quarter of 1917. The net profit for the quarter ended March 31, 1918, was $7,800,341 as compared with $7,056,391, the corresponding period in 1917. The report just issued shows a drop from the high mark of the final quarter of 1917, when $10,882,037 was the net profit figure.

The earnings for the quarter were equal to $3.90 a share on stock as compared with $3.53 for the correspinding quarter in 1917 and $5.44 earned in the fourth quarter of 1917. With the exception of the final three months' period of last year, the first quarter net of the current year compares favorably with the other quarters of 1917. In the second quarter the profits were $8,258,790 and in the third quarter they were $8,039,285.

The company charged off the sum of $1,181,321 for depreciation, the latest statement shows, compared with $1,800,864 for the corresponding period of 1917. The total of taxes is not divulged by the statement, which shows net earnings after making provision for federal levies, but before deducting interest on bonds and guaranteed stock and reserves for depreciation. Earnings in the quarters last year were given before charging off the taxes, which were accounted for in separate items. The comparative quartely income account follows:

	1918	1917
Net earnings	$9,775,044	$15,859,738
Deduct reserves for taxes	.....	6,189,027
Interest on bonds and guar. stock of sub. companies	793,383	814,456
Balance of earnings...	8,981,661	8,856,255
Reserve for deprec....	1,181,320	1,800,864
Net profit	7,800,341	7,055,391

Has Good Year Despite Curtailed Building

While the cessation of normal building operations throughout the country decreased the demand for elevators, the Otis Elevator Co. is able to report 1917 as being the largest in the country's history. This is because numerous building activities of the government has brought considerable elevator work and insures an appreciable amount for the future. President W. D. Baldwin stated in his message to stockholders: "Our various factories at present are largely occupied with government work, exclusive of elevators." As to European conditions, Mr. Baldwin said in part: "It is impossible to give any satisfactory information regarding our busi-

ness in Europe other than that we have charged off against current earnings the sum of $380,000 on account of European losses."

Net earnings for 1917 after interest and depreciation were deducted, amounted to $1,408,576, as against $1,036,588 in 1916. Reservation of $150,000 for federal taxes has been made. Dividends on preferred stock paid during 1917 totaled $390,000 and on common $318,575.

Business is Improving

A gradual recovery from adverse conditions which obtained during the winter is portrayed in the statement of operations for the first quarter of 1918 by the Allis-Chalmers Mfg. Co., Milwaukee. Net profits for the initial quarter were $1,396,238 while in the same period a year ago net profits of $900,672 were made. Gross sales for 1918 and 1917 first quarters were $6,589,827 and $5,183,716, respectively. Unfilled orders on hand March 31, 1918, amounted to $29,904,976. The company's comparative report for the quarter follows:

	1918	1917
January	$1,899,971	$1,690,627
February	1,990,863	1,615,009
March	2,698,993	1,878,080
Total sales	$6,589,827	$5,183,716
Net profits:		
January	$360,071	$301,466
February	418,769	273,164
March	617,398	326,042
Total profits	$1,396,238	$900,672

Big Taxes Reduce Balance

Heavy deductions for federal taxes, etc., reduce the net balance of the Savage Arms Corp. for the first quarter of 1918, as compared with the same period in 1916, notwithstanding the fact that there was a gain of $292,737 in the total earnings in the 1918 period. The total deduction of $1,889,757 for taxes reduced the balance to $282,653, as compared with $1,249,053 for the first quarter of 1917. Total earnings for the quarter were $2,324,595 compared with $2,031,858 for a similar period in 1917.

Earns Largest Total

The Railway Steel Spring Co. reports for the year ended Dec. 31, last, gross earnings of $23,905,715, a new high record, compared with $14,086,499 in 1916. Net earnings available for dividends on the common stock amounted to $4,362,859, or $32.31 a share, as against $2,765,806 or $20.45 a share in 1916. Deductions for depreciation amount to $1,000,000 and allowances for excess profits and income taxes to $3,500,000. In 1905 the company earned $3.09 on the common shares. In his report to stockholders President F. F. Fitzpatrick said:

"Your company encountered considerable difficulty throughout the year in conducting its regular line of business, due to the restrictive market in obtaining raw materials and to the very tense situation prevailing with the railroad transportation facilities. It has therefore been deemed advisable to carry much larger amounts of materials in the inventories than heretofore. The policy of the company to increase the capacity of the different plants has been continued. The year just closed shows results to be the largest in the history of the company, and the volume of business done, especially during the last few months of the year, has been conducted under most trying difficulties."

Electric Steel Corporation Takes Cleveland Plant

With a capital of $2,000,000 of 7 per cent convertible preferred stock, the Electric Steel Forge Co., Cleveland, has been organized to manufacture electric steel and its products. James H. Foster, president of the Hydraulic Pressed Steel Co., Cleveland, heads the new corporation. The company has absorbed the Crucible Steel & Forge Co., of Cleveland. This plant will be continued and expanded. The expansion plans include two electric furnace units of the Heroult type, one of 3 tons and one of 6 tons capacity giving an annual production of 9000 tons, also rolling mill and other equipment for the manufacture and fabrication of electric steel. The preferred stock is 7 per cent cumulative, the holder having the option to convert at any time within five years, share for share, into common. It is redeemable at $110 a share on any dividend date after April 1, 1924, on 60 days' notice. With each two shares of preferred the company is offering one share of common at s bonus. The officers of the company, beside Mr. Foster, are: Vive president and general manager, D. W. Well, formerly general manager of the Crucible Steel & Forge Co.; secretary, C. R. Cross, president of the Colonial Savings & Loan Co.; treasurer, A. B. Smythe, president, the A. B. Smythe Co. The directors include the officers and C. R. Hamilton; James H. Herron, consulting metallurgist; W. D. Sayle, president, the Cleveland Punch & Shear Co.; H. C. Osborn, president, the American Multigraph Co.; and W. H. Staring, vice president and general manager of the Peerless Motor Car Co.

The Germania Supply & Foundry Co., Covington, Ky., has changed its name to the Martin Foundry Co., and the capital stock has been increased.

Nitrate Demands

To Lead to Government Purchases of Solvent Naphtha

New York, May 4.—Crude solvent naphtha is the latest of the coal tar products which the government is preparing to purchase on a large scale. An inquiry for large quantities of this product for use in a special nitrating process has been put out by the navy department. The inquiry calls for delivery a number of months ahead, so that it will be some time before government demand will affect the market. The tone in solvent naphtha has been still further strengthened by this development. Prices, however, still are unchanged. This product is quoted at 18 to 22 cents per gallon for contract and at 18 to 25 cents for spot, depending upon the size of the order.

Additional quantities of toluol for delivery to commercial consumers during May are being released by the committee of the war industries board which has charge of the distribution of this product. No word yet has been received as to the extent of these releases. The business thus released is being booked by the producers at $1.75 to $2 per gallon.

Benzol continues to reflect a weak tone. Business in this product has been of rather small proportions this week. The market continues to be quoted at 28 to 35 cents per gallon both for spot and contract.

The entire output of phenol and naphthalin continues to be called for by contracts previously entered. Hence, current business involves only an occasional spot lot. The market on spot phenol continues at 52 to 55 cents per pound, and on spot naphthalin at 10 to 12 cents per pound.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.28 to .35
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.55 to 5.60

Contract

Pure benzol	$0.28 to .35
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant,	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Used Tools Made Available by Lull

Period of Light Inquiry to Builders is Characterized by Increased Business in Buying and Selling of Used Machines—Shipbuilding Furnishes Steady Call for Equipment and Cranes

THE law of averages is operative in the machine tool market. A decided lull is evident in all districts at the present time in the buying of new equipment. Even that steady volume of small lot and single tool inquiry which prevailed recently has diminished during the past week. But with this falling off, there is evidence of increased activity in used tools. Dealers report that an increasing number of machines are to be obtained at the present time, and in similar proportion the inquiries to used tool dealers are growing. Large machines still continue difficult to obtain, and in many sections, notably through the west, the inquiry for heavy tools is larger. The Wright-Martin Aircraft Co., New Brunswick, N. J., has closed for the greater part of its requirements. With this exception large lists have been infrequent in the past few weeks. The shipbuilding industry continues to develop and brings with it numerous inquiries for varied classes of machines and for hoisting and conveying equipment. The railroads are the center of attention in many sections at the present time. Some have issued preliminary lists through the engineering departments which, however, are tentative. It is stated that permission is being sought from the various regional committees to make purchases on some extensive requirements. The need for many of these tools has been evident for some time. When permission is granted and appropriations are available for purchase it is expected that practically all the railroad requirements will come on the market within a short space of time. This will produce a large volume of business in which the time of delivery will constitute an important factor. Deliveries from the manufacturer improve slowly though vertical boring mills, large lathes and some classes of radial drills are difficult to get. Shipping still has its worries for the manufacturer buying machine tools. It is becoming increasingly necessary to follow each shipment closely to assure the arrival of needed equipment in a reasonable time.

Tool Requirements of Railroads Wait Authority

INCREASING interest on the part of the railroads in their machine tool requirements was an outstanding development in the market during the past week. The Chicago, Burlington & Quincy is asking for a number of tools, and several other railroads are making tentative inquiries. This follows the recent heavy awards of rolling stock by the railroad administration. Whether buying of machine tools will develop into business of large proportions is not as yet ascertained; it is known, however, that the railroads are badly in need of equipment.

Trading generally during the week or 10 days has been considerably augmented by heavy buying by the Wright-Martin Airplane Corp, New Brunswick, N. J., which now is covering on the large list issued several weeks ago. While a number are yet to be purchased, the bulk of the inquiry has been closed. The company during the past week has also purchased the plant and equipment of the General Vehicle Co., Long Island, N. Y. This followed a series of negotiations in which sites at Atlantic City, N. J., Philadelphia and Poughkeepsie were also considered. The navy department has closed on about $30,000 to $40,000 worth of tools, including lathes, radial drills, etc., for its yard at Philadelphia. The New York Shipbuilding Corp., Camden, N. J., is in the market for a sizable number of tools and is also understood to be negotiating for several electric cranes in addition to those recently purchased from Pawling & Harnischfeger.

The American Locomotive Co., Dunkirk, N. J., will need a few tools for an addition soon to be built at its plant. The Chain Products Co., Edgerly, N. Y., is also figuring on the purchase of a few additional tools. Some forge shop equipment will be required by the Davis & Thurber Machine Co., North Andover, Mass. The Standard Shipbuilding Co., Shooters Island, N. Y., is expected to enter the market shortly for a few tools. The Tioga Steel & Iron Co., Philadelphia, has purchased a 6000-pound hammer. Included in new shipbuilding enterprises is the Bangor Shipbuilding Co., which will erect a yard at Hampden, Me. Prices of machine tools continue to advance, certain lines of screw machines, grinders, arbor presses and lathes having recently gone up 10 per cent.

The bureau of supplies and accounts, navy department, Washington, will receive bids until May 29 under schedule 3947½ for a number of lathes. The same department will open bids under schedule 4126½ on May 20 for core ovens for delivery at Brooklyn. A list of tools for the Japanese navy including milling machines, lathes, radial drills, slotting machines, planers and horizontal boring machines is in the market.

Crane Inquiry Continues Active

The largest inquiry to come into the crane market recently is that of the William Cramp Ship & Engine Building Co.,, involving 10 overhead cranes of varying capacities and eight 5-ton wall cranes. Specifications call for five 30-ton, one 70-ton, one 25-ton, one 10-ton and two 5-ton overhead cranes. The Baldwin Locomotive Co. has recently withdrawn its inquiry for two 50-ton electric cranes. The bureau of yards and docks of the navy department, Washington, will soon ask for bids on coal and ash handling equipment under specification 2961 for Philadelphia. The same office will receive bids on



AGATHON
Alloy Steels

This view of part of the control floor of our soaking pit plant is illustrative of the extent to which modern, labor-saving machinery has replaced man power throughout the Central Steel plant.

By eliminating the human element and centralizing control in the hands of a few highly skilled and conscientious individuals, we have eliminated nine chances out of ten for mistake or delay.

Thus have we taken a big step toward the realization of our ideal—Perfection.

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MASSILLON, OHIO

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Cleveland Office: Hickox Bldg. The Hamill-Hickox Company, District Representatives.

Chicago Office: 1370 People's Gas Bldg., 122 S. Michigan Blvd. C. H. Beach, District Representative.

Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager.

Syracuse Office: 621 University Blk. T. B. Davies, District Sales Manager.

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"AGATHON" Nickel Steels
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AGATHON STEELS
TRADE MARK

May 13 under specification 2913 for an electric traveling crane in the structural shop in New York. This latter was originally for May 6. The Federal Shipbuilding Co., New York, is inquiring for four 10-ton travelers of 70-foot span. The Perry Shipbuilding Corp., New York, contemplates purchasing three 10-ton electric cranes for machine shop use. Terry & Tench Co., steel contractor, New York, is tentatively figuring on three locomotive cranes. They are to be 40, 25 and 2 tons capacity respectively and the two former are to have 20-foot booms. The American Locomotive Co. has purchased a 10-ton crane from the Shaw Electric Crane Co., New York. The Thompson-Starrett Co., New York, has bought a 10-ton crane from the Toledo Bridge & Crane Co., Toledo, O.

Pittsburgh Rolling Mill Equipment Active

THE government appears to be making fewer inquiries of sellers in the Pittsburgh district for machine tools, but instead is buying more freely direct from makers. The market for rolling mill equipment shows signs of increased activity. Makers are beginning to receive more inquiries and it is believed that orders soon will be placed in better volume. Some of this equipment is being inquired for by makers who are getting ready to make installation to produce government work. Some fair-sized orders of this line were closed during the past week. The car supply has improved greatly and no difficulty is being expericnced in getting priority orders for shipments involving the transportation of equipment for the government. It also is less difficult to get these orders for purely commercial requirements.

Single Tools in Demand in Chicago

SINGLE tools of heavier type make up the bulk of business among machine tool dealers in the Chicago district. The aggregate business now being handled is fairly heavy, as has been the case for many weeks, but is devoid of large purchases. Although demand has been for heavy machinery almost entirely, considerable inquiry is in prospect for lighter tools, although this has not yet come to the point where sales are being made. Preparations are being made by the Rock Island arsenal to ask for considerable additional equipment under the appropriation recently granted. The Burlington and Santa Fe railroads, both of which have lists pending, have not yet come to the point of buying. Manufacturers of government material and munitions are not active in the market at present. The Lyon Metallic Mfg. Co., Aurora, Ill., is building an addition. The Riverside Iron Works, Chicago, is building a foundry addition. Wilson & Co., Union Stock Yards, Chicago, is equipping a refrigerator car repair shop of considerable size. The Pawling & Harnischfeger Co., builders of hoists and cranes, Milwaukee, will build a machine shop addition at its main plant. The Universal Machinery Co., Milwaukee, is about to build a new plant, in West Allis, including foundry, machine shop and other buildings. The Western Drop Forge Co., Seattle, Wash., will build an addition for which new equipment is required. The America Tractor Co., International Falls, Minn., will build a 2-story terminal building. The Higgins Packing Co. and the Skinner Packing Co., Omaha, Nebr., have plans for large packing house plants to be erected the coming summer.

Light Inquiries Prevail in Cleveland District

THE period of light business has continued the past week in the machine tool market in Cleveland. A few inquiries continue to be made for single tools, but the volume is decreased. Used tool dealers on the contrary report an increase in inquiry and a greater number of machines being disposed of to the dealers. The latter feature is usually characteritic of a period of quiet preceding expected new undertakings. The Stearns Automobile Co. has closed for practically all of its requirements on new motor contract work. The total amount of machinery purchased is reported to be in the neighborhood of $230,000, and the greater part is said to have been secured through W. M. Pattison Supply Co., and Motch & Merryweather Machinery Co., Cleveland. The Globe Stamping & Machine Co., Cleveland, is reported to have purchased principally used tools for a new addition now being built. The Central Steel Co., Massillon, O., is inquiring for a 36-inch x 20-foot lathe. The Elwell Parkins Electric Co., Cleveland, will purchase a No. 3 universal milling machine. The Acme Machine Co., Cleveland, is in the market for a milling machine between No. 1½ and No. 2½. The Weger Motor Co., Cleveland, is inquiring for an 18-inch lathe, and a 24-inch lathe is wanted by the Bowen Products Corp., Cleveland.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

PORTLAND, ME.—The Cumberland Shipbuilding Co. has received from the United States shipping board the signed contract authorizing the construction of a Crandall type marine railway at its South Portland plant, to cost from $150,000 to $200,000. The railway, which will be electrically operated, will be 700 feet long and have a capacity of handling a 5000-ton vessel.

MILFORD, N. H.—The Milford Mfg. Co. has let the contract for a brick and concrete, 3-story, 150 x 50-foot loom shed, in which will be installed 300 automatic looms.

ROCHESTER, N. H.—The box, lumber and shook factory of the B. H. Tufts & Son, was damaged by fire April 20, causing a loss of $20,000.

BOSTON.—The Wheatly Mfg. Co. has been incorporated to do forging, founding and metal working, with $2500 capital, by John H. Waterhouse, J. S. Wheeler and C. O. Deveau.

BOSTON.—The U. S. Fastener Co. has let the contract for a reinforced concrete 3-story, 170 x 60-foot addition to its factory in South Boston.

BROCKTON, MASS.—The Sterling Motor Co., with plants here and in North Abington, will establish a shell case factory here, and with this added equipment it will be possible

EXPANSION with ROLLING MILL JIM





Went over to "HUBBARD" yesterday and the boys gave me this picture of the new Steel Foundry. Looks to me like a **real shop,** and the most up-to-date stuff in her you ever saw. You ought to go see her.

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

for the company to turn out complete 1-pound shells. The addition will cost about $100,000 and will give work to 700 additional employes.

EAST BROOKFIELD, MASS.—The Daniels Manufacturing Co., woolens, is to enlarge its plant by the erection of a 1-story weave shed, 178 x 140 feet. The structure will accommodate 10 looms.

NEW BEDFORD, MASS. — The Nashawena Mills have purchased several lots of land with buildings adjoining the mill property. While it is believed that the corporation is looking ahead in these purchases, and is not planning any immediate additions to its plant, it is a fact that every available inch of floor space is now in use and the principal work of the plant at present is in making airplane, gas mask and baloon cloths for the government.

PALMER, MASS.—The Wright Wire Co. will build a power house, 1-story high, 100 x 120 feet. Griggs & Myers, 110 West Fortieth street, New York, are architects in charge.

SALEM, MASS.—Six bids for the construction of a tuberculosis hospital in Middleton, for Essex county, under the direction of the county commissioners already have been received: They are as follows: Charles E. Currier, Boston, $419,500; Crowley & Hickey, Boston, $614,000; E. A. Abbott, Boston, $447,390; E. H. Porter, Peabody, $443,774; Pitman & Brown, Salem, $455,331; and V. S. Peterson & Co., Salem, $475,000. Thirteen bids for the installation of a ventilation plant and five for a refrigerating plant also have been received.

SPRINGFIELD, MASS.—A new industry, backed largely by local capital will be established in East Longmeadow under the name of the New England Steel Castings Co. The projectors have acquired the old Norcross stone-cutting plant. The company has been incorporated under the laws of this state, with a capital of $99,000. H. L. Stevens, of Boston, New England manager for the Lackawanna Steel Co., is treasurer of the new concern. The company will manufacture small, high-grade steel castings from a recently perfected electric steel process.

UXBRIDG, MASS.—The Allendale Mill will erect a $10,000 addition, 42 x 62 feet. E. D. Ward is in charge of the construction.

WEBSTER, MASS.—A $10,000 mill addition will be erected by the Webster Dye & Yarn Mills, Inc. The new building will be 3-stories high, 30 x 65 feet.

EAST PROVIDENCE, R. I.—The Standard Oil Co. of New York, has let the contract for an oil distributing plant to cost $500,000, to include 26 steel tanks, a brick and concrete, with steel frame, 1-story pump house, and 12 x 408-foot stacks.

PAWTUCKET, R. I.—The Central Construction Co. has been incorporated to build bridges, water rights and railroads, with $100,000 capital by Herbert J. Humphrey, Edson K. Smith and Robert B. Dresser.

PAWTUCKET, R. I.—The Narragansett Machine Co. has let the contract to William H. Hamlyn & Son, Providence, R. I., to rebuild its factory on Vale street, recently destroyed by fire.

PAWTUCKET, R. I.—J. & P. Coats, Inc., has let the contract for a 2-story, 50 x 150-foot building to cost $20,000.

PROVIDENCE, R. I. — The H. & B. American Machine Co. has begun the construction of a large addition to its plant, which will be used as a machine shop. The building will be three stories high.

WOONSOCKET, R. I.—The Taft-Pierce Mfg. Co. has let the contract for a reinforced concrete, 4-story, 90 x 135-foot addition to its factory at 32 Mechanic avenue, to cost $60,000.

BRIDGEPORT, CONN.—The Liberty Ordnance Co., recently taken over by the American Can Co., will build five brick, 1-story buildings for storage near its plant on Union avenue.

BRIDGEPORT, CONN.—George B. Clark will build a fireproof, 11-story, 135 x 140-foot, hotel at Fairfield avenue and Broad street, to cost $2,000,000.

BRIDGEPORT, CONN.—The Ives Mfg. Co. has increased its capital from $50,000 to $100,000.

CENTERBROOK, CONN.—The Connecticut Valley Mfg. Co., maker of bits, has increased its capital from $30,000 to $60,000.

MILFORD, CONN. — The Rostrand Mfg. Co., brass goods, hardware, etc., has increased its capital from $60,000 to $115,000.

NEWTOWN, CONN.—The Harris Wire Co. has been incorporated with $13,700 capital by J. W. Perry, Southport, Conn., Frank A. Harris and A. E. Harris.

STAMFORD, CONN.—The 4-story building of the Stamford Foundry Co. was damaged by fire, April 20, with a loss of $50,000. The damage was mostly to machinery.

Along the Middle Atlantic Seaboard

BUFFALO, N. Y.—A 3-story plant addition will be erected by the Kurtsman Plane Co., 526 Niagara street.

BUFFALO, N. Y.—The Kellogg Products Co. will build a 1-story, 30 x 40-foot pump house, for which plans have been drawn by R. J. Reidpath & Son.

ELMIRA, N. Y.—Bids are being received by Architect H. M. Hasko on the construction of a $5000 addition to the plant of LaFrance Motor Truck Co.

GROTON, N. Y.—An electric power plant may be erected by the Groton Electric Power Corp., of which F. J. McGee is president.

NEW YORK, N. Y.—Joseph Bolch, 78 West Eleventh street, is planning to erect an addition to his machine shop, costing $7000.

NIAGARA FALLS, N. Y.—Preliminary plans have been prepared for a gas manufacturing plant for the Niagara Falls Gas & Electric Light Co. Willis Adams is engineer in charge of tbis work.

SYRACUSE, N. Y.—The Crucible Steel Co., Fayette and Magolia streets, has plans completed for a $17,000 machine shop and stock room.

SYRACUSE, N. Y.—The Syracuse Lighting Co. contemplates constructing an electric power plant. E. W. Poole is secretary.

UTICA, N. Y.—A 2-story, 111 x 130-foot warehouse will be erected by the Augusta Knitting Co.

ERIE, PA.—The Bay State Iron Works contemplates erecting a building of brick and steel, to cost $17,000. The building will be 45 x 80 feet.

HUNTINGTON, PA.—A 3-story, 58 x 100-foot warehouse will be erected by the Charles H. Muller Hardware Co. Charles Hillman & Son, Philadelphia, are architects, in charge of this work.

HYDE, PA.—The Nickel Alloys Co., of this city, is arranging to build a 1-story addition 140 x 240 feet.

NEW CASTLE, PA.—The Grasselli Chemical Co., Cleveland, will build a plant here to cost $750,000.

PITTSBURGH.—A permit was granted to the Heppenstall Forge & Knife Co. for a steel, brick and cement boiler house at Forty-sixth street and the Allegheny Valley railroad, to cost $23,000.

PITTSBURGH.—The U. S. Aluminum Co., New Kensington, Pa., is arranging to build three ice breakers, coal tipple and to make other improvements on the Allegheny river above Lock No. 3.

POTTSVILLE, PA. — The Atlas Powder Co., of this city, will build a munition plant at Tamaqua, Pa., in the near future.

POTTSVILLE, PA.—Bids soon will be received by the Austin Co., Philadelphia, on a $30,000 foundry addition for the Pottsville Iron & Steel Co. The proposed structure will be one story high, 99 x 120 feet.

TARENTUM, PA. — Fire damaged the plant of the Tarentum Glass Co. The loss was estimated at $200,000.

WILLIAMSPORT, PA. — The Lycoming-Edison Electric Co. will enlarge its power plant to cost $75,000.

CORNWELLS, PA. — Badenhausen Boiler Co. has awarded contract to A. Raymond Raff & Co., 1635 Thompson street, Philadelphia, for 1-story brick and steel manufacturing plant, 200 x 350 feet in size.

CAMDEN, N. J.—The Reeves Stove & Foundry Co. has been incorporated with $100,000 capital to engage in the stove and foundry business.

JERSEY CITY, N. J.—Industrial Poured Concrete House Co. has been incorporated with $1,000,000 capital to erect concrete buildings. The incorporators are A. Cole, Arthur R. Oakley and Paul E. Britsch, Jersey City.

NEWARK, N. J.—National Carbonor Gas Co., McClellan street, will erect 1-story brick boiler and tank house, 75 x 41 feet in size, to cost $10,000.

NEWARK, N. J.—Rossendale Reddaway Belting & Hose Co., Euclid avenue, will erect a 1-story brick storage buildings, 107 x 77 and 70 x 30 feet in size, to cost $15,000.

PERTH AMBOY, N. J.—Mayott Chemical Works has been incorporated with $15,000 capital to manufacture chemicals, by Max L. Scott, Celia Scott and Paula Zwingenberger, Perth Amboy.

TRENTON, N. J.—Crescent Insulated Wire & Cable Co. has let contract to Barclay, White & Co., Philadelphia, for 3-story factory building on Taylor street, to cost $47,987.



Where safety is paramount, Farrell-Cheek-Castings are always in evidence.

The ***factor of safety*** in the construction of all automobiles, tractors, trucks, etc., depends wholly upon the quality of steel used in the casting of their parts.

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Activities in the Central States

BELOIT, WIS.—The John Foster Co., manufacturer of women's shoes, will spend $25,000 or more in enlarging its factory and power plant. The company has formed a corporate connection with the Kaut-Reith Shoe Co., Carthage, Mo.

BERLIN, WIS.—Metzig Bros. will add a welding and cutting shop and increase their general equipment.

EAU CLAIRE, WIS.—The United States Switch Co., manufacturer of automatic switches and switch signals for railroads, upon the completion of an addition to its foundry, will enlarge its forge and machine shops.

EAU CLAIRE, WIS.—The United States Auto Gear Shift Co. has awarded a contract to Hoeppner & Bartless for a 4-story building, 80 x 100 feet, for an aluminum and brass foundry, machine shop, and assembling room. Edward Hutchens, 866 Superior street, Milwaukee, is architect.

KENOSHA, WIS.—The Simmons Co. will build an administration and laboratory building costing $100,000. Joseph Ferris is general superintendent.

LODI, WIS.—The board of education has taken preliminary steps toward the reconstruction and enlargement of the Lodi high school building, which was badly damaged by fire recently. The work will cost about $30,000. Herbert Palmer is chairman of the the building committee.

MADISON, WIS.—The Dahl & Stedman Co., Chicago, is the lowest bidder and is expected to receive the contract for building a $100,000 hospital and infirmary building at the University of Wisconsin. Arthur Peabody, university architect, prepared the plans.

MADISON, WIS. — The Buller Coupler Co., Madison, has been incorporated with a capital stock of $15,000, by Bascom B. Clarke, E. E. Parkinson and James L. Clarke. The company will manufacture patented coupling devices for tractors, trucks, etc., using trailers.

MENOMINEE, WIS.—The Ampco Rolling Mills Corp., 209 Security building, Milwaukee, is having plans prepared by J. C. Lauren for converting the plants of the Globe Iron Works and the Laursen Automatic Pump Co., into a foundry and rolling mill for bronze material, equipped with an electric furnace.

MILWAUKEE.—The Great Lakes Rubber Co. has been organized with a capital stock of $100,000 by Donald C. Barbee, manager of the Badger Belt & Rubber Co., 140 Reed street, to engage in the manufacture of molded and mechanical rubber goods of all kinds. A site of five acres has been purchased and a factory with an initial floor space of 40,000 square feet will be erected.

MILWAUKEE.—Articles of incorporation have been filed by the Crude Oil Gas Burner Co., of Milwaukee. The capital stock is $100,000 and incorporators are F. J. Hanmer, W. J. Bentley and Frank C. Kenney.

MILWAUKEE. — The Production Pattern & Equipment Co., capitalized at $25,000, has been chartered to manufacture patterns and foundry equipment by P. E. Keller, O. Koblitz, and M. A. Keller, and will build a plant.

MILWAUKEE. — The Milwaukee Paper Box Co., 400 Florida street, will build a 5-story plant 100 x 150 feet to cost $150,000. Schnetzky and Son are architects.

MILWAUKEE. — The International Oil Burner Co., capitalized at $25,000, has been chartered to manufacture oil-burning heating devices, by Lyman G. Wheeler, A. J. McKerihan and Richard S. Witte.

MILWAUKEE. — Architects Van Ryn & DeGelleke, Caswell Block, are preparing plans for a boiler house addition, new stack, two boilers, etc., for the Garfield avenue public school, Fourth street and Garfield avenue.

MILWAUKEE.—The Wisconsin Gear & Axle Co., Plankinton Arcade building, is building the first unit of its plant at Hawley road and State street, 50 x 150 feet, to cost $25,000.

OCONOMOWOC, WIS.—Sealed bids are being taken until May 13 by the board of public works for furnishing all materials and laying 1150 feet of 4-inch cast iron water mains; two Carey hydrants, one valve box, etc.

OSHKOSH, WIS.—The Winnebago Electric Co. has been incorporated with a capital stock of $5000 to supply the village of Winnebago with electric light and power. Richard W. Bufton and Ada Quigley appear as incorporators.

PLYMOUTH, WIS.—A milk sugar manufacturing plant, with cold storage warehouse, the whole costing about $50,000, will be erected at Plymouth, Wis., by the National Milk Sugar Co., 15 Park Row, New York.

SHEBOYGAN, WIS. — Architects Foeller & Schober, Green Bay, Wis., have completed plans and are taking bids for the erection of a new St. Nicholas hospital at Sheboygan, to cost about $75,000. Sister Alta is mother superior.

SHEBOYGAN FALLS, WIS.—The Falls Motors Corp. is having plans prepared for a 1-story gas engine shop addition, 60 x 135 feet, to cost $25,000. A. R. Clas is secretary.

SOUTH MILWAUKEE, WIS.—The common council and water commission accepted the bid of Allis-Chalmers Mfg. Co., Milwaukee, for furnishing a 2,500,000 gallon pumping engine, but rejected bids for two new filtration units of 500,000 gallons capacity each and sundry water main extensions. New bids on the work will be taken until May 7. J. J. O'Connell is city clerk.

STEVENS POINT, WIS. — The Jackson Milling Co., care the Consolidated Water Power & Paper Co., Grand Rapids, Mich., is building a hydro-electric paper plant costing $500,000.

SUPERIOR, WIS. — The Superior Iron Works, North Third and Lamborn streets, will build a 2-story boiler house, to cost $50,000.

TWO RIVERS, WIS.—The plant of the Two Rivers Plating & Mfg. Co. is being doubled in size by the erection of a machine shop addition. The company conducts a general metal plating and machining business.

WEST ALLIS, WIS.—A new brick and concrete foundry, 30 x 110 feet, will be erected by the Rosenthal Corn Husker Co. to replace the foundry damaged by fire April 9. It will cost about $15,000 complete.

BELDING, MICH.—The Belding Foundry Co. is now building a large pattern vault as an addition to its plant. The vault will be of cement block and steel construction.

CHELSEA, MICH.—F. H. Lewis, of the Lewis Spring & Axle Co., states his company is planning the erection of a factory at Ann Arbor, Mich., in order to fill a government contract for airplanes.

DETROIT.—The Daigle Iron Works, 549 Lafayette building, will build a 1-story plant, 45 x 195 feet, including a craneway.

DETROIT.—Charles Bohn, Chene and Finley avenue, will build a foundry, 70 x 140 feet.

DETROIT. — The Central Aluminum & Brass Mfg. Co. will build a plant 100 x 180 feet to cost $25,000.

DETROIT.—The Chalkis Mfg. Co., 666 Mack ridge, manufacturer of munitions, will build an addition.

DETROIT.—The National Twist Drill & Tool Co., Brush street and East Grand boulevard, will build a 4-story addition, 44 x 116 feet. R. H. Marr, 1205 Kresge building, is architect.

DETROIT. — The Universal Gear Works has been chartered for $30,000 by F. L. Banta, F. L. Brown and L. G. Younglove, to do a general business in gear and machine work.

DETROIT.—The Detroit Gray Iron Foundry Co., Wight and Iron streets, will build a sand building, 80 x 400 feet, and a foundry addition 20 x 60 feet, estimated to cost $80,000.

FLINT, MICH.—The Buick Motor Co. will erect a factory building here at a cost of $68,000.

FLINT, MICH.—The Copeman Laboratory Corp. will erect a 1-story building 40 x 100 feet, in which to manufacture metal grease cups.

GRAND RAPIDS, MICH.—The Oriel Cabinet Co. will soon begin building a 2-story addition to its factory, 65 x 100 feet, to cost $25,000. The Owen-Ames-Kimball Co. has the contract.

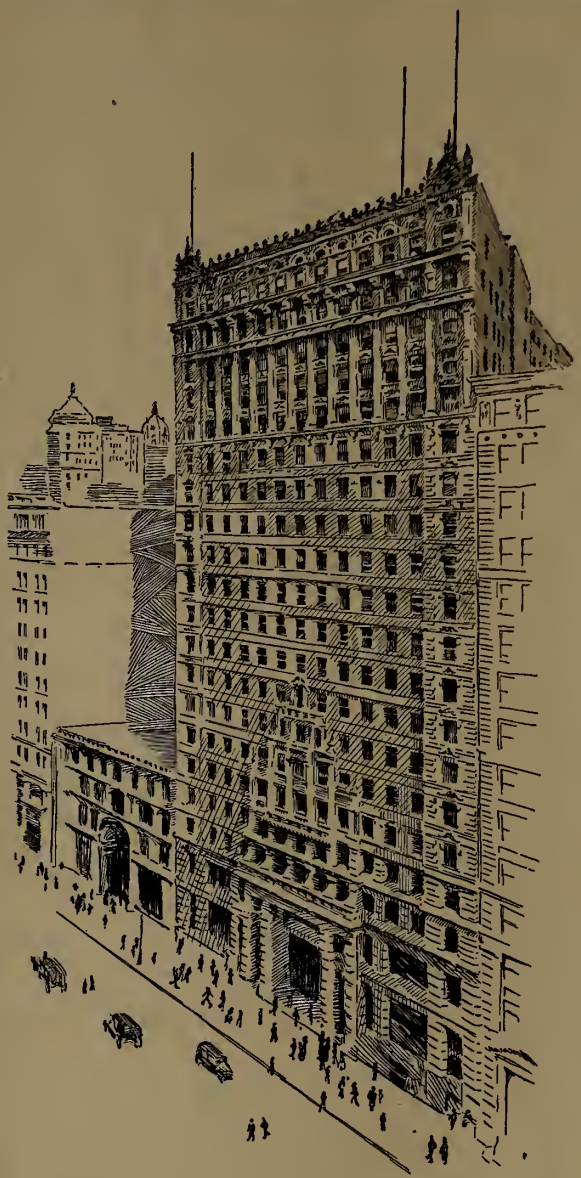
GRAND RAPIDS, MICH.—The Hackett Motor Co. is building a plant at Wyoming Park, 70 x 500 feet, one and two stories, to cost $50,000. A similar unit will be built immediately on the completion of the first.

JACKSON, MICH.—If tests on a steel wheel recently invented prove satisfactory the Hayes Wheel Co. plant will be enlarged to manufacture the wheel in large quantities.

MARSHALL, MICH.—The Peerless Fixture Co., manufacturer of bathtubs and fixtures, will build a 2-story addition, 60 x 110 feet.

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The first real business men were the traders who ventured to carry the products of their own lands abroad and trade them for the products of other lands. These merchants undertook the entire responsibility of shipping, selling, and financing the transaction. They built up industry by expanding the market for its products; they created and fostered a market at home for the raw materials of other lands; they sowed the seeds of international business as it now exists and laid down the principles which still hold good.



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42 BROADWAY - NEW YORK

The international merchant is still the trade ambassador, the world citizen, who goes into all markets and patiently studies conditions that he may gain knowledge indispensable to successful and economical trading. Add to this knowledge every facility for handling and financing transactions in all parts of the world and you have a service such as the Federal Export Corporation offers to American manufacturers.

We will be glad to explain how our services can be applied to securing a growing export business for your products. Call or write for particulars.

FEDERAL EXPORT CORPORATION

42 BROADWAY - NEW YORK

WEST BEND, WIS. — The West Bend Aluminum Co. will build a 3-story plant 72 x 195 feet and a 1-story addition 50 x 60 feet costing $60,000. B. C. Ziegler is secretary.

ANN ARBOR, MICH.—The Hoover Steel Ball Co. will build a machine shop and hammer shop 52 x 100 feet and 52 x 80 feet.

ANN ARBOR, MICH.—A bond issue of $200,000 has been voted for waterworks extensions.

BAY CITY, MICH.—The Michigan Cenor Co., 1891 Ford building, Detroit, will build a 1-story factory, 80 x 200 feet.

THREE RIVERS, MICH.—The city has voted $25,000 to build a bridge over St. Joseph river.

AURORA, ILL.—Work has been started on an addition to the plant of the Lyon Metallic Mfg. Co., and is to be completed in 30 days.

CARBONDALE, ILL.—A 24-stall roundhouse for the Illinois Central railroad is to be erected here at a cost of $200,000. Plans for the roundhouse have been under consideration several years.

CHICAGO.—The Interstate Iron & Steel Co. will build a 1-story addition to cost $9000.

CHICAGO.—Definite plans for the erection of several new buildings at the Sioux City, Iowa, packing plant of Armour & Co. are expected to be made known within a short time.

CHICAGO.—The Compound Railway Steel Co., capitalized at $300,000, has been chartered by Arthur C. Baker, J. Harvey Manny and John W. Fogg, 6460 Minerva avenue.

CHICAGO.—The sanitary district of Chicago, John McGillen, clerk, 910 South Michigan avenue, will build a three-track deck plate girder bridge for the Rock Island railroad over the Calumet-Sag channel, involving 465 tons of steel.

EAST ST. LOUIS, ILL.—The Excelsior Tool & Machine Co. will build a 1-story addition, 50 x 166 feet, to cost $12,000.

MURPHYSBORO, ILL. — Slaughter Bros. have secured the contract for a 60 x 80-foot, 2-story addition to the Egyptian Iron Works. A tool room and a storage room will occupy the first floor. The foundry room at the south end of the plant will be replaced.

TUSCOLA, ILL.—The board of education plans a $33,000 heating plant for the high school here.

ANDERSON, IND. — The Remy Electric Co. will build a 2-story addition, 50 x 314 feet, and a 4-story addition, 63 x 313 feet. F. L. Atwood is manager.

ANDERSON, IND.—The Hill Pump Co. will build a foundry, 100 x 200 feet.

EVANSVILLE, IND.—The Hercules Gas Engine Co. will build an addition, 175 x 450 feet, costing $150,000.

EVANSVILLE, IND. — The Schroeder Headlight & Generator Co. has taken over the business of the L. B. Jones Co., Kansas City, Mo., manufacturer of home electric plants and has increased its capitalization from $150,000 to $250,000.

GARY, IND.—The Gary Motor Truck Co. has increased its capitalization from $125,000 to $175,000, to care for its increased business.

INDIANAPOLIS, IND.—L. K. Fesler, auditor of Marion county, will open bids May 10 for the construction of a bridge of either steel or concrete.

NEW ALBANY, IND. — The National Hame & Chain Co. is enlarging its metal working plant. It has recently purchased the equipment of N. C. Starr & Sons plant, Indianapolis, which is being moved to New Albany.

RICHMOND, IND. — The Empire Brass Foundry, capitalized at $10,000, has been chartered to manufacture metal products by Joseph H. Hill, Albert C. Hurrell and James E. Jones.

AKRON, O.—The possibility of a filtration plant costing $100,000 being erected at Kenmore, adjoining Akron, is good, although the project may not mature for a year.

CANTON, O.—Bids will be received by the commissioners of Stark county till 10 a. m., May 1, for a bridge over the Mahoning river in Lexington township.

CINCINNATI.—Harry Hake, architect, is revising plans for offices and warehouse facilities for the Cincinnati, Lebanon & Northern railroad for Court street east of Broadway.

CINCINNATI.—The D. T. Williams Valve Co. will enlarge its plant on Spring Grove avenue before the summer is over.

CINCINNATI.—It is reported that negotiations are under way on the part of the John H. McGowan Pump Co., Central avenue, for the purchase of a large track of land for the erection of a large plant.

CINCINNATI.—The U. S. Electric Tool Co. has applied for a permit to erect a 2-story brick building for light manufacturing in the rear of 2488 West Sixth street.

CINCINNATI.—The ways and means committee of the city planning commission has decided to ask the co-operation of Director of Railways McAdoo in securing a modern railway terminal for this city.

CIRCLEVILLE, O.—T. D. Krimm, county auditor, states the commissioners have decided on the construction of eight new bridges. Total cost of which will be in excess of $70,000.

CIRCLEVILLE, O.—T. D. Krinn, auditor of Pickaway county, is having plans prepared for the building of new bridges and the rebuilding of old bridges in various townships of the county.

CLEVELAND. — The C. O. Bartlett & Snow Co., French and Winter streets, is planning a factory at Harvard avenue and East Sixtieth street. The site has been purchased and private preliminary sketches have been made.

CLEVELAND.—E. S. Frodin, representing H. L. Stevens & Co., Chicago, architects and contractors for the $75,000 hotel to be located at 3715 Prospect avenue, is at the Hotel Olmsted, this city, taking sub-bids.

CLEVELAND. — The Masters & Mullern Co., Electric building, have the general contract for a $20,000 factory for the C. Masek Glue & Reduction Co., Jennings and Valley roads. The Craig-Curtiss Co., 1031 Guardian building, has the contract for the Globe Machine & Stamping Co.'s $125,000 factory at 1250 West Seventy-sixth street.

CLEVELAND.—A site has been purchased by the Cleveland Builders Supply Co. for a shipyard to build concrete vessels. The location is at the foot of East Fortieth street. No architect is yet announced.

CLEVELAND. — Architect Theodore Mewbeck, West Sixty-fifth street, has completed plans and will take bids on a $10,000 factory on Berea road for the France Mfg. Co., 1434 West Seventy-fifth street.

CLEVELAND. — The Cleveland Retail Grocers association contemplates the erection of a milk plant on East Fifty-fifth street. The building will cost $25,000.

COSHOCTON, O.—The United Paperboard Co. has suffered a $200,000 fire loss. D. D. Riggs is superintendent.

DAYTON, O.—It is reported that in the near future an 8-story warehouse will be erected in the rear of the building now being constructed by Mrs. Victoria Wood, on East Third near Jefferson street.

DAYTON, O.—Walter H. Azling, clerk of the board of county commissioners, will open bids May 11, for the construction of bridge No. 89 in German township, plans for which are on file with the county engineer.

ELYRIA, O.—F. I. Ellenberger, clerk of the board of commissioners, states a meeting will be held May 22 at which time the commissioners will decide on the erection of a bridge in Wellington township.

HAMILTON, O.—The gray iron foundry plant of the Peerless Foundry Co., recently damaged by fire, is to be rebuilt in one of the suburbs of Cincinnati. The foundry will be 120 x 200 feet. The cleaning and shipping building will be 60 x 100 feet. There will also be a pattern vault, pattern shop, core building and general office building. The new plant will be built under the direction of Frank D. Chase, Inc., industrial engineer, Chicago. Plans now are under way.

LIMA, O.—The city officials will receive the new plans for the construction of a viaduct over the tracks on the Wapokoneta road during the present week. Plans will call for a bridge 24 feet wide.

MANSFIELD, O.—Amos Day, chairman of the board of commissioners, will open bids May 22 for the construction of Campbells bridge in Madison township and the Winbingler in Franklin county, plans and specifications for which are on file with the county engineer. The estimated cost of the Campbell bridge is $9000.

MASSILLON, O.—J. H. Lowry, South Canal street, has taken out a permit to build a $50,000 ice plant on Laurel street.

NEW PHILADELPHIA, O.—The Penn Mold Mfg. Co. will construct a large factory building, 60 x 350 feet. Work is to start immediately.

PORT CLINTON, O. — County commissioners have decided to build a bridge over the Toussaint river in Clay township. The structure will cost $10,500.

PORTSMOUTH, O.—The Cullen-Vaughn Co., Columbus, has been granted a permit to construct a new hotel at the corner of Second and Park avenues to cost $198,050.

SANDUSKY, O.—The Lake Shore Electric Railway Co. will soon begin the construction of a depot at Huron, O.

TOLEDO, O.—The county commissioners have approved the annual bridge report calling for the construction of 19 new bridges, the cost of which will be $37,000.

LOUISVILLE, KY.—The Superior Engineering Co., to manufacture gravity conveyors and other machinery, has incorporated with capital of $30,000, and will locate a plant on Main street, Louisville. Walter E. Zoller, St. Louis; Alvin Zoeller, Louisville; and J. E. Ulrich, Richmond, Ind., are named.

LOUISVILLE, KY.—The Louisville Steel & Iron Co., manufacturers of rolled bar steel and iron, operating former plant of Louisville Bolt & Iron Works, plans erection of new warehouse to carry 1000 tons of manufactured bar iron stock, in order to make immediate deliveries to district.

LOUISVILLE, KY.—St. Bernard Mining Co. will spend between $250,000 and $500,000 on a new power plant to be erected at Earlington, Ky., to supply power to a group of mines over feed line of several miles.

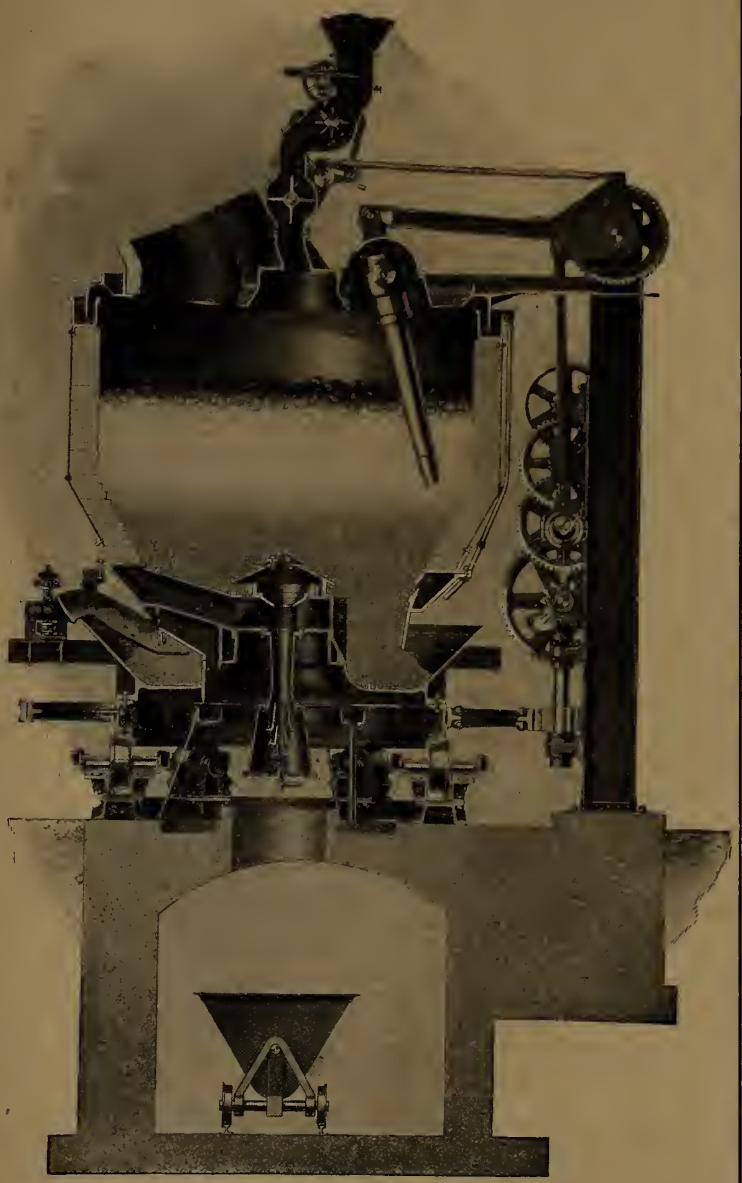
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A 4

Bulletin A 4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Western and Intermountain Territory

CROSBY, MINN.—Bonds for $54,000 have been voted for building a waterworks system. H. L. Nicholson is city clerk.

CEDAR RAPIDS, IOWA. — The Viking Pump Co., manufacturer of pumping machinery, will build an addition, 36 x 125 feet, to cost $20,000.

CLINTON, IOWA.—The Climax Engineering Co., Fourth street and Seventeenth avenue, will build a machine shop, 90 x 200 feet, to cost $100,000.

MASON CITY, IOWA.—The Gulf States Portland Cement Co., capitalized at $2,000,000, has been chartered in Delaware to manufacture cement, by W. M. Briar and R. A. Law, of Mason City.

KANSAS CITY, MO.—The city has voted $1,250,000 for waterworks improvements. C. Hill is city engineer.

ST. LOUIS.—The Eureka Brass Co. will build an addition to its foundry.

NASHVILLE, ARK. — Improvements and enlargement of the waterworks system will be undertaken shortly at a cost of $115,000.

TULSA, OKLA.—The Powell-Mahon Co. is building a machine shop and foundry.

BAXTER SPRNGS, KANS.—The Sherman Iron Works Corp. will build two 1-story machine shops to cost $20,000.

GALENA, KANS.—Bonds for $100,000 have been voted to build a waterworks system. W. B. Clement is city clerk.

TOPEKA, KAN.—Work toward the erection of the new 10-story North American hotel here is now under way. Workmen have begun razing structures now on the site of the hotel.

LINCOLN, NEBR.—The Hydraulic Engineering & Machinery Co. has bought a building, which it will remodel for the manufacture of machinery and power plant specialties.

OMAHA, NEBR.—The Auto Power & Mfg. Co., 729 First National Bank building, will build a foundry, 80 x 240 feet. Stockham & Baker, 426 Railway Exchange building, are architects.

HELENA, MONT. — The Cooke County Transit Co. has been incorporated for $1,500,000 for building a railroad from a point near Gardiner along the Yellowstone river to the Lamar river, thence easterly on the Lamar to Soda Butte creek. Tom Stout, of Lewistown, and others are the incorporators.

SCOBEY, MONT.—It is reported that the Great Northern Railroad Co. will construct the Poplar-Opheim branch this year if the government will provide the necessary labor.

Up and Down the Pacific Coast

EVERETT, WASH.—Everett Steel Co. has been incorporated for $30,000 by F. E. Powell and D. A. Duryee.

SALEM.—State Hydraulic Engineer Marvin Chase has received applications from P. C. Kaylor for appropriation of 9000 second-feet of water from Spokane river for development of power, and from the Western Washington Power Co. application for 30,000 acre feet of water from Baker river for production of power. Cost of reservoir and other development is estimated at $1,000,000.

SEATTLE. — A. L. Rutherford, Tacoma, Wash., has been awarded the contract for construction of the first section of the municipal elevated street railway here. The contract covers piling and trestle for this section of the line and the bid was $42,262.

TACOMA, WASH.—John M. McRae, owner of the Coast Iron & Machine Works, having secured a contract from the United States shipping board for building steam winches for steamers being constructed on Puget sound, has appealed to the city for a site on which to construct his plant.

YAKIMA, WASH.—The Libby, McNeill & Libby cannery at this place is to be doubled this season so 600,000 cases of fruit may be handled. The company will expend $150,000 on machinery and additional equipment.

PORTLAND, OREG. — Northwest Steel Co., foot of Sheridan street, will construct a $17,000 mold loft at same address. Portland Bridge & Building Co., 330 Worcester building, is the builder.

PORTLAND, OREG.—The Western Blower Co. will build a plant 60 x 80 feet.

PORTLAND, OREG.—The Norway Pacific Construction Co., manufacturer of marine motors, will build a plant near the mouth of the Columbia river to cost $1,000,000.

PORTLAND, OREG.—The Liberty Foundry Co. will build a foundry and machine shop, 50 x 100 feet, for which new equipment will be required.

BERKELEY, CAL.—The Hall-Scott Motor Co., Fifth and Snyder streets, is building additions to cost $50,000 to accommodate increased demand for war motors.

LOS ANGELES.—The Pacific Coast Tractor Co., capitalized at $50,000, has been chartered by R. D. Humphrey, J. A. Knudson and E. D. Humphrey.

LOS ANGELES.—The Townsend Tractor Corp., capitalized at $100,000, has been chartered to manufacture tractors by E. F. Townsend, and McCullough Graydon, of Los Angeles.

LOS ANGELES.—The Home Gas Generator Co. has been organized to manufacture gas generating plants by T. D. Heyl, 5215 South Figueroa street and J. L. Brown, Pasadena.

New Business in Eastern Canada

COBOURG, ONT. — Sparling & Reeson, Ltd., has been incorporated to manufacture motors and other vehicles, $40,000 capital stock. Provisional directors are Florence M. Thomson, Alfred J. Sneath, Peter Taylor and others of Toronto.

FOREST, ONT.—H. Fraleigh will build an addition to his flax mill and add sufficient machinery to increase its capacity by 50 per cent.

TORONTO, ONT.—International Lavand Mfg. Corp., Ltd., has been incorporated to manufacture metal articles and carry on the business of a foundry and machine shop, with $600,000 capital stock, by Ernest W. McNeil, William D. Toye, Hugh J. Dawson and others, of Toronto.

TORONTO, ONT.—British Forgings, Ltd., will erect an addition to their forge shop in the Ashbridge Bay industrial district to cost $80,000.

AMHERST, N. S.—The town council will make alterations to its waterworks plant, to cost $7000. W. F. Donkin is clerk.

WINNIPEG, MAN.—Dominion Metal Exporting Co., Ltd., has been incorporated to manufacture and deal in scrap metal, with $500,000 capital stock, by Michael Tessler, Joseph Gersfield and Benjamin Starikoff, of Winnipeg.

WINNIPEG, MAN.—The Central Tools & Forgings, Ltd., is in the market for a compound rest lathe, back gear, 4 to 6-foot bed; also a shaper, 12 to 18-inch stroke.

100

ROLLING MILLS

Of Our Design and Manufacture

79 in the United States of America

5 in Canada	1 in France
5 in England	1 in Belgium
4 in Germany	1 in Austria
3 in India	1 in Australia

AS CONSULTING ENGINEERS

we prepare estimates and make drawings for contemplated rolling mills. Our services include electrical engineering.

AS MANUFACTURING ENGINEERS

we enter into contracts for complete rolling mills, producer-gas machines, and wire drawing equipment.

MORGAN CONTINUOUS ROLLING MILLS—
STANDARD OF THE WORLD

MORGAN CONSTRUCTION CO.

Worcester, Mass., U.S.A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports	
Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Cbgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	26.50 to 27.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	26.50 to 27.00
Heavy melting steel, Birming.	23.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. steel, eastern Pa.	39.00
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 26.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.50 to 25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

FREIGHT RATES, PIG IRON

Mahoning and Shenango valleys to:	
Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	38.50 to 39.00
Angle bars, steel, St. Louis.	35.00 to 35.50
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland.	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati.	25.00 to 25.50
Busheling, No. 1, Chgo.	28.50 to 29.00
Busheling, No. 2, Chgo.	19.25 to 20.25
Busheling, No. 1, St. Louis.	27.00 to 27.50
Cast borings, New York	15.50 to 16.00
Cast borings, eastern Pa.	19.00
Cast borings, Cleveland	17.50
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 13.00
Cast borings, Chgo.	17.50 to 18.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chicago	31.00 to 32.00
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	16.50 to 17.00
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	15.50 to 16.00
Machine turnings, Pitts.	19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago	17.50 to 18.00
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	25.50 to 26.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 2, Chgo.	31.00 to 32.00
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 28.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.50
Cast No. 1, Cincinnati	29.00 to 29.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	25.00 to 25.50
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	32.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.00 to 31.50
Malleable railroad, St. Louis	28.00 to 28.50
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	36.00 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	42.00 to 43.00
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, May 16, 1918 *No. 20*

Great War Enterprises Maturing

Government's Urgent Demand for Full Mill Output Believed to be Based Largely on Needs Now Taking Form—Huge Building Program Planned—Ordnance Works Significant—Some Commercial Steel Expected

TREMENDOUS new requirements for war steel not hitherto disclosed apparently underlie the government's anxiety to command the full output of the mills and furnaces. The great ordnance program in which the Steel corporation finally has agreed to take a leading part is significant of other enterprises of corresponding magnitude which now are being matured. Construction plans unparalleled in their size and requirements are taking form. A government fabricating plant is reported to be among the possibilities. Producers quickly have adjusted themselves to the view that at least six months of full operations exclusively on government business will be necessary. Despite all that is being said, however, as to the insufficiency of steel supply for government requirements, the authoritative opinion of the industry is that not only will there be enough for war purposes, but in time some will be left over for commercial use.

Allies Want Much Steel

The needs of the allied governments are surprisingly large. In shell bars, 750,000 tons each, it is stated, will be needed at an early date for England, France and Italy. The British continue to call for an unexpectedly large tonnage of plates, shell steel, rails, etc. Much of this is to replace the steel borrowed by General Pershing. The British wants are interesting in the light of the 1917 statistics just announced, which show a steel production of approximately 10,000,000 tons, a high record figure, and approximately 2,300,000 tons greater than before the war. Present production is considerably greater. In Canada the question of commandeering the entire output of the works has been considered by the government.

Gray iron foundries are to be offered a new and broad opportunity to perform direct war work by the large orders for cast iron hand grenades, which soon will be placed. It is understood the government is inclined to favor this material for this purpose and it has caused a cessation of the manufacture of malleable hand grenades. Superior fragmentation is given as the cause. The production of cast shells also appears likely to be considerably extended.

Iron Industry Mobilized

The mobilization of the pig iron industry on a war basis rapidly is taking place. The committee on pig iron, iron ore and lake transportation has distributed official questionnaires among both producers and consumers. These data are to be used in classifying orders and production and in determining the channels of future distribution so that war demands shall be served first. The commandeering by the steel director of 3000 tons of basic under order for export on the banks of a Harrisburg, Pa., producer further reflects the shortage in this grade and the methods being adopted by the government to meet it. This iron will go to a Chester, Pa., steelmaker doing Emergency Fleet work. Normal market movements in iron are suspended, but this has not deterred buyers from putting forth new inquiry.

Assure Full Coke Supply

The government, concerned over the shortage in pig iron, continues to exert pressure on the railroads to furnish full supplies of cars to the coke regions. This has brought adequate response and transportation service in the Connellsville region the past two weeks has reached 95 to 100 per cent. Coke producers, however, have not been able to take maximum advantage of this improvement, owing to the undermanned forces. The Connellsville region is expected soon to be on a 75 per cent producing basis, which practically will assure the furnaces of full requirements. In the east coke improvement has been so marked that the government has recalled recent orders to requisition certain supplies.

MAY 16, 1918

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Two War Plans at Work

IN FRANCE a stupendous output in the production of war materials has been obtained largely by utilizing all of the capacity of the small manufacturers of the country. In a paper contributed to the American Foundrymen's association, E. Ronceray points out how even the smallest shops with a capacity of only two or three shells a day have been utilized. Although the ordnance needs of the United States today are fully as urgent as those of France, we have hardly yet scratched the production possibilities of our small and medium-sized manufacturers. We are prone in this country to think in large units and deal accordingly. Most of our war supplies, therefore, have been ordered from our largest manufacturers, from concerns trained and equipped to deal in outputs of millions. As a first step toward production on a scale sufficiently large to meet the demands of the war, this procedure of course had many advantages. It greatly simplified the task of the war department, both in placing contracts and in inspecting the finished work. In more than one case, however, such big orders were placed that the capacity of even the largest manufacturing establishments was quickly exhausted, with the result that these companies have had to spend huge sums for the rush construction of additional plant facilities. These new plants were built in some instances while existing capacity, owned by smaller companies, lay idle for lack of business. The malleable hand-grenade and rifle-grenade situation is a case in point.

The war department should not be wholly blamed for this situation. In many cases the manufacturers have failed to establish a suitable point of contact with the government. As pointed out by H. L. Dougherty in an address before the Cleveland Chamber of Commerce a few weeks ago, in too many cases the initiative has been put entirely up to the government. Manufacturers have written freely to Washington offering their services, but without definite knowledge of how to connect with an order. Also after tendering their facilities, there has been a tendency, Mr. Dougherty says, simply to sit back and await results.

Fortunately, this situation is changing rapidly. Throughout the country, producers are grouping themselves together to deal with the government collectively. Two distinct forms of organization are being developed. In one case the manufacturers, organized by industries, are acting through their national associations. This type of organization has probably been most highly developed by the American Iron and Steel institute, which acts for the steel industry as a whole through its war-service committee in Washington. The castings industry is similarly represented by the war-service committee of the American Foundrymen's association.

Another form of organization, known as the Cleveland Plan, is rapidly taking shape. This latter scheme is fully described in an article on page 1258 in this issue. According to the Cleveland plan, the country is divided into districts, with all manufacturers in all lines in each district working through a local chairman or district director. The actual work of keeping track of manufacturing capacity is delegated to subcommittees representing different lines of industry, each of these subcommittees operating within a definitely defined territory. Contact is to be established with the purchasing requirements of the government through an office which the central commission will establish in Washington. In this way it is believed every manufacturer in the district, no matter how small, will have an opportunity to bid on work in his line. This plan is being thoroughly tried out in the Cleveland district and its progress will be watched closely throughout the country.

It is evident, however, that both schemes of organization, one by districts and the other by industries through national associations, cannot survive. The purposes of these two plans are identical. Their object is to establish satisfactory contact between manufacturers and the government. The methods proposed, however, are distinct, and if both schemes were fully developed the resultant duplication of effort and complication would be highly unsatisfactory to all

concerned. Up to date neither plan has developed sufficient strength to overshadow the other. Both ideas are being carefully studied in Washington and it is probable that some suggestions will be forthcoming looking toward a working out of the problem on the basis of a single, unified program.

Too Much Labor Prosperity

NEVER before in the history of the world have workingmen enjoyed the degree of prosperity that is their present lot. This statement refers particularly to those engaged in munition-making. Now the average workingman does not change his standard of living as his wages advance. Thus, many of these workers, the majority of whom live from hand to mouth, find that they can get along very nicely through working about four days a week. Even at this rate, many of them seem to have an abundance of money as they are taking to buying luxuries with their savings. The government needs the full services of all its workmen and it needs them badly. Ships must be built without number, and munitions produced in unlimited quantities. In the face of this crying need, why should ablebodied men be allowed to turn loafers when they feel like it? War is the business of the whole nation. Can we afford to tolerate the slacker who makes such good wages that he feels he may lay off frequently? It is the old story with the workingmen; too much prosperity. However, we are in this war to win and the government eventually will not permit conditions wherein workingmen are hindering production. War workers will blame no one but themselves should conscription finally be found necessary.

Keeping Manufactures at Home

FOREIGN commerce for March, figures on which have just become available, presents some interesting points and furnishes some food for thought. Exports show that foodstuffs were exported to the amount of $155,279,206, compared with $69,797,946 in March, 1917. Exports of crude materials for use in manufacturing were of a total of $65,993,601 against $47,401,361 in the corresponding month last year. On the other hand, manufactures ready for consumption totaled only $173,926,239, against $270,754,803. Semifinished materials for manufacture in foreign countries also fell off. The inference is that while we are more than holding our own in foodstuffs and in raw materials, we are allowing our customers abroad to do more of their own manufacturing than formerly.

This doubtless is a result of war conditions which prevent manufacturers in this country from serving their foreign clients, as their facilities are taxed by our own needs. Then again the purely military aspects of the situation and shipping conditions may have something to do with it. At any rate, it would seem likely that our foreign commerce in the future may suffer from this enforced reduction of manufactured articles for export. While we are unable to supply foreign countries, they will increase their own manufacturing facilities and become more independent. This may be a considerable obstacle in the path of increased export business for the days "after the war", when we will have the ships and the shop capacity to supply the world.

Must Not Be Scapegoat

ANSWERING a query from the senate committee on interstate commerce for information as to what precautions are to be taken to supply sufficient cars to haul next winter's coal supply, the railroad administration has declared that "cars will be built just as rapidly as the steel, which is the controlling feature, can be provided." This statement smacks of the familiar sound of "passing the buck" and affords food for much thought on the part of steel manufacturers and pig iron producers. Already pledged to meet unprecedented demands due to a shortage over which it has no control, and with instances before it of some companies which have not responded fully to the war call, the iron and steel industry may well sense a warning and see to it religiously that its own skirts are kept clear.

Executives who, because of time-honored practices, have let subordintes handle important matters, now must get in closer touch themselves with details of their business if they want to be certain their responsibilities are being fully met. Subordinates, who have waited word from officials higher up before acting, must decide for themselves matters of importance from a war standpoint. Every order on the books should be watched from every angle. Daily developments in the war must, to an extent, guide daily mill operations. Priority orders are for the general guidance of manufacturers, but, as a rule, hit only the high spots. In between, there is much each mill operator must decide for himself. As Judge Gary has said, "use your conscience. And if you have any doubt about it, make inquiry." The Emergency Fleet corporation wants to build up reserve supplies of materials to tide over the expected transportation difficulties of next winter. The plan to increase the size of the army means new and unheard-of demands for steel. Plans may slip somewhere and if they do ugly snarls may develop. The railroad administration has indicated it will blame the steel industry if there isn't sufficient coal cars. It is up to each producer to see that his plant is not remiss in any way so that there will be no chance to lay upon the industry, the burden of responsibility for the nonperformance of any war enterprise. The iron and steel industry should not permit itself to be made the scapegoat for the mistakes, overconfidences or faulty judgments of others.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1282

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromangancse, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00
Spiegel, contracts, furnace	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	155.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. & small., Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70-5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products May 15, average for April, 1918, average for February, 1918, and average for May, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 15, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Bessemer pig iron, Pittsburgh..	$36.15	$36.15	$37.25	$44.95
Basic pig iron, Pittsburgh.....	32.95	32.95	33.95	42.15
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	43.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	43.20
Lake Superior charcoal, Chicago	37.50	37.50	37.50	49.25
Malleable, valley	33.50	33.50	33.50	42.70
Malleable, Chicago	33.50	33.50	33.50	43.20
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	32.00	33.00	40.75
**No. 2X Virginia, furnace....	33.50	33.50	33.50	41.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	43.25
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	425.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	85.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	88.00
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	88.00
Open-hearth billets, Pitts.....	47.50	47.50	47.50	85.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.50
Steel bars, Chicago.....	2.90	2.90	2.90	3.84
Iron bars, Philadelphia.....	3.50	3.50	3.50	4.109

	Prices May 15, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	3.50	3.50	3.50	3.39
Beams, Chicago	3.00	3.00	3.00	4.34
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.185	3.185	4.659
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	5.49
Tank plates, Philadelphia.....	3.435	3.435	3.435	7.559
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	7.00
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	6.65
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	8.80
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.50
Connellsville furnace coke.....	6.00	6.00	6.00	8.00
Connellsville foundry coke.....	7.00	7.00	7.00	8.50
Heavy melting steel, Pitts.....	29.00	29.00	30.00	28.40
Heavy melting steel, eastern Pa.	28.50	28.30	30.00	26.00
Heavy melting steel, Chicago..	29.00	28.65	30.00	28.70
No. 1 wrought, eastern Pa.....	34.00	34.00	35.00	40.75
No. 1 wrought, Chicago.....	33.50	33.50	35.00	36.40
Rerolling rails, Chicago.....	34.00	34.00	35.00	36.80

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1282)

Mobilizing Iron Industry for War

Producers Co-operate With Pig Iron Committee in Sending Out Questionnaires to Consumers—Believed Government Needs Can Be Fully Met Through System—Further Basic is Commandeered

Pittsburgh, May 14.—Well informed men in the trade insist that there is going to be enough pig iron for the government. Proper furnace operations and distribution of tonnages, they assert, will take care of all requirements for direct and indirect war work, as enormous as they are and will be. Questionnaires being prepared and sent out to furnaces by the committee on ore, pig iron and lake transportation will put into the hands of the government a complete survey regarding the output of the different grades, contracts on hand, their character and time of deliveries. With this analysis made, readjustment as to production, shipments and allotments may be necessary for it is the purpose of the work to see that government's needs, direct and indirect, are taken care of first, and if a surplus of iron then remains, it will be applied on other commitments. Manufacturers of less essentials may be cut off entirely from receiving iron. Through this plan foundries and steel plants doing government work are to be given iron according to their needs. Both classes of consumers have become alarmed lest they will not be able to cover requirements. Consumers of gray iron, as previously stated, are having the situation canvassed by the war service committee of the American Foundrymen's association. The changing of a number of furnaces to basic iron production has prompted this action. This has curtailed the output of both foundry and bessemer grades and consumers of the latter also are uneasy over the situation. Furnace interests say there is no justification for alarm but that all government requirements will be met and if readjustment of operations is necessary this will be done, probably through action of Washington authorities. Inquiries for iron still are being made but are less numerous. Consumers find there are no offerings and they are being told by the furnace interests to put their inquiries before the war industries boards, producers standing ready to furnish iron wherever possible, upon orders from or through the board. A steelmaker in this district is asking for 1000 tons of bessemer iron and a round lot of basic for prompt delivery. The Carnegie Steel Co. has added another furnace to its active list and now has 54 of its 59 stacks in operation.

Deliveries Much Better

Boston, May 13.—Deliveries of iron to this territory leave little room for complaint, save possibly from Virginia, where the Norfolk & Western is said to be in bad shape for accepting freight coming this way. It is reported that with the lifting of the New Haven embargo that one became automatically effective on the Norfolk & Western; confirmation of this report is not to be had locally, since the Boston office of the road like that in New York has been shut by government order. The fact remains, however, that little iron except that coming through on government permits, is reaching this section from Virginia. Alabama iron is coming through freely both on government permits and without them, for embargoes from Cincinnati via the Pennsylvania lines have been raised and large quantities of southern iron are now being routed by way of that city.

An embargo on the Boston & Albany is not seriously interfering with the movement of northern iron this way for the Boston & Maine is clear and practically all the New Haven gateways are now open, the embargoes having been lifted on Harlem River, Campbell Hall and Maybrook. Inquiries for iron continue fairly numerous. A Massachusetts valve manufacturing concern has succeeded in placing an order for 1000 tons of Alabama iron for prompt shipment by guaranteeing a government shipping permit. There is an inquiry for 500 tons of bessemer for third quarter delivery and a round tonnage of foundry iron of 2.25 silicon or higher is being sought by a Connecticut melter for June-October delivery, while an inquiry for 1000 tons of No. 1 foundry by a Connecticut buyer has been out for several days. Inquiries do not bring very prompt responses from the furnaces. While the makers are running fuller and are making some inroads on accumulated orders, they are yet in a position to accept much of the business offered.

Questionnaires Being Circulated

New York, May 13.—Questionnaires for ascertaining and classifying pig iron production and the requirements of all consumers now are being circulated by the committee on pig iron, iron ore and lake transportation acting for the war industries board. This is in accordance with the plan outlined in last week's IRON TRADE REVIEW and more fully explained in this issue. No iron has been sold in this district during the past week as far as known. Many inquiries, some for large tonnages, are out, but are receiving no attention. Furnaces now are occupied solely with making deliveries. Shipments are being made at a better rate than for some time past. Numerous permits have been granted for the shipment of iron from Virginia and also for some from the south to this district. Incidentally, nothing yet has developed from the proposal of the railroad embargo committee at New Haven to secure the shipment of several trainloads of Virginia iron to New England. At the instance of this committee, many consumers obtained permits for their iron and these were sent through to the furnaces. It is believed that the principal reason for the failure to carry out this project was the lack of stocks at Virginia furnaces. Virginia stacks now are shipping iron practically as fast as they make it.

Coke Supply Now Ample

Philadelphia, May 14.—For the first time in months all eastern furnaces have sufficient coke to meet their full needs. The situation has improved so much that government orders requisitioning coke for certain furnaces during the recent scarcity, have been recalled. The change in the situation is due partly to the modification of the Pennsylvania railroad's prohibition against the sending of large type coke cars off its lines, but largely to the action of the railroad director in switching cars from sand, gravel and other commodities to coke. It is expected that this improvement will soon become apparent in pig iron production and deliveries. The furnaces continue to deliver iron in accordance with original contracts and are exercising their own judgment in selling small tonnages as they find them available. The only current sales consist of off lots. Considerable borrowing of iron has been done recently by consumers in need with the understanding that this tonnage is to be returned later. New inquiries include 15,000 tons of foundry for June-December delivery for the Eddystone, Pa., plant of the Baldwin Locomotive Works and 3000 tons of second half delivery for the Westinghouse Electric & Mfg. Co. for its Essington, Pa., plant. The new No. 3 furnace of the Alan Wood Iron & Steel Co. at Swedeland is 75 per cent complete and is expected to be blown in this fall.

Basic Tonnage Commandeered

Cleveland, May 14.—Pig iron producers in this territory have begun the distribution among their consumers of the statistical forms prepared by the committee on pig iron, iron ore and lake transportation to determine the amount of essential business for which metal is required. In the meantime normal market activities are suspended, although various consumers continue to put out new inquiry and to attempt to make purchases. Further allocations are being made through the committee to cover war needs. The steel director has commandeered 3000 tons of basic in stock at Harrisburg, Pa., for a Chester, Pa., steelmaker who wanted 3500 tons of prompt iron for Emergency Fleet orders. The title to this basic which was under sale for export rested with a bank. Valley makers will furnish 1000 tons of bessemer for a Washington, D. C., ordnance maker. Further Emergency Fleet business up for allocation includes 400 tons of No. 2 foundry for June-July for a Portland, Oreg., melter; 350 tons of No. 2X and 125 tons of charcoal for June-July for an Allentown, Pa., plant; 500 tons of early Nos. 2X and 2 plain for a Baltimore user which will go to Alabama makers. In the open market a Brackenridge, Pa., steelmaker wants 1000 tons of bessemer and an indefinite tonnage of basic. There is some demand for mill forge. Some inquiry also is current for low phosphorus but western makers have little unsold tonnage for this year. The Stewart Iron Co. furnace is going out this week for relining. Some slowing down of melt among jobbing foundries doing regular commercial work is apparent.

Buyers are Persisting

Buffalo, May 14.—In the face of the repeated replies to consumers by furnacemen that they are unable to supply them with iron, even in small quantities, the former during the past week have been seeking information as to when the sellers will again be in the market with iron. Furnacemen have been unable to satisfy these queries and the request has been made in several instances that the consumer be notified when the time arrives. This is about the best that sellers have been able to do for their customers of late, as the shortage of iron continues to be the absorbing feature of the situation. Some sizable inquiries have been received from New York and New England but these have been treated the same as much other good business during the past six months. All furnaces are endeavoring to get ahead on shipments and this for most of them, is an all-absorbing problem. Stack A of the Donner Steel Co. at Tonawanda which was relined during the time it was out will be placed on ferromanganese shortly. It is running on foundry at present. The government is insisting that its orders for iron be filled before ordinary requirements.

West Needs Basic

Chicago, May 14.—Chicago producers of pig iron are directing their efforts mainly toward production and equitable distribution to serve melters in the best possible way. With their production for the remainder of the year entirely sold and some government orders being placed for immediate delivery, there is no possibility of their taking further contracts. Basic melters in the St. Louis district are still in need of that grade to fill out requirements for the remainder of the year and while they are not now actively inquiring, having learned the impossibility of placing further tonnages at present, they are in a receptive mood and will take whatever may be offered. Inquiry has fallen off, principally because it is not well received, but there is an open need for iron, indicated by the fact that any offer is immediately taken up. A survey of foundries outside of Chi-

cago recently disclosed that many have two to three months supply on their yards, and with what they will naturally receive during the summer, it seems probable they are comfortably provided for the remainder of the year. With an estimate of 200,000 tons of iron piled on furnace yards in the south, unshipped because of lack of cars, greater activity on the part of railroads should assist materially in furnishing stock for foundries which have contracts for the metal. No. 3 foundry is being taken readily whenever offered, as most foundrymen find it possible to obtain a good mixture of this iron with other grades carrying more silicon. A southern stack just put in blast is offering some off iron which is finding ready sale, carrying silicon from 4.06 to 6.50 and sulphur from 0.072 to 1.97.

Inquiries Still Plentiful

Cincinnati, May 13.—Judging from reports made by different firms there will be little chance for any iron melter to get a future supply unless engaged in work that is considered essential for carrying on the war. Fortunately for the foundries in this district nearly all castings are for concerns whose products are on the essential list. New business is very light, but inquiries are plentiful.

Plants Begin to Curtail

St. Louis, May 11.—The market for pig iron is working daily more completely to a war basis. Dealers report that less effort is being made to contract for supplies for the last quarter. The underlying demand, however, is enormous, and phenominally heavy tonnages of all grades could be disposed of in the immediate district were they available. To date there has been relatively little curtailment in activities but it was learned this week that a number of important manufacturers are preparing to cut down outputs in expectation of lack of raw materials, which they believe inevitable.

Furnace Stocks Shrink

Birmingham, Ala., May 14.—Southern furnace companies are about out of the market. A few sales are being made, usually in small lots, for delivery during the last half. Inquiries remain numerous. Government needs are receiving attention. Every shipment of iron is being closely scrutinized. The railroad car service shows improvement, embargoes in the middle west having been lifted. Shipments of iron exceed production which means a steady reduction of the accumulated furnace stocks. Disappointment is noted on the pig iron production in Alabama in April. The Tennessee Coal, Iron & Railroad Co. blew in a furnace the latter part of April and the Trussville furnace went in this month.

Rush Cars to Coke Regions

Government Continues Order to Railroads to Supply 100 Per Cent Service—Operators Unable to Use All Equipment Furnished

Pittsburgh, May 14.—Large supplies of cars are being furnished to the Connellsville coke region. The Monongahela railroad continues to receive a 100 per cent supply by reason of the government having continued its order asking that this quota be furnished. An order was issued recently so that a shipment of coke for Peru would be moved forward at once without interfering with fuel supplies for blast furnaces. The government apparently has continued the order to make certain that manufacturers of pig iron will not run short. The supply on the Pennsylvania railroad also is large and today it was 98 per cent. Coke producers have not been able to take full advantage of the improved supply of cars, but will be more nearly able to do so soon when they will have built up their organizations. It now is the belief that the Connellsville region in the near future will be on a producing basis of 75 per cent of the car supply and this perhaps will mean complete supplies of coke for all furnaces.

Price Question Raised

Boston, May 13.—A very interesting situation has developed in the local coke market as a result of the recent order of the fuel administration with regard to New England coke supplies. A very strong effort is being made to book orders, but it cannot be said that users are falling over one another to stock up. Those having contracts for Connellsville coke, indeed, are inclined to hold back to see whether or not they will have to make fresh arrangements as to prices, or will be given the equivalent of their contracts in local by-product oven coke at the price of their contracts. The price of the local product is $13.45 per ton f.o.b. ovens while that of most of the Connellsville fuel under contract is from $10.45 to $10.65 delivered. The difference in the delivered price is a matter from $4 to $5 a ton, and as the prices of castings are based on cheaper coke than can be had after May 15, it makes considerable difference with the foundries. There is a disposition on the part of these foundries to hold off purchases for the present, especially as the belief is fairly general that the local product is higher than it should be. Some Connellsville coke is reported to have come through all right, but there are equally as many cases where it has been commandeered at New England gateways.

Domestic Fuel Bought

Cincinnati, May 13.—Domestic coke has been purchased quite freely of late, but the bulk of the fuel and the inadequate storage facilities of consumers prevents any large accumulations. Foundry coke is contracted for in very small quantities because the ovens are not able to take on much new business. The easing up of transportation difficulties is having some effect and the foundries are making few complaints, except as to the quality of the fuel furnished. This does not seem to be a matter that the producers can remedy.

Some By-Product Sold

St. Louis, May 11.—Developments in the coke market here this week have been entirely negative. Aside from sales of small surplus tonnages made quietly by local by-product ovens, no selling has been done. These plants have virtually their entire outputs contraced for over the third quarter, and the fuel sold recently represented an accumulation due to embargoes and other delays in transportation. Representatives of eastern and southern producers report their principals have nothing to offer, and are hard put to it to meet contract obligations. Several leading oven interests in the Connellsville district which largely supply this market with 72-hour foundry coke, have advised customers they are so far behind on deliveries that nothing need be expected this month.

More Tonnage is Cry

Birmingham, Ala., May 14.—On all sides in the Alabama market there is a cry for more coke. The maximum production has about been reached with those ovens in condition to be operated. Shipments out of the district are about the same as they have been for several weeks. Contracts are being filled as transportation can be obtained. Some of the local consumers are worrying over future prospects. Plans continue under consideration for some increase of production. The Sloss-Sheffield Steel & Iron Co. has plans for a by-product plant. Progress is reported on the 154 additional ovens at the Koppers by-product plant of the Tennessee Coal, Iron & Railroad Co.

No Changes in Scrap Now

Committee Decides Against Any Price Revision Before July 1—Recommends Cost Price be Put at Foundry Iron Level

FOR COMPLETE SCRAP PRICES SEE PAGE 1282

Philadelphia, May 14.—No changes in old material prices are to be recommended by the subcommittee on scrap of the American Iron and Steel institute until July 1, according to a decision reached at a meeting held in this city last Friday by members of that body. The question of a reduction in the maximum price of cast scrap now fixed at $34 delivered for No. 1 quality was considered at the meeting. While it was decided that price action on any grade should be deferred until July 1, it was recommended that the price of cast scrap should be on a level with No. 2 foundry iron at the delivery point. It is believed that this arrangement will operate so that consumers who have had difficulty to get cast scrap may be given access to available supplies. It was pointed out that on the Pacific coast the foundries are finding it almost impossible to get sufficient scrap at present prices and they are paying from $47 to $48 a ton delivered for No. 2 foundry pig iron as the present maximum price. The only activity in the local scrap market concerns deliveries on old contracts. The steelworks are well covered and are showing no interest in the market. These contract requirements, however, are taking up all the steel scrap coming out. In fact there is no accumulation in any grade of scrap.

Market Becomes Active

Pittsburgh, May 14.—Due to the allowance by the war industries board of a 3½ per cent commission on sales as a compensation, the market for iron and steel scrap in this district has become active. Inquiries are numerous and dealers have been able to find supplies in excess of those reported to exist. Inquiries are coming from a number of mills and buying direct from producers appears to have come to an end almost altogether, the business being done through dealers and brokers. The market for heavy cast scrap is fairly active and is weak at the maximum of $29 at which a sale of 4000 tons plus a commission has been made. The market for cast scrap for cupola use is weak and is quoted between $32.50 and $33, delivered, against the maximum price of $34. Consumers are objecting to paying a price in excess of the maximum of $33 for basic pig iron. Heavy melting steel is in most active demand and one of the largest sales involved 7000 tons which went at $29, delivered, plus commission. Weakness prevails in machine shop turnings which are quoted at $18 to $19, plus commission. One recent sale involving 3000 tons is understood to have been made at $18.50, delivered. Cast borings are firm at the maximum of $19, delivered, at which 3000 tons have been sold to a consumer in the Pittsburgh district.

Transactions Remain Light

Cincinnati, May 13.—The situation does not seem to clear up as fast as dealers wish. Transactions are light, with the exception of No. 1 wrought and also No. 1 machinery cast. These grades have been in demand and stocks are not as large as has been stated. Cast borings and steel turnings are a trifle stronger but are unchanged in price. The settlement of the commission question has had some effect in brightening the market, but present market quotations are very close to the limit of what buyers will pay.

Demand Well Distributed

Boston, May 13.—There continues to be a good and rather well distributed demand for scrap in this market, with prices firm owing to moderate supplies. Local foundries want far more cast scrap than is available. Wholesale dealers' paying prices per gross ton f.o.b. cars, shipping points, follow: Wrought No. 1, yard long, $29 to $30; horse shoes, $29 to $30; cotton ties, $22 to $23; stove plate, $21 to $22; No. 1 machinery, $31 to $32; No. 2 machinery, $27 to $28; car axles, iron, $42 to $43; steel, $42 to $43; rerolling rails, $30 to $31; iron boiler plate, $33 to $34; bundled barrel hoops, $16.50 to $17.50; wrought iron pipe, new specifications, $28 to $29; steel rails, $25 to $25.50; No. 1 railroad steel, $25 to $25.50; heavy melting steel, $24.50 to $25; axle turnings, $20 to $21; machine shop turnings, $14 to $15; cast borings, $15 to $16; drop forge trimmings, $22 to $23; cast iron car wheels nominal in lack of offerings or sales.

Heavy Melting in Demand

Buffalo, May 14.—The market for iron and steel scrap in this territory continues strong, with no change in the price schedule. There is a very strong demand for heavy melting steel and in addition, there is a heavy call for low phosphorus scrap and machine shop turnings. This latter demand has been the feature of the past week. The demand continues good on practically every other grade. Scrap is moving freely with practically all the heavy melting steel produced in this district going to local consumers. One of the developments the scrap trade will face in the near future is the increase in freight rates. The effect on distribution will be rather important.

Weakness at Cleveland

Cleveland, May 14.—Weakness continues the dominating note of the Cleveland scrap iron and steel market. Practically all grades are lifeless, and those in which a fairly plentiful supply is on hand—such as turnings—are in no demand. Heavy melting steel still is scarce and purchases in more than two and three-carload lots are rare. Dealers believe trading will be at a low ebb until the latter part of June, when contracting will be resumed. Shipments are going forward at good pace and transportation facilities are easier than at any previous time this year. Some dealers, who say they have repeatedly bid at government maximum prices for scrap, say they have had no results, and are wondering if material is changing hands at a figure in excess of the top figure allowed. Dealers generally are with foundrymen in their endeavor to have the $5 differential on cupola-size cast removed.

Speculation is Absent

Chicago, May 14.—Fixing a maximum price and allowing a commission has practically removed the element of speculation from the scrap iron and steel market and has resulted in making it comparatively quiet. Inasmuch as the consumer knows to a certainty that his price will be the same for weeks to come on such grades as are scarce and at a maximum, he is not compelled to buy as a speculation and takes only sufficient tonnage to keep his reserve at a safe point. Thus buying for future delivery as was done formerly in heavy tonnages at intervals has almost disappeared. On the other hand, sellers of scrap do not hold their material nor rush it to market in accordance with their judgment of price movements, but sell it steadily as it is produced or gathered and thus make the market more stable. Heavy steel, malleable and busheling grades are strong, with others lagging somewhat behind. All offerings are taken readily and consumers are buying steadily. Railroad offerings are only fair. The

Chicago, Milwaukee & St. Paul offers 1250 tons, including 500 tons of No. 1 cast, the Chicago Great Western 850 tons and the Chicago, St. Paul, Minneapolis & Omaha 580 tons.

Cast Becomes Scarce

New York, May 13.—A good volume of demand prevails for virtually all grades of scrap in the New York market at this time. Foremost in point of demand, however, is cast scrap, which continues to be eagerly sought after by foundries. As a result supplies of this material are exceedingly scarce and dealers and brokers are careful not to book business unless they have stock right at hand. Stove plate has been bought by some brokers during the past week at as high as $23, New York, although the majority have found sufficient supplies of this grade obtainable at $22.50. With the exception of machine shop turnings and clean cast borings, which have gone up 50 cents to a range of $16 to $16.50, all grades are holding virtually unchanged.

Some Business is Released

St. Louis, May 11.—A fair amount of scrap business, which had been held in abeyance pending the decision on dealers' commissions, was consummated this week, but otherwise the market has been quiet and featureless. A few sales between brokers were reported. Large melters are not buying, most of them being covered well into the last half. There continues a fair inquiry for heavy melting steel and for several of the mill grades. Machine shop turnings are slow with the supply ample. Prices in the main are well under government maximums, so that the 3½ per cent commission privilege has not been exercised to any great extent as yet.

Stocks Still Dwindling

Birmingham, Ala., May 14.—Southern iron and steel scrap dealers are delivering steadily on old contracts and stocks on hand are dwindling. Country scrap is not coming in as liberally as before and the outward movement is at a greater pace than the incoming supply. Dealers still report the market uncertain with southern consumers not willing to pay maximum prices. Activity in the north, east and west is expected to be felt in the south. Opinion is expressed that the scrap market may continue in the uncertain stage for 60 days yet, until the government revises pig iron quotations again. Some of the large melters of scrap in the home territory are not operating so well. Failure of country scrap gathers to bring in stock are being felt.

Plants Pile Shell Steel

Insufficiency of Heat Treatment Facilities Obstructs Production by Munition Makers—Semifinished Shortage at Worst Stage

Youngstown, O., May 14.—Lack of heat-treating facilities continues to hamper shell-steelmakers. A large shellmaker in the Cleveland district because of limited capacity for heat-treating has stopped all shipments of shell steel by a company in this district. Material has been delivered to this plant so fast that a larger stock than can be handled in the near future has accumulated in its yard. This maker turns out more shell blanks in a day than can be heat-treated in his plant in the same time. Consequently, some are being sent to Pittsburgh and are heat-treated there. Approximately 37,000 tons of the 300,000-ton British shell-steel order which has been under allocation for the last month has been rolled. This steel was primarily intended for the United States government, but was rejected on account of the manganese content being under standard. It, however, met the British specifications. Shortly after the outbreak of the war, the mills in this country adapted themselves to the making of shell steel under British specifications which called for a heavy-walled blank. The mills were slow in meeting the United States specifications because they called for a thin-walled blank and were extremely strict in their physical tests of ductility, elongation and tensile strength. A majority of the mills now are coming to the point where they can meet the government specifications in a satisfactory manner and production is increasing daily. Sheet bars continue exceedingly scarce. One sheetmaker was forced to close down one jobbing mill and two finishing mills on this account. Since transportation difficulties have increased makers not self-contained are finding it difficult to keep more than a two or three-days' supply of sheet bars ahead. The scarcity has been so pronounced that high-carbon bars are now being converted into sheets.

Discards Only Sales

Philadelphia, May 14.—Sales of shell steel discards remain the practically only activity in the semifinished market. Offerings of billets and other semifinished forms except occasional off-heats are lacking.

Tonnages Sought Eagerly

Pittsburgh, May 14.—Consumers of semi-finished steel continue eagerly to seek tonnages in this district. Producers are completely sold up and they have no offerings to make. Some sellers are scouring the country in an effort to find steel for customers. Makers of plates have redoubled their efforts to get slabs to work up into material for the shipbuilding and other government requirements. Sheet bars are in especially strong demand by makers of sheets and some tin plate producers also are seeking good-sized tonnages. Active inquiry exists also for billets and the market for discards has become so narrow that there do not appear to be any sizable tonnages available. Some makers whose melting capacity exceed their rolling capacity are furnishing ingots to slab mills producing steel for plates. Some makers again have small lots of wire rods and are selling them to their regular customers. One producer during the past week sold 300 tons at the government price of $65, Pittsburgh.

More Gun Steel Needed

Cleveland, O., May 14.—A producer of ordnance in this territory has received additional contracts for guns for the navy department which will call for 3500 to 4000 tons of nickel steel. This business will go to a leading producer in the Pittsburgh district who has been furnishing material of this character to this consumer. A leading producer of munitions in this territory is putting in operation additional capacity which increases its output to 90,000 3-inch shells daily. Buyers of sheet bars who have canvassed the market with small results for steel of practically any character, whether odds and ends or discards, are in a very serious predicament. Some of them are on the verge of shutting down for lack of steel. One mill in this district may be closed this week.

Shortage Cuts Strip Output

Pittsburgh, May 14.—Shortage of steel is hampering the production of cold rolled strip tonnage good-sized lots of which are being taken by the government. Stocks which makers had on hand are now almost exhausted. Curtailment of the output of automobiles will temporarily shut off business in this line for makers of strip steel but will put them in a position to supply larger quantities for the government.

Ask Buyers for Pledges

Mills Put Consumers on Honor to Order Nothing But War Tonnage—Shell Bar Awards Reported Near

Cleveland, May 14.—Leading producers pledged to furnish the government 100 per cent of their output now are calling upon consumers equally to obligate themselves not to order out material except for war purposes. This means that the consumers are being called upon to pledge their fullest co-operation to the mills in the same manner that the latter have put themselves on record with the government. With the consumers formally committed to this policy, the mills will not insist on exacting requirements of technical proof that the material is for war use before shipments are made. The bar market is totally free of any business except that relating to war. An inquiry for 500 tons of rounds for time fuses is out from a local plant. It is learned that some implement manufacturers in this district are in a very comfortable position on their requirements through stocks which have been gradually accumulated. One consumer of this class now has practically enough steel on hand to cover capacity operations for a year and a half.

Commercial Tonnage Dropped

Philadelphia, May 14.—As a result of the pledge recently given by all steelmakers, large additional government orders for steel bars have been accepted by certain mills which heretofore had declared they were obligated on all the tonnage they could handle. Because of their pledge they are now producing nothing but government steel. This has involved the dropping of much commercial tonnage. By so doing that have made room for more government work. Bar iron demand is quiet.

Government Lettings are Large

New York, May 13.—The distribution of orders for 15,000 tons of reinforcing bars to be used in the construction of the warehouse at the South Brooklyn army supply base, now is being determined by the quartermasters' corps at Washington. The orders for the bars will be let, in accordance with the directions of the quartermaster's department, by the Turner Construction Co., which has the contract for the construction of the South Brooklyn base. The Cambria Steel Co. recently received an order for 2500 to 3000 tons of reinforcing bars for the construction of the army supply base at Boston.

Expect Shell Steel Orders

Chicago, May 14.—It is understood from sources close to the government that distribution of a heavy tonnage of shell bars will take place shortly covering the requirements of this country, France, Great Britain and Italy. Each of the latter is said to require about 750,000 tons and the United States will need fully that quantity, making the total for this purpose between 2,000,000 and 3,000,000 tons. It is believed this tonnage will be allocated in the near future and will fill some mills beyond third quarter in this department. Present requirements of the government for steel bars are not as heavy as for plates and shapes, but still cover a major portion of the production of most mills. Inquiry for hard steel bars rerolled from rails is somewhat less than has been the case recently, buyers apparently realizing their inability to place further tonnage while the shortage in steel rails continues. Consumers of bar iron are not seeking contracts and the general situation is decidedly quiet as manufacturers show no tendency to press matters and are willing to let the situation rest. Inasmuch as distribution of orders for carbuilding material has not yet been taken up, no new business is coming from that source, although a large tonnage is expected to be required in bar iron, for the purpose of saving steel.

Operations are Heavier

Pittsburgh, May 14.—Production of iron and steel bars has increased and now is almost at capacity. Tonnages are being supplied only for the government, either direct or indirect. Good sized orders are being taken for this class of demand but purely domestic consumers are unable to cover their requirements. The buying of steel bars for the implement trade is expected to become heavier soon and this business will be given a good rating in the way of priority because of its essential character in connection with the conservation program. Car builders also will be given a favorable position on the books of makers and precedence has been given to the shipbuilding program.

Bolt Inquiry Heavy

Chicago, May 14.—Large inquiry for nuts and bolts continues and the government requirements for more than 100,000,000 as well as another involving several million, previously mentioned, have not yet been covered. In addition to these general manufacturers are seeking considerable quantities which makes this a most active market. Mills are unable to take all that offers and are already sold well ahead.

Entire Order Not Distributed

Pittsburgh, May 14.—The government has not made any further distribution among makers in connection with its requirements for 129,000,000 bolts. The orders on this lot which are placed went to mills which filled the allotments from stocks. Good-sized orders are being placed with makers of nuts, bolts and rivets, which are to be used in connection with government work. Mills are able to get steel bars where they are to be worked up into this class of business but for no other purpose. Operations are proceeding at 80 to 85 per cent of capacity.

Demand for Hoop Steel

Pittsburgh, May 14.—Makers of oil barrels continue to put out inquiries for hoop steel and this business is being taken by mills, wherever it is possible. Some mills report a scarcity of steel and for this reason are unable to fully meet requirements. Limited tonnages of bands also are being taken at the government price of 2.90c, Pittsburgh.

Shafting Being Bought

Pittsburgh, May 14.—Heavy tonnages of both large and small sizes of cold rolled shafting are being bought either directly or indirectly for the government. A considerable quantity is to be worked up into detonators, time fuses, etc. Other large orders of similar character are about to be placed. Deliveries are being made in from one month to six weeks.

War Business

Will Have Right of Way to Warehouse Stocks

Chicago, May 14.—Following the lead of steel mills in pledging their entire output to the government, warehouses handling finished steel products have taken the same stand. All business not intended for direct or indirect government work is to be subordinated to government orders. One local warehouse has sent a circular to its customers containing the following request, to assist in giving the best possible service for war needs:

"We will do our utmost to handle the legitimate requirements of our customers, as in the past. Orders for mtaerial required for war work and public necessities will have prompt and immediate consideration, but all others must be subordinated to them. In order to avoid delay we ask that you send with all orders and inquiries all the information possible as to the ultimate use of the

material. If needed for government use, please advise government order number and state also under which of the following classifications the work comes: Ships, aircraft, munitions, military and naval supplies and operations. If material is not for government use, give us accurate and detailed information as to its ultimate use, as there are many most essential industries, necessary to the welfare of the country today, whose requirements should be given every consideration after the needs of the government."

Jobbers are Worried

New York, May 13.—Leading iron and steel jobbers in this district have signed the pledge which requires that they assure themselves that all iron and steel which they sell is to be used for government purposes. Some of the larger interests, however, state that not all of the smaller jobbers are regarding the government's needs so seriously. They say that they frequently come across instances where smaller jobbers are selling to non-war consumers, and where they often are making sales at prices higher than the fixed maximum.

Shipments Gain

Movement of Lake Superior Iron Ore Approaching Normal

Cleveland, May 14.—Iron ore shipments are increasing. Boats are being worked out more rapidly both at loading and unloading ports. As a result the congestion at upper lake ports which has been slowing down shipments, is being relieved. Vessels are rapidly approaching the summer schedule.

Many shipments are expected to total more than 7,000,000 tons, an increase of 1,000,000 tons over May of last year. Water levels are lower this year introducing a restricive factor in the sizes of cargoes.

Virginia furnaces will receive more lake ore this year than at any previous time. Contracts already made provide for the delivery of 250,000 to 300,000 tons to Virginia furnaces in 1918. With this ore, the output of Virginia stacks is increased 25 per cent.

Blanks will be sent out semimonthly to all consumers of Lake Superior iron ore requesting detailed information on stocks on hand, receipts, and consumption. In this way a revised check will be secured every two weeks as to the actual minimum requirements of each stack and the problem of adjusting the supply to the demand will be simplified. Doubts are expressed by some vesselmen regarding the fleet's capacity to carry within 7,000,000 to 8,000,000 tons as much ore as last year.

Labor Worries Plate Mills

Shortages Begin to Hamper Production in East—Government Rebukes Mills for Accepting Orders Without Priority Certificates

Philadelphia, May 14.—Labor shortage rapidly is developing as a new obstacle to maximum plate production among eastern mill. Producers are giving this phase of the situation earnest consideration. Government plate allotments of the week were larger than in previous weeks. Round tonnages were placed for chlorine tanks, ships, etc., and even larger orders are expected shortly. One eastern mill received 30,000 tons additional from the shipping board. In several instances since the recent meeting of the steelmakers at New York the mills have accepted direct from consumers plate orders for urgent government requirements for which priority licenses had not been secured. It is learned that the government protested emphatically against this action in order that hereafter no plates should be booked except on priority orders. This means that the government and not the mills will determine the importance of war business. Many users of plates have been unable to secure priority rating although they believe they are entitled to it. The oil industry which demands plates for storage tanks, is one of these.

Wait for Government Action

Pittsburgh, May 14.—Our builders are waiting for the government to make allotments for steel, lumber and other materials, so that they may be advised where to get their requirements before proceeding with construction work. Allotments for steel will be distributed under the direction of J. Leonard Replogle, steel director. Some mills which will be called upon to produce plates, shapes and bars for the cars probably will have to defer production on less pressing government contracts in order to supply car builders adequately and on time. Wheels for the heavier types of cars will be made of steel and for the lighter types will be of gray iron. Difficulty may be experienced in getting ample tonnages for wheels. Plate mills are engaged altogether on government work and are not accepting any other kinds of business.

To Place Boiler Steel

Cleveland, May 14.—From 3000 to 4000 tons of boiler steel for the 66 boats awarded the American Shipbuilding Co. by the shipping board, are still to be placed. This tonnage was not included in the 90,000 tons of hull material placed with Pittsburgh and Chicago mills covered in last week's report. Nothing but priority tonnage receives attention from the mills and their deliveries are more uncertain owing to the heavy tonnages for war demands already on the books.

Ship Demands Heavy

Chicago, May 14.—Demand for steel plates for shipbuilding continues to hold first place in the steel market, with tonnages being constantly divided among mills, both for the Emergency Fleet corporation and for shipyards on the lakes and on the Pacific coast. A representative order recently placed in the west involves 4500 tons of plates and shapes for a yard at Duluth. Word comes from Washington that still larger tonnages for ship work are to be divided among mills in the west for use by western shipyards, and that considerable tonnage will be required for delivery during third quarter. Most mills in this territory are already filled practically through third quarter, and it is a puzzle how the material will be provided. With allotment of tonnage for railroad car construction imminent, it seems to the observer that some careful planning will be necessary to avoid conflict between claims of shipbuilders and carbuilders. It is learned from a Washington source that the material for the 30,000 cars to be built by the American Car & Foundry Co. will be distributed shortly for delivery from June 30 to Nov. 1. The plans provide for making much of the steel in the west which will present a problem to the mills because of the heavy obligations already on hand.

Aircraft Aid Appointed

Washington, May 15.—Archer A. Landon, of Buffalo, who has been appointed director of the division of production of the aircraft board, already has assumed the duties of that office here. As vice president of the American Radiator Co., he has gained much business experience both in this country and in Europe. John D. Ryan, director of aircraft production, in commenting on the appointment, said: "It is believed that Mr. Landon's wide experience and great ability will materially advance the production of aircraft.

Shape Huge Building Plans

Government Will Require Great Tonnage for Additional War Construction Not Yet Announced—Commercial Business Put Aside

Pittsburgh, May 14.—The day of the purely domestic consumer in steel seems to have passed. For at least six months the government will take 100 per cent of the output of the whole industry and it may take the full production for an even longer period. Producers have learned this with surprise but it has come from authorities who are in a positive position to know what they are talking about. Perhaps nothing indicates better than the situation in the fabricating market, the requirements presented are to be presented by the government. During the past week, fabricators have had a rush of inquiries coming to them from private consumers. When steel mills were sounded out the answer invariably came back that the mills either would not book a pound of this business unless it was for the government or they would accept the business tentatively, without promising the time of delivery or, that it would be rolled at all. It is believed that the government is about to enter upon various activities involving steel requirements greatly in excess of those already announced. Over and above the program which has been or is about to be mapped out for enormous tonnages of shell steel, plates, shapes, bars, pipe, rails, etc., for itself and the allies, it is understood that additional and extremely large requirements are to be called for in connection with building and equipping ordnance plants, terminal warehouses, fabricating shop, by-product coke ovens, and other undertakings in connection with war work.

Need Navy Yard Tonnage

Philadelphia, May 14.—Government business continues to monopolize the structural shape market. A number of new structures for the League Island navy yard are up for action including a power house, two transformers building, and an extension to building No. 25.

Need Tonnage for Piers

New York, May 13.—Although estimates have not yet been fully worked out, present expectations are that about 20,000 tons of fabricated steel will be required for building the pier sheds at the South Brooklyn army supply base. The contract for the construction of this base has been let to the Turner Construction Co. The warehouse at this base will be built of reinforced concrete. About 15,000 tons of reinforcing bars will be required for the job. Only a few structural contracts, all involving railroad bridges or structures for the government, were included in the lettings in the eastern structural market during the past week. The only new jobs up include the army supply base at Norfolk and buildings for the signal corps at San Diego, Cal. On both of the latter projects bids now are being taken.

No Building in West

Chicago, May 14.—Following the tight rein placed on construction work in order to conserve steel for war purposes, new building in the west is practically done away with. Requirements of shipbuilders involving considerable tonnages of structural shapes keep mills busy and occasional building projects which have a direct relation to the war are allowed to slip through.

CONTRACTS AWARDED

Building at 817 South Wells street, Chicago, for Wells, Fargo & Co., express, 169 tons.

Engine repair shop, for the Bingham & Garfield Railway Co., Magna, Utah, 126 tons, to the Kansas City Structural Steel Co.

Synchronizer building in Maryland for government, 200 tons, to Lackawanna Bridge Co.

Bridges for Southern railroad, 1400 tons, to McClintic-Marshall Co.

Kent avenue power house, Brooklyn, 600 tons, to American Bridge Co.

CONTRACTS PENDING

Terminal at Norfolk, Va., for quartermaster general's department, 1800 tons, bids being taken.

Buildings for signal corps, San Diego, Cal., 1200 tons, bids being taken.

Extension to building No. 25, League island navy yard, Philadelphia, bids being taken.

Power house and two transformer buildings, League island, Philadelphia, bids being taken on the steel by the general contractor, the Turner Concrete Steel Co.

Sheets Only for War Use

Mills Producing Only Essential Tonnage—Heavy Requirements for Government Cars—Steel Shortage More Serious Factor

Youngstown, O., May 14.—A few weeks ago sheet makers in this territory predicted that before long there would be no sheet bars available for domestic purposes. That time is here now. Practically every bar is being used for government requirements and especially those which are converted into galvanized sheets. Nearly every mill in the valley is now producing and shipping galvanized sheets for the government strictly on a 100 per cent basis. While makers are not rolling black and blue annealed for the government at 100 per cent they are supplying 100 per cent of their war obligations for these grades. Direct export business is a thing of the past. Mills which were unable to roll all orders of this kind on account of the unusually heavy government demands now are producing such tonnages with the government's permission whenever the material is for war purposes. So scarce have domestic sheets become that regular customers are making special trips from distant cities begging sales managers for any size whether primes, seconds or wasters. Some users even buy oversized sheets and willingly stand a loss of 20 to 30 per cent in waste. A San Francisco jobber who supplies the Emergency Fleet corporation called on one sales manager and said he would take every sheet on hand. Sheet bars never have been as scarce as they are now. Sheetmakers not self-contained are finding it extremely difficult to locate even small tonnages. As a result, one maker has been obliged to close down one jobbing mill and two finishing mills. Another maker has three finishing mills idle on account of a scarcity of labor. Most mills are running from hand to mouth. Even sheet bars in transit are included by some mills in their rolling schedules. Mills are willingly buying high-carbon sheet bars.

Cars Will Require Tonnage

Pittsburgh, May 14.—The government continues to place orders for sheets, although the tonnages being booked are not so heavy. The output of mills has been restricted greatly owing to a shortage of sheet bars and this is causing considerable concern on the part of the trade. No business is being taken except that for the government, either direct or indirect. Large requirements will be necessary in connection with the 45,000 box cars which have been bought by the railroad administration.

Demand Continues Heavy

Chicago, May 14.—Although sheet mills are unable to obtain sufficient steel to keep production up to capacity, demand for all grades, both domestic and export, continues strong.

Permit System

For Ferromanganese Over 70 Per Cent May Follow

New York, May 13.—A new ruling by the subcommittee on ferroalloys that consumers of ferromanganese must obtain a war board permit to buy metal more than 70 per cent content may be adopted, it is reported. This is in line with the efforts to conserve shipping and stimulate production. The committee will meet Wednesday. Numerous and vigorous protests to Fred B. Peterson, director of the bureau of imports of the war trade board, by consumers and representatives of the English makers of ferromanganese and spiegeleisen, and by the subcommittee on ferroalloys, it is thought, may result in a modification of the recent order prohibiting the further importation of these metals. The order prevents shipment of ferromanganese from England for which licenses already had been granted. It became effective on all shipments from abroad after May 13. It is known that English makers secured licenses for and shipped large tonnages last week. One maker alone shipped more than 1300 tons ferromanganese.

Demand for spiegeleisen and ferromanganese has improved somewhat. The Crucible Steel Co. of America has put out an inquiry for 4000 tons of 16 per cent and 1000 tons of 70 per cent metal. The Carbon Steel Co. has bought 500 tons of 70 per cent metal and the Youngstown Sheet & Tube Co. 900 tons of similar quality. Other new inquiries are out. Prices continue unchanged on ferromanganese at $250, delivered, for 70 per cent, with a premium of $4 per unit for each unit above 70. Spiegeleisen is quoted at $75 to $77, furnace, for 16 per cent for spot and at $70 for futures. Several hundred tons of 18 per cent have been sold for prompt shipment at $80, furnace. On 50 per cent ferrosilicon prices are easy at $155, delivered, for spot, and $150, delivered, for contract. Ferrotungsten is quiet and unchanged at $2.20 to $2.30, furnace, per pound for 70 per cent metal.

Market Becomes Stronger

Pittsburgh, May 14.—Plans for conserving manganese ore have had the effect of strengthening the market for ferromanganese and spiegeleisen. While 70 per cent ferromanganese continues to be quoted at $250, delivered, reports in the trade indicate that the price is going to be advanced soon. The level for spiegeleisen has increased and 16 per cent now is quoted at $75 to $80, furnace, for prompt. One maker is asking the latter figure for either spot or contract. Consumers in general are not longer making complaint about taking 70 per cent ferromanganese. It is reported that the government may issue an order prohibiting the manufacture of a higher grade alloy, except in connection with particular requirements. Inquiries for ferromanganese and spiegeleisen again are brisk.

Great Tonnage

Of Tin Plate Wanted by Government For Food Conservation

Pittsburgh, May 14.—Operations of tin plate mills are estimated at 95 per cent of capacity. The output has been restricted somewhat at some mills, owing to a shortage of sheet bars. Considerable relief from a shortage of steel will result from the placing in operation of the sheet bar mill of the Trumbull Steel Co., Warren, O., which is understood will begin rolling about the middle of next month. Shipments of tin plate are satisfactory and stocks in warehouses generally have been reduced to a normal basis, although in some instances they still are large. The program of the food administration calls for a huge tonnage of tin plate for containers to meet the demands that will be necessary by reason of the large acreage planted, but inasmuch as the success of the crops is dependent upon weather conditions, it cannot be accurately determined just how great the amount will be.

May Take Full Output

Youngstown, O., May 14.—It is rumored that in the near future all tin plate made in this district will be taken over by the government and the mills will be unable to supply the domestic trade until the canneries are accommodated. One producer is making tin plate to be used for oil cans and expects to be informed soon by the government to turn this tonnage to food containers exclusively.

Domestic Tonnage

Being Booked by Wire Mills Subject to Government Needs

New York, May 13.—Government demand for wire products now is veering away from wire nails and involves on an increasing scale wire rope and all kinds of wire for manufacturing purposes. Large tonnages of wire for use in gas masks, for the manufacture of gun springs and wire parts for all kinds of ordnance, are being distributed. Business of this character now is accounting for the larger portion of the current output. Government demand has not yet been so large as to call for 100 per cent of the output of the wire mills, and consequently commercial orders continue to be booked.

Take Government Business

Pittsburgh, May 14.—Wire mills in this district are taking government business entirely except now and then some producers find they have small lots available for their regular customers. Specifications on domestic contracts are coming to mills from private consumers and some of these, after being pared down, are being filled. The government is a particularly heavy buyer of nails. In addition to the 49,000 kegs of nails recently taken by the Pittsburgh Steel Co. for the quartermaster's depot in Washington, it is understood that a lot of 47,000 kegs has been distributed among a number of makers. The committee on wire of the American Iron and Steel institute is about to allot 6000 tons of either galvanized or painted wire for the Italian government, which it is understood it will turn over to France.

Fair Tonnage

Of Cast Pipe Placed by Buffalo—Government Buying Wrought

New York, May 13.—A lot of 2100 tons of 36-inch pipe on which bids recently were received by the City of Buffalo have been awarded to the United States Cast Iron Pipe & Foundry Co. With this tonnage out of the market, little in the way of new municipal inquiry is pending in the east. Miscellaneous demand either directly or indirectly connected with the government, is being noted in the market on a gradually increasing scale. Private inquiry, however, which is far below normal, is shrinking still further, until now it is a relatively small factor in current transactions. Prices generally are firm at prevailing maximum levels.

Government Gets Tonnage

Pittsburgh, May 14.—Large tonnages of pipe for lines being laid for the government have been taken by mills in this district. The principal size taken in this connection is 8-inch. The government also has taken iron and steel pipe for use both in this country and abroad. Producers are sold far ahead on lap weld sizes and most butt weld sizes although in some of the latter, tonnages are being booked for delivery in two and three months.

Pittsburgh Gets Great Gun Plant

Neville Island in Ohio River Will Be Site of Arsenal Which Will Outrival Krupp Works—Largest Size Cannon and Projectiles to be Produced—Construction Work Begun

WASHINGTON, May 15.—Construction work upon the new ordnance plant to be built and operated by the United States Steel Corp. at the request of the war department, is under way. Simultaneous with the selection of Neville island, in the Ohio river near Pittsburgh as the site surveyors began work on the 300-acre plot which will be the location of the greatest gun and projectile works in the world, outrivaling the Krupp works in Germany. Plans have been submitted by the corporation and practically have been approved by the ordnance department. Work will be pushed rapidly and estimates by experts place the completion date one year hence. Steel corporation officials will work in conjunction with the war department and will receive no remuneration for their services.

Eight-inch cannon are to be the main product of the plant, but other large caliber guns including 16-inch howitzers will be forged, machined and assembled in the plant. Other heavy artillery to be produced will include the 12 and 15-inch sizes. Projectiles of large sizes, high explosive shells and shrapnel will likewise be produced in large quantities, under the supervision of the Steel corporation, which will detail 10 experts from its organization for the purpose.

Cost is Fifty Millions

The cost of building the plant will probably exceed $50,000,000. It will be built around three units: A heavy artillery plant; a projectile factory for every large type of shell; a machine shop that in its way will be the greatest in size and equipment in the world. Since the site chosen is in close proximity to Steel corporation blast furnace production but not to steel works, the erection of new open-hearth furnaces either in the arsenal or in the immediate vicinity for the manufacture of ingots is contemplated. The nearest Steel corporation open-hearth plants are Braddock, Homestead, McKeesport and Duquesne.

This immense arsenal will be located at the east end of the 7-mile long island on ground owned by the Carnegie Steel Co., almost directly opposite McKees Rocks, Pa. The site has been lying idle for 20 years. It was purchased when the American Steel & Wire Co. planned to move its Chicago plant to Pittsburgh. That company commenced the construction of its new plant but the formation of the Steel corporation ended the project after one blast furnace had been completed. This is now the Neville island furnace of Carnegie Steel Co., as it was leased to the latter by the American Steel & Wire Co. in 1908.

Experts in Charge

Secretary of War Baker, in announcing the completion of the arrangement with the Steel corporation for the construction of the plant, said:

"A committee formed from officers of the corporation and its subsidiary companies, men fitted by education and experience, will be in immediate charge of the work. These men will receive no compensation. The plant is to be built, equipped and operated at the expense of the government by the United States Steel Corp. without profit. Cannon of the largest calibre will be manufactured, as well as heavy projectiles in large quantities.

"While the United States Steel Corp., like other steel manufacturers, are full of work and have always gladly undertaken production of finished materials wanted by the government, they were persuaded by the secretary of war to undertake this additional task which they patriotically agreed to do, and have placed their best energies and the strength of their economic position at the disposal of the war department."

Corporation Acts Quickly on Formal Appeal

New York, May 14.—Requests of the government to various steel companies at present not producers of ordnance to co-operate in the establishment of greater gun capacity resulted in the decision of the Steel Corporation to enter the ordnance field on a large scale. The new plant will manufacture cannon and projectiles of the largest sizes. Work on the construction is to start at once and the cost will be defrayed entirely by the Corporation. Judge Gary's official announcement that the Steel Corporation had decided to proceed with the work follows a month or more of informal discussions between the government and various steel producers. When the matter was brought to a formal stage, the officers of the Steel Corporation promptly agreed to lend the government their full and immediate co-operation. The Steel Corporation heretofore has not been a producer of ordnance.

Judge Gary's official announcement that the Steel corporation would engage in gun making at the request of the government is as follows:

At the solicitation of the secretary of war, the United States Steel Corp. has undertaken to construct and equip for and at the expense of the government, upon a site to be located in the interior of the country, a plant for the manufacture of cannon and projectiles of large sizes and in great quantities; and to operate the same when finished.

At best, the time required will extend over a considerable period and the cost will be large; but the work will progress with all practicable speed and economy in the use of money will be practiced. It is hoped and expected the results will be creditable to the country.

The work will be in the immediate charge of a committee consisting of a vice president and the comptroller of the corporation, and eight others designated from the officers, presidents or vice presidents of the various manufacturing subsidiary companies, and all selected because of their education, experience and peculiar fitness. This committee will keep in close touch with the building and operating organization which is being formed, and with the officers of the Steel corporation and with the war department.

Officers of the corporation and of the subsidiary companies will receive no compensation for their services.

Accurate books of account will be kept which, with all records, files and other documents and papers, will be open and subject to examination by government officials or other properly appointed representatives.

General plans are being rapidly prepared and will soon be ready for examination by the ordnance department or other bureau, and when approved, the corporation will be given a free hand in construction and operation, holding itself responsible for the faithful performance of the duty imposed by the terms of the contract.

The corporation, in consequence of the magnitude of its business, most of which, directly or indirectly, is in aid of the military necessities of the government and its allies, had hoped to avoid the necessity of engaging in work of the kind now entered upon, but was persuaded by the war department that it was imperatively required under existing conditions.

Detailed Orders

For Government Cars and Locomotives Now are Announced

Washington, May 14.—Details of the car and locomotive awards of the past two weeks have been obtained from the railroad administration and show the types of motive power and rolling stock to be built under the Williams economy plan which limits the manufacturer's profit to 5 per cent on the costs, with the provision that the administration gets the excess profit above that margin and the manufacturer stands the loss if it falls below.

Concerning locomotives, the description of the order is:

American Locomotive Co., 555, including 217 light mikado, 70 heavy mikado, 20 light mountain, three heavy mountain, 10 light pacific, 10 heavy pacific, 75 light Santa Fe, 28 heavy Santa Fe, 30 light 6-wheel switcher, 75 heavy 8-wheel switcher, 15 light 2-6-6-2 mallet and five heavy 2-8-8-2 mallet.

Baldwin Locomotive Works, 470, including 183 light mikado, 30 heavy mikado, 15 light mountain, two heavy mountain, 20 light pacific, 10 heavy pacific, 75 light Santa Fe,10 heavy Santa Fe, 20 light 6-wheel switcher, 75 heavy 8-wheel switcher, 15 light 2-6-6-2 mallet and 15 heavy 2-8-8-2 mallet..

As to the details of number and type of cars, the following shows their allotment:

American Car & Foundry Co.: 10,000 40-ton double-sheathed box; 9000 50-ton single-sheathed box; 5000 50-ton composite gondola, and 6000 55-ton hopper.

Standard Steel Car Co.: 2000 40-ton double-sheathed box; 5500 50-ton composite gondola; 5000 55-ton hopper, and 2500 70-ton low-side gondola.

Pressed Steel Car Co.: 6500 50-ton composite gondola; 5000 55-ton hopper, and 2500 70-ton low-side gondola.

Pullman Co.: 6000 50-ton single sheathed box and 2000 50-ton hopper.

Haskell & Barker Car Co.: 6000 50-ton single-sheathed box, and 2000 50-ton composite gondola.

Rallston Steel Car Co.: 4000 55-ton hopper.

Cambria Steel Co.: 3000 55-ton hopper.

Mt. Vernon Car Mfg. Co.: 4000 40-ton double-sheathed box.

Mangor Car Corp.: 1000 50-ton composite gondola.

St. Louis Car Co.: 1000 50-ton single-sheathed box.

Pacific Car & Foundry Co.: 2000 40-ton double-sheathed box.

Liberty Car & Equipment Co.: 1000 40-ton double-sheathed box.

Laconia Car Co.: 1000 40-ton double-sheathed box.

Bettendorf Co.: 3000 50-ton single-sheathed box.

Keith Car Mfg. Co., 1000 40-ton double-sheathed box.

Lenoir Car Works: 2000 40-ton double-sheathed box.

Barney & Smith Car Co.: 2000 40-ton double-sheathed box.

Propose Big Coke Saving

WASHINGTON, May 14.—Effective tomorrow, the fuel administration will inaugurate the coke zone plan for New England previously outlined in THE IRON TRADE REVIEW. The order embargoes shipping from New England all coke except certain consignments to be licensed to Albany, Cohoes, Green Island and Troy, N. Y., and forbids shipment into New England of foundry coke. New England, through the by-product plant of the New England Fuel & Transportation Co., at Everett, Mass., produces all the foundry coke required in its own states, but for petroleum coke and crushed coke for domestic purposes, licenses will be issued for certain shipments from Maryland, New Jersey, New York, West Virginia and Pennsylvania.

In addition, the coke division of the fuel administration has formally approved the plan by which the surplus coke from the by-product plant of the McKinney Steel Co., Cleveland, will be used by the Upson Nut Co. at Cleveland and the Upson company's supply, from ovens in the Connellsville region, will go to the McKinney furnaces at Scottdale and Josephine, Pa.

These arrangements by the administration are part of the general plan to curtail long hauls of coke and ultimately are to result in a general coke zoning system for the country somewhat similar to the coal zoning plan, only more largely made up of special instances similar to that involving the McKinney and Upson companies.

To Correct Consuming Methods

The fuel administration expects to canvass each industrial plant in the country in an effort to save from 25,000,000 to 50,000,000 tons annually in the nation's fuel supply. Announcement of this plan came with the appointment last week of Thomas R. Brown, Pittsburgh, as administrative engineer for the Pittsburgh district, and C. P. Billings as his special assistant. Other similar appointments will be made for other districts.

The administration hopes to be able to save large tonnages through correcting operating methods now in use. These corrections are to be made without delay or expense or new equipment, the administration says, and are to benefit the coffers of the companies involved as well as conserving fuel for other purposes.

Institute Program

Includes Paper on Relations of Trade Papers to Industry

Six major papers will make up the formal program of the fourteenth general meeting of the American Iron and Steel institute, to be held at the Waldorf-Astoria, New York, May 31. Five of these will relate to technical and manufacturing subjects. The sixth, which promises to be received with much interest, will deal with the relations of the trade papers to the iron and steel industry. B. S. Stephenson, Pittsburgh representative of M. A. Hanna & Co., who will present this paper, is peculiarly fitted by his experience to deal with the topic in a broad, practical fashion. For several years Mr. Stephenson was associate editor of THE IRON TRADE REVIEW at Cleveland and New York.

The program of addresses and papers is as follows:

Address of the president, Elbert H. Gary, New York.

The Electric Steel Plant at South Chicago, T. W. Robinson, vice president, Illinois Steel Co., Chicago.

The Design of the Modern Blast Furnace Stack, J. G. West Jr., general superintendent blast furnaces, Jones & Laughlin Steel Co., Pittsburgh.

The Modern By-Product Coke Oven and Its By-Products, W. H. Blauvelt, consulting engineer, Semet-Solvay Co., Syracuse, N. Y.

Effect of Phosphorus in Soft Acid and Basic Open Hearth Steels, J. S. Unger, manager, central research bureau, Carnegie Steel Co., Pittsburgh.

Conservation of Ferromanganese, papers to be arranged for by C. A. Buck, vice president, Bethlehem Steel Co.

Relation of the Trade Papers to the Iron and Steel Industry, Bertram S. Stephenson, M. A. Hanna & Co., Pittsburgh.

Discussions of each paper under five-minute rule.

The banquet will be held Friday evening. A buffet luncheon will be served during the Friday recess.

Storms Damage Plants

Chicago, May 14.—Recent heavy storms have done considerable damage to industrial plants near Chicago, some of which is causing interruption to operation. At the plant of the Republic Iron & Steel Co., East Chicago, Ind., three smokestacks were blown down at the bar iron mill, necessitating a shutdown for a week or ten days. At the Indiana Harbor works of the Inland Steel Co., an ore bridge was toppled over and will require two to three months for rebuilding. This is one of five bridges, so that the handicap will be only partial. At the plant of the Iroquois Iron Co., South Chicago, an ore bridge was also blown over.

Auto Output

Will Not Be Curtailed by Formal Order—License Japanese Plates

Washington, May 15.—Automobile manufacturers have received assurances from the war industries board that there is no truth in the report that there will be 75 per cent curtailment in the passenger car production. There will be no government order at all curtailing automobile production, at least from present indications. Automobile builders, however, have been given to understand that the question of materials and transportation is a serious one and that all government requirements shall come first. Therefore, there will be automatic restriction of all nonwar industry, due to inability to get sufficient material. In other words, these industries will take the steel left after government requirements have been taken care of.

It is learned that the war trade board has granted licenses for the exporting of a large tonnage of steel plates for the Pacific coast to Japan. These plates are being sent as part of the agreement by which Japan turned over to us a large tonnage of shipping. Much criticism is to be heard by reason of the delay in granting these licenses, as the agreement was made more than a month ago.

Ruling is Confirmed

New York, May 14.—Chairman E. H. Gary of the general intitute committee today issues following statement: "The war industries board has confirmed this committee's interpretation of the President's announcement of Dec. 28 that all deliveries iron ore, pig iron, bar iron, steel and steel products made on and after April 1 under contracts entered into on and after Dec. 28 shall not be invoiced at prices higher than maximum in effect at time of delivery, as specified in President's announcement March 27. It is hoped all buyers and sellers of any of the above products will be governed by this ruling."

Starts Another Bar Mill

Youngstown, O., May 15.—Officials of the Carnegie Steel here have placed the new 10-inch bar mill at the McDonald plant in operation. This mill will have a capacity of 600 tons of finished material per 24 hours. Like the 8-inch bar unit which has a capacity of 350 tons of bars per 24 hours, it is one of the most modern and complete bar mills in the country. Work is being rushed on the new hoop mill and from present indications it will be in operation in about six months.

Ferro Shortage

Next Winter Feared by Steelmakers—Rail Orders Placed

New York, May 15. (By Wire.)—High opinion in the steel industry is that next winter will witness a great shortage in ferromanganese. It is believed it is a mistake for the government to restrict as at present the amount of shipping allowed for manganese ore. England can send over considerable ferromanganese in the next four months if the imports restriction is removed. Beyond that time the English supply of ferromanganese for this country is problematical on account of the ore supply. England is depending to a growing extent on Brazilian instead of Indian manganese ore because of the difficulties in bringing in the latter.

The Cambria Steel Co. has been allotted an order for 20,000 tons of bessemer rails for France. The Steel corporation has taken an order for about 50,000 tons of bessemer rails for delivery next year to South Africa. Prices on rails have remained unchanged.

Names Executive Board

Philadelphia, May 14.—A meeting of the recently organized Merchant Pig Iron Distributors' association was held in this city today. President W. S. Pilling appointed an executive committee consisting of J. O. Henshaw, of Boston; L. H. Miller, of Reed, Fears & Miller, New York; Robert C. Lea, of Robert C. Lea & Co., Philadelphia, and T. C. Ward, of Hickman Williams Co., Pittsburgh.

Machinists and others who recently went on strike at the plant of the Savage Arms Co., Utica, N. Y., have returned to work.

The Non-Ferrous Metals

Copper Lead Spelter Tin

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	**Aluminum	Spot antimony
May 8	23.50	.....	6.70	7.00	32.00	13.00
May 9	23.50	.....	6.75	7.00	32.00	12.50
May 10	23.50	.....	6.75	7.25	32.00	12.37½
May 13	23.50	.....	6.80	7.25	32.00	12.25
May 14	23.50	.....	6.85	7.30	32.00	12.12½

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
**Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 32.10c; one to 15 tons, 32.20c.

New York, May 14.—The tin market continues strong, with metal extremely scarce. Realizing the seriousness of the situation, the economy board of the council of national defense is now holding conferences with representatives of various consuming industries in an effort to bring about only the most essential use. Chinese tin is available for spot delivery in small quantities at as low as $1.10, after having been as high as $1.25, New York, with metal for shipment at the Pacific coast holding at $1.06, New York. May shipment from China is quoted 98.50c to 99c. The situation at Batavia continues slightly unsettled, with the trade here as much in the dark as ever as to what may be expected in the future.

Improved inquiry from galvanizers and other consumers made for higher spelter prices during the past week. Prime western for prompt and May and June shipment advanced to 7.25c to 7.37½c, St. Louis. July is firm at 7.50c. Reports of early buying for the allies and some buying of grades B and C hy the government also lent strength to the market. Brass special is holding strong at 7.62½c to 7.75c, St. Louis.

While little trading developed in lead, the market was somewhat stronger. This was due in part to the upward turn in spelter and to the growing realization that supplies in the east were none too plentiful. While this resulted in a slightly improved volume of inquiry, sellers were scarce and little business resulted. Lead in the outside market is now holding at 6.85c to 6.90c, New York, for prompt, and 6.75c to 6.80c for May and June shipment. The leading seller continues to quote 7c, New York.

Antimony sagged throughout the greater part of the week. Sellers at one time offered spot delivery as low as 12.12½c, duty paid. After cheap holders got rid of their metal the market moved up to 12.50c to 12.70c, duty paid, but today it again sagged to 12c bid, 12.25c asked.

Belief that there is little likelihood of a downward revision in prices after June 1 and that quotations might be set at a higher level resulted in a somewhat better demand for copper from private consumers. Sellers, on the other hand were scarce and little metal changed hands.

Aluminum continues dull and unchanged.

New Iroquois Furnace Now in Blast

Furnace Rated at 600 Tons Capacity—A Solid Armor of 1½-Inch Plates Encircles the Tuyere Breast—Elevator Permits Easy Access to Top of the Stoves and Furnace

TO build and put in operation within a period of 12 months a new blast-furnace unit of the largest size, complete with an ore dock and ore handling machinery, including extensive changes in the existing boiler and power houses, blowing equipment, ore bins, electric transmission, water mains and sewers, without loss of tonnage on other furnaces, is a record in these days of embargoes, transportation difficulties, and scarcity of labor and materials. This feat has recently been accomplished at the plant of the Iroquois Iron Co., Chicago.

Early in 1917 the Iroquois company decided to increase its pig iron production at South Chicago. Soon after a contract for building a new 600-ton blast furnace was awarded to Freyn & Co., Chicago. The new furnace was to be built in line with the two 400-ton furnaces which were erected in 1911-12. These furnaces were fully described in an illustrated article published in THE IRON TRADE REVIEW, page 49, Jan. 4, 1912. It was the expectation of the Iroquois officials to have the new furnace in blast when lake navigation opened this spring. Ground was broken on March 12, 1917, and due to the excellent co-operation of the owners, engineers and contractors, it was possible to blow in the furnace on March 5, 1918, or considerably ahead of the scheduled time.

The new stack was erected at one end of No. 4 cast house. The cast house roof afforded splendid protection for the work of excavating, pile driving and putting in the concrete foundation. It was left intact as far as possible. The work due to this protection proceeded without interruption during the winter weather. The excavation which was accomplished in record time by the Iroquois Iron Co.'s own labor forces, included the removal of 1500 cubic yards of reinforced concrete. All other excavating, piling and concrete work was done by the Great Lakes Dredge & Dock Co., Chicago.

The new blast furnace from the iron notch to the top ring is 92 feet high. It has a bosh diameter of 22½ feet, a hearth diameter of 18½ feet, and a cubical content of 25,000 feet from the bottom of the closed 13-foot bell to the iron notch. The 10 cast iron columns which support the steel plate mantle rest on a continuous cast iron sub-base. The hearth jacket is cast iron. It is of the segmental, water-cooled type, heavily banded. The tuyere breast shown in Fig. 11 consists of a solid armor of 1½-inch plates with openings for 10 tuyeres. The bosh is reinforced with eight bands, 1½ inches thick. The furnace shell, which is specially designed to meet modern furnace lines is surmounted by a Kennedy top dome. The latter, which is of heavy construction, is integral with the shell. The stock line of the furnace is protected by wearing plates of white iron. The furnace top is of the Brassert type, and is designed to decrease the production of flue dust. The design of the receiving hopper and throat was also worked out so as to give a correct distribution even when the charge is not revolved. The top allows of adjustment and proper centering of both bells and hopper. This insures uniform wear on the lining and regular operation of the furnace. The uniformity of distribution on the big bell independent of the method of charging is effected by the McKee revolving mechanism. The gas from the top of the furnace

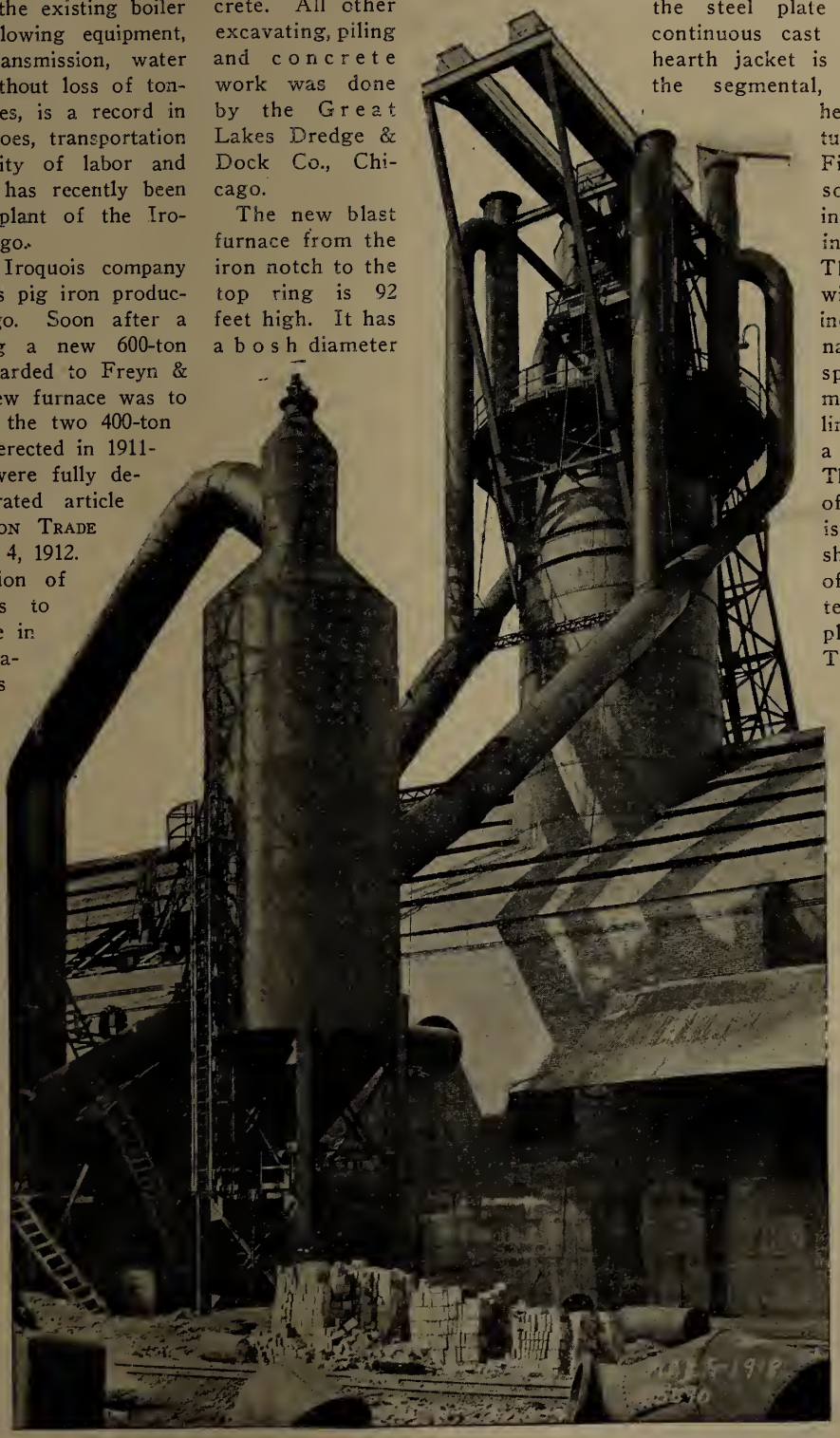


FIG. 1—TOP OF FURNACE SHOWING UPTAKE AND DOWNCOMER PIPES

passes into four uptake pipes, two of which are equipped with Baer safety explosion valves. There are four downtakes, each two combining into one unlined downcomer. The two downcomers which are clearly shown in Fig. 1 enter the dustcatcher radially. The gas, leaving the dustcatcher, passes through a 15-foot Brassert gas washer, and then through a 12-foot dryer, the clean, dry gas being delivered to the stoves and boilers.

The washer which is shown in Fig. 9 embodies the standard Brassert principle of two-stage scrubbing. In the first rough-cleaning stage the heavier portion of the dust is eliminated and the gas is primarily cooled. The second stage in the same tower effects the fine cleaning. The dirty gas which enters at the bottom meets a heavy spray of water from the hurdles above. Rough dust is precipitated and the gas saturated with water vapor. The latter is condensed on its upward travel, entrapping the fine dust and fume particles. The rough-cleaning stage is arranged to give a combined rain and contact effect in cleaning and cooling the gas. Channeling and stratification are prevented by the spacing and arrangement of the superimposed hurdle elements which retard the descent of water through the scrubber and give an increased time element for cleaning. In the second stage of fine cleaning, the gas at considerable velocity impinges against three successive, double rows of inclined baffles. These are set at an angle with spacing to insure a maximum impinging effect, and to overcome any back pressure. The effect of a dynamic or rotary washer is approximated at this stage. All water used in the second-stage cleaning is passed through specially designed spray nozzles in such a manner that the water and gas are forced into intimate contact as they impinge and travel through the baffles. The counter current effect is utilized to the fullest extent. The gas leaves the scrubber within a few degrees of the initial temperature of the entering water.

Experience with this type of washer has not only demonstrated satisfactory economy in operating and maintenance charges, together with economy in water consumption, but has shown favorable characteristics in amount of care required. A constant supply of water is essential for successful operation. With the water supply assured, the scrubber remains clean and no inspection is required during a blast campaign. There is no mechanism to require attention. The washer is built large enough to handle heavy dust loads on a slipping furnace. The large number of these scrubbers which have been in operation for a number of years have offered opportunity for inspection at the end of various furnace campaigns. They have invariably been found clean after a number of years service. Many hot blast stoves which use the gas from this type of scrubber have similarly been inspected and have been found to have clean, undisintegrated checker work and joints.

Three 2-pass stoves, 22 x 100 feet, supply the hot blast. A passenger and freight elevator which has a capacity of 1500 pounds and ascends 150 feet per minute, gives access to the top of the stoves and furnace. It is located adjacent to one of the stoves and is 100 feet high. The elevator is shown in Fig. 8. The stoves were built with 285,000 square feet of heating surface, 3½-inch checker openings and 2-inch checker walls. Washed gas is burned by means of specially designed gas burner shown in Fig. 10.



FIG. 2—ANCHORING SKIP BRIDGE TO THE TOP OF THE FURNACE. CAST HOUSE LEFT INTACT AS FAR AS POSSIBLE

The checker and arch construction follows the Brassert-Jones patent. This construction forces the equalization of the flow of descending gas and ascending air through the checker openings. It has proved effective in overcoming the tendency of gas and air to channel and to give hot and cold segments in the checker work. The ability of a stove of this type to carry high heats from 1300 to 1400 degrees Fahr. on wind volumes in excess of 40,000 cubic feet per minute, and to maintain stack temperatures not in excess of 400 degrees Fahr. over periods of a con-

tinuous furnace blast, has already been demonstrated. Putting the furnace on a 3-stove basis, accomplishes a notable saving in stove equipment, including shell, lining, valves, and other castings and accessories, decreases radiation and leakage loss, and saves operating labor. The stoves are insulated between the brick lining and stove shell. They are fitted with 30-inch Mathesius hot blast gate valves. This type of valve was described in the Aug. 23, 1917, issue of THE IRON TRADE REVIEW.

The valves were originally developed at the South Works of the Illinois Steel Co., where many have now been in service for over three years without replacement. As contrasted with the mushroom type, they eliminate the usual double right angle turn of blast travel with the attendant difficult brickwork. Wind leakage is negligible on account of the faces of the seats and valves being tapered and in alignment. This also eliminates cutting and cracking of the faces of the gates and seats. Each valve is equipped with two stems which are interlocked by an external yoke. There is no water leakage between the stems and valves since the latter do not drop on the seats nor do the valve gates bind on the stems. With the stove on blast, the gate of the valve is completely drawn from the path of the blast. This preserves the face of the gate. The withdrawal of the gate from the path of blast effects a saving in heat, tests having shown an increase in temperature of cooling water that is negligible as compared to the marked increase of temperature of cooling water through the mushroom-type valve. Before the valve is installed, it can be inspected for closure and alignment, and there is always assurance of a long life of equipment with freedom from wind and water leaks.

The existing chimney flues had to be interconnected and a 20-foot tunnel cut through the concrete foundations of No. 4 furnace stoves to connect with the flues of the new stoves. This work, including the interconnection of the boiler flues to equalize drafts in the two existing stacks, was made with both Nos. 3 and 4 furnaces in blast.



FIG. 3—CAST-IRON SUB-BASE IN 10 SECTIONS IS MOUNTED ON TOP OF OUTER HEARTH WALL. COLUMNS READY TO BE BOLTED TO PLATES

Overhead Cold-Blast Mains

The original plant had been designed for only two blast furnaces. The cold-blast mains were located underground and arranged in such a way that it was impossible to connect the cold-blast main of the new furnace with the existing turbo-blowers. In order to connect the turbo-blower with all three blast furnaces, it was decided to change the cold-blast main system entirely, all mains being placed overhead and connected accordingly. This difficult work was performed during one of the severest winters known in Chicago and without interfering with the operation of the existing blast furnaces.

The iron and steel for the new furnace, stoves, gas washer, hot-blast and cold-blast main system, was fabricated and erected by John Mohr & Sons, Chicago.

In order to stock ore for the new furnace a 350-foot extension of the present ore dock and ore storage yard was necessary. As the present type of dock construction had proved entirely satisfactory the same type was adopted for the extension. This work was done by the Great Lakes Dredge & Dock Co., Chicago. A combined ore-unloading and ore-handling bridge with a span of 300 feet was furnished by the Mead-Morrison Mfg. Co., East Boston, Mass. It is equipped with an automatic grab bucket which has a capacity of 11 tons. The ore is delivered to the plant by boats unloaded by the bridges and buckets and is discharged into deflecting hoppers which are built in the framework of the dock shear-leg towers. It is then either transferred into railroad cars, or delivered directly to transfer cars which traverse the ore bins.

The new ore, coke, and limestone bins are of the Baker suspension type and are built of reinforced concrete and steel. The bin system occupies a space of 169 feet and consists of nine ore, five limestone and one scrap bin all of

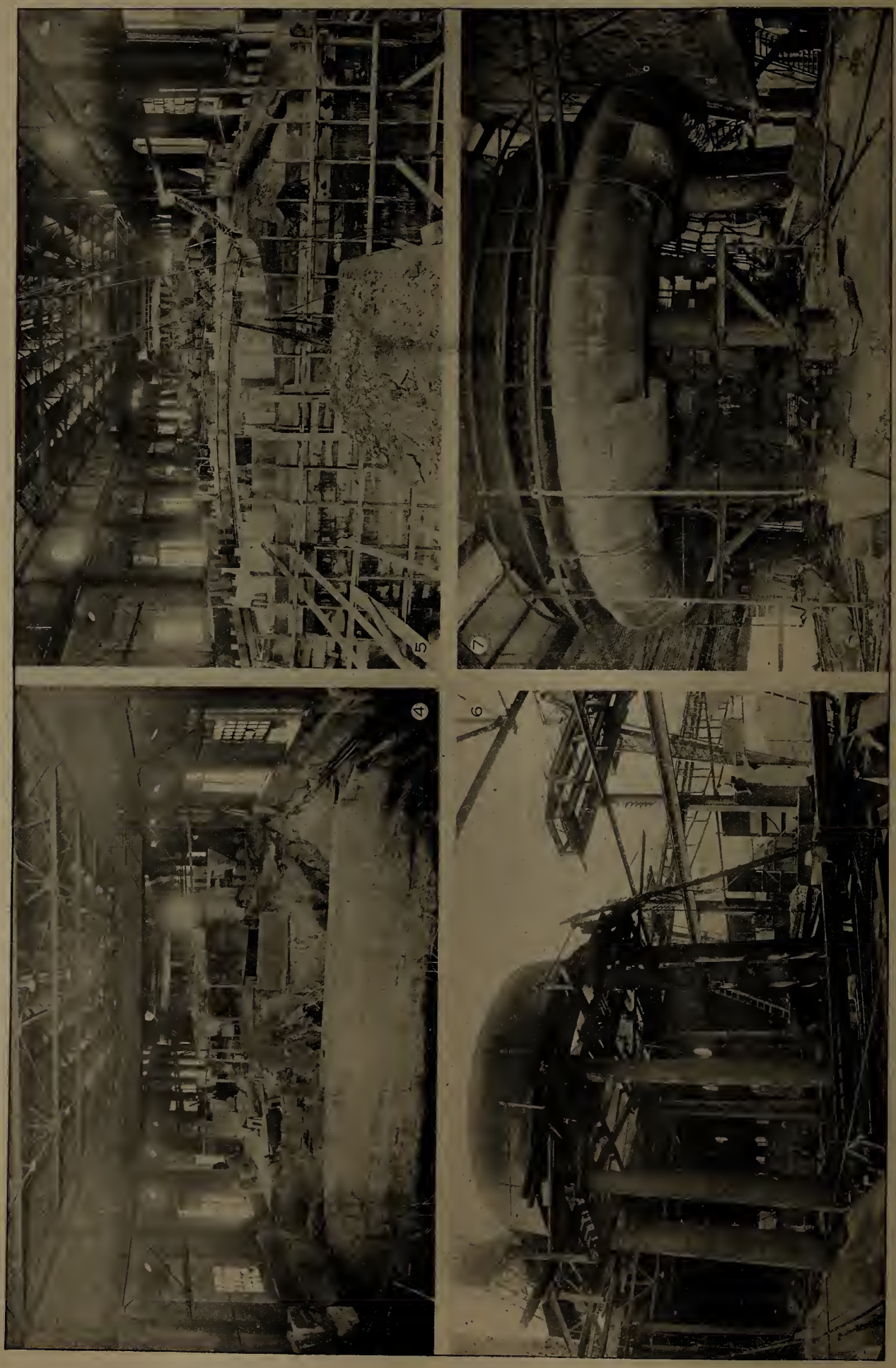


FIG. 4—PROGRESS OF CONSTRUCTION MARCH 21, 1917. FIG. 5—HEARTH FOUNDATION 83 DAYS LATER. FIG. 6—FIRST SHEET OF THE SHELL INSTALLED 169 DAYS AFTER CONSTRUCTION WAS BEGUN. FIG. 7—FURNACE IN BLAST 369 DAYS AFTER GROUND WAS BROKEN

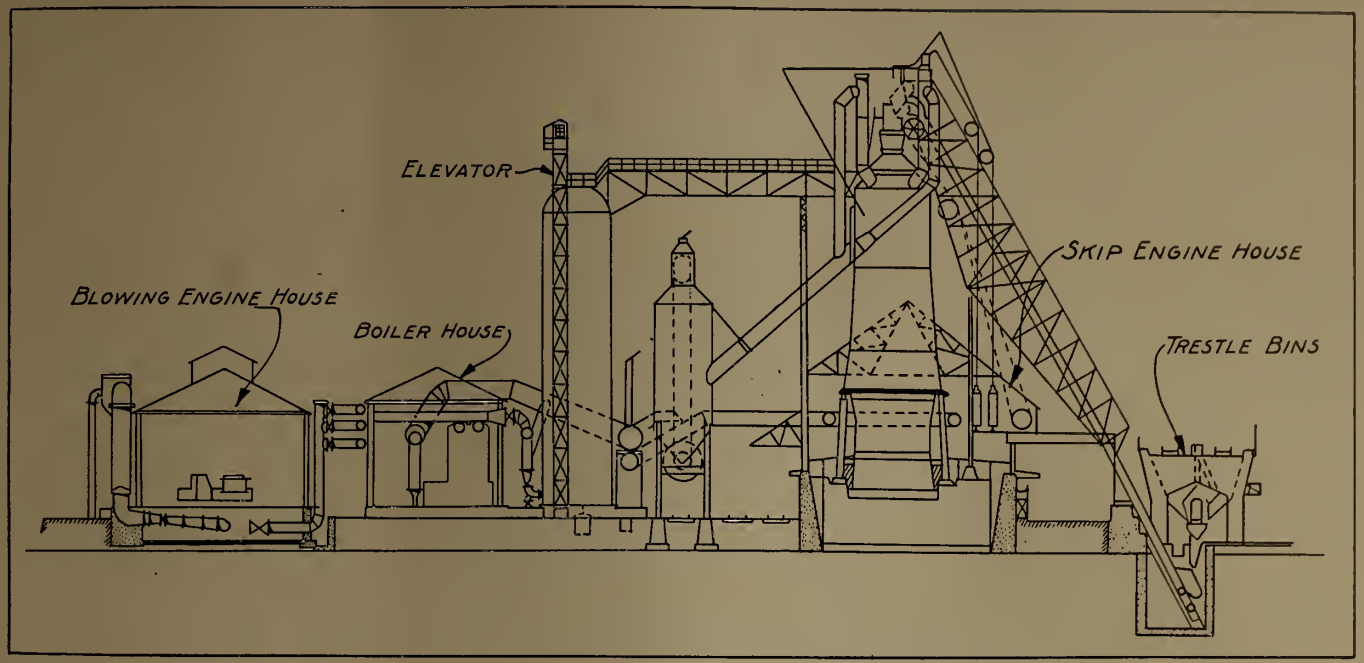


FIG. 8—SECTIONAL PLAN OF THE 600-TON FURNACE OF THE IROQUOIS IRON CO. THE ELEVATOR IS BUILT ADJACENT TO NO. 3 STOVE

which discharge into scale cars. One double coke bin discharges directly into the skip cars. The bins were designed by Arthur G. McKee & Co., Cleveland. Before they could be installed, the existing high-line had to be removed and relocated without interrupting the operation of the other furnaces. This was an intricate job, as the high-line consisted of three separate trestles which necessitated the relocation of the entire high-line of 600 feet in length, in order to keep it in relative position. To avoid interference with the operation of the transfer car, while the skip tank was being installed, only one track of the double-track structure was removed at one time. The skip pit required an excavation of 40 feet below the yard level with a head of water of 35 feet. After installing the skip tank the other track was removed and the bins were erected. The filling of furnaces Nos. 3 and 4 was not effected by this work.

The skip bridge is of the cantilever type inclined 60 degrees from the horizontal. It is supported entirely independent of the blast furnace, so as to keep its load off the furnace. The skip bridge which was furnished by the Worden-Allen Co., Chicago, is shown in Fig. 11. It is 171 feet long and supports a double track upon which two heavy skip cars operate. The latter are of the trailer truck type. The weight of a skip load is eight tons of ore, and each car holds 110 cubic feet of coke.

The skips are operated by a double-drum skip engine built by the Lidgerwood Mfg. Co., New York. The drum is driven through reduction gears by a 200-horsepower Westinghouse motor. Auxiliary equipment for controlling the operation of the skips was supplied by the Cutler-Hammer Mfg. Co., Milwaukee. The hoist engine is in a concrete and brick structure directly under the skip truss, and above the iron-ladle tracks. This structure also houses the bell cylinders for raising and lowering the bells. The latter are operated by air from the cold-blast main. The skip cars and bells are operated from the scale car.

The steel and tile roof of the cast-house was remodeled to fit the skip incline and furnace. An extension to

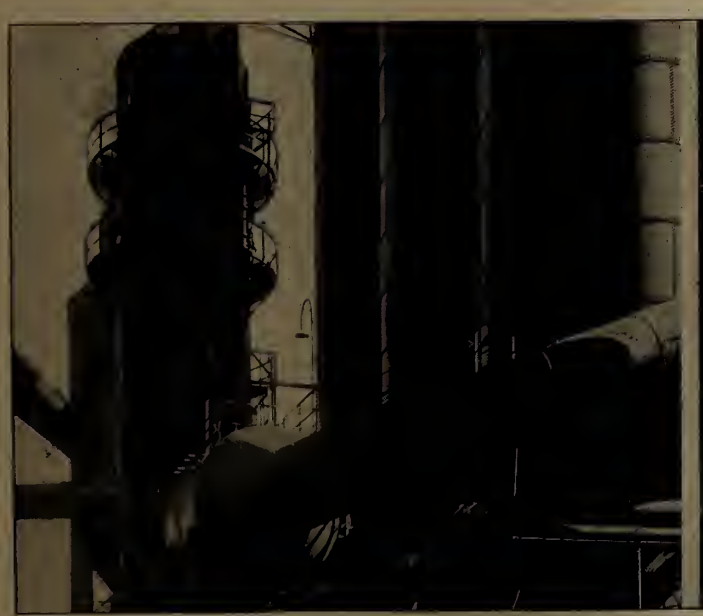


FIG. 9—GAS WASHER AND SOW DRIER. GOGGLE VALVE IN GAS MAIN



FIG. 10—GAS BURNER AT STOVE. BUTTERFLY VALVE IN LEG-PIPE



FIG. 11—TOP RIGGING AND SELF-SUPPORTING CANTILEVER SKIP BRIDGE. NOTE PLATFORMS NEAR SHEAVES

this cast-house was made to provide a modern lavatory and locker room for the comfort of the blast furnacemen. The blacksmith shop was moved 300 feet and placed on new foundations.

The cold blast is supplied by a turbo-blower which delivers 45,000 cubic feet of air per minute. The blower was built by the Ingersoll-Rand Co., New York. For additional steam requirements two 550-horsepower Rust boilers with superheaters were installed. To do this it was necessary to extend the boiler house 40 feet. The boilers are equipped with Birkholz-Terbeck premixing gas burners. No addition to the power house was required, there being room for the installation of the new turbo-blower and of a 600 kilowatt turbo-generator. The latter was furnished by the DeLaval Steam Turbine Co., Trenton, N. J.

Condensing equipment for the turbo-generator and turbo-blower of ample size to take care of an additional blowing engine was furnished by the Alberger Pump & Condenser Co., New York. Additional pumping capacity is being furnished by a 20,000,000-gallon DeLaval centrifugal pump. A second double-strand Heyl & Patterson pig-casting machine was installed, together with a ladle-tilting device. The necessary pipe work for water, steam, air and oil lines as well as the remodeling of the existing piping occasioned by the construction of the new blast furnace, was erected by the Pittsburgh Piping & Equipment Co., Pittsburgh.

The excellent showing made in the construction of this blast furnace which involved placing 60 subcontracts, is due to the co-operation of the owners, engineers and contractors. The best efforts of all concerned were concentrated on the fulfilment of the task which they had set out to do.

Germans New Society Aimed at Warfare

According to a translation by Sir Robert Hadfield of England, the Kaiser has approved the foundation of a trust which will be known as "Kaiser Wilhelm Trust for Promotion of War Science". The aim of the trust is to further the development of scientific and technical aids to warfare, by uniting the scientific and the military forces of the country for work together. The scientific military work is to be carried on by the committee for the chemical raw materials, for the production of munitions-manufacturing materials; committee for chemical war materials (powder, explosives, gas, etc.); committee for physics, including ballistics, telephony, telegraphy, determination of targets and distances, measurements, etc.; committee for engineering and communication; committee for aeronautics; committee for obtaining and preparing metals.

Employs Unique Carrier for Pig Iron

The Niles stack of the Carnegie Steel Co., Niles, O., was blown in May 6 after being banked since Sept. 29, 1917, on account of the coke shortage. It was placed in operation Oct. 10, but after a run of two days was forced to suspend. Later the blast was put on long enough to get a cast of iron. Streams of water were turned in the top of the furnace and allowed to quench the stock. The superintendent states that the cold stock was raked out to the level of the iron notch. Picks were used to loosen the cinder which was extrely soft to a depth of 2 feet below the tapping hole. No salamander was encountered to this depth. During the shutdown, a Tod blowing engine was installed and all blowing engine valves replaced with the Mesta type. An electric generator which will be held for emergency purposes was also added to the electrical equipment. A unique method is used at this furnace for transferring the pigs into the railroad cars, the equipment used for this purpose having also been installed recently. Bolted to the roof cross girders and equally spaced are four monorails, one end of each extending over railroad cars at the far end of the cast house. Each monorail is equipped with an electric hoist block, the hoisting hook of which is fitted with a scoop-shaped container. After the iron is cast the sows and pigs are broken and loaded into the container. The latter is then elevated, moved to the rear of the cast house until it is positioned over the railroad cars, and automatically dumped. By means of this equipment the pig beds are cleared more quickly while the pigs are only handled once.

Using Pulverized Coal Efficiently

Practical Methods of Crushing, Drying and Delivering the Fuel to the Furnace Together With Important Details Essential for Proper Combustion Are Discussed—Four Types of Burners Are Compared

BY H. R. COLLINS

THE purpose of pulverizing coal before burning it is to make available every heat unit it contains. Machinery has been developed which will pulverize coal in one operation, delivering it to bins in front of the furnaces at an expenditure of about 17-horsepower-hour, per ton, in a medium-sized plant. The cost of the operation depends upon the amount of moisture that must be expelled before pulverizing, the cost of labor, and the cost of coal delivered at the plant. At a small plant, requiring a pulverizer with a capacity of only ½ ton per hour, the cost per ton pulverized will naturally be greater than at a plant requiring the largest pulverizer, with a capacity of 7 tons per hour.

The first step is to reduce large lumps to a size suitable for drying uniformly, before passing to the pulverizing mills; this is done in rolls, at a single pass. The second step is the elimination of moisture, in order to facilitate pulverizing to great fineness, while also increasing the heating effect and the temperature attainable when the coal is burned.

Driers are now manufactured which are able to eliminate moisture without distilling any of the volatile combustible matter in the coal; they are fired by hand or with pulverized fuel. The heat first surrounds the shell of the drier, being confined within a chamber where complete combustion takes place; the heated gases are then led through a duct to the discharge end of the drier and enter the inside of the shell at a temperature not exceeding 300 degrees Fahr. This temperature is maintained by the operator and is indicated by a pyrometer. Volatile combustible matter is not likely to be distilled until the temperature rises above 400 degrees Fahr.

Protecting the Pulverizer

On discharging from the drier, the coal is usually passed over a magnetic separator in order to prevent pieces of iron from going to the pulverizer. Two types are used—a magnetic pulley, which automatically discharges its collection of iron, and a lifting type, from which the iron is removed by hand when convenient. In the operation of pulverizing, the coal should preferably be reduced until 95 per cent will pass through a 100-mesh and 70 per cent through a 300-mesh sieve. Such a product is obviously an almost impalpable powder. After pulverizing, the fuel is conveyed by one of several methods to the point where it is to be used. In several installations the pulverized coal is conveyed a distance of over 900 feet. Where possible, a bin should always be installed at the furnace, in order to guard against interruption of supply.

Regulating the Supply

Feeders are practically indispensable for regulating the passage of the fuel from the bin to the burner. They are now made quite simple and highly efficient. They deliver the pulverized coal in definite quantities into an air current of fixed volume, where the air disseminates the pulverized fuel, surrounding every particle and putting it into condition to develop all its energy. The first to ignite are the volatile gases; these raise the temperature to the ignition point of the solid carbon, and before leaving the zone of heated air every particle has released its last heat unit. It is entirely possible to obtain temperatures ranging between 1900 and 3500 degrees Fahr.; the latter temperature was observed in an open hearth, when the average temperature of the furnace itself at some time ranged from 3100 to 3200 degrees Fahr.

To justify the expense of erecting a special building, and installing special machinery to pulverize coal, the following advantages in its use may be enumerated:

1.—Conservation of the country's fuel, by utilizing every heat unit in the coal, made possible by this method of consumption.

2.—Reduction of labor for handling coal to the point of consumption, handling by the fireman, and the removal of ash and unconsumed fuel from the ashpits; practically all of this expense is avoided when fuel is burned in pulverized form. All the coal is received at one point, and thereafter it is handled entirely by automatic machinery, the human element being eliminated, except for supervision, adjustment and repairs.

3.—From actual experience with many grades of coal it has been found that nearly every carbonaceous fuel in solid form, from lignites to the graphitic anthracites of Rhode Island, will yield its maximum measure of heat, if burned in a truly pulverized condition.

4.—Coal in pulverized form can be injected into a furnace on a column of air, at low velocity, thus allowing the expanding gases to liberate their heat without erosion of the refractories.

5.—Pulverized fuel permits the maintenance of a constant temperature in a furnace, when the relative amounts of fuel and air have once been set, and the body of the furnace has been brought up to the desired temperature. It will continue thereafter under what is known as a test condition. Furnaces can be operated in this manner hour after hour, as shown by charts of recording pyrometers. The correct relationship between the amount of pulverized fuel and the volume of air, for any desired temperature, can be controlled automatically, after adjustment to the particular grade of coal in use, thus using a minimum of excess air. Gas analyses have been obtained as high as 17 per cent of CO_2.

Coals of about 35 per cent volatile, 50 per cent fixed carbon, 8 per cent or less ash, and 2 per cent or less sulphur, are preferable for kilns, boilers or metallurgical furnaces. Coals analyzing 25 per cent ash, and 5 per cent sulphur, have caused no trouble in kilns, boilers or metallurgical furnaces. Experience shows that sulphur is entirely consumed by burning in suspension, none of it being absorbed by the metal or other liquid bath, as does occur in the usual reverberatory furnaces used for melting electrolytic copper. Storage bins for pulverized coal should be dust-tight and have steep hoppers. This enables old coal to leave the bin completely; accumulations of old coal are liable to fire, smolder, coke and cause more or less annoyance.

Advantages of Pulveried Coal

Coal should be pulverized: (*a*) To give the finest product with the least power consumption. (*b*) To permit high temperatures with the least consumption of fuel. Drying of the coal also promotes uniformity of temperature. (*c*)

Abstract of paper to be presented at the September, 1918, meeting of the American Institute of Mining Engineers. The author is mechanical engineer for the Fuller Engineering Co., Allentown, Pa.

Dried coal will flow more easily from bins and through the feeders and burners. Coal should be dried to 1 per cent of moisture, or less, when possible, except that lignites can be readily handled with 5 to 8 per cent combined moisture. The finer the coal the more rapid its combustion, with relatively higher efficiency. It is commercially and economically possible to grind coal so that at least 95 per cent will pass a 100-mesh sieve and 70 per cent will pass a 300-mesh sieve.

The cost of preparing pulverized coal depends largely on the price, and on the moisture content of the coal to be used. On the basis of 200 tons per day, of coal containing 7.5 per cent moisture, at present rates of wages and supplies, and with coal ranging in price from $1 to $8 per ton, the cost of pulverizing will be between 30 and 40 cents per ton, not including overhead charges, interest, or depreciation.

Avoiding Explosions

A mixture of coal-dust particles in air will not ignite until it reaches a certain density; on the other hand, a mixture that is too rich in coal dust has a tendency to smother flame. Dust clouds should naturally be avoided outside the furnace chambers, and all sparks or flames should be kept away. Pulverized coal should be conveyed from mills to bins in as compact condition as possible; air currents should not be used to convey pulverized coal if any other method can be devised. Leakages should be stopped, to prevent uncleanliness and accumulations in accessible places. Carelessness in the handling of pulverized coal, and poorly designed plants, are the only causes of so-called explosions.

A good feeder must absolutely control the flow of pulverized coal to the burner, and prevent any rush or flooding of the fuel. This is essential for positive control of predetermined temperatures. A good mixing projector, of burner, should be so designed that it will receive the pulverized coal in regulated quantities, break up the stream of fuel, and so distribute it that each particle is surrounded by the correct proportion of air. It must also project the fuel into the furnace at the velocity required by the operation, and must be so proportioned as to deliver the necessary volume of air at the proper velocity.

Types of Burners

Four types of burners are employed, as follows:

1.—Induction type, in which a high-velocity jet induces and entrains the necessary additional air, and projects it into the furnace at low velocity; this type has the high-velocity air under control as well as the induced air.

2.—Positive type, in which the high-velocity air induces and entrains the fuel and projects it into a positive, larger column of low-velocity air. This breaks up the fuel stream evenly, and disseminating it through the larger column of low-velocity air, before it enters the furnace. The larger column of low-velocity air is usually preheated in stoves located in a chamber through which the waste gases from the furnace pass; temperatures of preheating range from 100 to 600 degrees Fahr. in the better designed system of stoves. Both columns of air are positive, being generated by fans or pressure blowers, while gates regulate the quantity.

3.—Single type, in which the high-velocity air first induces and entrains the fuel stream, after which a high-pressure jet of air, applied usually in the center of the stream, gives a sharp projection of flame and quick distribution of the fuel through a larger volume of preheated air at quite low velocity. This type of burner is usually adjustable in direction. The heated air ranges in temperature from 2200 to 1300 degrees Fahr., as in open-hearth practice; usually 10 to 15 per cent of the air enters with the fuel, and 85 to 90 per cent from regenerators. The stack draft through the regenerative chambers is regulated by a valve.

4.—Single type, in which the high-velocity air induces and entrains the fuel and projects it into the furnace, as in rotary-kiln practice, under usually 5 to 6-ounce pressure from a fan. The additional air required for combustion is induced by stack draft, and enters around the hood and through kiln discharge opening.

Air Pressure and Stack Draft

Air pressures of ⅜ ounce entering the combustion chambers of some types of furnaces, from air and fuel mixing burners, up to 2 pounds in pressure jets of other types, have been in successful, constant use for years. Stack draft should be of only sufficient intensity to create a partial vacuum in the furnace, thereby helping the fuel and air into and not out of the chamber; its strength must be enough, however, to extract all the products of combustion.

Fuels low in volatiles but high in fixed carbon, as anthracite and coke breeze, require a special furnace, in which the incoming fuel and air pass through the flame and the products of combustion, in a water-cooled, arched firebrick chamber, on their way to the furnace or boiler. When the volatile constituents of the fuel range from 1 to 3.5 per cent, it is difficult to support combustion unless a temperature above 900 to 1000 degrees Fahr., the flash-point of carbon, is maintained. The water-cooled arch, rear wall, and side walls are made of a special form of firebrick, which slips in place over the water tubes. After circulating through the tubes, the water passes to the hotwell or heater at approximately 190 degrees Fahr., entailing no appreciable loss of heat.

Lignites and bituminous coal require no special furnace. As the volatiles ignite between 600 and 700 degrees Fahr., from the radiant heat of the walls, the flame is self-supporting, and every heat unit in the fuel is liberated before coming into contact with any cold surface. Anthracite, coke breeze and lignite ash do not slag. Bituminous coal ash will slag on the bottom of the furnace chamber, if not blanketed with cooler air, properly admitted, and if allowed to remain too long in the furnace. Most of the ash from pulverized coal passes away through the breeching to the cyclone, where the ash is separated from the gases. That portion which settles to the floor of the furnace should be removed from time to time; the quantity is very small and it is quite light.

Degrees of Heat Maintained

Temperatures between 1800 and 3500 degrees Fahr. can be maintained in the flame. Slag forms more readily at high temperatures, necessitating proper blanketing with cooler air, always remembering the advisability of obtaining the maximum percentage of CO_2. We frequently obtain 16.5 to 17 per cent CO_2 under operating conditions.

Experience seems to point to the necessity for vertical baffle walls where the waste gases enter the regenerative chambers. Turning the direction of the gases up and down several times tends to discharge the dust tangentially, allowing the major portion to settle in the bottom of the passages, whence it is easily removed, through proper cleaning doors at the sides, not interfering with the operation of the furnace. The gases then filter through checkerwork properly spaced and installed. The narrow side of the brick tile should be laid vertical and on rider walls, to permit the use of longitudinal scrapers to remove the ash which may have passed by the vertical baffle walls. This arrangement will undoubtediy give the regenerating chambers a life equal to the best record ever attained, as the narrow edge of a vertical tile presents little surface for the flocculent ash to rest and close the gas passages.

Powdered Coal is Unharmful

The life of furnaces in which pulverized fuel is used is equal to that of hand-fired, stoker, oil, or gas-fired furnaces. By absolute control of the quantity of coal and air, the velocity of the expanded gases can be re-

duced until erosion of refractories becomes hardly discernible. All the benefits of pulverized coal should be taken into account: Labor saving, increased fuel efficiency, ability for closer adjustment, absence of smoke, etc.

The efficiency of hand firing depends upon the skill and reliability of the fireman. With the best of attention, a loss of 20 per cent heating value is frequent, and it often reaches as high as 40 per cent, taking into consideration the analysis of the ash and of the flue gas. Stoker firing is relatively more efficient and more regular than hand firing, but the feeding of moist coal wastes part of the heat in the most undesirable place. Losses also occur in breaking and removing the clinker, in the discharge of unburned fuel, and in the flue gas.

Coal properly pulverized and burned is on the same basis, as far as thermal capacity is concerned, as oil or natural gas; and the price of the coal prepared and delivered into the furnace is directly comparable, on the heat unit basis, with the cost of fuel oil or gas delivered into the furnace, plus the slight additional cost for ash removal. Savings by the adoption of pulverized fuel in the operation of various types of furnaces have been attained as follows: Heating and busheling furnaces, 20 to 25 per cent; puddling furnaces, 30 to 50 per cent; open-hearth furnaces, compared with gas producers, 30 to 40 per cent; copper reverberatory, smelting ore, 30 to 45 per cent.

In other furnaces, the consumption has been reduced to the following figures: Continuous billet heating, 160 pounds of coal per ton of billets; desulphurizing iron ore in rotary kilns, 296 pounds of coal per ton of ore; drying and nodulizing iron ore in rotary kilns, on basis of 30 per cent free moisture and 11 per cent combined moisture, 477 pounds of coal per gross ton of ore. The foregoing figures are from actual operations over extended periods, and confirm our contention that coal burned in true pulverized form is the only method by which every heat unit in the fuel will develop its full value.

Turns Ore to Wrought Iron

A PROCESS has been perfected and patented by Herbert Lang, chemical engineer, 1012 Hearst building, San Francisco, for manufacturing wrought iron using petroleum as fuel. The process has been placed at the disposal of the government through the bureau of mines. Mr. Lang claims that by means of his process wrought iron can be produced much cheaper than the prevailing market price. The process is best adapted to California ores which are practically limitless in quantity.

The features claimed for Mr. Lang's process are as follows:

1.—Forming a solid mass prior to introduction into the furnace.
2.—Keeping the mass intact during the whole process.
3.—Forming a slag which will assist in holding the mass together, exclude air, and extract to some extent, sulphur and phosphorous.
4.—Compressing the mass in an atmosphere of reducing, or at least neutral gases.
5.—Carrying on the process continuously.
6.—Using a furnace capable of administering a gradually increasing heat.

In discussing his process, Lang says the ore is ground so that it passes through a 16 mesh sieve. It is then mixed with a heavy oil, preferably asphaltum. The mixture is formed into a cylinder of such a size that the reduced iron in each one will weigh about 150 pounds, a convenient size for subsequent rolling. The cylinders are then placed in a furnace and heated gradually to the welding point of the iron, when they are taken out and compressed to form blooms of convenient shapes for the mill.

To preserve the mass, small portions of fusible silicate rock are added thus forming sufficient slag to hold the semi-fused mixture together. Lang's experimentation with phosphoric and sulphuric ores in this direction enable him to produce a comparatively pure iron, he maintains.

Open-hearth steel makers have offered Lang $40 a ton for his product, he says, which they propose to use in connection with pig iron. After working out his process laboratorily, he built a furnace large enough to turn out from one to two tons of iron a day. This furnace is said to embrace automatic features and to be continuous in its action.

A reducing atmosphere is kept within the furnace at all times so as to avoid the reoxidation of the iron which occurs whenever free oxygen is allowed to strike it. To avoid this the bloom is compressed before taking it entirely out of the furnace. This reoxidation is the rock upon which previous attempted processes in this line have foundered. No provision was made for the compression of the metal. Instead, it was uniformly sought to make only the powdered form of iron, which was to have been dealt with in another operation and usually in another furnace, to bring the material into a compact body. The hot powder absorbed oxygen with great avidity and, of course, became unweldable at once.

In previous attempts to make direct iron in reverberatory furnaces, it was necessary to rabble the charge upon the hearth in order to work the metal into balls. Mr. Lang avoids this by forming the ball before placing it in the furnace. The mass is thoroughly heated through and reduced in approximately four or five hours. Mr. Lang states that he has made iron of varying degrees of hardness from soft wrought iron to hard steel containing 2 per cent of carbon by his process.

Aero-Engine Development in Great Britain

At the annual meeting of the D. Napier & Son, Ltd., London, England, manufacturers of automobile and airplane engines, H. I. Vane, general manager, said they had far exceeded any previous year's output and that better results could be expected when the buildings now under construction were completed. The Napier company last year perfected an airplane engine of high power and light weight. Mr. Vane is of the opinion that government and civilian requirements for these engines will be large because airplane postal, light freight, and passenger routes will be established in the near future. The future of the motor industry, says Mr. Vane, should be a bright one, especially in view of the way in which motor transport has proved its worth. There is great need, however, for proper and adequate government protection for the trade, especially in the first few years after peace is declared. Sales organizations and factories will have to be rebuilt on a peace footing which is distinct from a war footing. In England the government is expected to aid the industry in this direction, especially after the patriotic way in which the whole industry adapted itself to government requirements and loyally supported them during this war.

At the April 11 meeting of the Birmingham Metallurgical society, Birmingham, Eng., a committee was appointed which eventually will form a trade research association. This association will collect data, trade secrets, etc., on the various alloys in which the metal trades are interested. The information will be pooled and placed at the disposal of all the members of the society.

Westinghouse Marine Engine Plant

The Westinghouse Electric & Mfg. Co. Has Built a Modern Plant for the Manufacture of Steam Turbines and Reduction Gears—Contracts With Government Necessitated Expansion

IT is officially announced that the Westinghouse plant at South Philadelphia for the manufacture of marine-power machinery is complete and it is understood that orders for apparatus representing 1,500,000 horsepower, equivalent to the equipment for about 300 steam vessels, will be filled before the end of next year.

Plant is Self-Contained

This new plant, which was conceived before our entrance into the war, is one of the largest of its kind in the country. It is completely self-contained and includes a foundry, pattern shop, forge shop, double-deck machine shop, erecting shop, etc. The machine shop is 750 x 125 feet. The foundry has a capacity of 2000 tons a month. The buildings have a combined floor space of 35 acres. About 5000 employes will be required for capacity operation.

The Westinghouse company acquired the Essington property toward the close of 1916. The storage house and pattern shop were completed by Aug. 15, 1917. By Nov. 15 the last building was completed and on that date the foundry went into commission.

The plant is located on a tract of land embracing 500 acres, with a frontage of 4500 feet along the Delaware river. The site is 9 miles south of Philadelphia and is reached by the Pennsylvania and Philadelphia & Reading railroads. The Delaware river also affords adequate means of transportation but as yet the company has built no docks.

The new plant is devoted exclusively to the manufacture of ship propulsion machinery principally for the Submarine Boat Corp. and the Merchant Shipbuilding Corp. as agents for the Emergency Fleet corporation, and also for the United States navy.

Buildings Are of Modern Construction

So far, there have been erected seven buildings. These, as previously mentioned, comprise the erecting shop, two machine shops, forge shop, pattern storage, foundry and power-house. Throughout the plant, the welfare and safety of employes has been given consideration and ample provision has been made for their benefit.

Expansion is Considered

In laying out the power and lighting systems, the engineers in charge of this work profited by the past experiences of other plants and designed a system which beside being able to supply present wants is capable of expansion should occasion require.

The company wished to use power from the Philadelphia Electric Co. and at the same time steam was necessary for the economical heating of the buildings during the winter months. After due consideration, a plan was perfected that promises to work efficiently for both the Westinghouse and the power companies. During the summer months no steam



INTERIOR OF FOUNDRY SHOWING GENERAL ARRANGEMENT AND TRAVELING CRANES

will be required at the plant except for testing purposes and on the other hand the power company during the winter months has an exceedingly heavy load. Under an agreement made between the two companies, the Westinghouse company is to operate its own power plant during the winter. As the plant is of the noncondensing type, the exhaust steam is to be utilized for heat. In the summer, when there is no call for steam heat, the Westinghouse company will use current from the Philadelphia Electric Co.

Underground Cables Used

Three-phase, 60-cycle current is delivered at 66,000 volts to an outdoor substation where it is stepped down to 6600 volts, the distribution pressure of the works, and sent to the powerhouse through lead covered cables which are located underground. The powerhouse at the present time contains three 3-phase, 6600-volt, 60-cycle, 1500 kilovolt-ampere steam turbines. A switchboard of two panels with the necessary measuring and switching devices controls the output of the power generating equipment. Six 625-horsepower boilers have been installed for supplying steam. They are equipped with automatic stokers.

Four substations have been installed for distributing the current to the various buildings. At these substations the 6600-volt current is stepped down to 440 volts for all constant-speed motor applications, such as elevators, machine tools and air compressors. Direct current at 250 volts is used for operating cranes, furnaces, blowers and other variable-speed installations. This current is obtained from converters of the rotary type which are installed at the substations.

In order to improve the power factor, the rotary converters are operated at 100 per cent power factor and the synchronous motors used for driving the air compressors in the substations are slightly oversize, the excess in capacity being used also as a corrective measure. From the substations the current is carried to the various buildings through underground cables to switchboards from which it is distributed to the motors.

The power and lighting systems are separate. The lighting system is supplied through its own transformers which are installed in each substation. Here the potential is reduced to 440 volts, which is the distribution pressure throughout the buildings. Transformers are installed on the outside of the buildings to reduce the 440-volt current to 110 volts which is the potential of the lamps.

A 7-foot canal has been dug from the Delaware river to the plant as a means of securing an adequate water supply for manufacturing purposes. At high tide, this canal has a surface of 45 feet. Mud and silt are removed from the water in a reinforced concrete settling basin. The canal ends in a concrete receptacle on the testing floor of the erecting shop, where a large amount of water is used in testing operations. This receptacle also is a distributing center for the other buildings. Fire protection is obtained from a reinforced intake flume and pumped to a tank from whence it flows by gravity. A plant has been installed for taking care of sewerage. The Imhoff system is used with lime as a precipitant.

Standard Construction Throughout

Heavy steel construction is used in all the buildings with the exception of the pattern storage. The walls are tile, the sash steel and the roofs, which are of the saw-tooth type, consist of concrete slabs covered with waterproofing material. The pattern storage is reinforced concrete. The construction is of the flat, mushroom type. The intermediate panels between the various concrete posts are made of tile.

H. T. Kerr, vice president of the Westinghouse company, directed the



EXTERIOR OF FOUNDRY SHOWING THE GENERAL DESIGN AND AMPLE PROVISION FOR LIGHT

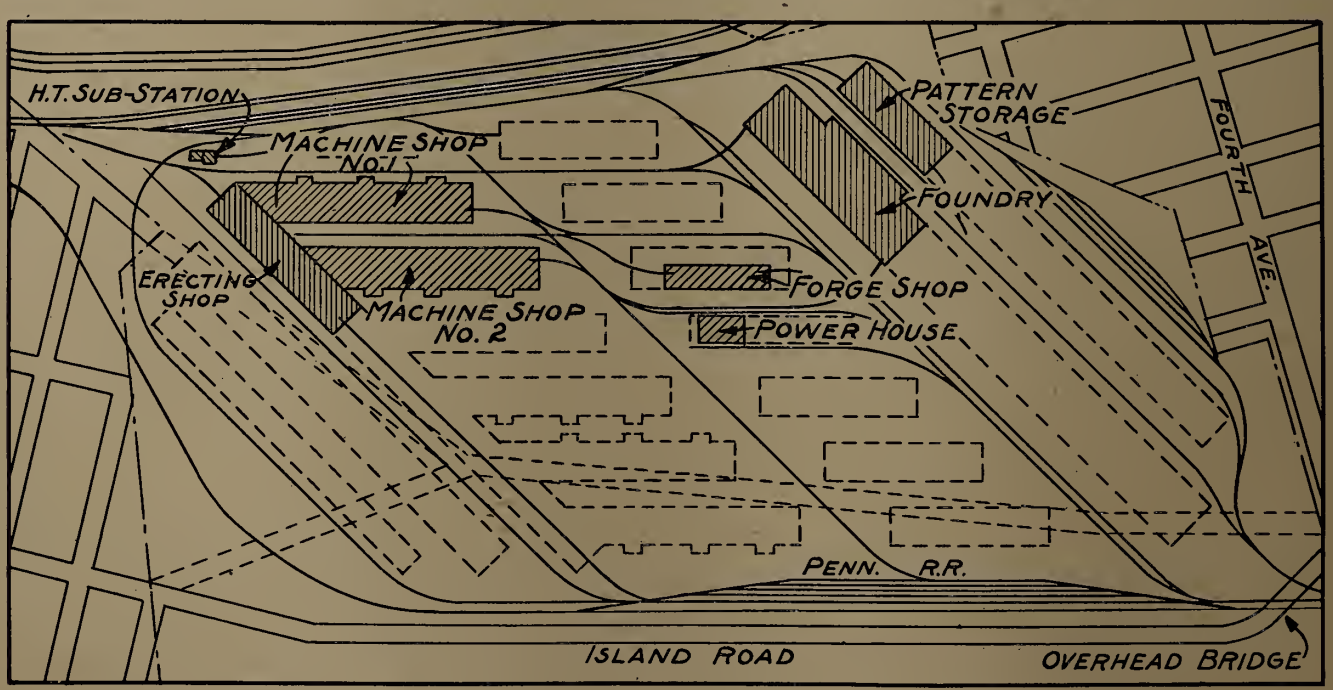


THE ERECTING SHOP IS ONE OF THE PLANT'S MOST IMPORTANT DEPARTMENTS

construction of the plant, while R. B. Hildon, assistant to the vice president, had direct charge of construction work. All of the various relations with the builders, Westinghouse, Church, Kerr & Co., were handled by Calvert Townley, assistant to President E. M. Herr, who had the final approval of all arrangements.

Will Make Shells

Certificate of incorporation has been filed in Buffalo for the J. J. Carrick, Inc., capitalized at $1,500,000, "to manufacture and deal in iron and steel and to deal in lumber and do a general mining business". The directors are Charles H. McCullough, vice president and general manager of the Lackawanna Steel Co.; Donald A. Mann, of Toronto, and Edward McMaster Mills, of Buffalo. It is understood that the new interest will take over the plant of the Militaire Motor Co., a defunct motorcycle factory in Kensington, and will manufacture 6-inch shells for the government. The shell contract is said to amount to $2,000,000.



SITE OF THE PLANT—TWO STEAM RAILROADS AND THE DELAWARE RIVER ARE CLOSE AT HAND

Correcting Heat Radiation Errors

Recent Temperature Measurements of Gases Show that the Hot Junction of the Thermocouple Has a Definite Relation to and Determines the Magnitude of the Radiation Error

BY HENRY KREISINGER AND J. F. BARKLEY

OF the errors entering into the determination of the average temperature of a stream of hot gases surrounded by colder or hotter surfaces, the radiation error is the most serious one and the most difficult to correct. Ordinary temperature measurements made with commercial devices under such conditions are from 5 to 25 per cent in error. If the surrounding surfaces are cooler than the gases, the temperatures indicated by the measuring instrument will be too low; or if the surrounding surfaces are hotter, as is the case in regenerating furnaces, the temperatures indicated will be too high. Radiation error may become of great significance under certain conditions of temperature measurements, and judgment must be used in interpreting the accuracy and the value of temperature readings.

The radiation error is due to the fact that, to a large extent, gases are permeable to radiation. When a temperature measuring instrument is immersed in a stream of hot gases surrounded by cooler surfaces, it absorbs heat from the gases by convection and its temperature rises. As soon as its temperature exceeds that of the surrounding surfaces, heat passes by radiation from the instrument to these surfaces through the intervening gases. Thus the instrument receives heat from the hot gases by convection, and gives off heat by radiation to the surrounding colder surfaces. The temperature of the instrument continues to rise with a decreasing rate until the quantity of heat it gives off is equal to the quantity of heat it receives; the temperature then remains constant. Under these equilibrium conditions the temperature of the instrument is between that of the stream of gases and that of the surrounding surfaces; in other words, it is lower than the temperature of the gases which it is intended to measure.

Nature of Radiation Error

When the instrument is inserted in a stream of gases surrounded by surfaces hotter than the gases, it receives heat by radiation from the hot surfaces and at first also by convection from the stream of gases, and its temperature rises. When the temperature of the instrument has risen above the temperature of the gases, the flow of heat from the gases to the instrument reverses, the instrument begins to give off heat by convection to the hot gases, and receives heat only by radiation from the surrounding surfaces. The rise of temperature of the instrument continues at a rapidly decreasing rate until the quantity of heat received by the instrument by radiation from the hot surfaces is equal to the quantity given off to the stream of gas; the temperature of the instrument then remains constant. With these equilibrium conditions the temperature of the instrument is somewhere between that of the surrounding surfaces and that of the stream of gases; in other words, it is higher than the temperature of the gases which the instrument is supposed to measure. The difference between the temperature of the gases and that indicated by the instrument is the radiation error.

The magnitude of the error depends

A paper presented at a recent meeting of the American Society of Mechanical Engineers.

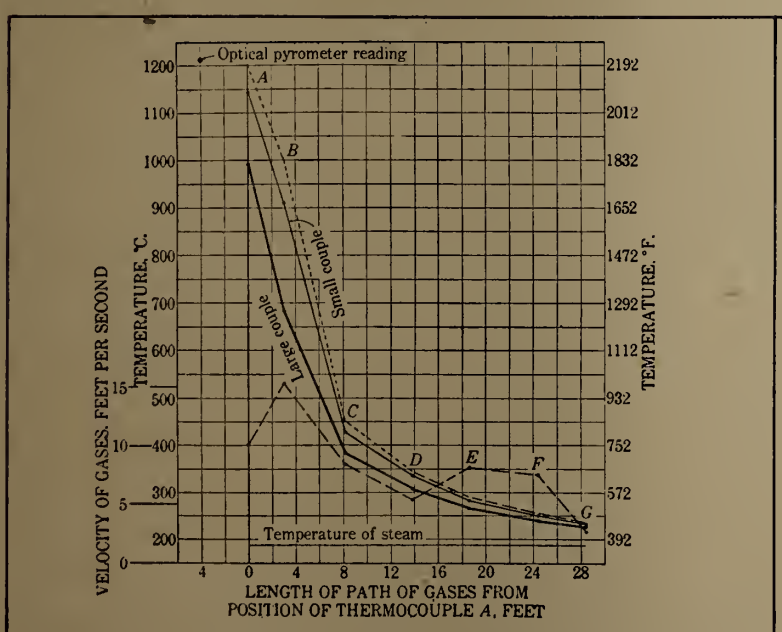


FIG. 1—TEMPERATURE OF GASES AS THEY PASS THROUGH A BABCOCK & WILCOX BOILER

The heavy curve connects readings obtained with a couple 0.5 inch in diameter and the light curve readings obtained with a couple 0.008 inch in diameter. Dotted curve is estimated true temperature of gases. Curve drawn in dashes shows approximate velocity of gases

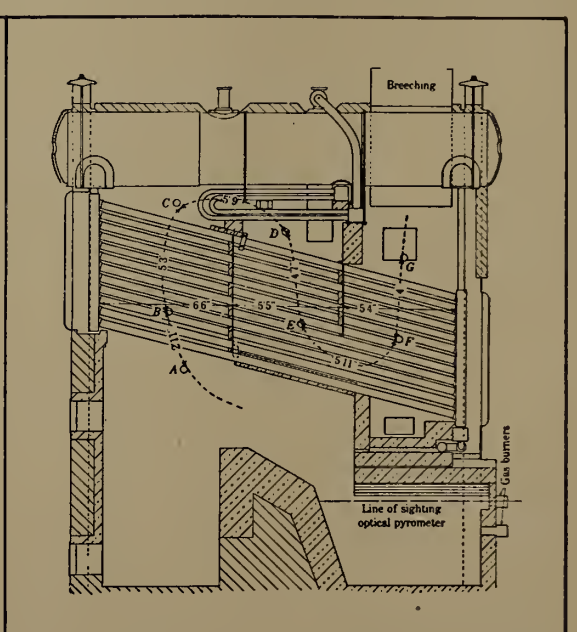


FIG. 2—SETTING OF GAS-FIRED BABCOCK & WILCOX BOILER IN WHICH THE MEASUREMENTS WERE MADE — TOTAL HEATING SURFACE, 3400 SQUARE FEET; STEAM PRESSURE, 165 POUNDS BY GAGE

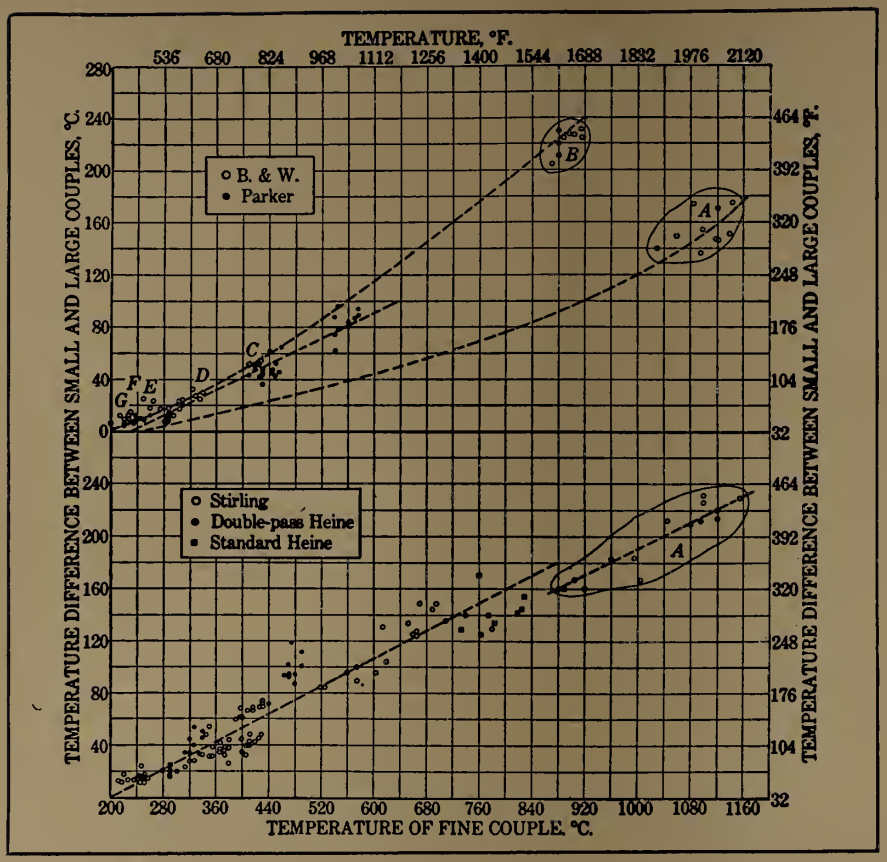


FIG. 3—EFFECT OF TEMPERATURE OF GASES ON RADIATION ERROR IN VARIOUS TYPES OF BOILERS

mainly on the size of the part of the instrument exposed to the gases and the radiation, and difference between the temperature of the gases and the temperature of the surrounding surfaces. The smaller the exposed part of the measuring instrument, the smaller the radiation error; also, the smaller the difference between the temperature of gases and the temperature of the surrounding surfaces the smaller the radiation error. In the measurement of the temperature of gases only the first-named factor can be controlled. The second factor is fixed by the kind of apparatus and its operation.

The effect of the size of thermocouples is shown in Fig. 1 which gives two sets of temperature measurements of the gases passing through a Babcock & Wilcox boiler fired with natural gas. One of these sets of measurements was taken with thermocouples having the hot junction made of wires 0.008 inches in diameter and the other set with couples having the hot junction parts made of tubes about 0.500 inch in diameter. This large couple is about the size of commercial instruments used for such purposes. Several thermocouples of each size were made and clamped together in pairs, each pair containing a large couple and a small couple, with their hot junctions about 1½ inches apart. These pairs were placed at different points along the path of gases, indicated by the small circles and designated by the letters *A, B. C. D, E.* and *F,* in Fig. 2. All the couples were connected to a central switch and read in rapid succession with a portable potentiometer. While the readings were taken the furnace conditions were kept uniform, which was a comparatively easy task with the gas firing.

Exposition of Curve

In Fig. 1 the abscissa are the approximate lengths of the paths of gases, measured fram the position of the first pair of couples *A.* The full heavy curve connects the readings obtained with the large couples, and the full light curve the readings obtained with the small couple. The dotted curve above the full curves gives the probable true temperature of the gases which was obtained by extrapolation from the readings of the two couples of different sizes. The curve near the bottom of the figure (drawn with dashes) gives the approximate velocity of the gases computed from the volume of gas burned, the chemical analysis of the products of combustion and the true temperature of the gases. The small black circle at the upper left-hand corner gives the furnace temperature as measured with the optical pyrometer sighted through one of the gas burners, as shown in Fig. 2.

The two full curves of Fig. 1 indicate that the small couples consistently showed temperatures considerably higher than the large couples, although the small couples themselves read somewhat too low. The difference between the readings of the two couples is nearly proportional to the difference between the true temperature of the gases and the temperature of the surrounding boiler surfaces which was about 50 degrees higher than the temperature of steam in the boiler. The large couple at *B* shows a radiation error of about 575 degrees Fahr., whereas the small couple at the same place indicates an error of only 150 degrees Fahr. In position *F* where the temperature of the gases is much lower, the large couple reads only about 25 degrees Fahr. too low, and the small couple shows an error of only 5 degrees Fahr.

Construction of Holder

The water-cooled holder of the platinum couples was made of three concentric copper tubes arranged in such a way that the cooling water flowed twice the full length of the holder. The outside tube was ¾ inch, making the holder of convenient size for manipulation. The cold junctions of the couples were placed in a water bath attached to the cold end of the couples.

Fig. 3 shows how much lower the large couples read than the small ones when the couples were placed in the boiler settings of five of the common types of water-tube boilers. The readings were plotted on two charts to avoid crowding the points. With the exception of the groups marked *A,* all the readings were obtained with the thermocouples placed among the tubes, or in other places where they were almost totally exposed to the heating surfaces of the boilers.

The group *A* of the Babcock & Wilcox boiler was obtained with the thermocouple placed in position *A,* Fig. 2. In this position the thermocouples were exposed partly to the boiler tubes and partly to the brick walls and the clay-tile furnace roof, which latter surfaces were much hotter than the boiler tubes. Therefore the thermocouples did not lose as much heat by radiation as those couples which were completely surrounded by the boiler tubes, and their radiation error was smaller.

Group A of the lower half of Fig. 3 was obtained with the couples placed about 1 foot above the arch and 1 foot from the front nest of tubes in a setting of standard Stirling boiler. They were therefore exposed partly to the boiler tubes and to some extent also to the hot brickwork of the furnace. Therefore the radiation error of these couples was somewhat smaller than the radiation error of the other couples

completely surrounded by the boiler tubes.

To determine the nature of the relation between the radiation error and the size of the hot junction of a thermocouple, four thermocouples of different sizes were clamped together and placed in a setting of a Heine boiler in a position similar to *A*, Fig. 2. The diameters of the hot junctions of these couples were 0.008, 0.025, 0.31 and 0.45 inch. These couples were clamped together in such a way that the two small couples were between the large ones, the distance between the hot junctions of the two end couples being 4 inches. The couples were read in rapid succession by means of a multiple switch and a potentiometer. In all cases the smallest couple has the smallest radiation error and therefore reads the nearest to the true temperature of gases on the inside of boiler.

It is apparent that the radiation error has a definite relation to the size of the part of the couple containing the hot junction. Very likely it is the extent of the surface of the hot junction which determines the magnitude of the radiation error. Inasmuch as the surface is proportional to the diameter, the radiation error should have a rather definite relation to the diameter of the hot-junction part of the couple. As the diameter of the hot junction of the couple decreases, the temperature indicated by the couple rises, at first very slowly, but after the diameter of about 0.100 inch is passed this rise in temperature becomes very rapid; and also, the greater the difference between the temperature of gases and that of the surrounding surfaces, the steeper this rise.

Builds Dust-Tight Crane

BY G. G. ROBBINS

ONE of the worst enemies of steel mill traveling cranes is dust. It attacks the armatures and gets between the bearings, causing serious wear. At some plants the motors and other important appliances on the crane are cleaned two or more times a week with compressed air. This method of cleaning is effective to a certain extent, but there have been cases where more harm has been done than good. One of the most effective ways to protect the working parts of a crane is to enclose them in dust-tight compartments.

A crane designed on this principle was recently installed at the Cuyahoga Works of the American Steel & Wire Co., Cleveland. It was built by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., and is said to be the first crane of its type to be placed in operation. The crane has a span of 76-2/3 feet and a capacity of 10 tons. The electrical wiring is so arranged that a magnet can be operated whenever desired.

The hoist and bridge carriages move on rolled steel wheels. The latter are fitted with gears and jig-drilled spiders of the Shepard type. To provide sand for the rails and overcome slippage, the crane trucks are equipped with a cylindrical container as shown in Fig. 1, the outlet of each being positioned directly over the rail. The rails are sanded by pulling a lever which is located in the operator's cab and connected to a control valve in the base of each container. The valve is automatically closed by means of a compression spring.

Driving Shaft is Encased

The bridge driving shaft is entirely enclosed in standard boiler tubing, as shown in Fig. 2. Each end of the tube is inserted in collars of the flare type, which are cast in two sections and clamped directly to the bearings. Spring bumpers are provided. They are so designed that when the front wheels strike the bumping blocks, the shock is distributed between the coils of the spring, and friction between the wheel, bumper and bumper support. Runways, which are provided on both sides of the crane, are supported by angles securely bolted to anchor lugs, which are fastened to the bridge girders. A steel stairway connects these runways with the operator's cab. The latter is enclosed with glass windows, steel sash being used throughout. The sash are held in place by springs and may be opened or closed by sliding to the left or right, as the case may be. The floor of the cab is steel plate covered with asbestos board for safety. At the rear of the cab there is a cage-shaped compartment. It is made of channels and supports a switchboard, which is equipped with switches, breakers, fuse blocks, etc., used in operating the crane. This arrangement permits easy access to the electrical equipment in case operating difficulties are encountered or repairs are necessary.

On the plain side of the crane, the conductors for the hoisting and trolley motors provide a railing for the runway. The conductors are of the weatherproof, T-bar type and are supported by porcelain insulators. Platforms with toeboards and hand railings are provided on each side of the hoist carriage to permit the workmen to repair or oil the working parts of the machinery with safety. The hoist carriage is equipped with an automatic reel, which is used for winding the power line attached to the magnet. The sheave block upon reaching its maximum safe elevation is automatically stopped by means of a Palmer-type limit switch which throws off the current and causes the



FIG. 1—DRIVING SHAFT ENCASEMENT, SAND CONTAINER AND PART OF CRANE CARRIAGE

The author is chief draftsman for the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.



FIG. 2—ENCLOSED TROLLEY MOTOR, DRIVING-SHAFT COVERING AND COUPLINGS. FIG. 3—CLOSE-UP VIEW OF FLARE-TYPE COUPLING

dynamic brakes to be applied instantly. The sheaves are entirely enclosed in the hoisting block. The latter is equipped with a hook which is manipulated by means of a handle welded onto one side.

Spring Meeting Program

The final details of the program for the spring meeting of the American Society of Mechanical Engineers, which will be held at Worcester, Mass., June 4-7, have been completed. The meeting will be formally opened at 8 p. m., June 4, by addresses of welcome by Pehr G. Holmes, mayor of Worcester; Ira N. Hollis, president, Worcester Polytechnic institute, and R. Sanford Riley, president, Worcester chamber of commerce. The evening program will be concluded by an address by Charles G. Washburn entitled "The Growth of an Industrial City".

Wednesday, June 5, has been set aside as New England day. The professional sessions will be held at the Worcester Polytechnic institute. The following papers will be presented:

"The Small Industry in a Democracy", by George H. Haynes; "The Textile Industry in Relation to the War", by J. E. Rousmaniere; "Foundry Cost and Accounting System", by W. W. Bird, professor of mechanical engineering, Worcester Polytechnic institute; "The Public Interest as the Bedrock of Professional Practice", by Maurice L. Cooke, consulting engineer, Philadelphia; "Moisture Reabsorption of Air Dried Douglas Fir and Hard Pine and the Effects on the Compressive Strengths"; by Irving H. Cowdrey; "A High Speed Air and Gas Pressure", by Lieut. J. L. Alden; and "Investigation of the Uses of Steam in the Canning Industry", by J. C. Smallwood.

At a special New England session to be held Wednesday afternoon papers will be presented on subjects relating to New England industries under war conditions, including: "Converting a Factory for Munitions Manufacture", "Fire Protection", "Training Labor for Shipbuilding", and "Oil Fuel in New England Power Plants".

A sectional meeting under the auspices of the subcommittee on protection of industrial workers also will be held Wednesday afternoon to consider topics relating to industrial safety and workmen's compensation.

On Wednesday evening a general war session will be held at the Hotel Bancroft. The following general theme will be discussed: "How the Engineering Societies Can Assist in the Procurement Program of the Government".

Thursday's Program

Simultaneous sessions on general subjects, fuel problems and vocational training will be held Thursday morning, June 6 at Worcester Polytechnic institute. The following papers will be read and discussed:

"Efficiency of Gear Drives", by C. M. Allen, professor of hydraulic engineering, Worcester Polytechnic institute, and F. W. Roys; "Self-Adjusting Spring Thrust Bearings", by H. G. Reist, designing engineer, General Electric Co., Schenectady, N. Y.; "Air Propulsion", by Morgan Brooks, professor of electrical engineering, University of Illinois; "The Elastic Indentation of Steel Balls Under Pressure", by C. A. Briggs, W. C. Chapin and H. G. Heil, bureau of standards, Washington, D. C.; "Electric Heating of Molds", by Harold E. White, engineer, Crocker-Wheeler Co., Ampere, N. J.; "Stresses in Machines Starting or Stopping", by F. Hymans, engineer, Otis Elevator Co., New York; and "An Investigation of the Fuel Problem in the Middle West", by A. A. Potter, professor of mechanical engineering, Kansas State Agricultural college, Manhattan, Kans. Topical discussions on fuel economy and on the Boston system of vocational training also will be held.

The entertainment features have been carefully worked out. The usual opening reception and dance will be held Tuesday evening, June 4. Luncheon will be served at the Worcester Polytechnic institute on Wednesday and at the plant of the Norton Co. on Thursday. Various important manufacturing plants in Worcester and vicinity will be visited, including the Crompton & Knowles Loom Works, Norton Co. and the Royal Worcester Corset Co. There will be a tea and reception at the Tatnuck country club Wednesday afternoon and a dinner at the Worcester country club Thursday evening. Friday will be devoted to an all-day automobile trip to Camp Devens, Clinton dam, Concord and Lexington.

Plan Big Navy Shops

Boston will become one of the largest ship-repair ports on the Atlantic coast if plans now being considered by the navy department to enlarge the Charlestown navy yard into a big ship-repairing base, meet with approval. Among the provisions of the plans are a permanent extension of the navy yard piers, the building of several new piers, the erection of a new foundry, machine shops, boiler shops, power plant, a big storehouse, and a new administration building. beside an entire rearrangement of the present layout of the yard and an enlargement of the yard itself. The proposed development, it is estimated, would cost about $7,000,000. The plans for the improvements have been maturing quietly for several months.

To Build New Plant

Because in its present location the C. O. Bartlett & Snow Co., Cleveland, manufacturers of elevating and conveying machinery, has no room for expansion, it has purchased six acres in Harvard avenue, Cleveland. Construction of a new plant will commence in the near future.

War Labor Board at Work

Strikes at Pittsfield, Mass., and Chicago Settled by Its Action—Other Strikes Demand Attention

DUE to intervention by telegram from Secretary of Labor Wilson, the anticipated general strike, May 7, at the plant of the General Electric Co., Pittsfield, Mass., did not materialize. Both sides agreed to the suggestion of Secretary Wilson that the matter be laid before the recently appointed war labor board at Washington. An increase of 25 per cent in wages and new working conditions were the demands made. Originally but 200 employes were affected, mostly cranemen, but a general strike would call out about 7000 employes.

On account of the pressing demands for machinery at the present time as a part of the war program, the prospective closing of the plant on account of a strike was not countenanced in Washington. The metal trades union met and its action in which it was voted to let nothing interfere with the strike was rescinded. The electrical workers' union also voted to call off the strike and accept the proposition as made by Secretary Wilson. A committee of five to represent the employes, was appointed and will meet in conference with the war labor board at Washington at an early date.

Chicago Strike Settled

This board was recently called in to adjust the strike of molders and coremakers at Chicago, who went out on strike May 1, from 18 jobbing foundries employing approximately 1200 molders. Originally the foundries posted notices that on May 1 the molder wage rate would be $5.25 per day of eight hours with no Saturday half-holiday. The men demanded $6 per 8-hour day with Saturday afternoon off. Negotiations brought the demand to $5.50 per day of eight hours, which the men stated would be their lowest figure. A compromise was affected. Since no effort was made by foundrymen to operate their plants in the interval, the strike was entirely peaceful. Recent labor disputes settled by the conciliation department of the labor bureau include a lockout at the Hawkeye Foundry Co., Waterloo, Ind.; a threatened strike at the Fulton Machine Co., Knoxville, Tenn., and strikes at the Mackle Construction Co., Atlanta and Ft. McPherson, Ga., the American District Steam Co., Tonawanda, N. Y., and the St. Joe Lead Co., Herculaneum, Mo. In handing down its decision in the recent controversy between the telegraph companies and their telegraphers, the national war labor board ruled that American workers have the right to organize and join unions. The companies were asked to refrain from discharging employes for union affiliation and otherwise to abide by the principles laid down in the President's recent proclamation. At the same time the board directed its joint chairman, William Howard Taft, and Frank P. Walsh to make a further attempt to bring about mediation of the difficulties between the two parties.

Other strikes in the eastern territory include one of about 100 machinists and toolmakers in 22 of the smaller plants in Bridgeport, Conn., where a minimum wage scale of 70 cents an hour for the former and 80 cents an hour for the latter was demanded. It was claimed that these were the rates paid in the larger factories. This strike, which tied up these 22 small factories for more than a week and which had seriously affected several of the larger plants, came to an end May 11. On May 8, however, 420 machinists and toolmakers representing 30 per cent of the men employed, walked out of the Remington Arms-Union Metallic Cartridge Co.'s shop in Bridgeport. Toolmakers demanded 80 cents an hour and machinists 70 cents as a minimum. A closed shop likewise is demanded. These workmen have been receiving 60 and 70 cents respectively. Similar demands were made the following day by the 300 toolmakers and machinists employed by the Liberty Ordnance Co. Draft officials have requested lists of strikers so that they may be examined and immediately sent into military service. The Remington company has canceled all contracts with 20 shops in that city for the making of Browning machine gun tools and parts and will transfer them to factories in the middle west which have been either closed or running on part time owing to the government orders covering the manufacture of automobiles and nonessentials. In these strikes, it is expected that the national war labor board will play an important part.

About 175 iron molders are on strike in all Lowell, Mass., foundries, except the Saco-Lowell shops, for an advance of from $4.50 a day to $5.25. They claim the working agreement expired May 1, while owners say the date is June 17.

The strike of machinists in the large mills in that city for time and a half for overtime still continues.

Seek Government Backing in Housing Projects

Among the communities making surveys to back their requests for appropriations by congress to build workmen's homes are Cleveland and Bridgeport, Conn.; as well as many of the shipbuilding districts. The housing committee of the Cleveland chamber of commerce is obtaining data with which to support a request for $1,000,000 from the government. Last fall 10,000 additional homes were needed and the growth of the war industry in Cleveland since has made housing conditions more acute.

The Bridgeport Housing Co., Bridgeport, Conn., will erect 1000 brick single and double houses to cost $3,000,000, the money for which has been secured by a government loan. The houses will be standardized as in other cities where the government has taken a hand in the building program. Actual construction work will be started as soon as possible and it is hoped to have the houses ready for occupancy by Nov. 1.

In harmony with the much-followed policy in Washington of vesting authority in one head, A. Merritt Taylor, formerly chief of the Philadelphia department of transit, has been appointed director of housing and transportation of shipyard workmen throughout the country, under Charles M. Schwab, director general of the Emergency Fleet corporation.

Housing projects to cost approximately $10,000,000, for shipyard workmen at Hog Island, Pa.; Newport News, Va.; Camden, N. J.; Chester and Bristol, Pa.; Sparrows Point, Md.; Baltimore, and Wilmington, N. C., have been announced by the United States shipping board. Between $2,000,000 and $2,500,000 will be spent on work to be done at Camden, N. J., where a model village for the workmen is to be erected.

Contemplated plans of the Emergency Fleet corporation include the erection of 100 residences to cost $500,000 for the employes of the Bath Iron Works, Bath, Me., and also 200 to cost $700,000 for the employes of the Texas Steamship Co., of that city. Both yards are producing vessels for the government.

To

THE SUB-COMMITTEE ON PIG IRON, IRON ORE AND LAKE TRANSPORTATION OF AMERICAN IRON AND STEEL INSTITUTE,
800 WESTERN RESERVE BLDG., CLEVELAND, OHIO, BEING A CERTIFIED STATEMENT (TO PRODUCER'S BEST KNOWLEDGE AND BELIEF) OF CONTRACTUAL OBLIGATIONS OF..... (NAME)
TO DELIVER PIG IRON DURING THE PERIOD BETWEEN MAY 1 AND DEC. 31, 1918, INCLUSIVE.

NUMBER OF STACKS AVAILABLE MAY 1 TO DEC. 31, 1918..... TOTAL MONTHLY CAPACITY..... TONS. ESTIMATED PRODUCTION BALANCE OF YEAR, STARTING MAY 1
UNFILLED PURCHASES FROM OTHER FURNACES, BALANCE OF

CUSTOMER	PLACE OF CONSUMPTION	UNFILLED TONNAGE MAY 1, 1918	GRADE	DELIVERY PERIODS								TOTAL PIG IRON CONSUMPTION May 1 to Dec. 31	PIG IRON ON HAND AND IN TRANSIT MAY 1	EMER. FLEET CORP'N	
				MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC			% DIRECT	% INDIRECT

Form Used by Pig Iron Producers in Reporting Condition of Their Order Books and of

Pig Iron Rapidly Reaching War Footing

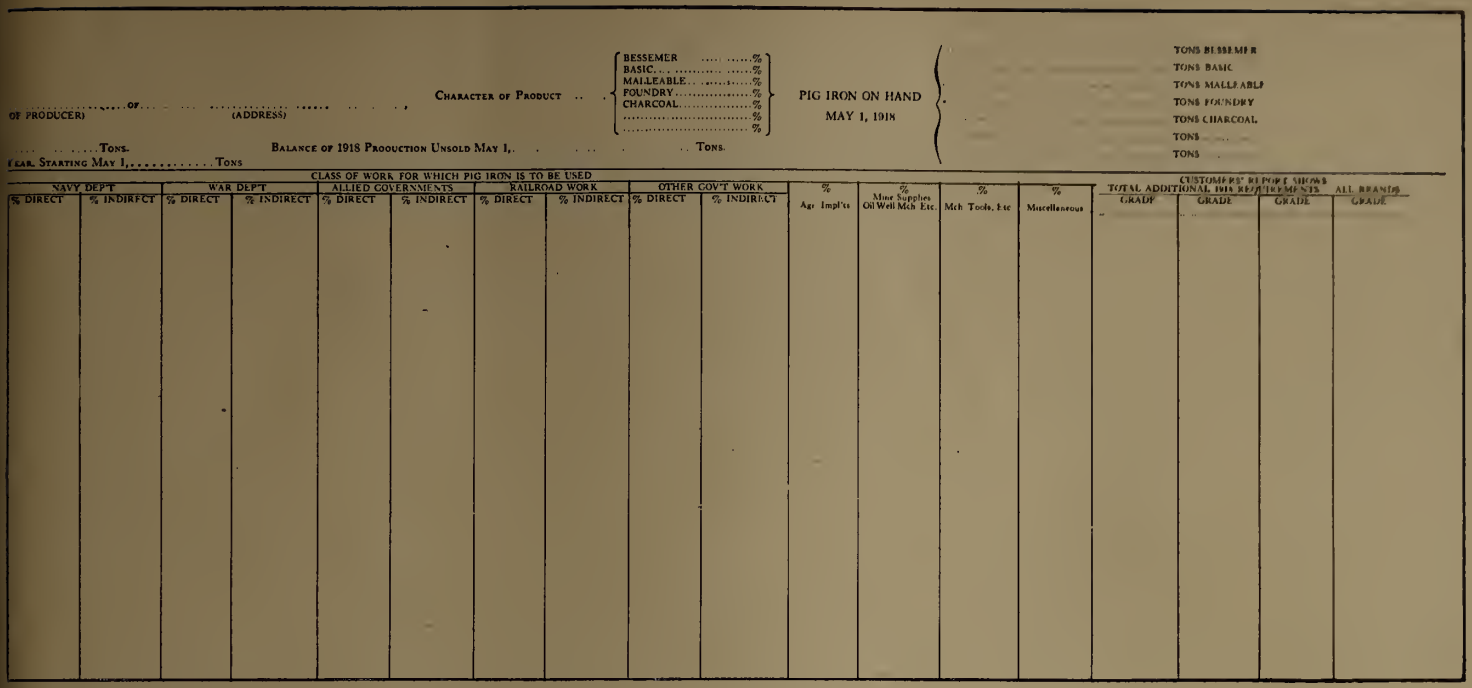
PRELIMINARY to exercising a complete control over the distribution of pig iron so that available supplies shall be applied to the war requirements of the government and its allies in accordance with their importance, the subcommittee on pig iron, iron ore and lake transportation of the American Iron and Steel institute now is taking a true and comprehensive inventory of the industry. This effort will lead to the compilation of data covering every phase of manufacturing and sales conditions in the pig iron industry. It will serve the basis for a close and intelligent supervision both of the pig iron market and of shipments from this time forth under war conditions. The subcommittee which is in charge of the work is made up of H. G. Dalton, chairman, Pickands, Mather & Co., Cleveland; C. D. Dyer, W. P. Snyder & Co., Pittsburgh; Leonard Peckitt, president, Empire Steel & Iron Co., Catasauqua, Pa.; W. T. Shepard, Rogers, Brown & Co., Buffalo; A. H. Woodward, Woodward Iron Co., Birmingham, Ala.; Frank Billings, Tod-Stambaugh Co., Cleveland; H. Coulby, president, Pittsburgh Steamship Co., Cleveland; Frank B. Richards, M. A. Hanna & Co., Cleveland; Amasa S. Mather, Pickands, Mather & Co., Cleveland, secretary.

Suitable forms have been prepared by the subcommittee and now are being circulated among both producers and consumers of pig iron for the collection of the desired data. One of these forms which is reproduced herewith calls upon the furnaces to render to the subcommittee a complete statement of the present condition of their order books, giving a list of customers to whom they are now obligated by contract, and the deliveries required. In addition the estimated production of the individual makers for the balance of the year dating from May 1, any tonnage that may remain unsold for that period, the character of iron now being made or the approximate percentage of each grade where several are produced, is being requested. The return of the producer is to be made in duplicate, the original going to J. Leonard Replogle, director of steel supply at Washington.

Insure Coke Supply

A second form has been prepared by the subcommittee and has been forwarded to the various producers for the latter's distribution in turn to their respective customers. This canvass is to determine how much iron is on hand at plants or is in transit for respective consumers; the probable consumption of these plants for the year dating May 1, the portion of these requirements not now covered by purchase, and the percentage of the company's business that is either directly or indirectly for government use. The government business is to be further analyzed where it is of direct character to show for what department the iron is required. The division of war business includes orders for the Emergency Fleet corporation; for the navy department; for the war department; for the allied governments; for railroad work; for agricultural implements; for mine supplies, oil well and fuel oil machinery and other fuel work; for machine tools, cranes and other machinery directly connected with the conducting of the war and not elsewhere included in the report; and for miscellaneous work not otherwise included. On the tonnage required for the indirect purposes of war, the use to which the material is to be put is to be declared.

In connection with government supervision over the sale and distribution of pig iron, energetic efforts are to be made through the war industries board to maintain the production of the furnaces at 100 per cent. Careful attention is to be given to the matter of supplying the furnaces with their full requirements of coke. In this connection it now is believed that the railroad transportation difficulties which have been the main factor in the irregularity of coke supply, have been obviated. The pig iron producers are requested whenever their coke supply is found insufficient to get immediately in touch with J. Leonard Replogle, director of steel supply at Washington, and to advise whether this delay arises from the lack of proper railroad transportation, or through the fail-



Operations to Steel Director and Institute Committee. Original Goes to Steel Director

ure of the coke producers to fill orders.

A general letter setting forth the purposes and desires of the subcommittee in collecting the statistical information relative to the pig iron industry has been sent out to the various producers accompanying the report forms. This letter is as follows:

Dear Sir:—

As you probably have already been advised direct from the American Iron and Steel institute, the producers of iron and steel products are taking pledges binding themselves to make their product as large as possible during the remainder of the war and to see that the requirements of the government and its allies are first supplied. All of this at the request of the war industries board. Doubtless you have already for your company and personally subscribed to this pledge.

The demands of the government for pig iron direct and indirect are going to be very large and at the request of the director of steel supply of the war industries board this committee has been asked to make a careful canvass of the pig iron situation and be ready from time to time to advise them where the necessary requirements of the government can be supplied. In order to do this intelligently this committee has decided to send you this letter with blanks, asking for certain statistics and showing your orders on hand, to whom the iron has been sold, the deliveries required, your estimated production for the balance of the year starting from May 1, and also showing any balance that you may have unsold; approximately the character of iron you make (that is, foundry, malleable, basic, etc.) or the approximate percentage of each, if you make all kinds.

The committee also requests that you immediately make a canvass of your customers to determine how much pig iron they have on hand at their respective plants, their probable consumption of pig iron for the balance of this year from May 1 and the percentage of their business that is either directly or indirectly intended for government use. The direct business should state for what department of the government their iron is being shipped and the indirect, for what purpose the material is being used. It is hoped that these figures can all be in within the next two weeks and therefore, you are urgently requested to compile them and send them in without delay. In order to facilitate this report, forms will be furnished promptly to you by the committee, which blanks we suggest be mailed by you to your customers, in order that the proper information may be obtained in a uniform manner. An appropriate letter should accompany these blanks urging consumers to promptly furnish the data requested and emphasizing the importance of their earnest cooperation.

The committee also begs to advise you that the war industries board has been energetically working to secure the blast furnaces of the country a full supply of coke, and they believe that as far as railway transportation matters are concerned that the difficulties have been practically obviated. They request that you telegraph J. Leonard Replogle, director of steel supply, war industries board, Washington, D. C., at any time you find your supply is insufficient, stating the cause, whether it is from the lack of proper railroad transportation being furnished you or through the failure of the coke producer, if he in turn is not filling your orders. This advice will enable them to further pursue their efforts to see that you are fully supplied. The war industries board will feel, in case they do not receive advice of insufficiency of coke supply, that the pig iron producer will not have cause for complaint if his plant is not operated to its full capacity, barring of course accidents or other causes beyond his control.

The producer's report is to be made in duplicate; the original to be mailed to J. Leonard Replogle, director of steel supply, war industries board, Washington, D. C., and the duplicate to the undersigned.

Your hearty and prompt co-operation in all of these matters will be greatly appreciated.

Sincerely yours,

(Signed) H. G. Dalton,

Chairman, Pig Iron, Iron Ore and Lake Transportation Subcommittee.

Letter to Consumers

A copy of the letter which prominent producers are sending out to their customers soliciting data regarding the latter's present uses of iron, as

American Iron and Steel Institute

Committee on Steel and Steel Products

Sub-Committee on Pig Iron, Iron Ore and Lake Transportation

OFFICE: 800 WESTERN RESERVE BUILDING
CLEVELAND, OHIO

The following information is desired from .....
(NAME OF CONSUMER)

.....
(ADDRESS)

who will kindly furnish same and mail promptly to .....
(NAME OF PRODUCER)

.....
(ADDRESS)

	TONS	GRADE
Estimated monthly Pig Iron consumption from 1st day of current month to Dec. 31, 1918	.....	.....
Total Pig Iron in Stock and in transit on 1st day of current month - - -	.....	.....
Total Pig Iron to be delivered from all sources on all contracts from 1st day of current month to Dec. 31, 1918 - - - - - - - - -	.....	.....

The class of work for which this iron is to be used is as follows :	DIRECT ORDERS	INDIRECT ORDERS
Orders from Emergency Fleet Corporation, percentage, (see Note) - -	.....%	.....%
Orders for Navy Department - - - - - - - -	.....%	.....%
Orders for War Department - - - - - - - -	.....%	.....%
Orders for Allied Governments - - - - - - -	.....%	.....%
Orders for Railroad Work - - - - - - - -	.....%	.....%
Orders for other Government Work - - - - - - -	.....%	.....%

Please show Government Numbers on reverse side of this form, and on Indirect Government Orders give name and address of your Principal.

Orders for Agricultural Implements - - - - - - -	.....%
Orders for Mine Supplies, Oil-well and Fuel-oil Machinery and other Fuel Work	.....%
Orders for Machine Tools, Cranes, and other machinery directly connected with Conduct of War, and not elsewhere included in this report - - -	.....%
Orders for Miscellaneous Work not elsewhere included in this report - -	.....%

*NOTE:-In all cases the above percentages are to be calculated upon the Estimated Total Pig Iron Melt, (scrap excluded) between 1st day of current month and Dec. 31, 1918

Sum of percentage in above columns should equal 100%

	TONS	GRADE
Additional Pig Iron requirements (All brands) for use prior to Dec. 31, 1918, and not provided for - - - - - - - - - -	.....	.....
	.....	.....
	.....	.....
TOTAL		TONS

The accuracy of the above report is Certified to as being substantially correct to the best of my knowledge and belief:-

.....

Date..... .....

FORM SENT TO CONSUMERS FOR DATA ON THEIR USE OF PIG IRON IN ORDER TO DETERMINE THEIR WAR STATUS

requested by the pig iron committee, is given below:

Gentlemen:—

The government demands for pig iron direct and indirect are increasing rapidly, and at the request of the war industries board, the American Iron and Steel institute, has been asked to make a comprehensive survey of the situation, and therefore, all of the producers, in addition to furnishing information pertaining to their operations, are called upon to immediately canvass all of the pig iron consumers in the United States, for the purpose of mobilizing the industry on a war basis.

In order to gather this information uniformly, the institute committee has provided the necessary blanks, one of which we are enclosing herewith, and we believe will be found self-explanatory and enable you to make return of the data required in an intelligent manner for the purpose intended, so that we can make our report through the medium that the government has designated to collect these statistics.

We are expected to report within a week, and some time will be necessary to compile the figures of all the customers on our books; therefore, cannot emphasize too strongly the importance of your giving the matter immediate and preferred attention.

Feeling confident of your willingness to heartily co-operate in hurrying the compilation of this data, which the national emergency seems to require, and thanking you in anticipation of the early return *to us* of the enclosed form properly filled out, we remain,

Very truly yours,

.....

Installing Special Mill

A modern mill for the rolling of special shapes entering into the manufacture of brake beams and of other special sections which the plant may handle advantageously, is being installed by the Pennsylvania Brake Beam Co., Danville, Pa. This extension of capacity is to round out the plant which the company has been practically rebuilding since acquiring it by purchase last July. This purchase followed the occupancy under lease of the plant for a number of years, after the company's removal from Easton, Pa., where it has outgrown its facilities. The plant originally consisted of a three-high 24-inch rolling mill, engines of 1000-horsepower capacity, and other equipment. All the new equipment required for the rebuilding of the plant has been installed, and this has been done without affecting production.

Refractory Costs

Being Investigated by Government—Recommendations Expected Soon

Pittsburgh, May 14.—Investigation being made by the federal trade commission into the cost of producing refractories is nearing an end. Producers expect to go to Washington this week and hold a conference with members of the commission and give the latter what information they can.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.

(First Quality)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK

(Second Quality)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 160.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK

(Per Net Ton)

55 per cent.	$40.00 base
76 per cent.	100.00 base

Soon thereafter the recommendations of the commission probably will be submitted to the war industries board and then to the President. Prices of all grades of refractory brick have remained unchanged since the United States entered the war and manufacturers feel confident that no reductions will be ordered by the government. Many assert that they cannot operate if levels are brought down, but instead are hoping that the government, after a thorough investigation, will find that higher prices are justified.

Fair sized quantities of second quality fire brick are being sold but other grades are not active, chiefly because makers are heavily committed on contracts and cannot take new business. It is understood that the government is seeking a large lot for the proposed nitrate plants.

War Convention

Of Allied Machinery and Supply Men Opens at Cleveland

Three large associations representing machinery and supply manufacturers and dealers, are holding a joint convention at the Hollenden hotel, Cleveland. The sessions of the National Pipe and Supplies association opened on Monday and continued until Wednesday, when the Southern Supply and Machinery Dealers', the National Supply and Machinery Dealers' and the American Supply and Machinery Manufacturers' associations met together in the first of a series of joint sessions at which war problems will form the chief topic of discussion. Technical papers will be presented and discussed in the open meetings by executives and experts from various large industries. Among the speakers scheduled are: W. O. Rutherford, general sales manager, B. F. Goodrich Co., Akron, O.; Melviille W. Mix, president, Dodge Mfg. Co., Mishawaka, Ind.; Farnham Yardley, vice president, Jenkins Bros., New York; Wm. Brooks Covell, president, International Leather & Belting Co., New York; William E. Manning, vice president, Youngstown Sheet & Tube Co., Youngstown, O.; N. J. Clarke, secretary, Upson Nut Co., Cleveland; David C. Jones, secretary, the Lunkenheimer Co., Cincinnati; Charles W. Beaver, Yale & Towne Mfg. Co., New York; George Vonnegut, Vonnegut Hardware Co., Indianapolis; W. E. Frick, Frick & Lindsay, Pittsburgh; F. H. Kramer, Somers, Fitler & Todd Co., Pittsburgh.

Financing under the present conditions will occupy a portion of the joint sessions, and speakers of national prominence will discuss the various phases of new capital, loans, collections and more particularly trade acceptance. Overhead expenses and federal tax questions will be the subjects of reports and general discussion, and the question of export trade following the war will have attention. The major topic of the meetings, however, will be the responsibility of the industries and activities represented, in the successful prosecution of the war. Ways and means of attaining top-notch efficiency will form the prime work of the convention.

The Cleveland committee, which has had the conventions in charge, include, W. M. Pattison, W. M. Pattison Supply Co.; H. W. Strong, Strong, Carlyle & Hammond Co.; S. D. Latty, Kirk-Latty Mfg. Co.; George M. North, Ferry Cap & Set Screw Co.; F. H. McIsaac, Kirk-Latty Mfg. Co.; and Harold D. North, Ferry Cap & Set Screw Co.

Getting Together With Uncle Sam

Manufacturers in Northern Ohio and Western Pennsylvania Launch an Organization to Correlate the Government's Needs With Existing Plant Facilities —Personal Information to Supplant Statistics

SERVICE implies a knowledge of the needs and desires of the institution or person served. In the turmoil of the first stages of the war, through which the country has just passed, service has been freely proffered by American manufacturers but efficient action has been hampered by inability to get together with the government. The difficulty in making connections with Washington, and the problem of determining what constitutes service on the part of the individual manufacturer endeavoring to engage his plant facilities, have rendered unavailable a great potential output of all classes of war materials. The situation has been aptly compared to a huge conflagration when every member of the fire department has been busily engaged, and an individual has rushed to the chief with the pertinent query, "What can I do?"

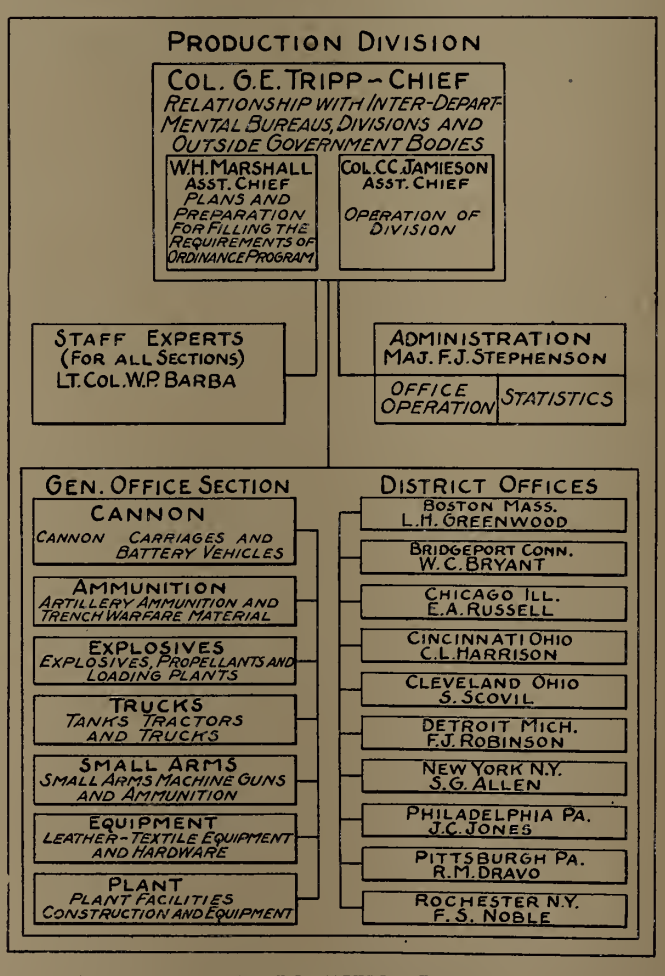
The purchasing power of the government, functioning through a number of separate agencies has achieved remarkable results, when the difficulties encountered are considered. With the exception of the iron and steel producers brought together through the American Iron and Steel institute and one or two other large well integrated industries, the manufacturers of the country have not been so organized as to furnish a unit, capable of stating definitely what may be expected in production. The departments charged with procuring the extensive miscellaneous materials and supplies for war have had to depend to a great extent upon statistics, laboriously collected, and upon the tender of service from large industries. In almost every case the initiative has been with the government.

All manufacturers have not awaited the government's call. Some have spent much time in Washington endeavoring to establish a point of contact, by which they would be enabled to secure contracts. Here again misunderstandings have prevented efficient action. The small manufacturer has been unable to handle orders involving millions when his plant output is in terms of thousands. Lack of technical knowledge and a real ignorance of the ability of his plant to furnish the articles wanted, also has contributed to the failure of the government to secure the service of a great number of operating plants.

The result of this absence of contact between the government and the average manufacturer has been the centering of work in the larger localities; the influx of labor and housing congestion in the cities, and an undercurrent of dissatisfaction from workers transplanted to strange communities, and from manufacturers able and willing to handle government work, who were unable to locate the proper channels through which to secure contracts. This latter is an insiduous danger to the civilian morale. It weakens the will to win.

The purchasing power of the government at the present time is vested in several departments, chief among which are the ordnance department, the quartermaster department, the navy, the signal corps and the Emergency Fleet corporation. The ordnance department and the quartermaster department are understood to handle over 70 per cent of the needs of the government.

The ordnance department has developed an efficient system for purchasing and supervising the manufacture of needed supplies. A procurement division of the ordnance department has charge of the contracts. Parallel with this division is an agency called the production division which becomes effective immediately upon the making of a contract, and also functions in an advisory capacity in the placing of contracts. The work of this production division is divided into 10 districts covering the area in which the bulk of the ordnance work is handled. Each of these districts is under the control of a chief with an organization which follows up, supervises and regulates production on all ordnance department contracts in that particular district. The producer deals directly with the district production department on all questions save those relating to price, quality and complaints. A personal contact is thus maintained, and first hand knowledge supplants or at least supplements statistics. The accompanying map and organization chart show the geographical boundaries, organization and supervising heads of this production division. Great service is being done by this division in following production in the plants, in securing the use of facilities needed in manufacture, and in procuring needed machines and supplies for factories operating on ordnance department work. Manufacturers have



ORGANIZATION OF PRODUCTION DIVISION OF THE ORDNANCE DEPARTMENT

appreciated the value of the decentralized control of war production. They have also come to a realization that the policy of "let the government do it" is harmful to themselves and to war-time factory output. Several broad-visioned business men in the Cleveland district of the ordnance production division conceived the idea that the contact should be made with the government through the initiative of the manufacturers. In other words, the manufacturers should so organize as to be able to say, "Here are our plants, our facilities are known, we can handle a definite amount of the task at hand."

Samuel Scovil, ordnance production chief, accordingly called a meeting of all manufacturers in the territory known as the Cleveland district of the ordnance production division. The problem was analyzed as consisting of two factors: the securing of information and the question of centralization of industries. The district was organized on the geographical lines bounding the Cleveland district of the ordnance production division. It was clearly indicated at the start that except for this identity of territory covered, the new war industries commission should be in no way connected with the ordnance department. Information is to be secured and distributed regarding proposed purchases of all kinds of supplies needed by the government.

The need of centralization was emphasized by the problem of gathering information relative to plants within certain territory and classifying and distributing information received from Washington regarding purchases. The Cleveland district was divided into eight subdivisions known as the Toledo, Lima, Mansfield, Columbus, Canton, Cleveland, Youngstown and Erie divisions, respectively.

These subdivisions proceeded to organize with the counties within their territories as units. The existing factors such as chambers of commerce, manufacturers associations, etc., were requested to form the respective county units. Each division then appointed a representative, who became a member of the district governing body or district executive committee.

Returning to the zones or divisions, the different industries were grouped under general headings as shown in the accompanying diagram. These industries designated committees, who possess a first hand knowledge of the capacity, personnel and amount of work on hand relative to each factory in their own industry in the division. Thus a foundry owner on the castings committee from Columbus will have personal knowledge of the tonnage of gray iron castings that can be obtained from every foundry in his division. Each zone, each county, and each city will have its committee for every general division under the classification of industries.

The headquarters of the commission were established in Cleveland. J. H. Foster, president of the Hydraulic Pressed Steel Co., Cleveland, was made chairman; C. A. Otis, Otis & Co., Cleveland, treasurer, and W. E. Tousley, Cleveland, secretary. It was

A Double Barrelled Organization

THE accompanying article describes the Cleveland plan for establishing a point of contact between manufacturers and the great purchasing agencies of the government, in order to facilitate the production of war materials. As a result of the development of this plan, two distinct war-service organizations are now functioning in the Cleveland district. First we have the Cleveland district war industries committee, an orgonization of manufacturers, with no official connection with the government, created solely to help manufacturers to obtain war contracts suited to their capacities and abilities. Second, and totally distinct from the Cleveland district war industries commission, is the Cleveland district organization of the production division of the ordnance department, created exclusively for the purpose of following up ordnance contracts after they are placed, thus keeping deliveries up to date. This latter organization is an official part of the government. In other words the war industries commission gets the contracts, as the representative of the manufacturers, while the production division of the ordnance department keeps track of and follows up ordnance department contracts on behalf of the government.

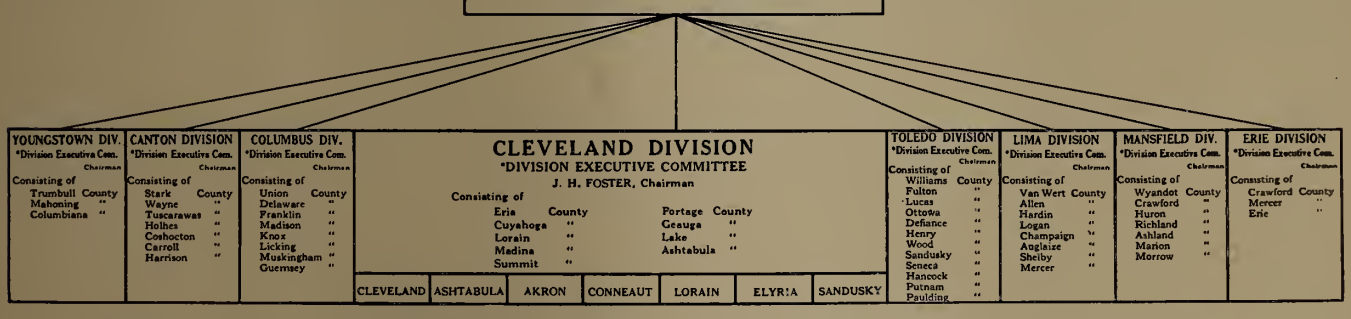


DIAGRAM SHOWING THE ORGANIZATION OF THE CLEVELAND DISTRICT WAR INDUSTRIES COMMISSION

The foregoing main divisions will be subdivided as noted under the Cleveland division and committees will be organized under the following general sections:

CASTINGS

Aluminum and brass
Gray iron
Malleable
Steel

FORGINGS AND STAMPINGS

Drop forgings, light and heavy
Gun forgings
Shell forgings, large and small
Stampings, heavy and light
Sheet metal work, heavy and light

RUBBER PRODUCTS

Solid tires
Tires, tubes and accessories
Clothing and footwear
Mechanical goods
Ball, airplane fabric
Medical supplies
Gas masks
Hard rubber

CLAY PRODUCTS

Chemical stoneware and apparatus
Sewer pipe and hollow tile
Insulators
Common stoneware and tableware
Conduits
Brick, fire, paving and building

MACHINERY AND MACHINE PRODUCTS

Electrical appliances
Machinery
Machine shop equipment
Specialties
Bar metal products

CHEMICALS, OILS AND PAINTS

Oils, refiners, manufacturers and jobbers
Paints, varnish and shellac
Chemicals, acids, fertilizers and industrial chemicals

TEXTILES AND CLOTHING

Knit Goods
Shirts and overalls
Sewing machines and products
Uniforms
Garments
Caps and hats
Woolens

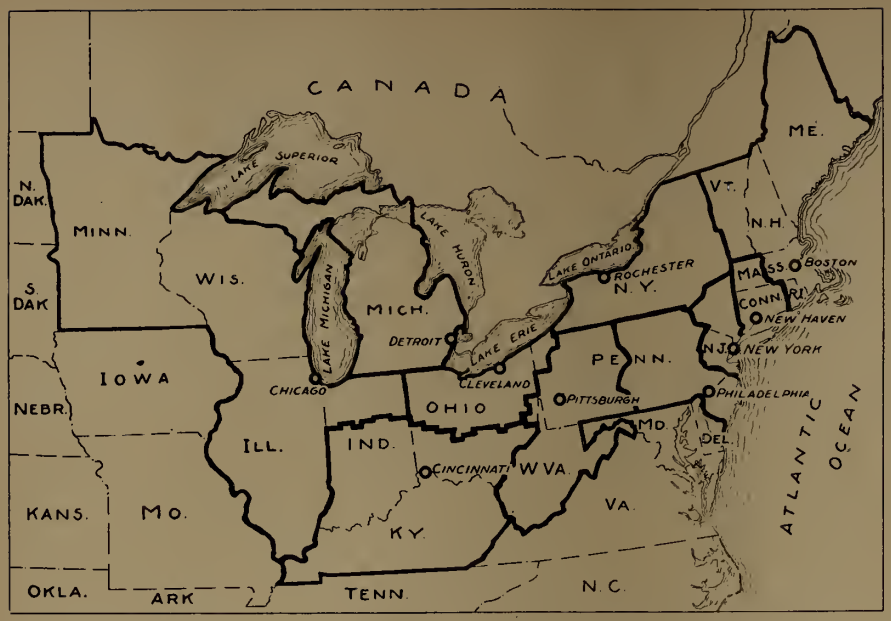
WOOD AND LEATHER

Paper boxes
Wood cases
Leather
Truck bodies
Mill work

ENGINEERING

Plant survey
Estimates
Tools, jigs, gauges, etc.
Production

AUTOMOTIVE



MAP SHOWING THE TEN ORDNANCE PRODUCTION DIVISION AREAS

determined to establish a Washington office, which will form the contact with the government's purchasing agencies. All information relative to proposed work will be communicated to the Cleveland office. From this point it will be sent directly to each of the zone centers where each inquiry will be analyzed, and communicated to the division committee interested and by them to each factory capable of bidding on the work. The intent is that each producer in the entire district shall have an equal opportunity to bid on all contracts and conversely that the government shall be put in touch with every manufacturer capable of doing a share of the work.

Value of Manufacturers' Committee

The separation of the zone organizations according to the different industries is significant. It will compel manufacturers in the same line of work to get together, and the final working part of the organization will consist of a number of industrial units, which will have their own committees of their own men in charge of interpreting the needs and fulfilling the requirements of the government. In the final analysis, the result will be a committee of foundrymen, of textile manufacturers or of leather men representing the district and capable of acting as a unit to absorb the immense volume of work to come. These men will be able also to say from first hand knowledge, not statistics, "This much can we do." The example of the efficacy of the American Iron and Steel institute is sufficient to establish the value of such knowledge and such an organization at this time.

Ingot Output

In April Matches Gain Shown in Pig Iron Production

Production of steel ingots in April followed the upward trend which marked pig iron output last month. In both instances the gain was a continuation of the striking recovery shown in March over the poor records of January and February.

The increase is reflected in the monthly statement just compiled by the American Iron and Steel institute showing the production of steel ingots by 29 companies which in 1916 made 88.14 per cent of the country's total output. These companies in April produced 3,163,410 gross tons against 3,110,381 tons in March. The average daily output was 105,447 and 100,335 gross tons, respectively. April's total was the highest of any month since October.

The record of steel ingot production by these companies since June 1917, follows:

Months:	Open hearth, gross tons	Bessemer, gross tons	All other, gross tons	Total gross tons
1917:				
June	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
Sept.	2,195,556	770,064	6,639	2,972,259
Oct.	2,475,754	870,494	5,687	3,351,935
Nov.	2,384,218	772,489	9,550	3,166,257
Dec.	2,195,832	524,084	13,806	2,733,722
1918:				
January	1,763,356	429,588	10,901	2,203,845
Feb.	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381
April	2,377,974	769,249	16,187	3,163,410

Steel Corporation Orders Again Show Shrinkage

A decrease of 314,524 tons in the unfilled bookings of the United States Steel Corp. is shown by the report covering April operations. Booking at the end of last month aggregated 8,741,882 tons, as against 9,056,404 tons on March 31. While improved transportation facilities and expanded operations of the mills were factors, the cancellation of further commercial orders also figured materially in the shrinkage. A year ago unfilled orders reached the record height of 12,183,083 tons.

The monthly record of unfilled orders with the respective changes is as follows:

Date	Total	Change, tonnage	Change, per cent
Apr. 30, 1918..	8,741,882	314,522—	3.47—
Mar. 31, 1918..	9,009,675	232,049—	2.49—
Feb. 28, 1918..	9,288,453	189,400—	1.99—
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Plans New Steel Capacity and Mills on Coast

The Pacific Coast Steel Co. soon is to commence improvements calling for an outlay of $300,000. A 28-inch rolling mill is included in the additions and alterations planned in the plant in South San Francisco. This later may be converted into a merchant mill for the rolling of angles, beams and channels. Open-hearth improvements include the addition of a 40-ton furnace and the converting of two 25-ton furnaces into 40-ton units. This will give the plant four 40-ton and one 35-ton open hearths which are expected to increase capacity 300 per cent. Further additions include the building of a six-mill sheet plant with a capacity of 3000 tons per month. Other additions planned by the directors include the construction of more open hearths, a large blooming mill and additional improvements which are expected to bring the output of the plant up to 20,000 tons monthly. Approximately 80 acres will be occupied by buildings and equipment when the work is completed. Casting, machining and erection of the fourteen 20-ton castings to be used in the new 28-inch mill is to be done independently of eastern foundries.

The 60-ton open hearth furnace of the Washington Steel & Iron Co. at Sedro Woolley, Wash., has been completed and will begin operations in May.

Priority Applications Deluge Board

Consumers Rush in to Get Preferential Accommodation on Steel—Mills Face Problem in Adjusting All Orders to Efficient Operations—Government Regulations Give Producers Some Latitude in Handling War Work

WASHINGTON, May 14.—The pledge of the steelmakers at the meeting in New York on April 26 to furnish 100 per cent production for war requirements already has resulted in almost quadrupling the number of applications from consumers to the priorities division of the war industries board for certificates to allow preferential production of steel. This means that steel manufacturers, already loaded down with priority orders, are in turn to be deluged with these certificates and that if mill practices are not adjusted to meet the influx, confusion may arise which may lead to serious consequences.

The sudden demand for priority certificates is regarded here as in keeping with the natural trend of events under the system employed by the war industries board to assure fulfillment of the requirements of the United States and its allies ahead of commercial orders. Government officials and representatives of the steel and other industries here almost to a man realize the burden the mills have to carry and feel that mill managers and company executives must employ their wits to successfully cope with the situation.

Must Use Their Conscience

The statement made by Judge E. H. Gary at the New York meeting, which was amplified by James B. Bonner, the industry's representative in Washington, and J. Leonard Replogle, director of steel supply for the government, that manufacturers must use their consciences and inquire if in doubt as to the proper course of procedure, has full government sanction. This is contained in paragraph No. 9 of the "Rules and Regulations Governing Priority," which says:

"The classification of an order simply means that it shall be given such precedence over orders of a lower classification as may be necessary (and only such as may be necessary) to insure delivery on the date specified in the order. It does not mean that work should cease on orders of a lower classification, or that the order should be completed and delivery made in advance of orders taking a lower classification if this is not necessary to effect delivery within the time specified. The one to whom a priority certificate is directed should make his own production plans, so as to get the maximum of efficiency out of his operations, making all deliveries at the time contracted for, if possible, and where this is not possible, giving precedence to the orders taking the highest classification."

Situation Fully Covered

This provision was made in the rules which were issued here on Jan. 1, 1918, with the full approval of Secretary of War Baker, Secretary of the Navy Daniels, and Chairman Hurley of the shipping board, with Secretary Baker also acting in his capacity as chairman of the council of national defense and Mr. Hurley as president of the Emergency Fleet corporation.

Judge Edwin B. Parker, chairman of the priorities division of the war industries board, cites the rule as fully covering the steel manufacturers position on priorities. In a statement to THE IRON TRADE REVIEW, Judge Parker said: "That provision, I believe, fully covers the situation for the steel men. The entire priority system was designed primarily to meet the government's requirements and the provision was inserted in the rules in order that manufacturers might adjust their operations to their own convenience as far as practicable, all the while remembering the war orders of the United States and her allies must be filled first. The provision is liberal and ample."

May Follow Coal Priority

The priorities division some time ago issued a list of industries recognized by the government as requiring fuel first ahead of all other industries. This was carried fully in THE IRON TRADE REVIEW, issue of April 18. While the announcement specifically stated the list was for guidance in supplying fuel—the fuel administration formally accepted the list as standard—it is felt here that priority of manufacture of steel and other materials should be confined to those special consumers even when priority certificates have not been issued. Some steel makers have stated privately that they found the list of great assistance. It is generally admitted, although the use of the term is in bad repute, that there really are essential and nonessential industries as far as capital, labor, materials, transportation, etc., are concerned in waging the great war.

Economy Board Shifted

Washington, May 14.—The work of the commercial economy board of the council of national defense, it is announced, has been transferred to the war industries board. A. W. Shaw, the chairman of the commercial economy board, will serve as chairman of the conservation division of the war industries board under Mr. Baruch. The plans for conservation which the commercial economy board has been carrying out during the last year in the clothing, garment, shoe, paint agricultural implement, and other industries, and in various wholesale and retail trades will be continued and similar plans of conservation put into effect in other trades and industries.

By-Product Coke Capacity Grows Swiftly

WASHINGTON, May 14.—By-product coke plants in the United States today are capable of producing a maximum output of 30,903,180 tons. Reliable compilations just completed from reports received direct from by-product coke manufacturers show their productive capacity equal to that amount and that the maximum coal consumption of all the plants aggregates 41,983,300 tons. The capacities indicated are based on 8993 completed ovens.

The coke productive capacity of these ovens today is approximately 50

per cent greater than the actual production in the first quarter of 1918. Production figures compiled by the geological survey show that in January, February and March the by-product output was 5,200,000 tons, or at an annual rate of 20,000,000 tons. In the week ending April 27, by-product capacity was 534,000 tons and production 476,000 tons, or at annual rates of 28,000,000 and 25,000,000 tons respectively. That, however, was before the completion of three plants the annual capacities of which total more than 2,000,000 tons.

There now are under construction 3015 ovens whose coal consumption is expected to reach 18,591,345 tons for an output of 13,486,230 tons of coke. These ovens will raise the coal consumption maximum to 60,574,645 tons annually and the coke production capacity to 44,389,410 tons. The proportion production of toluol, ammonia, etc., will be increased.

The accompanying table shows the plants built and building, the number of ovens for each and their respective coal consumption and coke production capacities.

COMPLETED PLANTS

Owner or Operator	Location	No. of ovens	Kind of oven	Annual capacity, (net tons) Coal	Annual capacity, (net tons) Total coke
Allegheny By-Product Coke Co.	Glassport, Pa.	120	Otto	260,000	195,000
Cambria Steel Co.	Johnstown, Pa.	492	400 Otto, 92 Koppers.	1,756,000	1,229,000
Carnegie Steel Co.	Farrell, Pa.	212	Otto	690,000	480,000
Semet-Solvay Co.	Dunbar, Pa.	110	Semet-Solvay	248,000	173,600
Bethlehem Steel Co., (Northampton)	South Bethlehem, Pa.	424	Koppers	2,400,000	1,920,000
Bethlehem Steel Co., (Lebanon)	Lebanon, Pa.	90	Semet-Solvay	387,000	278,600
Bethlehem Steel Co., (Steelton)	Steelton, Pa.	120	Semet-Solvay	516,000	371,500
Phila. Suburban Gas & Elect. Co.	Chester, Pa.	40	Semet-Solvay	125,000	87,500
Camden Coke Co.	Camden, N. J.	150	Otto	360,000	252,000
Empire Coke Co.	Geneva, N. Y.	46	Semet-Solvay	146,000	102,200
Lackawanna Iron & Steel Co.	Buffalo	469	188 Otto-281 Rothberg.	1,350,000	972,000
The Solvay Process Co.	Syracuse, N. Y.	40	Semet-Solvay	65,000	45,500
New England Fuel & Transportation Co.	Everett, Mass.	400	Otto	780,000	600,000
Bethlehem Steel Co., (Maryland)	Sparrows Point, Md.	120	Koppers	730,000	525,600
Bethlehem Steel Co., (Colebrooke)	Lebanon, Pa.	228	Otto	500,000	360,000
National Tube Co.	Benwood, W. Va.	120	Semet-Solvay	270,000	189,000
LaClede Gas Light Co.	St. Louis	56	Koppers	320,000	240,000
Minnesota Steel Co.	Duluth	90	Koppers	510,000	375,000
Zenith Furnace Co.	Duluth	80	Otto	200,000	144,000
Cleveland Furnace Co.	Cleveland	100	Semet-Solvay	540,000	350,000
Republic Iron & Steel Co.	Youngstown, O.	143	Koppers	1,020,000	744,600
Youngstown Sheet & Tube Co.	Youngstown, O.	204	Koppers	1,300,000	949,000
Toledo Furnace Co.	Toledo, O.	94	Koppers	560,000	408,800
United Furnace Co.	Canton, O.	47	Koppers	280,000	204,400
Hamilton Otto Coke Co.	Hamilton, O.	100	Otto	240,000	168,000
Milwaukee Coke & Gas Co.	Milwaukee	160	Semet-Solvay	1,004,000	800,000
Northwestern Iron Co.	Mayville, Wis.	72	Otto	320,000	230,400
Citizens Gas Co. (1)	Indianapolis	41	Semet-Solvay	262,000	196,500
Citizens Gas Co. (2)	Indianapolis	100	Otto	338,000	253,500
Illinois Steel Co.	Gary, Ind.	700	Koppers	4,475,000	3,580,000
Seattle Lighting Co.	Seattle, Wash.	20	Klonne	36,000	26,000
River Furnace Co.	Cleveland	204	Koppers	1,300,000	949,000
Indiana Coke & Gas Co.	Terre Haute, Ind.	30	Gas-Machinery	150,000	93,000
Central Indiana Gas Co.	Muncie, Ind.	22	Klonne	40,000	28,000
Inland Steel Co.	Indiana Harbor, Ind.	130	Koppers	890,000	610,000
By-Products Coke Corp.	South Chicago, Ill.	280	Semet-Solvay	1,300,000	975,000
North Shore Gas Co.	Waukegan, Ill.	13	Semet-Solvay	100,000	65,000
Coal Products Mfg. Co.	Joliet, Ill.	53	35 Koppers-18 Wilpute	340,000	238,000
Illinois Steel Co.	Joliet, Ill.	280	Koppers	1,500,000	1,200,000
Semet-Solvay Co.	Detroit	215	Semet-Solvay	1,343,300	1,009,000
Michigan Alkali Co.	Wyandotte, Mich.	54	Otto	217,000	149,000
Kentucky Solvay Coke Co.	Ashland, Ky.	108	Semet-Solvay	800,000	600,000
Woodward Iron Co.	Woodward, Ala.	230	170 Koppers-60 Wilpute	1,255,000	954,200
Tennessee Coal, Iron & Railroad Co.	Fairfield, Ala.	280	Koppers	1,781,000	1,192,600
Semet-Solvay Co.	Ensley, Ala.	240	Semet-Solvay	699,000	479,600
Central Iron & Coal Co.	Holt, Ala.	60	Semet-Solvay	290,000	200,000
Semet-Solvay Co.	Buffalo	60	Semet-Solvay	386,000	289,500
LaBelle Iron Works	Follansbee, W. Va.	94	Koppers	610,000	400,000
Brier Hill Steel Co.	Youngstown, O.	84	Koppers	630,000	453,000
Dover By-Products Coke Co.	Canal Dover, O.	24	Roberts	220,000	150,000
Gulf States Steel Co.	Alabama City, Ala.	37	Koppers	230,000	174,800
The Portsmouth Solvay Coke Co.	Portsmouth, O.	108	Semet-Solvay	770,000	559,900
Chattanooga Coke & Gas Co.	Chattanooga, Tenn.	24	Semet-Solvay	210,000	150,000
Algoma Steel Co.	Sault Ste. Marie, Ont.	110	Koppers	681,000	510,700
Dominion Iron & Steel Co.	Sydney, N. S.	520	Otto	1,664,000	1,198,080
Nova Scotia Steel & Coal Co.	Sydney Mines, N. S.	190	30 Bauer-160 Bernard.	159,000	110,000
Seaboard By-Product Coke Co.	Jersey City, N. J.	110	Koppers	800,000	600,000
Minnesota By-Products Coke Co.	St. Paul	65	Koppers	380,000	273,600
American Steel & Wire Co.	Cleveland	180	Koppers	1,150,000	839,500
Total completed ovens		8,993		41,983,300	30,903,180

PLANTS BUILDING

Owner or Operator	Location	No. of ovens	Kind of oven	Annual capacity, (net tons) Coal	Annual capacity, (net tons) Total coke
Carnegie Steel Co.	Clairton, Pa.	1,280	Koppers	7,920,000	5,702,000
Northwestern Iron Co.	Mayville, Wis.	36	Otto	197,000	147,000
Bethlehem Steel Co.	Sparrows Point, Md.	240	Koppers	1,500,000	1,125,000
National Tube Co.	Lorain, O.	208	Koppers	1,320,000	963,600
Colorado Fuel & Iron Co.	Pueblo, Colo.	120	Koppers	720,000	518,400
Bethlehem Steel Co., (Steelton)	Steelton, Pa.	60	Koppers	375,000	270,000
The Ironton Solvay Coke Co.	Ironton, O.	60	Semet-Solvay	432,000	311,000
Ford Motor Co.	Detroit	120	Semet-Solvay	864,000	622,000
By-Products Coke Corp.	Indiana Harbor, Ind.	120	Semet-Solvay	864,000	622,000
Dominion Iron & Steel Co.	Sydney, N. S.	120	Koppers	720,000	518,400
Youngstown Sheet & Tube Co.	Youngstown, O.	102	Koppers	650,000	474,500
Steel Co. of Canada	Hamilton, Ont.	80	Wilpute	465,000	331,000
Algoma Steel Co.	Saulte Ste. Marie, Ont.	25	Wilpute	142,500	108,500
Providence Gas Co.	Providence, R. I.	40	Koppers	240,000	172,800
Seaboard By-Product Coke Co.	Jersey City, N. J.	55	Koppers	340,500	255,350
Indiana Coke & Gas Co.	Terre Haute, Ind.	15	Koppers	93,750	67,500
Tennessee Coal, Iron & Railroad Co.	Fairfield, Ala.	154	Koppers	877,800	668,360
Cambria Steel Co.	Johnstown, Pa.	180	Otto	869,795	608,820
Total ovens building		3,015		18,591,345	13,486,230
Total ovens built		8,993		41,983,300	30,903,180
Grand total for all plants		12,008		60,574,645	44,389,410

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

GEORGE H. CHARLS has resigned as vice president and sales manager of the American Rolling Mill Co., Middletown, O., and shortly will assume an important executive connection with the Berger Mfg. Co., Canton, O., manufacturer of sheet metal products. He has disposed of his stock holdings with the American Rolling Mill Co., and has acquired a substantial interest in the Berger company. Ed. A. Langenbach, president and general manager of the Berger company announces that while Mr. Charls' official title had not yet been determined, in a large measure he will assume the responsibility and directive powers of the president himself. By close application and marked ability, Mr. Charls had risen from the bottom of the ladder to a leading executive position in the American Rolling Mill Co. organization, within a period of 17 years. Upon leaving the University of Cincinnati in his junior year, he accepted a position with the Central Union Telephone Co., Indianapolis. One year later, he became affiliated with the American Rolling Mill Co., as clerk in the galvanizing department. He was promoted to a clerical position in the accounting department in the main office about two years later, where he remained about the same length of time when he was transferred to the sales department as assistant to Secretary R. C. Phillips. He gradually worked himself up to the position of sales manager and in October, 1914, he was elected vice president in charge of the sales division. He organized in 1909, the Dixie Culvert & Metal Co., Atlanta, Ga., of which he served as president. He also was one of the organizers of the Tennessee Metal Culvert Co., Nashville, and of the Colorado Ingot Iron Pipe Co., Denver. He is best known in connection with the introduction and sale of American ingot iron.

A. B. Ehst was recently appointed controller of the Baldwin Locomotive Works, Philadelphia, and Charles Riddell was made assistant secretary.

C. J. Quinn recently resigned as manager of the La Point Foundry Co., Schlesingerville, Wis., and H. L. Regenetter is temporarily in charge.

Ambrose Swasey of the Warner & Swasey Co., Cleveland, was succeeded by Charles E. Adams as president of the Cleveland Y. M. C. A. Mr. Adams was formerly vice president.

W. J. Eldredge has been made manager of the San Francisco office recently opened in the Merchants Exchange building by the Machinery & Metal Sales Co., New York.

J. L. Ackerson, formerly assistant to Charles Piez, vice president of



GEORGE H. CHARLS

the Emergency Fleet corporation, has been made assistant to Director General Charles M. Schwab.

S. W. Platt has been appointed manager of the Pittsburgh office in the Park building of Luria Bros. & Co., dealers in iron and steel scrap, Reading, Pa.

August Hechscher, who for a number of years has been a large stockholder in the Central Foundry Co., New York, resigned his position on the board of directors recently and has been succeeded by R. A. Fairburn.

Daniel Hurley resigned on May 1 as superintendent of the Cooper Machine shops, Bennington, Vt. On May 1, 32 years ago, he entered the employ of the late Charles Cooper, founder of the business.

Charles C. Alvord accepted a position in the hull scientific section of the Lake Torpedo Boat Co., Bridgeport, Conn., upon being graduated with the class of 1918 from the Worcester Polytechnic institute, Worcester, Mass.

Thomas E. Griffin, who for nine years has been connected with the Dickinson Mfg. Co., Springfield, Mass., has been made manager of the plant which has been taken over by the International Insulation Corp., New York.

Walter H. Allen has been made efficiency engineer of the Graton & Knight Mfg. Co., Worcester, Mass., machinery belting. He formerly was secretary of the New England Steel Roofing Co., that city.

Harry G. Stoddard, vice president and general manager of the Wyman & Gordon Co., Worcester, Mass., and Cleveland, drop forgings, has been named Worcester manager of the Red Cross campaign for the week of May 20.

A. Merritt Taylor has been made director of housing and transportation of shipworkers throughout the country under Charles M. Schwab, director general of the Emergency Fleet corporation. Mr. Taylor was formerly chief of the Philadelphia department of transit.

Charles M. Schwab has been elected president of the Oratorial society of New York to succeed Andrew Carnegie. Mr. Carnegie has been president for over 30 years and explains that his advancing years makes it necessary for him to retire.

Dr. J. Bennett Hill, who has charge of the chemical laboratory of the Barrett Co., will deliver an illustrated lecture on a new method for the determination of toluol at the May meeting of the Philadelphia section of the American Chemical society.

M. L. Lothrop who has been in charge of the steel and tube department of the Timken Roller Bearing Co., Canton, O., was recently made assistant factory manager. He likewise has been chief metallurgist of the Timken company for the past seven years.

Maj. Harold J. Riley, who was active in the organization of the Sanford Riley Stoker Co., Ltd., Worcester, Mass., and Detroit, of which his brother, R. Sanford Riley, is president, has been promoted to the rank of lieutenant colonel. He is with the

twenty-seventh city of Winnipeg battalion, Canadian overseas expeditionary force, is not yet 30 years old and was given the D. S. O. metal for gallant service at Vimy Ridge. He was wounded in action two years ago.

Thomas R. Brown, engineer, Pittsburgh, was recently appointed administrative engineer for the fuel administration. C. P. Billings was made special staff assistant. These appointments are in connection with the program for fuel conservation through economies in operation methods.

Capt. H. Bryant, O. D. N. A., who formerly was in the scrap iron and steel business in Milwaukee, under the firm name of H. Bryant, Inc., has communicated with Chicago friends from the French front. He is in charge of the repairing of ordnance and small arms, having seen considerable service.

Clifford S. Anderson and M. A. Williamson of the Norton Co., Worcester, Mass., manufacturer of grinding wheels have gone to South America, where the company is conducting an investigation in the Guianas. Mr. Williamson, a chemist, expects to locate there permanently.

A. Warren Wells, who for 10 years has been assistant superintendent of the lens plant of the American Optical Co., Southbridge, Mass., resigned recently to become president of the Optical Lens Mfg. Co., recently incorporated. Headquarters are in Boston and the plant is located in Southbridge, Mass.

J. H. Riordan is now connected with the sales organization of the Cleveland Milling Machine Co., Cleveland, having recently resigned as sales engineer of the Grant Lees Gear Co., Cleveland. He formerly represented the Fellows Gear Shaper Co., Springfield, Vt., in the central states.

W. F. Wagner who recently resigned his connection with William Jessop & Son after 52 years of service, has been made sales manager of the Seaport Steel Co., with offices at 217 Broadway, New York. The company specializes in high speed, alloy and carbon tool steels and carbons, sheet steel and forgings.

Archibald R. Lemieux has become vice president and general manager of the Worcester Mfg. Co., Worcester, Mass., upon his resignation as head of the Ansonia Mfg. Co., Ansonia, Conn., maker of brass goods. He formerly lived in Worcester, when serving as foreman of the Reed & Curtis Machine Screw Co., for four years.

Evan F. Jones, treasurer and general manager of the Morgan Spring Co., Worcester, Mass., recently resigned as president of the Norcross Bros. Co., general contractor of that city, remaining as director and stockholder. Edward J. Cross, president and treasurer of the E. J. Cross Co., Worcester, general contractor, succeeds him.

Stuart B. Marshall, who at one time was manager of the American Manganese Mfg. Co., Dunbar, Pa., is now a consulting engineer, chemist and metallurgist on blast furnaces, coke ovens, foundries, ferroalloys, ores, etc., at Roanoke, Va. Mr. Marshall was formerly general superintendent of the Aluminum Co. of America in North Carolina.

Charles Leonard, who was graduated from the Worcester Polytechnic institute, Worcester, Mass., in 1917, where he took a special course in safety engineering, has become safety engineer of the Dupont powder works, Wilmington, Del. He resigned as a director of the vocational school at Holyoke, Mass., to accept the appointment.

William Griscom Coxe has been made supervisor of ship construction in the Delaware river district by Director General Charles M. Schwab. Mr. Coxe is a shipbuilding expert. After having practiced his profession in England and Germany, he became associated with Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, and later became president of Harlan & Hollingsworth Corp.

Warren B. Ryther, 512 Ellicott square, Buffalo, was recently appointed manager of the Buffalo office of the Miner-Morse Corp., Erie, Pa., high-speed steel, alloy steels, sheets, shapes, etc. Pierre A. Miner, president of the corporation has been spending a great deal of time in Washington in connection with the alloy steel requirements of the government.

T. H. McKenney of the Illinois Steel Co., Chicago, addressed the Chicago Safety Council and the accident prevention committee of the Illinois Manufacturers' association at a joint meeting and dinner at the Hotel La Salle, Chicago, April 30, on accident prevention. Other speakers were H. F. Perkins of the International Harvester Co., and H. E. Myles, chairman of industrial training of the council of national defense.

Victor E. Edwards has been granted a leave of absence for duration of war by the Morgan Construction Co., Worcester, Mass., of which he was vice president. On March 18, he became consulting engineer for the ordnance department at the proving grounds, Aberdeen, Md., but declined to accept a commission. He now has been commissioned a major in the ordnance reserve corps of the army.

C. A. Miller, assistant purchasing agent for the Carnegie Steel Co., Pittsburgh, succeeds J. M. Taylor who recently resigned after 25 years of service.

S. B. Reynolds, who for the past 17 years has been connected with the Brown & Sharpe Mfg. Co., Providence, R. I., was recently appointed New York representative at 50 Church street for William E. Duff, York, Pa., machinery and mills supplies.

C. W. Hancock, Cleveland, well known in the middle west machinery trade, will succeed P. J. Hopkins as eastern representative at 50 Church street, New York, of the Cleveland Punch & Shear Works Co., Cleveland. Mr. Hopkins has held this position for several years and resigned recently to accept an important position with the Fore River Shipbuilding Corp., Quincy, Mass.

S. E. Chadsey, assistant to the general superintendent of the Massey-Harris Co.'s plant at Toronto, Ont., has been made general manager of the agricultural implement plant at Brantford, Ont., to succeed Franklin Grobb, who has retired because of ill health. The latter continues his connection with the company in an advisory capacity only. R. D. Johnson has retired as superintendent of the Brantford factory and is succeeded by John W. Dunn.

Prof. Samuel J. Barnett of the department of physics, Ohio State University, has been awarded the Comstock prize by the National Academy of Sciences, in recognition of his successful research work in magnetism by rotation. This prize, offered once in five years, has been awarded but once before, to Prof. R. A. Millikan of the University of Chicago and consists of a cash award of $1500 together with the accompanying distinction in scientific circles.

J. F. Webb has become affiliated with the the E. J. Woodison Co., Detroit, which recently absorbed his company, the J. F. Webb Mfg. & Supply Co., Davenport, Iowa, manufacturer of air squeezer molding machines. Mr. Webb will have charge of the Woodison company's molding machine department. The Woodison company now is manufacturing electric jar-ramming, pattern drawing and roll-over molding machines, and is now designing a coremaking machine which will have a large capacity for the production of flat cores.

Iron and Steel Men in War Machine

Edward N. Hurley, Chairman, United States Shipping Board

EDWARD NASH HURLEY'S contribution to the winning of the war is not easy to overestimate. That it is more than large, there can be no doubt. Ships form not alone the foundation for the successful prosecution of the war but a bulwark of defense for every branch of warfare. Everything relates to, is dependent upon and revolves about ships. And with ships, as all know, Mr. Hurley has had much to do. Due to his efforts, plants now are ready to turn out ships in quantity. Launchings now average over one a day. He has laid the basis for the production possibilities under the commencing regime of Charles M. Schwab, recently appointed director general of shipping. As chairman of the United States shipping board and president of the Emergency Fleet corporation, Mr. Hurley for months has occupied the foreground of public interest and patriotic feeling since the extreme importance of the ship program everywhere has been appreciated. How Mr Hurley's achievements are regarded by those to whom shipping is a familiar matter and by business men in general was evidenced at the recent foreign trade convention in Cincinnati. An officer of the government, praising the ability of Mr. Mr. Schwab and the part the Bethlehem steelmaster is to play in the carrying out of the ship program, invoked great applause. This cheering only was exceeded upon his reminding his hearers that when the shipping program "goes over the top", none should forget the man who made it all possible, the man who prepared the groundwork and worked against terrific odds, Edward Nash Hurley.

In the three years which have elapsed since President Wilson appointed Mr. Hurley chairman of the federal trade commission, the latter has earned for himself the name of "Hurry Up" Hurley in Washington circles. Incidentally he was the man who drove the first rivet to be driven in a ship by compressed air. His rise in 15 years from an obscure position running a switch engine into Chicago at $35 a month to millionairedom was made possible by his genius exercised in the invention of pneumatic tools. After several railway jobs, he became deputy collector of customs in Chicago. On Jan. 1, 1890, he became chief engineer of the Cook county insane asylum. He had long been interested in the application of the pneumatic principle to tools and his several inventions included a pneumatic bell ringer, brake, sanders, hammers, etc. With two machinists he commenced business in a barn. Three months later the first pneumatic pouring machine was placed on the market and Hurley's career of success was assured. On April 1, 1898, he opened the office of the Standard Pnuematic Tool Co., Chicago, with a capital of $50,000. Three years later he sold out to its competitor at a price which made him a millionaire. He was born in Galesburgh, Ill., July 31, 1864, and in that town received his first shipping experience. It was in a tub which he sailed down Cedar Fork creek, running under the town's streets.



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EDWARD NASH HURLEY

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

McAdoo Says New Revenue Bill Will Pass

KEEN interest is being manifested by business men generally in the demand of Secretary McAdoo for the enactment of a new war tax bill at this session of congress. Proposed immediately after the third Liberty loan has been heavily oversubscribed and when business houses are planning to meet the federal taxes due June 15, it is thought by many that the proposal is somewhat inopportune. Many large corporations and business interests have obeyed the injunction of Internal Revenue Commissioner Roper to take advantage of the government's interest offer of 25 cents a month on every $100 in taxes paid in advance, applicable to May 15, and thus relieve a congestion in the revenue offices the middle of June. In one day recently $115,000,000 was received from this source alone and in the first 10 days of the month approximately $227,000,000 was on hand from income and excess profits taxes, as compared with a total of only $412,000,000 in the last 10 months. By June 15, it is expected this total will be smaller , an amount greatly in excess of $3,000,000,000 or about $1,000,000,000 more than was originally anticipated from this source. Nothwithstanding this fact and that the last loan brought in an extra billion, Secretary McAdoo apparently proposes to push the new tax measure.

Measure Will Be Strenuous

When submitted to congress, the bill, it is said, will go the limit in taxing war profits. It will establish definite profits and all in excess of that mark will go to the government. It is understood that the President has told congressional leaders who oppose additional tax legislation at present that the measure must be passed now. Secretary McAdoo is prepared to prove to Senator Simmons, senate finance committee chairman ,and Chairman Kitchin of the house ways and means committee, that the measure is imperative. Representative Kitchin stated in the house recently that estimates for the next fiscal year would reach at least $31,000,000,000, while other estimates supplied later place the expenditures at $33,500,000,000 as follows:

Ordinary expenses	$2,000,000,000
Fortifications	6,000,000,000
Sundry civil and shipping	3,000,000,000
Naval	1,500,000,000
Loans to the allies	6,000,000,000
Military	15,000,000,000
Total	$33,500,000,000

Representative Joseph W. Fordney, ranking Republican member of the ways and means committee, one of the opposers, recalled the percentages raised by direct taxes in different countries engaged in the war. He said the United States had raised 35 per cent of its revenues by direct taxes, while Great Britain had obtained only 25 per cent and Canada only 18.5 per cent in this way. He insisted that the rest of the money necessary for the conduct of the war be obtained from loans, and advocated pause until next winter before inaugurating another tax. Representative John M. Garner of Texas agreed that sufficient taxes had been levied for the present and that another revenue bill would seriously affect the morale of the nation and cause possibly critical confusion in the business world.

War Expenses Increase Rapidly

That we are quickly overtaking Great Britain in war expenditures is shown by comparative figures recently issued by the Alexander Hamilton institute. During the fiscal year ending June 30, 1918, the United States will have disbursed upwards of $12,000,000,000, while Great Britain in the year ended March 31, disbursed $13,500,000,000. However, since loans to allies were twice as great as those to Great Britain, the national expenses of the United States are only $7,000,000,000 for the year as against $11,000,000,000 for Great Britain. The comparative war budget for the two countries follows:

	Great Britain fiscal year ending Mar. 31, 1918	United States fiscal year ending June 30, 1918
Total disbursement, billions.	$13.5	$12.0
Loans to allies, billions....	2.5	5.0
Net nat'l exp., billions.....	11.0	7.0
Paid by taxation, billions..	3.5	4.0
Borrowed for net expenses (not including loans to allies) billions	7.5	3.0
Ratio, taxes to net exp....	32%	57%
Per capita taxes, last 12 months	$77.00	$40.00
Per capita loans to allies, 12 months	55.00	50.00
Per capita borrowings (less loans)	170.00	30.00

New Finance Corporation Ready For Business

Washington, May 14.—The war finance corporation is expected to get on the job this week. The senate last Thursday completed its confirmation of the four directors of the corporation and the seven members of the corporation's capital issues committee. As soon as the oaths of office have been taken, the board of directors, of which Secretary McAdoo is a member exofficio, and the committee will complete their respective organizations and the new machinery which is to keep the financial wheels of war industries grinding, will be set in motion.

The board and the committee each will be constituted as Secretary McAdoo, with the approval of the President, has desired, with the exception of Allen B. Forbes, who declined one of the directorships. In his place was nominated, and confirmed, C. M. Leonard of Chicago, president of the Leonard Construction Co. The other directors are W. P. G. Harding, Eugene Meyer Jr., and Angus W. McLean. Members of the capital issues committee are Charles S. Hamlin, John Skelton Williams, Frederic A. Delano, James B. Brown, John S. Drum, Frederick H. Goff and Henry C. Flower.

The capital issues committee, authorized in the act creating the cor-

poration, will succeed a similar committee now acting voluntarily for the federal reserve board. This committee has been particularly active since last January. Last week, practically the last full week of its existence, the reserve board's committee passed upon 37 applications for approval of issues, municipal, public utility and industrial, larger than $100,000, the minimum provided for in the war finance corporation act.

Of last week's considerations, issues aggregating $4,811,000 were disapproved. In addition to this, the committee induced postponement of issues aggregating $4,990,000 until after the war. Of the total submitted, $6,777,084 were to meet expiring obligations. The $15,899,193 approved is nearly $1,700,000 greater than the amount of new issues offered in the market in the corresponding week last year.

First Quarter Net Drops

A slight decrease in earnings for the initial quarter of 1918, as compared with the same period a year ago, is shown by the recent report of the American Steel Foundries. Income for the three months ended March 31, 1918, totals $2,102,020 as against $3,179,978 in the same period in 1917. Payments of notes and redemption of outstanding bonds in 1917 made the charges before dividends in the first quarter much smaller than the corresponding period last year. The sum reserved for federal taxes was $548,000. Earnings on 171,840 shares were equivalent to $8.77 per share as against $13.97 in the first quarter 1917. The comparative income account for the first three months follows:

	1918	1917
Net earnings	$2,059,850	$3,104,814
Other income	42,170	75,164
Total income	2,102,020	3,179,978
Charges	46,427	778,576
Taxes	548,000	.....
Surp. after charges	$1,507,593	$2,401,402

Harvester Co. Reorganized

Ample finances to continue the operation of the Independent Harvester Co., Plano, Ill., which went into a receiver's hands on Dec. 11, 1917, at maximum capacity in the manufacture of agricultural machinery, implements, tractors, etc., have accrued through the complete reorganization by Milwaukee capitalists. The new company is known as the Independent Harvester Co., Ltd., and is organized under the laws of the state of Delaware, with a capital stock of $3,500,000, $1,000,000 being preferred and the remainder common. The company has acquired all assets and assumed all approved liabilities of the old concern. All the old stockholders will be given an opportunity to take new stock while creditors will all be paid off by the new company.

Grant Fitch, vice president of the National Exchange bank, Milwaukee, represented the Milwaukee syndicate in the purchase. With him are associated Lawrence Fitch, an officer and director in numerous large industries of Milwaukee and Wisconsin; Albert J. Earling, chairman of the Chicago, Milwaukee & St. Paul railway, and others.

Financial Crop Ends

The Northwest Harvester Co. and the Holt Mfg. Co., Spokane, are to turn out $3,000,000 worth of caterpillar tractors and combined harvesters this season, according to Ben C. Holt, president of the former.

* * *

The name of the Theisen-Braithwaite Co., Port Huron, Mich., has been changed to the Great Lakes Foundry Co. Its capital has been increased to $50,000 and new equipment has been installed.

* * *

The Southern California Iron & Steel Co., of Los Angeles, has been granted authority by the state corporation department to issue a stock dividend of $237,500 to its stockholders. The dividend represents accumulated and undistributed profits.

* * *

The American Equipment Co. of Bucyrus, O., has sold to the American Steel & Machine Co. of Chicago, property at Watt avenue and Lake Calumet, Chicago, which it recently bought from the Illinois Brick Co. The property will be utilized for a plant to manufacture munitions.

* * *

The estate of W. I. Babcock and Babcock & Penton, consulting naval architects and engineers, 120 Broadway, New York, and Penton building, Cleveland, announces the discontinuance of their business as of May 1, 1918. Communications may be addressed to H. Penton, Penton building, Cleveland.

* * *

The New Haven Rivet Co., New Haven, Conn., has been authorized to increase its capital from $5000 to $80,000. Repairs to the present plant will be made and considerable new machinery installed. The company's line of manufacture includes rivets of all kinds and sizes, machine screws and wood screws.

* * *

The Walcott Lathe Co., Jackson, Mich., has increased its capital stock from $700,000 to $1,500,000. Other increases in capital stock made recently include: The Belknap Hardware & Mfg. Co., Louisville, Ky., $4,000,000 to $5,000,000; the Blashill Wire Machine Co., Montreal, Que., $48,000 to $100,000; and the Louisville Axe & Tool Co., Louisville, Ky., to $40,000.

Government Buying

More Prominent in Coal Tar Products —Sulphate Demand Heavy

New York, May 11.—Present indications are that the government will take practically the entire production of sulphate of ammonia over the next few months. Producers now are awaiting word with regard to large deliveries to be made to the new government nitrate plant at Baltimore. Sales to the government are being made on the basis of $4.50 per 100 pounds at producers' plants. In the outside market, spot continues to command $5.55 to $5.60 per 100 pounds at tidewater, but this level is largely nominal. It has become definitely apparent that producers will be unable, for some time, to renew yearly contracts with regular customers.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.28 to .35
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.55 to 5.60

Contract

Pure benzol	$0.28 to .35
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

The toluol committee of the war industries board has granted additional permits to commercial users for May delivery. The committee is exercising great caution in acting upon applications and in many cases the quantities requested have been cut down materially. Prices on this commercial business range from $1.75 to $2 per gallon. The government continues to pay $1.50 per gallon.

The government is taking some benzol, but not in quantity. It is expcted the government ultimately will be a large buyer. Demand is rather slow and the tone is easy. Pure benzol continues at 28 to 35 cents per gallon.

No action has developed on the inquiry of the navy department for large quantities of solvent naphtha. Other demand continues fairly active and supplies are comparatively scarce. Spot may be quoted at 18 to 25 cents per gallon, and contract at 18 to 22 cents.

Obituaries

COL. JOHN GORDON BATTELLE, who retired as president of the Columbus Iron & Steel Co., Columbus, O., about a year ago, died at his home in that city, May 10, after a brief attack of bronchial pneumonia. His connection with the iron and steel industry had extended over nearly a half century. In that time he had gained for himself a position of much prominence. Born at Clarksburg, Va., May 12, 1845, he obtained his education at a Fairmont, Va., academy and at the Lindsay institution, Wheeling, W. Va. Upon his graduation he obtained a position as clerk in the treasury department at Washington, where he remained six months. For a while he worked in the United States quartermaster's department at Wheeling and then accepted a position as bookkeeper for J. L. Hobbs & Co., of that city. This marked his entry into the iron and steel business. A rapid rise, due to his energy and ability, made him secretary and general manager of the Wheeling Rolling Mill Co. at the age of 21. Mr. Battelle then located in Memphis, Tenn., continuing in the rolling mill industry there for several years. In March, 1883, he resigned and moved to Cincinnati, O., to take the management of the Cincinnati Corrugating Co. This corporation then moved to Piqua, O., where the Piqua Rolling Mill Co. was organized, of which Mr. Battelle was made president. He also filled the post of general manager of both companies which were ultimately sold to the American Sheet Steel Co. He served in those capacities for about 10 years and having acquired some of the stock of the Columbus Iron & Steel Co., he was elected to the presidency. He remained at the head until his company was consolidated with the American Rolling Mills Co., Middletown, O., final plans for which were arranged last May. Then he retired. Col. Battelle received his commission as colonel in the Ohio National Guard from the late Governor Nash. He was an aide on the governor's official staff and was one of the Ohio commissioners to the Panama-Pacific International Exposition in San Francisco. He always took a keen interest in Republican politics, and was especially active in his support of the principles of a protective tariff. At one time he was a director of the Inland Steel Co., and of the Rising Sun Mining Co.

James May, who for many years was foreman for the Continental Iron Works, New York, died at his home in Brooklyn recently, aged 64.

Henry A. Purdy, retired, who at one time owned and operated a foundry in



COL. JOHN G. BATTELLE

Greenpoint, Brooklyn, N. Y., died at his home in Brooklyn, May 8.

Edward Jessup Stewart, organizer, president and treasurer of the United Metal Seal Co., South Boston, died May 8 at his home in Brookline, Mass.

William L. Collamore, formerly chief engineer of the Warren Mfg. Co., Warren, R. I., and inventor of the Collamore governor for steam engines, died at his home there, May 1, aged 80.

De Witt C. Prescott, aged 77, inventor of the Prescott steam feed, died May 4 at his home in Chicago. He was the founder of the Marinette Iron Works Co., Duluth, but retired from active business several years ago.

George Dunham, inventor of nut-making machinery, died suddenly at his home in Unionville, Conn., May 9, aged 88. He organized the Dunham Nut Co., which was later sold to the Garland Nut & Rivet Co., New Castle, Pa., when he retired.

Charles Jenkins, aged 74, who for 24 years has been actively identified with Jenkins Bros., Boston, valve manufacturers, died at his summer home in Winthrop, Mass., May 1. His father, Nathaniel Jenkins, was the patentee and maker of the Jenkins valve.

John M. Toppin, formerly manager of the Rhodes Mfg. Co., Hartford, Conn., special machinery, died in Pittsfield, Mass., May 10, aged 25. As consulting engineer he was a member of the American society of mechanical engineers and for six years was connected with the General Electric Co.

John J. Cummings, president of the McGuire-Cummings Mfg. Co., Chicago, railway cars and equipment, died May 4 after a 10-day illness, aged 53. He was chairman of the Chicago & West Town Railway Co.'s board of directors and was likewise chairman of a district exemption board.

C. A. Francis, who for 25 years was superintendent of the Studebaker Bros. Mfg. Co., South Bend, Ind., and at the time of his death, affiliated with the Packard Motor Car Co., Detroit, died recently in the latter city. He was a pioneer designer of automobile bodies.

John S. Hunter, mechanical engineer, who for six years has been secretary of the Terry Steam Turbine Co., Hartford, Conn., died at his home there, May 7, following a two-weeks' illness, aged 84. He was the organizer and president of the Hartford Foundry & Machine Co., where he remained seven years. Later he was affiliated with the Henry R. Worthington Co., New York.

Arthur L. Clark, president and treasurer of the Winsted Edge Tool Works, Winsted, Conn., maker of chisels and draw knives and treasurer of the Winsted Mfg. Co., that city, maker of scythes, hay and corn knives, died in Litchfield county hospital, Winchester, Conn., May 3, following an operation at the age of 60. He was president of the Hurlburt National bank, Winsted, and a director of many important industries in the town. He had served in both branches of the state legislature.

Steel Exporting Buffeted by War

Complicated Procedure Now Necessary Before Shipment Can Be Made Due to Licensing System, Ship Shortage, Railroad Permits and Other Difficulties —Tremendous Tonnage of Unfilled Foreign Demands Piling Up

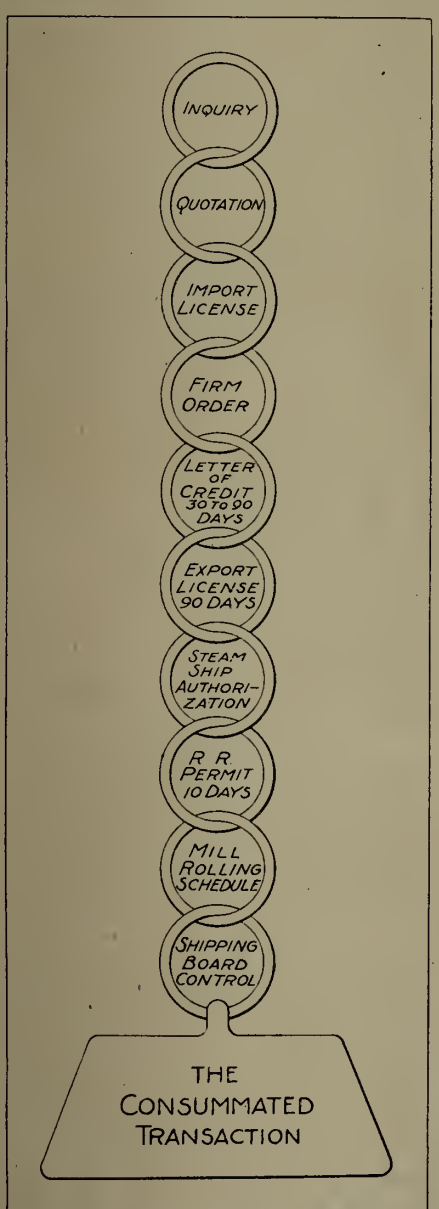
BY G. F. CREVELING

EXPORT merchandizing of steel products used to be a business. Now it is a science, in which experience, good judgment and good luck are among the main constituents. Probably no industry in the United States today is being conducted under as many handicaps as our overseas trade in steel, due to conditions arising from the world shortage of ships, scarcity of materials, diplomatic negotiations, a crippled railroad system and various other difficulties.

These untoward conditions have created a routine through which the export order must pass on its way from the original inquiry to the delivery of goods aboard ship that is so complex and changing that the export seller must be on the job every day and every minute. And he must be lucky, too, no matter what his experience, or the deal may fall through in any one of several stages. The general routine of the ordinary export transaction is elaborate.

Many Preliminaries Necessary

After the merchant receives the original inquiry from abroad, he shops around for as low a price as possible, then cables his quotation, subject to granting of export license, and naming approximate delivery and other terms. If these are accepted, it is then up to the customer to arrange his letter of credit with a bank in this country, which usually runs from 30 to 90 days, first arranging with his government for an import license, if he is located in a country requiring such a license. After the credit is established, the merchant applies to the war trade board for an export license, which expires in 90 days. This done, he applies to the steamship company for steamship space, and, if he is lucky, obtains authorization for space on approximately a certain date. If granted this authorization, he applies to the railroad company for a permit to ship the material from the steel works to tidewater. This permit expires in 10 days, but is easily renewable. Armed with these various documents he may now approach the steel mill for a place on its rolling schedules. Unless the merchant has railroad permit, steamship authorization and export license, the mills will not accept the business. When the mill has rolled the goods and shipped them to tidewater, however, the merchant's troubles are not over. Within recent weeks the United States shipping board has been assuming strict control of such shipping as is left in the foreign trade; consequently at this stage in the transaction it may step in and name the cargo that the ship—on which the merchant had booked space—may carry. Under such cicumstances the merchant can only pile his goods in warehouse at tidewater and wait for the next steamer or try to charter a small sailing vessel. The alternative of the sailing boat is not particularly alluring. If a sailing vessel has a capacity of around 1000 deadweight tons or more, the shipping board views it with jealous eyes and may press it into service. If it is around 500 tons or too small to interest the shipping board, its capacity is so insignificant in terms of iron and steel tonnage that it is hardly worth while. A sailing vessel will only make about two trips a year to a South American port and not much over one round trip to the far east. Several of the steel export merchants have thousands of tons of steel at tidewater, waiting boats. One large house doing general South American business, has over $2,000,000 worth of goods stored in American ports.



VARIOUS LINKS IN THE CHAIN OF AN EXPORT TRANSACTION

One Year's Credit Required

Now, while the steel is lying in warehouse, the letter of credit may expire, having originally been drawn, say, for only 60 days. In this connection, it is reported that the United States Steel Products Co. now will book tonnage only on the express terms of an irrevocable credit of one year. When the credit expires, the customer may cancel at will. This leaves the merchant with a tonnage of goods on his hands which may be made up especially, and, therefore, is practically impossible to resell. However, the customer may be prevailed upon to renew his credit and the merchant again breathes freely, but his troubles are not over. In a short time the export license will expire, having been originally granted for 90 days. If, in the meantime, the goods have been placed on the war trade board's conservation list, the merchant may have to whistle for his money. Or possibly, the export license is reissued, but the foreign customer is located in a country which requires an import license, such as France, Italy or England. In the course of time this import license will expire, causing more trouble. One French consumer, because of just

such a mischance, has over a quarter million dollars worth of goods lying in a New York warehouse, which he can't use because his import license expired just before the goods were shipped, and he cannot get is renewed.

The accompanying diagram shows the various links in the routine of an export transaction. Only an export seller himself can describe adequately the details and work involved in the welding of any one link. And, if any link breaks, through expiration of the time limit allowed, or other exigencies, the transaction falls through.

Situation Becoming Worse

The situation is not getting better. It is growing worse. Buenos Aires, for example, has been a kind of meal ticket for several of the merchants during recent months. Up until April, from four to six steamers were booked for this trip monthly. But in April, only one small steamer is booked and there is every possibility that the shipping board may order that this boat carry coal, tin plate or some other material needed for the production in Argentina of goods wanted by the allies. As stated previously, the board is constantly exercising stricter control. Sometimes it bargains with the owner or charterer of a vessel, agreeing to allow the latter to use the vessel for one more voyage, prior to taking it over for governmental purpose, but the board is to specify what the cargo shall be.

It is hardly likely the United States will launch enough new ships in 1918 to free vessels for commercial uses this year. And even if the shipping situation were less serious, the shortage of steel would remain an effective obstacle. The war trade board has a long list of iron and steel products on its conservation list, which could not be shipped even if there were plenty of boats.

The steel export merchants enjoyed a flourishing business in 1916 and 1917. They have developed extensive and specialized organizations. They have advertised widely in the foreign fields and have spent money lavishly. The present restriction of their business is the country's loss, just as their previous profits were the country's gain. But the seed they have sowed is not wasted. They have assisted the American manufacturers to better knowledge of the needs of the foreign trade and have implanted a desire for American goods among foreign consumers. The demand for steel abroad is growing steadily. One prominent seller estimates the tonnage requirements now piled up at 25,000,000 tons and says he could book 5,000,000 to 10,000,000 tons if he could promise deliveries. Sooner or later the bars will be let down and then the export merchants will be able to serve manufacturers on a broader scale than ever in the distribution of steel products overseas.

But, for the present, it seems as though the export merchants and the country at large must sacrifice a brilliant opportunity to develop foreign trade, because of the still bigger business of war.

Conservation List of Iron and Steel

ALLOYS, steel.
Bars, steel sheet.
Billets, steel.
Blades, saw (circular, hack and band).
Bloom, steel.
Boilers, marine.
Boilers, ship.
Cable (iron and steel) consisting of six wires or more.
Cable, stud link chain.
Cars (railway, completely assembled and unassembled and parts thereof).
Chain, stud-link, open-link.
Drilling machines, radial.
Drills, carbon and high-speed twist.
Drills, twist.
Ferroalloys.
Ingots, steel.
Iron, pig.
Iron pipe, cast.
Iron plates, including ship, boiler, tank and all other classes of iron plates ⅛ inch thick and heavier and wider than 6 inches and circles over 6 inches diameter, whether plain or fabricated.
Iron, scrap.
Locomotives and parts thereof.
Machines, as follows: Aeronautical, their parts and accessories; boring (horizontal and vertical); drilling (radial); milling, plain and universal (except hand millers); oil well drilling and accessories.
Machine tools: Grinders, internal, plain and universal; horizontal and vertical boring machines; lathes, all sizes; milling machines, plain and universal (except hand millers); planers; radial drilling machines; slotters; vertical boring mills, all sizes.
Manganese ore and metals thereof.
Mills, plate rolling.
Oil-well casing (frequently described as boring tubes).
Oil-well drilling implements, machinery and accessories.
Open-hearth blast furnaces.
Open-link chain.
Pipe, cast iron.
Plate, terne.
Plate, tin.
Plates, iron and steel, including ship, boiler tank and all other classes of iron and steel plates, ⅛ inch thick and heavier and wider than 6 inches and circles over 6 inches diameter, whether plain or fabricated.
Railway cars, completely assembled and unassembled and parts thereof.
Ship boilers.
Slabs, steel.
Steel, as follows: Alloy; billets; blooms; boiler tubes; files; abrasive; high speed; ingots; oil well casings (frequently described as boring tubes); plates, including ship, boiler, tank and all other classes of steel plates ⅛ inch thick and heavier and wider than 6 inches, and circles over 6 inches diameter whether plain or fabricated; scrap, sheet bars; slabs; wire rope; cable or strand consisting of six wires or more.
Steel furnaces.

Concrete Barge Ordered

The Ambursen Construction Co., 61 Broadway, New York, with a yard on the Hackensack river, has taken a contract from the bureau of construction and repair of the navy department for four reinforced concrete fuel oil and coal barges to be used in New York harbor. This is the first official recognition the navy department has given to the adaptability of reinforced concrete in ship construction. The requirements for these vessel are extremely severe and a variety of designs were considered before letting a contract. The chief consideration was the oil-proofing of concrete, which has been successfully provided for. The vessels are designed to carry a maximum of approximately 800 tons of fuel oil. They also are designed for carrying the same total tonnage of coal or other cargo. One of the factors leading to the selection of this type of vessel was speed of construction, as it is estimated the first vessel will be launched within 50 days, and the others at intervals of 10 days. It is expected that the navy department will build altogether 12 of these vessels. About 50 tons reinforced bars and wire cloth or expanded metal will be needed for each vessel.

More Boats Awarded

J. F. Duthie, vice president and general manager of J. F. Duthie & Co., shipbuilders, Seattle, has become president and practically sole owner of the plant by reason of the fact that he has taken over the interests of C. D. Bowles, former president. The Duthie yards have just closed a contract with the United States shipping board for construction of 10 additional 8800-ton steel vessels at a price of $17,000,000 which increases the number of boats awarded to this plant from 6 to 16. About $200,000 will be expended in making improvements and additions to the mechanical equipment of the plant.

Push Home Output of Ferroalloys

Government Giving Deep Study to Problem of Reducing Importations of Ores and Metals—Experts Discuss Subject at Pittsburgh Conference—Manganese, Chrome, Tin Tungsten, and Other Metals Receive Attention

PITTSBURGH, May 14.—Plans for increasing the domestic production of various ores essential to the manufacture of alloy steel and the attendant problems were discussed by scientists and mining experts in charge of the various experiment stations of the United States bureau of mines at a three-day conference here which ended last Saturday. After completing the discussions, the representatives of the bureau went to Washington where another three-day conference starting yesterday was begun. Final reports then are to be made to Director Van H. Manning of the bureau.

The necessity of increasing production and conserving supplies has been brought about by the action of the war department in taking over ships which were being used in bringing minerals to this country. The importance of the meeting was heightened by the fact that it followed immediately upon the gathering of steelmakers in Pittsburgh last Tuesday when plans for conserving the supplies of manganese and chrome ore were discussed and the question regarding a change in the practice of manufacturing alloy steel was debated.

May Cut Imports Deeply

It is estimated that the minerals involved in the study being made by the bureau of mines represent importations of about 2,000,000 tons. About three-fourths of this total, it is claimed, can be eliminated in the case of extreme necessity. It also has been pointed out that the importation of bulky materials congests the ports of the United States and exhausts its credit in the purchases of supplies abroad. Dorsey A. Lyon, supervisor of the bureau's stations, said that the importation of these minerals call not only for the diversion of ship tonnage from military service, but in addition requires that this country furnish fuel, equipment and supplies to the foreign mines producing these minerals, and also the transportation of other products which the latter demand in return for their minerals.

An interesting angle in connection with the development of domestic mines is the possibility, if not the probability, of a sweeping readjustment in the electric furnace industry being necessitated whereby the furnaces will be located near the mines so that the points of production of ferroalloys will be adjacent to raw material sources. The advantage claimed would be through the concentration of shipping by rail transportation. The ferroalloys would be carried to the steel mills in the east instead of the more bulky ores being transported to the furnaces in that section.

Reviews Western Developments

Dr. L. H. Dushak, metallurgist in charge of the station at Berkley, Cal., told THE IRON TRADE REVIEW of work that is being done to develop manganese and chrome ore mines on the Pacific coast and in the southwest.

"So far as known there are no extensive deposits of chrome ore in that section," said Doctor Dushak, "but there are a great many deposits that are not developed. With few exceptions the same thing applies to the manganese ore station. The problem is to build the industry from the ground up. In the case of chrome ore there are many possibilities of developing high grade deposits, but it is going to cost a great deal to get it out of the scattering pockets, some of which are almost inaccessible. There is also some low grade ore in California which may prove to be of moderate extent."

There are two plants on the Pacific coast which make ferroalloys. One of them is that of the Noble Electric Steel Co., Heroult, Cal., which has been reopened and is making ferromanganese and ferrosilicon. This company has five furnaces but is operating at from only 20 to 40 per cent of capacity, principally because of the difficulty of obtaining electrodes. The other is a new plant, that of the Pacific Electro Metals Co., at Bay Point, situated in the San Francisco Bay region.

At the present time steel industry requirements for manganese ore for the manufacture of ferromanganese and spiegeleisen are from 700,000 to 800,000 long tons per year of high grade ore, besides a large quantity of lower grade ores. In 1917 more than 500,000 tons were imported from Brazil, 50,000 tons from India and about 60,000 tons from the West Indies and Central America, besides 45,000 tons of ferromanganese from New England. The domestic production of high grade ore has 114,000 tons.

Domestic requirements of chrome ore for 1918 have been estimated at 150,000 tons of 50 per cent and of that 12,000 to 15,000 tons have been set aside for use as a refractory. In 1916 California produced about 50,000 tons, this ore being used in the manufacture of high-speed steel, automobile axles and springs, locomotive frames and certain parts of ore-crushing apparatus, in projectiles, armor plate and cannon linings. In 1917 the domestic production of chrome ore is estimated at about 42,000 long tons and the import at 72,000 long tons, making a total supply of 114,000 tons, which is a falling off of 50,000 tons as compared with 1916. The imports come from Rhodesia and New Caledonia.

Studying Tin Problems

Tin, which is an essential in the composition of bronze and for tin plate used in the manufacture of food containers and many utensils, is not found in the United States except for a small amount which comes from Alaska. The United States is importing about 70,000 short tons of tin annually, chiefly from the Straits settlements and Bolivia. An increased amount of tin ore is being imported from Bolivia for smelting in the United States. In addition to the supply of new tin a considerable quantity of this metal is recovered from scrap. Recovery of waste tin and substitutes for tin are being suggested as a conservation measure.

Domestic production of tungsten is chiefly from California and Colorado. It is one of the most important alloys for high speed tool steel and it is estimated that 99 per cent is so used. The supply of 60 per cent concentrates is between 8000 and 9000 tons, about one-half of which is imported and the other half is produced in the United States. Substitutes and better amount of vanadium used in the United States is only a few thousand tons, largely imported from Peru. The United States has a considerable production from Colorado and Utah. Uranium has possibilities for use in tool steel, but thus far it has been little used. The United States has large deposits in Colorado and Utah.

Tool Requirements Continue Slow

Few Large Inquiries Are in the Market, But the Average Demand is Good Compared With Conditions Previous to the Abnormal War Requirements—Forthcoming Ordnance Contracts Will Involve Large Machinery Purchases

GENERAL conditions in the machine tool market continue good, although few large lists are in sight at the present time. Manufacturers of materials not used for war purposes are diffident with regard to making purchases, and many companies which now are operating practically full time on war orders are displaying a reluctance as to adding new shop equipment pending the fulfillment of existing contracts. A great amount of shell and ordnance work is under consideration and the complete equipping of the large additional force of men to be called, will force the intensive use of all available machine shop facilities and the addition of much new machinery. No buying is anticipated on the forthcoming ordnance contracts in the immediate future, but the inquiries, tentative to date, indicate a large volume of buying to come. The demand for small lots holds steady, reinforced by occasional heavier requirements such as those coming from the Pacific and Gulf coasts for tools for shipyard shops. These inquiries have appeared as far east as Cleveland. In the east, also the buying for shipbuilding purposes shows a steady increase as new companies are formed to take up the task of producing tonnage. The latest undertaking in this line is a new yard to be built by R. C. Camp at Fernandina, Fla. New shell contracts are being made from time to time in and about Chicago and a steady buying is noted in small lots in that vicinity. The railway requirements continue light, though tentative lists have been issued in many cases, dependent upon final approval. The official announcement that the United States Steel Corp. will establish a government ordnance and munitions plant, the scope of which is unequalled in this country at the present time, ranks high as a development of an equipment market character. This plant has been considered by the government for some time and negotiations have been carried on with the object of building a unit which will surpass the Krupp works. The machinery requirements obviously will be large.

Steel Corporation Will Be Heavy Buyer

NEW inquiry in the eastern machinery market during the past week has been made up almost entirely of demand for single tools. While sellers of certain types of tools report a good volume of this demand, the situation generally is quiet. Considerable interest is manifested in the trade as to the scope of the railroad buying which appears likely to develop within the near future. As yet, the railroads have confined their buying to the purchase of a few miscellaneous tools, although two sizable lists are now pending, and indications point to others being issued shortly.

Confirmation this week of reports current for some time that the United States Steel Corp. is to establish a huge government munitions plant, has added optimism to the tone of the market and has given further evidence of the large demands to be made upon machine tool builders in the future. In the market at the present time is the Carolina Shipbuilding Co., which is buying a few tools for its proposed yard in the south. The Worthington Pump & Machinery Co., New York, which recently received a contract for pumps for Ford submarine chasers, is in the market for a few tools for its plants at Harrison, N. J., and Holyoke, Mass. The Savage Arms Co., Utica, N. Y., it is understood, is contemplating the erection of a large plant addition requiring new equipment.

Demand for boiler shop equipment is somewhat improved and a large order for tools of this description is expected to be closed this week. The Remington Arms-Union Metallic Cartridge Co., has just awarded a contract for the construction of several buildings at its plant in Bridgeport, Conn. A $1,000,000 shipyard will be erected at Fernandina, Fla., by R. C. Camp and associates. The company is said to have a $5,000,000 contract for the construction of ocean-going tugs and large barges for the French government. The Federal Shipbuilding Co. recently has purchased 21 acres along the Hackensack river, near Newark, N. J., with a view to further increasing its plant. A machine shop and several other buildings will be erected by Alexander McDonald at his shipyard in Port Richmond, L. I., N. Y.

Few New Crane Inquiries

Among the few new inquiries for cranes during the past week is that of the Sun Shipbuilding Co., Chester, Pa., which calls for one 25-ton overhead crane. The Reliance Fertilizer Co., Savannah, Ga., is in the market for two 2½-yard bucket cranes, one with a 40-foot and the other with an 80-foot span. Mitsu & Co., Ltd., New York, has purchased from the Cleveland Crane & Engineering Co. two 11½-ton overhead cranes, with 50-foot span, for export to Japan. The Chile Exploration Co. is expected to close this week on three 20-ton electric cranes for shipment to South America. The Submarine Boat Corp., Port Newark Terminal, N. J., has purchased 22 electric hoists

Small Lots Continue in Chicago

PREPONDERANCE of small orders for single tools is the continued feature of the machine tool market in Chicago. With continued placing of subcontracts for munitions, shops are finding necessity for adding to equipment, which is resulting in this sort of buying. Small lathes, up to 24 inches, are plenty and there is steady demand for them. Lathes over 24 inches are



THE gigantic scrap sheds and their busy, clanging cranes are typical of the immensity of the proposition of making enough Agathon Alloys to meet the ever-growing demand.

From the time the first charge went into the great furnaces, we have been engaged in a breathless race to keep apace of the call for Agathon Alloys.

Far-sighted steel users appreciate the wisdom of using the most carefully and conscientiously made alloy steel in the world.

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Cleveland Office: Hickox Building,
The Hamill-Hickox Co., District Representatives

Chicago Office: 1370 People's Gas Building,
122 So. Michigan Blvd. A. Schaeffer, District Manager

Philadelphia Office: 603 Widener Bldg.,
Frank Wallace, District Sales Manager

J. E. Dockendorff & Co.: 20 Broad Street, New York.
General Export Agent

comparatively scarce. A recent inquiry asked for forty 16-inch stud lathes to be used in machining hand grenades and the same buyer is also inquiring for fifteen 2-spindle high-speed drill presses. This inquiry is tentative and hinges on obtaining a contract for grenades. The Burlington railroad is still working on its list and has begun to place orders. The Winslow Bros. Co., which has a contract for 6-inch shells and also for a smaller shell, has practically covered its requirements except a few tools to fill in. The Rock Island arsenal is preparing to buy further equipment for which it has been given an appropriation, but its requirements have not yet been outlined definitely. The International Harvester Co. is inquiring tentatively for a large quantity of equipment for its Ohio plant said to involve about $1,500,000. As an instance of how second hand machinery is moving, a Chicago dealer recently sold a machine which had been on the warehouse floor for nine years and within 24 hours, before the machine had been shipped, had an opportunity to sell it to another buyer. The William Ganschow Co., Chicago, gear manufacturer, has bought a site for an addition. The Boggess Mfg. Co., Fond du Lac, Wis., will install a galvanizing plant. The Ampco Rolling Mill Corp., Menominee, Wis., is preparing to build a wire mill. The San Diego & Arizona railroad will build repair shops and other buildings at San Diego, Cal. The Patrick Lock Co., Indianapolis, will build a plant to manufacture machinery and locks. The Forge Products Corp., Ann Arbor, Mich., will build a machine shop and forge shop. The Walls Frogless Switch Co., Kansas City, Mo., will build a plant at Pueblo, Colo. The Western Iron Works, Spokane, Wash., has bought the machine shop of the Mark Machine Co., which it will equip for the manufacture of tractors and locomotives. The Houston Power & Supply Co., Houston, Texas, will install machine shop equipment, including drill presses, lathes, and milling machines. The J. I. Case Tractor Co., Racine, Wis., will build a machine shop. The Universal Machinery Co., West Allis, Wis., will build a plant. The Pfau Motor Pumping Co., Milwaukee, will build a plant. The Green Foundry & Furnace Works, Des Moines, Iowa, will build a foundry and remodel a building recently purchased, for its shops. The United States Switch Co., Eau Claire, Wis., is doubling its foundry capacity and a new machine shop will be added. The company is now in the market for milling machines, turret lathes, a bolt cutter, some forging equipment and several lathes. It is also planned to install an electric furnace.

Varied Inquiries in Cleveland Market

BUSINESS which in ordinary times would be considered good characterizes the machine tool market in the Cleveland district. But measured in the light of what has prevailed during the early spring, the demand is not heavy. Small lots still continue to mark the major portion of the inquiries and the classes of tools required vary widely. Some dealers report an increase of business in the lighter machines, while others state that there is nothing moving but heavy equipment. Several inquiries, which in the aggregate make a large volume, are reported from the Pacific coast, from shipbuilding companies in the vicinity of Seattle and a few from the region of San Francisco. Heavy planers, shapers, and horizontal boring mills for shipyard use are required. Several representatives from western coast companies have come on personally to secure needed tools. A few inquiries from southern shipbuilding companies, also have been noted. The Alabama Drydock & Shipbuilding Co., Mobile, Ala., is in the market for large lathes, planers, and vertical boring mills for shipyard use. The Bowen Products Corp., Cleveland, is in the market for a turret lathe. The National Steel Barrel Co., Cleveland, will purchase a heavy straight side press. The Shuler Axle Co., Detroit, is inquiring for a steam hammer. The Timken Detroit Axle Co., Detroit, requires a 10-ton traveling crane. The Dravo Contracting Co., Pittsburgh, is in the market for a 36-inch throat punch and shear. The Pittsburgh Iron & Steel Co., Midland, Pa., is inquiring for a 8 to 10-foot vertical boring mill. The Atlas Car & Mfg. Co., Cleveland, wishes a 4-inch bar horizontal boring mill. The American Forge & Machine Co., Canton, is inquiring for a 36-inch swing lathe. P. Pettler & Son, Beaver Falls, Pa., are in the market for a screw cutting engine lathe; a 26 to 36-inch planer with a bed between 8 and 10 feet; and a 20 to 30-inch swing roll lathe.

New Ventures and Changes of Producers and Sellers

THE L. Wolff Mfg. Co., manufacturer of plumbing supplies, Chicago, is about to abandon its offices and plant at Lake and Jefferson streets. The offices will be removed to the company's building at 111 North Dearborn street. The plant will be concentrated at Fulton street and Hoyne avenue where it is already established.

The Oesterlein Machine Co. has removed its machinery into its new plant on Colerain avenue, Cincinnati, which it expects to have in operation soon.

The Seaboard Steel & Manganese Corp. has moved its headquarters from 71 Broadway, to 50 East Forty-second street, New York.

The Machinery and Metal Sales Co., New York, W. J. Eldridge, manager, has opened an office at 1216 Merchants Exchange building, San Francisco.

The office of the Steel Founders' Society of America has been moved from 1643 Oliver building to 511 Magee building, Pittsburgh.

The Tufts Machine Co. of the Jamaica Plain district, Boston, is removing to Westboro, Mass.

Henry Stock and Frank Perkins, formerly connected with the Ladewig & Stock Co., have purchased interests in and assumed the management of the C. W. Hathaway Machine Co., Waukesha, Wis., manufacturer of special machinery.

The Aborn Steel Co., Inc., New York, has opened an office at 520 Marine Bank building, Buffalo. D. J. Mahoney is in charge as district manager for the Aborn Steel Co., Inc., and the Century Steel Works.

The McVoy Sheet & Tin Plate Co. moved its offices on May 1 from 429-30 to 625-26 Oliver building, Pittsburgh.

The name of Watson Bros., New Castle, Pa., has been changed to Watson Bros. Steel Co.

Midgley & Prentice, Inc., dealers in metals and steel, will remove their executive offices to Rooms 312 and 314 Hudson Terminal building, 30 Church street, New York.

The name of the Asbestos Protected Co., Pittsburgh, has been changed to the Aspromet Co. This company handles a line of specialties used in building construction. The company has moved its New York office to 170 Broadway.


WAR ACTIVITIES
The manufacture and sale of pig iron except as a means of ending this war has ceased to interest us. This page was originally taken to exploit "Delaware" Iron. It is now available free of cost to any recognized "War Activity." It will advertise "Delaware" Brands only at such times as it cannot do a better service in giving publicity to War Work. Any organization will confer a favor by applying to us for this space.
DELAWARE RIVER STEEL CO.
"DELAWARE"

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BANGOR, ME.—The Bangor-Brewer Shipbuilding Co. has been incorporated with $100,000 capital by Charles D. Stanford, William S. Higgins, Irving G. Stetson, Ralph S. Crowell, George H. Hamlin, Calvin P. Thomas, James Q. Gulnac and Josiah T. Taylor.

MACHIAS, ME.—The Machias Shipbuilding Co. has been incorporated with $200,000 capital by A. I. Babb, H. S. Palmer and C. F. Clark.

PORTLAND, ME.—The American Ammunition Co. has been incorporated for the making of ammunition and general manufacturing with $100,000 capital by William S. Linnell, S. E. Hunt and B. L. Merryman.

PORTLAND, ME. — The New England Construction & Engineering Corp. has been incorporated to build ships with $10,000 capital by J. Ernest Roberts, Calvin S. Lane and Charles W. Wentworth, Westbrook, Me.

BURLINGTON, VT.—Fire damaged the plant of the Vermont Milk Chocolate Co., causing a heavy loss.

BOSTON, MASS.—The navy department plans to enlarge the Charlestown navy yard into a ship-repairing base at a cost of $7,000,000. The plans call for a foundry, machine shops, ship fitter shop, boiler shop, power plant, general storehouse and administration building.

BOSTON.—The Coastwise Ship Engineering Corp. has been incorporated to build ships with $250,000 capital by Richard H. Rich, New Haven, Conn., James L. MacEachran, West Somerville, Mass., and William W. Rich, Hingham, Mass.

BOSTON, MASS.—The Ideal Gas Machine Co. has been incorporated with $20,000 capital by A. H. Nichols, James F. McHugh, Medford, Mass., and R. A. Jordan.

CHELSEA, MASS.—The wooden box factory and wharf of the Parsons Mfg. Co. was damaged by fire with a loss of approximately $60,000. The value of the machinery and building was placed at $50,000.

HINGHAM, MASS.—The government contemplates building 10 hollow tile and concrete, 1-story, 50 x 150-foot storage buildings to cost $200,000, and five 2-story, 50 x 200-foot magazine buildings, to cost $200,000, at the naval magazine.

NATICK, MASS.—The Northway Motors Corp., Boston, will build a brick and reinforced concrete, 1-story, 600 x 200-foot automobile factory.

SOUTH MIDDLETON, MASS.—Fire in the mills of the Copper Product Corp. caused a loss estimated at $50,000.

SPRINGFIELD, MASS. — The New England Steel Castings Co., newly organized, has acquired the old Norcross stone cutting plant, and will start at once making changes necessary for its work. H. L. Stevens, Boston, New England manager of the Lackawanna Steel Co., is treasurer.

WARE, MASS.—Steps to prevent the dismantling of the Ware & Brookfield street railway, recently sold for scrap, have been taken by the selectmen of the towns which the line served.

WESTBORO, MASS.—The Tufts Machine Co., Jamaica Plain, Mass., has procured property on Brigham street, to which it will move its business.

WESTFIELD, MASS.—The M. & G. Aircraft Co. has been incorporated to do airplane and dirigible manufacturing with $50,000 capital by W. H. Ensign, Frank E. Cowles and A. E. Pfeiffer.

WORCESTER, MASS.—The A. H. Steele Co., iron forgings, plans to build a plant on Frank street, where it has acquired a 10-acre site.

PROVIDENCE, R. I.—George E. Boyden & Son, hosiery manufacturers, have had plans prepared for an addition to the plant. The building will be two stories, 41 x 100 feet.

DANBURY, CONN. — The Warner Bros. Co., Bridgeport, Conn., will build a 1-story, 50 x 175-foot addition to its branch plant.

DANBURY, CONN.—The business of the National Electric Utilities Corp. has been bought by Landers, Frary & Clark, New Britain, Conn. It is understood the new owners intend to continue the business in the present plant and to considerably enlarge it.

NEW BRITAIN, CONN.—The New Britain Machine Co. has purchased 133 acres on South street and will build a 100 x 340-foot pressed steel factory, to cost $125,000.

NEW HAVEN, CONN.—The Holmes Special Tool Co. has been incorporated with $25,000 capital by William E. Sloan, Percy J. Holmes and Harold H. Holmes.

NEW HAVEN, CONN. — The Lederer-Murray Co. has been incorporated to deal in machinery with $25,000 capital by David A. Lederer, James E. Murray and Harold S. Lederer.

PUTNAM, CONN. — The Cochrane Mfg. Co., Malden, Mass., will build a dam, power house and a transmission line at the Quinnebaug dam.

TORRINGTON, CONN.—J. Howard Gath, Brooklyn, N. Y., has purchased 171 acres at West Goshen. A 3-story sanitarium, to cost $100,000 will be built.

WATERBURY, CONN. — The O'Neil & Warner Co. has been incorporated to make wagons and automobiles with $10,000 capital by William O'Neil, Frank Clark, Edward J. Carroll, William F. Morgan, James E. O'Neil and William H. O'Neil.

WATERBURY, CONN. — The United States Pin Co. has been incorporated to make pins with $100,000 capital by Edwin S. Ingraham, Edward B. Reilly and Harry Beardsley.

WATERBURY, CONN.—A 1-story, 60 x 90-foot addition will be erected at the plant of the Waterbury Clock Co.

WATERFORD, CONN.—The Connecticut Shipbuilding Co., Inc., New London, Conn., contemplates erecting a barge building plant at Brownings beach.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—A $40,000,000 terminal will be erected south of Bush terminal in this city by the government. Six large piers will be constructed in addition to a number of warehouses, plans for which have not been completed.

BROOKLYN, N. Y. — Plans have been filed by the Morse Dry Dock Co., Fifty-eighth street and First avenue, for a $70,000 forge shop. The plans call for a 100 x 175-foot building.

BROOKLYN, N. Y. — A $15,000 factory will be erected by George H. Amann.

BUFFALO. — The Washburn-Crosby Co will build a warehouse on Ganson street, this city, to cost $18,000.

BUFFALO.—A $60,000 oxygen producing plant will be erected here by the Linde Air Products Co., 30 East Forty-second street, New York. The proposed structure will be one story high, 100 x 100 feet.

DUNKIRK, N. Y. — The United States Radiator Co. will build an addition to its warehouse here.

LONG ISLAND CITY, N. Y.—The Ir-

OHIO STEEL CASTINGS

OUT in the wheat fields of the Great Northwest, where they harvest the Nation's grain, time is just as important as in the busiest factory.

Plowing, planting, reaping, threshing must be done on Nature's schedule. Mistakes or loss of time can never be made up. It is imperative that every machine and implement used be absolutely reliable.

The fact that Ohio Steel Castings are sought for use in tractors and other types of farm machinery, is proof of their quality.

Quality PLUS Service

The Ohio Steel Foundry Co.

Plants:

Springfield, Ohio Lima, Ohio Bucyrus, Ohio



ving Iron Works will start work shortly on a $3000 addition.

NEW YORK.—The Crane Co., Chicago, manufacturer of steel valves and piping, has purchased property on Park avenue from 134th to 135th streets for the construction of a plant. The property has a frontage of 200 feet and is 90 feet deep.

UTICA, N. Y.—The Bossert Corp. will build a factory, 116 x 62 feet, at a cost of $20,000, in which to manufacture stamped articles for automobiles.

ASHMORE, PA.—The Lehigh Valley railroad will build a mixer plant here this spring.

FORT WASHINGTON, PA.—The Columbia Chemical Co., this city, will build an addition to its plant at once.

HAZLETON, PA.—The Lehigh Valley Coal Co. is arranging to electrify its Oneida No. 4 slope in this city.

HAZELTON, PA.—The J. S. Wentz Co. will increase the capacity of its coal mines at the upper Lehigh by building a breaker.

HUNTINGTON, PA.—The Aetna Explosives Co. will spend $150,000 on the erection of a mechanical nitrating plant at the company's works at Mount Union, and $75,000 for housing workmen at the plant.

LANSDALE, PA.—The Lansdale Foundry Co. is taking bids on the construction of an addition to its foundry. The addition will be 70 x 120 feet.

PHILADELPHIA. — A $70,000 machine shop addition will be erected by Dougherty & Bachran. The proposed structure will be two stories high, 35 x 112 feet.

PHILLIPSBURG, PA. — Charles Dunlap, this city, and A. R. Klotten, Albany, N. Y., and others, have organized the Meadow Brook Coal Co., which will equip a plant near Clarion, Pa.

PITTSBURGH. — The Standard Underground Cable Co. has bought 20,000 square feet of land on Pike street, and it is understood they contemplate the erection of an addition to their plant.

PITTSBURGH.—Fire damaged the three buildings of the Tarentum Glass Co. at Brackenridge, causing a damage of $350,000.

SHARON, PA.—The Pittsburgh & Lake Erie railroad will increase the capacity of its Ferrona yards near Wheatland, Pa., and considerable equipment will be bought.

CAMDEN, N. J.—Bids soon will be received on a $100,000 plant by the Joseph Campbell Soup Co. The proposed structure will be five stories high, 54 x 127 feet.

IRVINGTON, N. J. — The Liberty Tool Co., Newark, N. J., plans to erect a 2-story, 100 x 100-foot factory in this city.

IRVINGTON, N. J. — The Die Casting Co. will make alterations to its plant, costing approximately $10,000.

NEWARK, N. J.—An $18,000 warehouse addition will be erected by the Rossendale-Reddaway Belting & Hose Co.

NEWARK, N. J.—The Liberty Machine & Tool Co., 692 South Eleventh street, plans to enlarge its factory and install from $75,000 to $100,000 worth of additional machinery.

Activities in the Central States

BARTON, WIS.—W. F. Gadow, owner of the Barton Roller Mills, is planning to build a new concrete dam and hydro-electric power plant costing about $20,000. The dam will be 140 feet long and 11 feet high.

CAMERON, WIS.—A new building will be erected here by the Bank of Cameron.

CLINTONVILLE, WIS.—Sealed bids are being received until May 20 by J. A. Perkins, secretary of the board of education, for the erection of a 2-story brick and concrete high school building, 76 x 139 feet, and a power house, 58 x 63 feet. The estimated cost is $100,000. Architects Parkinson & Dockendorff, LaCrosse, Wis., drew the plans.

EAU CLAIRE, WIS. — Architect E. J. Hancock is taking bids until May 15 for the erection of a $50,000 public garage and repair shop for the Union Auto Co., C. H. Dickson, secretary. It will be 2-story and basement, 105 x 125 feet, of brick and reinforced concrete.

FAIRWATER, WIS. — Architect B. E. Mehner, Fond du Lac, Wis., has been engaged to prepare plans for a new $35,000 high school, 45 x 100 feet, two stories and basement.

FOND DU LAC, WIS.—J. S. McCullough, city engineer, and J. C. Pinney Jr., consulting engineer, Milwaukee, are preparing plans for two steel spans across the Fond du Lac river at West Second and Brooke streets. One bridge will be 270 feet long and the other 64 feet long, with concrete piers and abutments. The structures will cost about $40,000 complete.

FOND DU LAC, WIS.—The Fred Ruepping Leather Co. is contemplating the construction of a new generating plant at its factories here. Tentative plans are now being prepared by Edward F. Kottke. The work will cost about $100,000.

GREEN BAY, WIS.—The Miller Scrap Iron Co., 1121 Main street, is having plans prepared by Architect C. H. Williams, Green Bay, for a 2-story warehouse and scrap handling plant, 50 x 80 feet.

KENOSHA, WIS.—Simmons Co. is preparing to build a new administration building at an estimated cost of $100,000. Plans for the building are being prepared by Architect Max Dunning, 304 South Wabash avenue, Chicago.

MADISON, WIS. — The Buller Coupler Co., capitalized at $15,000, has been chartered to manufacture tractor coupling devices by Edward E. Parkinson, James L. Clarke and Bascom B. Clarke.

MARATHON CITY, WIS. — Fred W. Krause, Wausau, Wis., has been awarded the general contract for erecting a $200,000 monastery for the St. Joseph Province of the Capuchin Order at this point. The building will be 150 x 170 feet.

MARINETTE, WIS.—A 2-story brick factory addition, 35 x 120 feet, will be erected by the Aerial Cutlery Co., 114 Hosmer street. Plans are being completed by Architect Derrick Hubert, Menominee, Mich.

MIDDLETON, WIS.—James R. and Edward J. Law, architects, Madison, Wis., are preparing plans for a new high school building at Middleton, to be 60 x 100 feet, two stories and basement, of brick and tile, costing $30,000.

MILWAUKEE.—The Pawling & Harnischfeger Co., manufacturer of hoists and cranes, has remodeled the plant of the former Prime Steel Co., Mitchell and Kinnickinnic avenue, and will add a 1-story machine shop addition at its main plant.

MILWAUKEE.—The Universal Machinery Co., 784 Thirtieth street, manufacturer of tools and lathes, is planning to build a new plant in West Allis, including a machine shop 150 x 300 feet, foundry 90 x 150 feet, boiler and transformer house 40 x 60 feet and other buildings.

MILWAUKEE. — Articles of incorporation have been filed by the J. C. Theilacker Co. Capital stock is $5000 and incorporators are Julius C. Theilacker, George H. Crombie Jr., and Ben J. Sommers. The company will engage in the manufacture of architectural iron work.

MILWAUKEE.—The Milwaukee Paper Box Co., 400 Florida street, has purchased a site at South Pierce street and Muskego avenue, and will erect a new factory costing about $200,000 with equipment. The main building will be 120 x 145 feet and five stories high. Bids will be taken soon by Schnetzky & Son, architects, Milwaukee.

MILWAUKEE. — The Stein Construction Co., Medford, Wis., and Milwaukee, is the lowest bidder and probably will be awarded the contract for constructing a reinforced concrete and steel highway bridge over the Milwaukee river at Greentree road for $30,370.

MILWAUKEE.—A new shoe factory costing $40,000 will be erected at North avenue and Twenty-fifth street by the Wobst Shoe Co., now located at 499 Twelfth street. The building will be 50 x 165 feet, two stories and basement, of brick and concrete.

MILWAUKEE.—Architect Henry C. Hengels, First National Bank building, is completing plans and will take bids at once for the erection of a 2-story brick and mill factory building, 100 x 200 feet, at 418-436 West Ontario street, Chicago, for the Hinckley & Schmidt Co.

MILWAUKEE.—An additional steam generating unit of 150 kilowatts capacity is to be installed by the C. Ansted Leather Co., 560 Commerce street.

MILWAUKEE. — The Wisconsin Gear & Axle Co., Plankinton arcade, has purchased a factory site at State street and Hawley road, just west of the city limits, and will begin work at once on the erection of a machine shop, 50 x 150 feet. The general contract for the work has been let to Henry Kroening, 893 Layton boulevard, Milwaukee.

MILWAUKEE. — Architects Schnetzky & Son will award contracts within a few days for the construction of a new 5-story fireproof manufacturing plant at South Pierce

100

ROLLING MILLS

Of Our Design and Manufacture

79 in the United States of America

5 in Canada	1 in France
5 in England	1 in Belgium
4 in Germany	1 in Austria
3 in India	1 in Australia

AS CONSULTING ENGINEERS

we prepare estimates and make drawings for contemplated rolling mills. Our services include electrical engineering.

AS MANUFACTURING ENGINEERS

we enter into contracts for complete rolling mills, producer-gas machines, and wire drawing equipment.

MORGAN CONTINUOUS ROLLING MILLS—
STANDARD OF THE WORLD

MORGAN CONSTRUCTION CO.

Worcester, Mass., U.S.A.

Say you saw it in THE IRON TRADE REVIEW

street and Muskego avenue for the Milwaukee Paper Box Co., 400 Florida street. The new plant will be 120 x 145 feet and represent an investment of approximately $250,000.

MILWAUKEE.—Klug & Smith, consulting engineers, have completed plans for a new bascule bridge costing about $50,000 for the city of Sheboygan, Wis.

OCONOMOWOC, WIS.—Sealed bids are being taken by the board of public works until May 13 for furnishing and laying 1150 feet of 4-inch class C water pipe, two hydrants, one valve, and appurtenances.

OSHKOSH, WIS.—The bridge and road committee of the Winnebago county board awarded contracts for two bridges costing $4750 to Morris Martin, Berlin, Wis., and the contract for a $2000 bridge to the Whitewater (Wis.) Bridge Co.

RICE LAKE, WIS.—Local capital is negotiating with the Wisconsin Aluminum Foundry Co., Manitowoc, Wis., to build a branch foundry in Rice Lake.

PORT EDWARDS, WIS.—Architect A. F. Billmeyer, Grand Rapids, Wis., has been engaged to prepare plans for a city auditorium, jail and community building, 72 x 95 feet, 2-story and basement, for Port Edwards. It will cost about $30,000.

SHEBOYGAN, WIS. — A new factory building and warehouse, 60 x 100 feet, three stories high, will be erected at 1819 Calumet road by A. Locke & Co., conducting a scrap metal yard, small foundry and machine shop. Architects Juul & Smith are in charge.

SOUTH WAYNE, WIS.—A public garage and repair shop costing about $12,500 will be erected here by R. H. Blackbourn, according to plans made by Architect A. F. Rote, Monroe, Wis.

SPRING GREEN, WIS.—The Wisconsin Cheese Producers' federation has engaged Architect B. E. Mehner, Fond du Lac, Wis., to prepare plans for a $35,000 cold storage warehouse and refrigerating plant, of brick and tile, 2-story and basement, 40 x 100 feet.

STOUGHTON, WIS.—A new blacksmith shop to be devoted entirely to the production of parts for manure spreaders will be erected by the Stoughton Wagon Co. The building will be 45 x 66 feet, two stories high, of brick and concrete.

STURGEON BAY, WIS.—Architect F. D. Crandall, Sturgeon Bay, has completed plans for a new high school at Gibraltar, near Fish creek, and bids for the erection of the building are being taken by John B. Poirier, clerk at Fish creek.

TIGERTON, WIS.—Hackbarth & Krause, Wausau, Wis., have taken the general contract for erecting a new high school building at Tigerton. Architects Swartout & Speer, Wausau, Wis., are supervising engineers.

WATERTOWN, WIS. — The Monarch Tractor Co., Watertown, Wis., has awarded the general contract for the erection of a new machine shop and assembling floor to the Austin Co., Cleveland. The building will be of brick, steel and steel sash, 140 x 160 feet, 1-story high. Enlargement of the foundry is also planned by the Monarch company under its recently announced plant extension program.

DETROIT.—The Detroit Shipbuilding Co., M. E. Farr, president, will build a machine shop.

DETROIT.—The Kelsey Wheel Co., John Kelsey, president, will build a 1-story addition, 80 x 140 feet to cost $20,000.

DETROIT.—The Universal Gear Works, Highland Park, capitalized at $30,000, has been formed to operate a general machine shop with gear cutting a specialty, by L. G. Younglove, Frank J. Brown and Frank L. Banta.

IRON MOUNTAIN, MICH.—The county highway engineer's office will take sealed bids until May 15 for constructing a new reinforced concrete and steel bridge between this city and Homestead, Wis. The structure will consist of three 80-foot spans and the cost will be borne jointly by Wisconsin and Michigan.

MUSKEGON, MICH.—Muskegon Heights is to have a new manufacturing concern known as the Sectional Tire & Rubber Co. The promotor is G. W. Kitterman. The plant will probably be located on Ninth street south of McKinley avenue.

MUSKEGON, MICH. — The Continental Motors Corp. has purchased 34 acres adjoining its plant and will use the property in connection with general plans for improvement and enlargement.

BRADFORD, ILL.—The Jim Dandy Collar Co. will build a plant of three buildings. John Hanifen, 6 Neitney building, Ottawa, Ill., is architect.

CHICAGO. — The Riverside Iron Works, 10624 Buffalo street, will build a foundry addition 60 x 75 feet. R. G. Pierce, 10 South La Salle street, is architect.

CHICAGO.—W. E. Gehring, First National Bank building, Chicago, will build a wagon works, 60 x 115 feet at 1819 South State street, to cost $15,000.

CHICAGO.—Wilson & Co., Union Stock Yards, will build a 2-story refrigerator car repair shop, 426 x 651 feet, at Forty-third street and Hermitage avenue.

CHICAGO. — The Independent Button & Machine Co., 3940 Ravenswood avenue, will build a 3-story foundry, 42 x 162 feet.

CICERO, ILL.—The Kropp Forge Co., Charles A. Kropp, president, 2512 West Twenty-first street, Chicago, will build a 1-story plant, 150 x 350 feet.

DANVILLE, ILL.—Officers of the Sidell & Olney railroad, now operating as a part of the Cincinnati, Indianapolis & Western railroad, have asked permission to dismantle the road and cease operation. The road is 76 miles long.

DECATUR, ILL.—The Decatur Malleable Iron Co. will build a foundry. Schmidt, Garden & Martin, 104 South Michigan avenue, Chicago, are architects.

EVANSTON, ILL.—The National Biscuit Co. is building a 1-story machine shop addition 50 x 115 feet.

GIRARD, ILL.—The city has voted a bond issue of $50,000 for a new school building.

ROCKFORD, ILL. — The Rockford Knitting Co. will add two floors to their factory.

SPRINGFIELD, ILL. — The Springfield Terminal Railway has filed a petition with the Illinois public utilities commission, asking permission to construct an extension of its line at a cost of $50,000.

CHARLESTOWN, IND. — This township has sold an issue of $36,000 4½ per cent bonds for a new high and grade school building.

FRANKLIN, IND.—Trustees of Franklin college will erect a science hall, 125 x 95 feet, three stories with basement.

HUNTINGTON, IND. — O. E. Eviston, auditor of Huntington county, will open bids May 8 for the construction and repair of five bridges in various parts of this county, plans for which are on file at his office.

KOKOMO, IND. — The Liberty Pressed Metal Co., 516 Sycamore street, will build a plant.

LA GRANGE, IND.—Bids will be received until May 6 by Harry B. Lewis, county auditor, for a steel bridge over Pigeon river.

RICHMOND, IND. — The Kile Electric Meter Co., Indianapolis, may locate in Richmond.

CANTON, O.—The Union Metal Co. contemplates the construction of a factory addition to its plant, 1420 Maple avenue. C. C. Barrick is president. The engineer is H. L. Rastetter, care of owner. Construction is to be of brick and steel.

CANTON, O.—A consulting engineer will soon be chosen in connection with the intended pumping station to be erected by Canton, Frank de Corps, director of public service. W. E. Sarver is city engineer. Brick, steel and reinforced concrete construction is planned. The estimated cost is $150,000.

CINCINNATI. — Additions are being planned for the plant of the Cincinnati Steel Castings Co., 1220 Queen City, by Martin Fisher, architect, who will receive estimates next week.

CLEVELAND.—The city council has consented to the exchange of land necessary to the construction of the Cleveland Builders' Supply Co. shipyards at the foot of East Fortieth street. The enterprise will now go forward at a cost of $200,000.

COLUMBUS, O.—The state of Ohio, care of D. S. Creamer and H. S. Riddle, will take bids until May 20 for the construction of an administration building to cost $100,000.

DAYTON, O.—A. V. Dickerson, president of the Dickerson Steel Specialties Co., announces that at the close of the war, a large steel mill will be started in Dayton, involving the expenditure of $300,000.

DAYTON, O.—Walter H. Aszling, clerk of the board of commissioners, will open bids May 11 for the construction of bridge No. 89 in German township, complete plans for which are on file with the engineer.

FREMONT, O.—The Modern Construction Co. has acquired possession of the Frank Smith farm in Ballville township of 80 acres and it is understood the company intends to put a large stone crushing plant on the property.

LIMA, O. — The Allen county commissioners have delivered a $10,000 four-months note to the city auditor to pay the county's share of the construction of the Main street bridge. The cost of this structure will be $41,000. It will span the Ottawa river.

SANDUSKY, O.—The Bay View Foundry Co. plans the installation of a steelmaking unit. It also contemplates the erection of a foundry.

TOLEDO, O.—Toledo university trustees will at once let a contract for the erection of a machine shop and a 2-story dormitory for 100 soldier machinists.

YOUNGSTOWN, O. — Architect Louis Miller will soon take bids for additions and alterations to a factory building at 113 Market street for the Miller-Smythe Co., same address.

YOUNGSTOWN, O.—The Trumbull Steel Co. is to add $8,000,000 to its capitalization subject to a favorable vote by its stockholders May 17, but it is understood that the excess is not to be immediately issued. It is believed that the company will build a blast furnace in the near future. Jonathan Warner is president.

ZANESVILLE, O. — The Ohio National Guard armory, care Col. J. E. Gimpering,

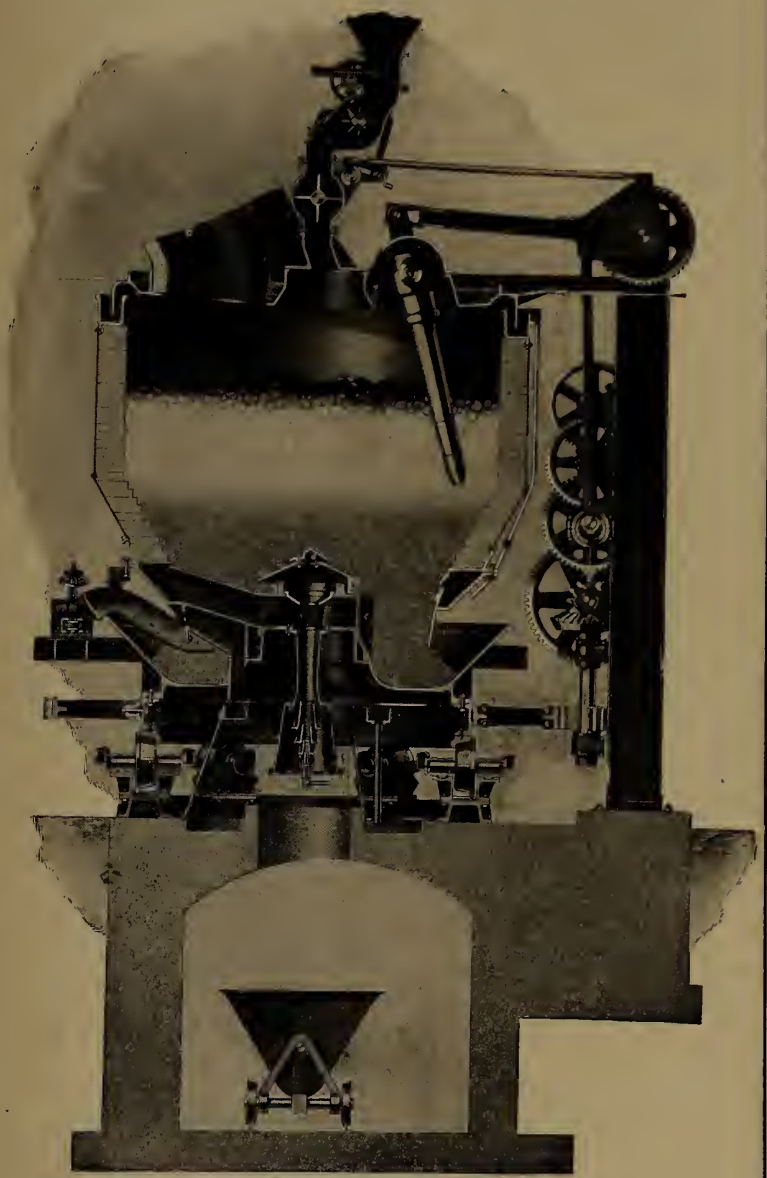
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	27.50 to 28.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	26.50 to 27.00
Heavy melting steel, Birming.	23.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. steel, eastern Pa.	39.00
Shoveling steel, Chicago	28.50 to 29.00
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.50 to 25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	38.50 to 39.00
Angle bars, steel, St. Louis.	35.00 to 35.50
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland.	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Bushcling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati.	25.00 to 25.50
Busheling, No. 1, Chgo.	28.75 to 29.25
Busheling, No. 2, Chgo.	19.25 to 20.25
Busheling, No. 1, St. Louis.	27.00 to 27.50
Cast borings, New York	16.00 to 16.50
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cleveland	18.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	17.75 to 18.25
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chicago	30.50 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	33.00 to 35.00
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	17.00 to 17.50
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 17.50
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.75 to 26.75
Pipes and flues, St. Louis	25.50 to 26.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo.	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 2, Chgo.	30.50 to 31.50
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 27.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.50
Cast, No. 1, Cincinnati	31.00 to 31.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	25.00 to 25.50
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	32.00
Malleable railroad, Chgo.	33.00 to 34.00
Malleable, agricultural, Chgo.	32.00 to 32.50
Malleable railroad, St. Louis	28.00 to 28.50
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	36.00 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	42.00 to 43.00
Locomotive tires, St. Louis.	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, May 23, 1918 *No. 21*

Government Planning Many Works

Will Join in Large Extensions of By-Product Coke Capacity—Will Support New Blast Furnace Construction—Second Ordnance Works and Fabricating Plant Assured—Official Prices Revised

GREAT government war enterprises of an iron and steel character continue to develop. A large program of construction in by-product coke plants under government financial auspices is to be launched. Expectations are that 1500 additional ovens will be built at different locations. These will serve the double purpose of augmenting the supply of high explosives for military needs and of fortifying the weak spots in the coke situation against winter uncertainties. The new ovens are expected to be in service as soon as possible. Blast furnace extensions figure in these plans. A start along this line already is being made in the Wheeling district. Two new furnaces at St. Louis are being considered. Ordnance officers have notified machine tool builders to be prepared to equip a second great gun plant to be established near Philadelphia for the government by the Midvale Steel & Ordnance Co. For this and the new Neville island ordnance works of the Steel corporation, $15,000,000 worth of heavy and small tools will be needed. Details of the Neville island plant are to be rapidly determined. Its finished output of large guns and projectiles will be 25,000 tons monthly. A steel plant is to be provided on this scale. Whether it will be duplex or straight open hearth is yet to be settled. The proposed government fabricating plant to furnish ship steel is expected to take form soon.

Big Orders Piling Up

These impressive undertakings to enlarge both raw material and finished capacities are being paralleled by further demands for steel for immediate war purposes. Chicago district mills have had an unusual week in bookings of this kind. About 200,000 tons of material covering a new Pacific order for 50 ships and 75,000 to 100,000 tons of shell bars have been entered there. Arrangements were made with lake shipyards to 130 additional craft by the end of 1919 season calling for over 200,000 tons of steel. The distribution of the 1,300,000 to 1,400,000 tons of rolled steel for the 100,000 cars is about to be made..

Government Shows Needs

The rapidity with which the government is piling up requirements before the mills and furnaces has made it imperative that producers know more explicitly just what is to be expected of them. The government at a meeting with the manufacturers in Washington last week acknowledged their right to more exact information of this character than hitherto has been given. A joint committee of producers and the war industries now is at work to assemble and consolidate these data relating to present and future war necessities. The result of this survey largely will settle the moot question whether there is to be any surplus of steel for commercial buyers and how much. Whether there is something for open market consumption as the majority view maintains, or not, a definite curtailment policy for nonwar industry and probably some form of licensed distribution promise now to come to a head.

Foundry War Work Light

Such partial data as have been collected by pig iron producers from their customers shows less proportion of foundry capacity on war work than had been believed previously. Gray iron and malleable plants have returned to date a showing of not over 50 to 60 per cent of war business on the average. Steelworks capacity is taken up to about 90 per cent by essential production. If the foundry percentage of war business holds good in the completed data, it would indicate there is perhaps 2,000,000 to 3,000,000 tons of annual consumptive capacity which is either to be filled by war orders or is to be deprived of iron in behalf of more necessary requirements.

Numerous revisions of differentials and extras on various iron and steel products have been put into effect by a voluminous announcement of the general committee of the American Iron and Steel institute.

MAY 23, 1918

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Machinery and Supply Manufacturers and Dealers in Concurrent Sessions of Four National Associations Deliberate War Problems and Emphasize Necessity for Subordinating Self-Interest in the Present Struggle.

Rivalry and Shipbuilding Records

PACIFIC coast shipyards, up until the present time, have been carrying off most of the shipbuilding honors. News columns have been filled with the exploits of the western yards. The first steel ship built under a direct government order was a Seattle product. The first wooden ship delivered complete to the government is undergoing her trials on the Pacific, and the largest concrete ship ever built was constructed near San Francisco and has just completed a successful trial trip.

Records of actual ship construction recently made public by the shipping board reveal strikingly the class of work the western yards have been doing in comparison with those eastern yards which were free to take contracts from the shipping board. The Pacific coast division, for instance, during one recent week averaged nearly 30,000 rivets driven per way. The best the north Atlantic yards working on shipping board orders could do, was about 9500 rivets per way, with the Great Lakes making a record of 9000 and the gulf and south Atlantic section ranking fourth with less than 4000.

Of the 25 ships built in the shortest time, 13 were built on the Pacific, eight on the Great Lakes and four on the Atlantic. Of these 13 western built ships, nine were built by one company, which in the same week showed an average rivet drive of 43,000 per way, the highest record set by any yard in the country.

The older, established yards in the east generally were filled with navy business when the shipping board began distributing its immense orders for ships. Records on naval construction, of course, are not being made public, so that until this class of business is completed, many of the yards which for years have figured most prominently in American shipbuilding activities will be unable to pick up the gage of competition thrown down by their new Pacific competitors. The recent record made by the New York Shipbuilding Corp. in constructing and fitting out complete an ocean-going steamer in 37 days, is indicative of the class of work which these eastern yards are prepared to handle after the requirements of the navy department have been met.

"Proclaimed championships produce team work," said Mr. Schwab recently, "first in the groups comprising the working force in each yard and finally in the yard itself." Healthy rivalry is growing between yards and groups of workmen and executives all over the country and the results are being shown in the speed with which the American merchant marine is growing.

Dismiss the Steel Suit

WAR has demolished more false ideas and standards of public and private life than years of the slow process of logic and education ever could have made possible. Business has felt this almost revolutionary movement toward basic truths and bare essentials and has modified some of its methods accordingly. Government likewise is purging itself of some of the virus of practical politics with its attendant vacillation and mere vote-catching tactics. The public with the increased stake of life and treasure in this conflict has not patience for inefficiency and nonperformance. Nor is it mindful of the bruised feelings of those who have been foisting on the country nostrums that stand revealed in their true light now that the welfare and safety of the nation are in jeopardy. Results are demanded, and these quickly. War is applying the absolute acid test.

The active partnership established by the government on its own initiative with the United States Steel Corp. for the construction and operation of a great ordnance plant in the Pittsburgh district is a sure sign of the changed times. It may appear incongruous that the government should have joined with—in fact, should have appealed for help—to a business organization which it has been trying for several years to put in the outlaw class. It need not be so regarded. The country needs the concentrated authority, resources and power of the Steel corporation in the present crisis. Every patriot well may

utter a thankful prayer that the country has a Steel corporation to enlist in its aid in this hour of greatest need. It is a manifestation of sound and capable counsel at Washington that the government is making full use of the country's industrial potentialities.

If this war means anything, it means the enthronement of efficiency and achievement. This is the true significance of the government's specific call upon the Steel corporation and its heavy dependence upon the whole steel industry. Organized business, the bigger the better, never was so welcome in this country as at the present time. The courts in dismissing the antitrust suit this week against the United Shoe Machinery Corp. held that it was poor public policy to dissolve an organization so highly efficient. The government constructively now has recognized the efficiency and value of the Steel corporation by summoning it to its aid. In these days, when hackneyed theories are being discarded for more elementary and genuine standards, the government has a singular opportunity to demonstrate that it is joining step with the new conditions of progress. To dismiss the Steel corporation suit now indefinitely suspended in the Supreme court, would be an act not only consistent with the circumstances, but significant of the formal recognition that new and practical bonds now unite government and business in this country.

Encouraging Ideas From Operatives

IMPROVEMENTS in machinery and methods of operation not only originate in the minds of executives, engineers and draftsmen, but often in the minds of employes much further down the line. Many operatives in iron and steel plants by reason of their close contact with the work and by the possession of inventive ability are in a better position to suggest changes in equipment and methods of operation or the addition of new machinery, special tools or other appliances, than those whose duty it is to oversee. Plenty of inventive ideas which would effect economy, if applied, are anchored in the minds of operatives; but on account of their minor positions in the organization, they are prone to keep these suggestions locked in their brains rather than to advance them and be ridiculed by other employes.

As a means of encouraging the practice among employes of making suggestions for plant improvement, not a few iron and steel companies every six months offer cash prizes ranging from $2 to $100 for the best suggestions. It is intended that the prizes shall go to those who have no other way of offering suggestions and no opportunity for testing their original ideas. Any employe, excepting superintendents, foremen, mechanical and electrical engineers, etc., may write suggestions which he thinks the company could use to advantage and place them in an envelope without any signature. A duplicate copy is retained by the man offering the suggestion. The envelope is then deposited in locked boxes which are installed in prominent places throughout the plant. Once a week the boxes are opened and their contents considered by judges, including superintendents and foremen. If any suggestion is found to be of sufficient value to warrant its use by the company, it is adopted immediately. After the suggestions are considered, they are numbered in the order of their value and posted where they may be seen by all concerned. The employe who receives an award presents to the judges the duplicate copy of his suggestion signed by himself and then is given the corresponding prize. No limit is placed on the number of original ideas that may be brought forth by any employe.

In too many cases ideas are considered of no value by the man who first thinks of them. He tries them on his co-workers and is told to throw them on the ash heap because they are too trifling. Discouragement of this nature should not be tolerated. What may seem trifling to some, especially a workman, may possess merit making it of much importance to a whole plant. A slight change in the detail of a machine or in the method of operation often produces results which are beneficial not only to the company, but to the workmen as well.

Daylight on Railroad Problem

GOVERNMENT control of railroads is bringing about a vastly changed attitude on the part of all concerned. It was welcomed by the railroads because them knew that intimate knowledge of conditions would lead the government to change its attitude toward transportation interests. The repressive tactics that kept income low while costs climbed had brought about an impossible condition, which probably will not recur once it is fully recognized by the government. The shipper also has come to see the futility of expecting service in keeping with his needs under a plan whereby income is not sufficient to look after betterments and maintenance. Probably the efforts of shippers to obtain reductions in rates will become less in the future as it is recognized that fair rates, though higher, will be cheaper in the long run through more efficient service and lessened delays in moving material.

Just what will result from the present experiment no one can foresee, but it is certain that one effect will be a better atmosphere and improved conditions in every respect.

No loss has been sustained in operating efficiency, as men of ability have been retained to manage the several properties. In other ways efficiency has been gained by cutting out competition and duplication, unnecessary hauls and a host of other evils which resulted from former repressive rules. Operating as a unit every road does its utmost and gets a better return. The nation thus is the gainer.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1344

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00 to 77.00
Spiegel, contracts, furnace	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	155.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. & small., Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products May 22, average for April, 1918, average for February, 1918, and average for May, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 22, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Bessemer pig iron, Pittsburgh	$36.15	$36.15	$37.25	$44.95
Basic pig iron, Pittsburgh	32.95	32.95	33.95	42.15
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	43.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	43.20
Lake Superior charcoal, Chicago	37.50	37.50	37.50	49.25
Malleable, valley	33.50	33.50	33.50	42.70
Malleable, Chicago	33.50	33.50	33.50	43.20
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.	32.00	32.00	33.00	40.75
**No. 2X Virginia, furnace	33.50	33.50	33.50	41.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	43.25
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	425.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	85.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	88.00
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	88.00
Open-hearth billets, Pitts	47.50	47.50	47.50	85.00
Steel bars, Pittsburgh	2.90	2.90	2.90	3.50
Steel bars, Chicago	2.90	2.90	2.90	3.84
Iron bars, Philadelphia	3.59	3.50	3.50	4.109

	Prices May 22, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Iron bars, Cleveland	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill	3.50	3.50	3.50	3.39
Beams, Chicago	3.00	3.00	3.00	4.34
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.185	3.185	4.659
Tank plates, Pittsburgh	3.25	3.25	3.25	4.50
Tank plates, Chicago	3.25	3.25	3.25	5.49
Tank plates, Philadelphia	3.435	3.435	3.435	7.559
Sheets, blk., No. 28, Pitts	5.00	5.00	5.00	7.00
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	6.65
Sheets, galv., No. 28, Pitts	6.25	6.25	6.25	8.80
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Connellsville furnace coke	6.00	6.00	6.00	8.00
Connellsville foundry coke	7.00	7.00	7.00	8.50
Heavy melting steel, Pitts	29.00	29.00	30.00	28.40
Heavy melting steel, eastern Pa.	28.50	28.30	30.00	26.00
Heavy melting steel, Chicago	29.00	28.65	30.00	28.70
No. 1 wrought, eastern Pa.	34.00	34.00	35.00	40.75
No. 1 wrought, Chicago	33.50	33.50	35.00	36.40
Rerolling rails, Chicago	34.00	34.00	35.00	36.80

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1344)

Foundry War Work Shows Up Light

Partial Survey of Pig Iron Consumption Discloses Only 50 to 60 Per Cent of Castings Plants Are Filling Essential Demands—Steel Works About 90 Per Cent—Adjustments May Follow

Pittsburgh, May 21.—Broadening the scope of the survey regarding the pig iron situation, a form has been made out and sent to producers of ingot molds, who have been requested to use it to learn the nature of the requirements of their customers. The data will show the tonnages involved, the kind of contracts represented by production from the molds, time of deliveries, etc. This work follows the line of that being done by blast furnace interests who are receiving reports from their customers. The reports already made show that an extremely high percentage of steelmaking iron shipped and under contract is being used for direct and indirect government work. It is understood that reports coming from consumers of foundry grades show that a large tonnage is entering into the manufacture of so-called less essentials and as a result a sharp readjustment may be brought about so as to shut off supplies for this purpose and to divert tonnages to strictly war uses. In case any surplus then remains, as some think is probable, it will be allowed to move to consumers engaged on less important production. The survey is being conducted by the committee on ore, pig iron and lake transportation. Except for a few sales involving small lots of off iron, chiefly foundry grades, no transactions are taking place. Consumers realize the fact that no tonnages are available, barring the character mentioned, and as a consequence new inquiries are extremely limited. Furnace interests generally have adopted the policy of referring inquirers directly to the war industries board.

Bookings are Heavy

Boston, May 20.—Inquiries for pig iron are as numerous as ever, but the actual amount of business closed is very limited. While the furnaces are doing better in the matter of production, thanks to a more regular coke supply and less labor difficulties, there still stands ahead of them the immense business booked some time ago and on which they are still very much behind on deliveries. At one office, orders aggregating 28,000 tons were on hand and in others while less definite as to actual figures, it was admitted that a good many orders had accumulated through the disinclination on the part of the furnaces to accept business. There is little doubt that it is only a matter of a short time before the distribution of iron will be purely a governmental function. As matters stand now, it is probably no exaggeration to state that from 90 to 95 per cent of the iron now coming into this territory is for government work, and when the questionnaires now being circulated among the users are filled out and returned that it is going to be extremely difficult for those concerns not working on some kind of government work to secure supplies. Not only that, but there are now few of the local trade who doubt that some such zone system as exists with regard to coke supplies will be applied to local iron requirements. The barring of outside coke from New England was dictated by the transportation situation and local iron men figure it out that if the desire is to make present facilities adequate, this can be effected only by cutting off shipments from Virginia and Alabama. The government is

going to have an increasing amount to say as to sales and deliveries of iron, and in view of the attitude of the furnaces toward new business, it is apparent that the big producers are not adverse to the new arrangements.

Eastern Operations Improve

New York, May 20.—Now that eastern furnaces are receiving enough coke to enable them to maintain their operations at maximum, indications are that it will not be long before they will be in a better position to cope with the demand. In fact, some makers go so far as to say that by the end of June or the beginning of July, there will be enough pig iron to meet all requirements. This change in the situation, however, still is reserved entirely for the future, since many consumers still are short of iron for current consumption. Large numbers of inquiries for prompt iron of necessity still are being ignored by the furnaces. The amount of prompt iron now being sold has been decreasing steadily of late, due to the fact that consumers are so anxious to obtain deliveries on their contracts, that many of them are accepting off grades without question. As a result, sales of prompt iron which were made during the past week apparently aggregated only 1000 to 2000 tons. In general, the furnaces continue to refrain from quoting on second half business. The only exception which is reported is the sale of 3000 tons of copper-bearing low phosphorus for second half. Only a few eastern furnaces so far have distributed questionnaries among their consumers. It therefore is considered unlikely that they will be filled in and returned by May 23, as requested. The Reading Iron Co. will blow in its Emaus, Pa., furnace about July 1. The new No. 2 blast furnace of the Seaboard Steel & Manganese Corp., at Temple, Pa., is to be blown in about June 10 on foundry iron, to be switched later to 70 per cent ferromanganese.

Demand Strong as Ever

Buffalo, May 21.—The pig iron situation in this district remains quiet with little or no trading. The furnaces are doing no business pending the return of the questionnaries. The inquiry continues almost as good as ever, though it has been somewhat dulled by the discouraging information furnacemen have had to give inquiries for months past. Certainly the demand is, if anything stronger than ever. There is hardly a consumer who wouldn't like to get some iron, and furnace representatives say they could dispose of any tonnage whatever, if they had it to sell. One sales agency has done, during the past week, a little business in carload lots. The transition of the plants to government production is gradually proceeding. The questionnaires that have been sent out by all the furnaces to customers will be sent to Washington when they are filled. This will give the government an idea of the tremendous volume of the commercial demand.

Off Grades Only Sales

Philadelphia, May 21.—Current sales of pig iron are made up almost entirely of small prompt tonnages mainly of an off-grade character. No future iron is being sold. In some quarters it is believed that improved operations will enable them to make much better deliveries than expected. Several furnaces who thought they would not be able to furnish first half deliveries until the third quarter now believe they may have more first half iron to distribute than they had expected.

Foundry War Work Limited

Cleveland, May 21.—Such partial returns as have been returned by producers in this district from their customers to the questionnaire recently circulated, indicate that the capacity of foundries now engaged on direct or indirect war work is less than expected. It is shown that not over 50 to 60 per cent of the present melt is for essential production. This applies both to malleable and gray iron plants. Steel plants show about 90 per cent of war orders. The effect of the questionnaire has been in some cases to bring back to the furnaces inquiries for additional iron. Inquiries for 1919 delivery are more numerous. At the rate the canvass is proceeding it probably will be several weeks before any definite data can be assembled. Allocations of the week by the committee on pig iron, iron ore and lake transportation call for 8000 to 10,000 tons of foundry iron for plants doing Emergency Fleet corporation work. These include 3500 tons of No. 24 for a Minneapolis melter; 2575 tons of three foundry iron grades and 225 tons of malleable for the Westinghouse Electric & Mfg. Co., Essington, Pa.; 1250 tons of No. 24 for a Detroit shipbuilder; 700 tons of No. 2 foundry for a Milwaukee user. Delivery in all cases is to start at once or in June. For the ordnance department, 800 tons of No. 24 were placed for a Stowe, Pa., plant and a small lot for Stamford, Conn., delivery. A Chicago independent steelmaker is to receive 1000 tons of 10 per cent bessemer ferrosilicon by allocation. Local foundries doing general jobbing business continue to experience a considerable slump in orders.

Chicago Situation Easy

Chicago, May 21.—Some increase is noted in requirements of the government for pig iron to be shipped immediately to manufacturers producing war materials. This has not yet attained sufficient proportions to be embarrassing to local producers, and every request is being taken care of promptly. This district is peculiarly situated in this respect. All the merchant pig iron except the comparatively small output of the Bay View furnaces is marketed by one selling interest, and as a result nearly all consumers are its regular customers. This makes it easy to adjust the conflict of government prompt requirements and contract shipments. Inquiry is not active simply because consumers have found they are unable to place further tonnages for this year's delivery. However, were books to be opened, there is no doubt large tonnages could be placed at once, as many consumers are ready to take on considerable iron if available. Southern furnaces are not selling at present. Although they have considerable last half tonnage not yet covered, they hesitate to take further contracts until assured of obtaining sufficient fuel. There is no incentive for selling far ahead, as price is fixed and there is no doubt of full production being required for months to come.

Southern Offerings Less

Cincinnati, May 20.—From all accounts the market is dead, as far as new contracting is concerned. Southern producers who had some iron to offer a few days ago are now unable to take on any business, with the exception of a few favored customers, who have been allowed to add to previous purchases. The percentage of sales for nearby shipment is very small and probably lower than at any time this season, if estimates of reliable concerns are accepted. Iron is moving much faster from the Birmingham district, and no requests have been received to hold up shipments. On the other hand, melters are willing to take all the iron they can get and pile it for future use. However, foundry yard stocks are not at all heavy. Much interest is taken in the proposed plan to distribute shipments of both basic and foundry, but so far no definite steps have been taken along this line. The inquiry is lighter, although there is a great deal of last half business that

can be booked if the furnaces were able to supply the iron.

Heavy Tonnage is Begging

St. Louis, May 18.—New commercial inquiries for iron during the past 10 days have been heavy, despite the generally recognized fact that no tonnages are to be had. Consumers are registering their demands with every possible source of supply in the hope that some happy accident may result in their getting a stray car or so. One dealer says that inquiries received during the past two weeks will aggregate 5000 tons, all for southern foundry. There is little doubt that upwards of 100,000 tons of all varieties could be placed in the district proper by telephone. Every day brings accounts of lucrative business being rejected. Shipments have been coming along somewhat more regularly, due to the lifting of embargoes in the middle west. This is especially true with regard to metal from the Birmingham district. Quite a number of diversions in transit have been reported this week, and local plants not engaged on government contracts have become reconciled to the determination to favor war essentials. Representatives of southern furnaces report a heavy demand, but declare they hardly expect anything more than a scant provision for regular clients and possibly a few small lots additional through the balance of 1918. They freely admit even these expectations may be upset by government intervention. Nothing in the way of actual business consummated was heard of this week.

Practically Out of Market

Birmingham, Ala., May 21.—Southern furnace companies repeat their assertion that they are out of the market. The probable make for the last half of the year has been sold against quite liberally. Priority shipment orders required by the government are being followed on a constantly increasing scale and the prospects are that it will not be long now before the government is positively directing deliveries of all pig iron and steel products. Inquiries are being received for iron from all directions. Regular customers are willing to accept delivery at any time, even into next year. Efforts to produce the largest output in the history of the district during this month will hardly bring about desired results for the reason that there is much complaint against the quantity and quality of labor and raw material supplies. Accumulated stocks of pig iron are being reduced steadily but there still is a large amount on hand.

Coke Shortage is Passed

Oven Plants Are Sending Forward Shipments So Satisfactorily That Complaints Are Few—Car Supply Ample

Pittsburgh, May 21.—Shipments of coke are moving satisfactorily to blast furnaces and there are practically no complaints of shortages of fuel. Under the direction of the fuel administration shipments have been diverted from idle to active stacks. The order giving a 100 per cent supply of cars to the Monongahela railroad still is in effect, and the supply on the Pennsylvania railroad is averaging about 95 per cent. With the proper organization of working forces at the ovens in the Connellsville region greater tonnages will be loaded, and when the region is on a producing basis of 75 per cent of the car supply it is believed adequate tonnages for all furnaces will be available. Rigid enforcement of the order of the Pennsylvania railroad prohibiting the movement of coke to eastern furnaces off its lines in hopper cars is in effect. This order was issued April 1 but was not strictly adhered to until recently. Production for the week ending May 11, totaled 341,110 tons as compared with 333,455 tons for the preceding week, according to *The Connellsville Courier.*

Price Now is Secondary

Boston, May 20.—There have been no new developments of note in connection with the coke situation, save that the desire to be covered is becoming of more importance to the foundries than the price and those who at first were inclined to balk at paying the difference between the figure at which they contracted Connellsville for and the price of the local by-product oven coke, now are reported to be covering their needs. Connellsville operators did the best they could to meet their contracts prior to May 15, and there was quite a rush of supplies into this section before the fuel administration order became effective.

Stacks Are Cold

Chicago, May 21.—Inasmuch as steelmakers have only the idea of production before them at present and are not interested in contracts or price, it is a matter of much concern that the fuel situation leaves much to be desired. At this season, when fuel should be moving steadily, the Illinois Steel Co. finds it cannot obtain sufficient to keep all blast furnace stacks active and at present has four stacks cold. One at Milwaukee and one at Joliet have been in this condition since last winter and within the past 10 days it has been necessary to blow out one at Joliet and one at South Works.

Shipments Well Regulated

Cincinnati, May 20.—Shipments from the different fields are now so well regulated as to insure very little fuel getting into the hands of nonessential consumers. In this plan the hearty support of the coke producers has been in evidence, although they have not been able to enlist labor in carrying out the general idea for increasing the production. Reports from different fields differ. A complaint from Connellsville is that an important percentage of foreign-born labor recently laid off for religious celebrations and that substitute labor was difficult to obtain.

Only Odd Cars Obtainable

St. Louis, Mo., May 18.—Since the first of the month coke dealers here have been intensively combing all fields in the hope of getting together tonnages sufficient to meet part of the urgent demands. The net results in the main have been utterly disappointing. Apparently there are no surplus tonnages, even among the most important by-product manufacturers. One dealer said today he had spent two weeks in personally visiting gas ovens in Illinois and Indiana, but had been unable to secure more than half a dozen cars, and most of the plants he saw will have nothing to offer before the end of August. Metallurgical coke continues the scarcest commodity in the list of steel-making materials here, but more especially to the west and southwest. Deliveries from the Connellsville and Virginia ovens are spasmodic and unsatisfactory.

Southern Demand at Maximum

Birmingham, Ala., May 21.—The coke demand in the south is still above the production and very few orders are being accepted by producers. Every oven in shape is in operation and the output is above the figures of last year at this time. Still there is an apparent shortage. Announcements some time back that within two months it might be possible for some of the old contracts to be worked off, have brought about some inquiry again out of the regular line but there is very little that can de done.

Scrap Supplies Are Scant

But Absence of Speculation Keeps Market on Even Keel— Consumers Paying Commission to Dealers

FOR COMPLETE SCRAP PRICES SEE PAGE 1344

Pittsburgh, May 21. — Maximum prices are being commanded by all standard grades of scrap, according to dealers. The most active demand is being made for heavy melting steel and low phosphorus grades of which there is said to be a scarcity. Dealers claim that there is a general shortage of all the leading grades, although there has been a large supply of miscellaneous material which suddenly has come to yards and is being assorted and prepared for the market. Secondary grades still are available at less than maximum levels. Consumers who have been buying directly from producers previous to the allowance of the commission of 3½ per cent to dealers, now are buying through the latter and are willingly paying the commission.

General Demand Good

New York, May 20.—A good demand prevails for virtually all grades of scrap in the New York market. As a result, prices generally are tending upward. Wrought pipe, under the new specifications, is now holding at $30 to $30.50, an advance of 50 cents a ton. Cast borings have made a similar gain, dealers offering at this time $16.50 to $17. No. 1 machinery cast and No. 1 heavy cast have advanced to $32.50 to $32.75 and $32.25, respectively. Stove plate and grate bars are strong at $23.50, which is slightly higher than the level of last week. Trading, while of good volume, is of a purely perfunctory nature, and the situation generally is featureless.

Shipping Old Contracts

Philadelphia, May 21.—Important transactions in scrap are lacking. Deliveries on old contracts call for all the heavy melting steel available. In fact in no grade is there any tendency toward accumulations. Cast scrap and wrought are in active demand.

Supplies are Scarce

Boston, May 20.—There is no lack of demand for the various grades of scrap in this section; the greatest difficulty that dealers have is in securing sufficient supplies. The turnover suffers from this fact and while the market is fairly satisfactory from the fact that practically all kinds of stock are selling at full government maximums, plus commissions, dealers would be better pleased if they could secure greater supplies. More or less trouble is still had in securing permits for shipments to distant points of consumption, but the situation in this respect is better than it was a few weeks ago. New England foundries are still hungry for cast scrap and a much larger business might be done if supplies permitted. Very few car wheels are available. Wholesale dealers' paying prices per gross ton, f.o.b. cars, shipping points, follow: Wrought No. 1, yard long, $29 to $30; horseshoes, $29 to $30; cotton ties, $22 to $23; stove plate, $21 to $22; No. 1 machinery $31 to $32; No. 2 machinery, $27 to $28; car axles, iron, $42 to $43; steel, $42 to $43; rerolling rails, $30 to $31; iron boiler plate, $33 to $34; bundled barrel hoops, $16.50 to $17.50; wrought iron pipe, new specifications, $28 to $29; steel rails, $25 to $25.50;; No. 1 railroad steel, $25 to $25.50; heavy melting steel, $24.50 to $25; axle turnings, $20 to $21; machine shop turnings, $14 to $15; cast borings, $15 to $16; drop forge trimmings, $22 to $23; cast iron car wheels, $27 to $27.50.

Probing Turnings Sale

Buffalo, May 21.—The market for all kinds of scrap is very strong. Heavy melting steel is in very active demand. There are indications that consumers are looking beyond their immediate needs which are heavy and are accumulating stockpiles to meet the inevitable strain of next winter Demonstrating the strength of the market in cast borings, a sale was made during the past week at $19, the government price. Borings are in good demand. Railroad scrap is changing hands, but not through the dealers. It is in almost every case going direct to the consumers, except in the case of rough scrap which must of necessity, go through the yards. Some mills in this district have consummated transactions under the new ruling allowing 3½ per cent commission. It is understood that a transaction made some two months ago in which an eastern consumer bought shell turnings at $36.50 is being quietly investigated.

Consumers Want Steel

Cleveland, May 21.—Heavy melting steel continues in heavy demand in this district, but sales are restricted by an acute shortage of supplies. Rolling mill and foundry scrap is not moving fast on account of hesitancy on the part of consumers. Turnings are a trifle stronger than last week. One Cleveland interest has purchased several thousand tons at about $18, for blast furnace use in the past few days. Consumers feel that lower scrap prices will be in order in the next quarter and accordingly are not in any hurry to buy. Fewer shell turnings are on the market than dealers expected, since Washington is directing to more or less extent the disposal of scrap on its shell contracts. So far as actual trading is concerned, dealers contend that the past week has been the dullest of the year to date.

Chicago Market Livelier

Chicago, May 21.—Increased inquiry is being received for iron and steel scrap in the Chicago market, practically all grades being in demand, except that No. 2 wrought is less sought after. Activity is particularly marked in heavy melting steel and malleable grades. Consumers of heavy melting steel in the east are in need of considerable tonnages and are obtaining permits for shipments at their expense because of their inability to obtain sufficient supply in their natural territory. This is causing considerable heavy material to move eastward from this point. Comparatively little railroad scrap is being offered, a list of 350 tons being offered by the St. Louis & Southwestern railroad.

Interest is Limited

Cincinnati, May 20.—Consumers of scrap are taking little interest in the market with the exception of those who use heavy melting steel and No. 1 machine cast. Stove plate has been a trifle more active, but no advance has been made. Common comment is that offerings are so light. Whether yard stocks are being reduced is a matter for speculation, although as shipments are now going forward more rapidly the assumption is that these stocks are being reduced at a gradual rate.

Sales Are Exceptional

St. Louis, May 18.—Purchases of small tonnages by the local car plants constituted about the only activity in the local scrap market this week. Mills and the general run of consumers are showing a decided disposition to hold off. Offerings from all quarters continue extremely light for this particular season. Dealers explain this by saying that price fixation has acted as a damper of efforts to collect and sell. Elimination of the spec-

ulative element has robbed the market of virtually all its life. Consumption is maintained at the recent maximum rate. Fairly prompt deliveries have resulted in the maintenance of stacks by most of the important melters. There is no urgency in the demand for any particular grade, and heavy melting steel, which last month was scarce, is apparently plentiful at the moment. Generally prices hold steady, but the tendency of the market is to stiffen. Several dealers marked up malleable grades slightly this week and there was also a slight advance in iron rails. Railroad offerings are light, the only lists this week being the Wabash, 5000 tons; St. Louis Terminal railroad, 800 tons, and Cotton Belt, 600 tons.

Sheet Output is Crippled

Shortage of Sheet Bars Keeps Mill Operations Irregular and on Greatly Reduced Scale—Western Sales Few.

Youngstown, O., May 22.—Sheet mills in this territory are operating irregularly on account of the acute shortage of sheet bars. Several mills are idle for this reason and makers say they cannot plan from one week to the next. The leading maker of bars at times is short of this material and right now several of his sheet mills are idle for this reason. Contracts closed some time ago with this company are being filled whenever enough steel is available to convert into sheet bars, and this is causing a shortage of bars in the company's sheet mills. Approximately 400 tons of black sheets were shipped recently to the French government and will be used for covering box cars. All the mills here are heavily booked with government tonnage and few sheets are reaching the domestic trade.

French Allotment Made

Philadelphia, May 21.—Additional orders for blue annealed sheets for shipment to France have been allotted to the leading eastern maker through government agencies. These will amount to several thousand tons.

Operations Do Not Improve

Pittsburgh, May 21.—Operations of sheet mills do not improve. Output is restricted by the scarcity of sheet bars. The American Sheet & Tin Plate Co. is producing at the rate of about 50 per cent of capacity while the output of independent mills is about 80 per cent of capacity. The entire production is for the government, either direct or indirect, and it continues to place good-sized orders. The Emergency Fleet corporation has bought large tonnages of blue annealed sheets.

Western Mills Sell Nothing

Chicago, May 20.—Except for government requirements, which are less exacting in the case of steel sheets than in any other finished line, mills are not taking on any new tonnages. The leading independent is able to make shipments to customers on former contracts, but has not been in the market for new business for several weeks.

Discard Steel

In Growing Demand Owing to General Shortage of Rerolling Material

Cleveland, May 21.—Demand for discard steel is very active owing to the acute shortage of standard semifinished material. Prices paid in some cases are as high as $50, mill, when this material has been marketed in the form of small billets. Ordinarily it is bringing from $45 to $47.50, or up to the maximum base for rerolling billets. One buyer freely canvassed the market in this district this week with offers of $44 without much result. Usually sales are of moderate lots as they accumulate, but a producer in this district has sold his output for a period of months involving a round tonnage. Discards are being used for a wider variety of purposes. Makers of small tools now are buying them. Government rejections of forging steel were sold here this week at maximum prices.

Slabs are Requisitioned

Philadelphia, May 21.—Another slab tonnage from an eastern maker has been requisitioned by the government in behalf of the eastern plate mills.

Demand is Unsatisfied

Pittsburgh, May 21.—Demands for semifinished steel continue to be heavy and denote plainly that consumers are unsuccessful in their efforts to cover requirements. Sheetmakers are extremely short of bars and as a result their output is considerably restricted. Platemakers are scouring the market for slabs, and consumers of billets are increasing efforts to cover requirements, although the demand for billets is not so heavy as that for sheet bars. Makers of semifinished steel are exerting themselves to supply tonnages wherever possible, but do not see any indication that they will be able to do so fully in the near future.

Strip Demand is Active

Pittsburgh, May 21.—Active demand prevails for cold-rolled strip steel, makers of which have pledged their entire output to the government. They are operating almost at capacity, but have had to curtail output somewhat on account of a scarcity of billets and slabs. Stocks which some had on hand almost are depleted.

Labor Shortage

Handicaps Production of Cast Pipe—Government Buying Wrought

New York, May 20.—Severe shortage of labor continues to impose great hardship on eastern manufacturers of cast iron pipe. Several of the shops are operating at around 50 per cent while others are able to do but little better. This in conjunction with a continued good demand for the smaller sizes of pipe has made deliveries on this material increasingly difficult. At present, eastern foundries as a rule are unable to ship 6 and 8-inch pipe before August, and 12-inch before July. The larger sizes, however, especially from 24 inches up, are available for relatively early shipment.

Buying Line Pipe

Pittsburgh, May 21.—Oil country interests are buying good-sized tonnages of 4, 6 and 8-inch iron and steel lap weld pipe for lines being laid in the south for the government. Tonnages are also being taken for shipment to France, according to report.

Western Demand Light

Chicago, May 21.—Requirements of cities for cast iron pipe to go into extensions this summer continue to be almost negligible and orders following the marketing of improvement bonds have not yet made their appearance.

Pipe Plants Readjusted

Birmingham, Ala., May 21.—Cast iron pipe plants in the Birmingham district now are in position to take on some of the big foundry and machine shop business that is being offered since readjustments of plants have been made. The cast iron pipe business still lags with no prospects of a material improvement at any time this year.

Shell Bar Tonnage Placed

Chicago Mills Allotted 75,000 to 100,000 Tons—Railroad Bar Orders Awaited—New Capacity in Service

Chicago, May 21.—Specifications for shell steel rounds are being placed and an independent maker in the west has been allotted 28,000 tons, while the leading interest has been given a larger tonnage as part of the same order. Outside of government requirements, comparatively little is being done in steel bars and mills find it difficult to ship more than occasional small tonnages to regular customers not engaged on war work. No new contracts are being made with this class of consumers. In bar iron the situation is extremely quiet with nothing new being taken except small tonnages where specifications accompany the order, though the total of this business is a fair aggregate. No contracts have been made for second half delivery and consumers are not asking contracts that far ahead. The railroad car situation is not changed, but mills are relying on this order to give them business for last half. Hard steel bars are being inquired for strongly, one request for 1000 tons for government work from a manufacturer not ordinarily using high carbon steel being received recently. Most inquiry is not being considered as mills are unable to obtain sufficient rerolling rails.

Discards are Sold

Philadelphia, May 21.—Quietness prevails in the bar iron market. Steel bars rolled from shell discards are selling well for reinforcing, forging and general machine work.

War Work Absorbs All

Pittsburgh, May 21.—Makers of iron and steel bars are engaged practically altogether on government work, either direct or indirect, and will take no other business. Implement makers have been given preferential classification by the government and are taking tonnages, but probably will be in the market sooner for much greater requirements for 1919 business. The 10-inch bar mill at the McDonald plant of the Carnegie Steel Co., Youngstown, O., began to roll steel on Wednesday of last week. It will produce rounds and squares up to 1¼ inches, hexagons up to 1¼ inches, flats up to 3 inches wide, concrete bars up to 1¼ inches, angles 1 x 1-inch up to 1¾ x 1¾ inches and small merchant mill shapes. The mill has a monthly capacity of about 7500 tons and is rolling from 4 x 4 billets obtained from the Ohio works of the Carnegie company.

Iron Bars Strong

New York, May 20.—The iron bar market has strengthened materially in this district during the past few weeks and nothing more is heard of the 3.30c and 3.35c, Pittsburgh, quotations which were being offered. Shading of the government maximum now either is exceptional or is lacking altogether. All of the current business appears to be going at the full price of 3.50c, Pittsburgh, or 3.695c, New York. Domestic demand for iron bars is of larger proportions. Preference in all cases is being given to government business; owing to the fact that the mills are not crowded with work, however, they are not restricting their new business to priority orders. Demand for bars rolled from shell discards is increasing steadily. Such bars are being used on an increasing scale by machine and forging shops which are unable to get steel of the usual specifications. A fairly large business is being booked in both iron and shell discard steel bars, for shipment to the Argentine, Chile, Brazil, South Africa, Australia, Japan, China and other countries, on government permits.

Large Bolt Inquiries Pending

Chicago, May 21.—It is understood that tentative allotment has been made of the government's requirement of more than 100,000,000 bolts and nuts and is now awaiting the proper government authority. No word has been given out as to the distribution of this large order. Other inquiries for large quantities of bolts and nuts still are pending. Practically all makers are well booked up and some embarrassment is being met by lack of shipping instructions on material ordered for immediate shipment and ready to move.

Shafting Tonnages Taken

Pittsburgh, May 21.—Round lots of cold-rolled shafting are being placed with makers, virtually all of the tonnage being either directly or indirectly for the government. Demand is most active for the larger sizes, 2¼ inches and more, and difficulty is being experienced in getting sufficient steel to meet requirements. Smaller sizes are also in fair demand, but production is considerably below capacity owing to shortage of steel. The trade is interested in the situation with regard to the proposal to cut down greatly the output of automobiles, makers of which take large tonnages of shafting. The demand for screw stock is light.

Bolt Requirements Large

Pittsburgh, May 21.—Requirements being made upon producers of nuts, bolts and rivets are large, and are for the government either direct or indirect. Makers are able to get steel bars for this class of business only. They are operating at about 90 per cent capacity. Jobbers report that their stocks have been reduced considerably and that they are unable to replace them fully.

Hoop Steel Tonnage Taken

Pittsburgh, May 21.—Tonnages of hoop steel are being taken by makers of oil and other kinds of barrels, who are engaged in supplying requirements of the government. Mills are unable to take any business except that which is for the government either direct or indirect. It is reported that tonnages still are being bought for shipment to France. The next unit of the McDonald plant of the Carnegie Steel Co., Youngstown, O., which will go into operation probably will be a 10-inch hoop mills. It will have a capacity of approximately 6000 tons a month and perhaps will begin rolling about July 1.

Protest Wins

And 12,000 Tons of Ferro Will be Imported—Market Strong

New York, May 20.—The vigorous protests against the action of the war trade board in prohibiting imports of ferromanganese and spiegeleisen, have resulted in a modification of this restriction. The war trade board has agreed to permit the importation of 12,000 tons of English ferromanganese, provided that licenses for exporting this tonnage to this country are granted by the British government.

At the instance of the American Iron & Steel institute requests now are being made upon consumers to accept deliveries of 70 per cent ferromanganese even where they have 80 per cent metal under contract, except where their practice absolutely forbids. This transfer is to be made on the basis of an equal number of manganese units as due allowance made.

The principal transaction in the ferroalloys markets during the past week was the placing of 4000 tons of 16 per cent spiegeleisen by the Cru-

cible Steel Co. of America. About one-half of this tonnage went to one maker and the remainder was distributed among several others. With this exception, business in spiegeleisen during the past week comprised only small tonnages. The market on 16 per cent spiegeleisen continues to be quoted at $75 to $77 at the furnace, for spot shipment, and at $70 for futures.

Only small transactions featured the ferromanganese market during the past week. Seventy per cent metal continues to be quoted at $250, delivered.

The market on 50 per cent ferrosilicon continues easy, both for spot and contract metal, and may be quoted at $150 to $155, delivered.

Market Strong and Active

Pittsburgh, May 21.—Activity and strength are reflected in the market for ferro alloys. Consumers evidently are covering requirements as quickly as possible in the belief that prices are going to advance soon and that tonnages are going to become scarcer. This appears to be especially true of ferromanganese and spiegeleisen. The embargo preventing imports of ferromanganese has caused anxiety, and consumers are hoping that it may be lifted at least temporarily. Tonnages of this alloy are reported to be available in England. The British government is said to be opposed to shipments because of the time required to load and unload vessels. Cutting down of imports of manganese ore also has made the market firmer. The Crucible Steel Co. of America has bought 1000 tons of 70 per cent ferromanganese from three interests for shipment during the last half at $250, delivered, and 4000 tons of 16 per cent spiegeleisen from the the same sellers, also for last half. The price paid is said to have been equivalent to $73, delivered. A valley consumer has purchased 500 tons of 70 per cent ferromanganese for last half shipment at $250, delivered, and the Carbon Steel Co. has taken a similar tonnage at the same price for shipment during the next 60 days. Another Pittsburgh consumer has taken 100 tons for spot shipment. An inquiry is out for 500 tons of 18 to 20 per cent spiegeleisen, which some makers are holding at $85, furnace. Demand for 50 per cent ferrosilicon is fair and spot now is quoted at $170, delivered, and for last half at $155.

Western Market Steady

Chicago, May 21.—Ferromanganese is in good demand and selling for last half delivery is going on steadily for the 70 per cent grade.

Need Plates in Big Lots

Chicago Producers Take 200,000 Tons—Lake Boats Call for 200,000 Tons Additional—Japan Gets Half of Old Orders

Chicago, May 21.—One of the heaviest orders for ship material received in the west since the war began was given the principal interest late last week, involving material for 50 steel boats to be built by the Skinner & Eddy Corp., on the Pacific coast. This is estimated to involve approximately 200,000 tons, mostly plates. Some difficulty is expected in giving required deliveries on this large tonnage in view of other obligations already on the books. Other specifications have been filed in steady volume for smaller tonnages and the total plate requirements aggregate a heavy tonnage. Division of the steel requirements for the carbuilding program has not yet been made and much interest is attached to the course which will be the following in obtaining this material, in view of the urgent necessity of furnishing shipyards sufficient steel to keep them busy.

To Roll Japanese Orders

Philadelphia, May 21.—Licenses for plates for export to Japan recently granted by the war board cover only such material as is now on the Pacific coast, or about 40,000 tons. It is understood that to fill the remainder of the tonnage now due to Japanese buyers on old orders, the mills will roll altogether a total of about 87,000 tons. This grand total of 127,000 tons to be supplied from Pacific coast stocks or new rollings, is slightly more than 50 per cent of the Japanese plate orders now on the books. The allocation of the steel for the 100,000 government cars is expected soon. This business will go largely to companies having 72-inch mills or smaller, so as not to interfere with large shipbuilding production. The steel distributing committee of the American Iron and Steel institute has protested against the proposal of the Emergency Fleet corporation to allow 20,000 tons from June rollings for use in the building of 60 additional 7500-ton vessels. The committee contends that the fabricators will not be ready to handle these plates for several months. Several thousand tons of plates have been placed for France and large tonnages are to be closed in England and Italy. Numerous government lots for domestic buyers also have been placed.

To Distribute Steel

Pittsburgh, May 21.—Steel for the carbuilding program is about to be allotted by the war industries board, according to reports reaching the trade here, and the work will be directly under the jurisdiction of J. Leonard Replogle. The 100,000 cars will require approximately 1,400,000 tons, and makers, it is understood, will be given the option of rolling either bessemer or open-hearth steel, or both, and sheared or universal plates. Platemakers are engaged altogether on government work and are declining other business

Big Tonnage For Lake Boats

Cleveland, May 21.—More than 200,000 tons of steel including the boiler material, will be required for 130 additional vessels for the Emergency Fleet corporation which it has been arranged by Director General Charles M. Schwab will be built by lake shipyards, for delivery at the end of the season of 1919. The ships will be of 4200 tons deadweight capacity each. The American Shipbuilding Co., which recently received 66 boats, is to obtain 60 additional, requiring 105,000 tons of steel. The Great Lakes Engineering Co., of Detroit, will build 24 additional; the Manitowoc Shipbuilding Co., 12; while the Toledo Shipbuilding Co., Saginaw Shipbuilding Co., McDougall-Duluth Shipbuilding Co., and the Globe Shipbuilding Co., of Detroit, will construct the remainder.

War Board May Take Tin Jurisdiction

Pittsburgh, May 21.—Tin plate mills are operating at the rate of about 95 per cent of capacity, shipments are satisfactory and stocks have been reduced to about normal proportions, or one week's output. Production at present is on the basis of probably 825,000 base boxes weekly. It may be expected to show a decline when hot weather arrives. Heavy demands are provided for in estimates of the food administration and probably exceed actual requirements. Regular customers are practically covered for the last half. The price for this delivery has been left to the war industries board, which it is reported, is to assume a still broader control over steel distributors, which may bring tin plate tonnage directly under its jurisdiction.

Official Prices Revised to Date

General Institute Committee Announces Many Changes in Base Figures, Differentials and Extras—Pig Iron Schedule Amplified—Shell Turnings Defined—Cast Iron Pipe Advanced $6—Chrome Ore Ruling

NEW YORK, May 21.—Many important revisions and amplifications of base prices, differentials and extras in various iron and steel products previously recommended are contained in a voluminous statement announced by Chairman E. H. Gary on the committee of steel and steel products of the American Iron and Steel institute. This statement brings up to date all extras and differentials as previously published in the price pamphlet issued by the institute several months ago. Some announcements on base prices also are given. The prices of steel bands, hoops and unfinished hot rolled strip steel for cold rolling are reaffirmed, by the substitution of new bases and cards of extras. Heretofore these prices were given in the form of extras over the steel bar card. A new base of $7.50, Pittsburgh, per 100 pounds for 1-inch common chain is shown. The former base was $8 for ⅜-inch coil. A ruling covering chrome and ore consumption is given. Cast iron pipe prices have been advanced $6. Large rivets are reduced.

Some important changes are made in the pig iron differential list. These apply to high silicon bessemer iron, to charcoal iron, to silveries and to low phosphorus grades, both copper free and copper bearing.

Among the additions to the extra and differential list are those applying to sketch steel boiler plates; to boiler tubes, including lap-welded superheater and seamless tubes; to sheets covering extras for forming flanging and miscellaneous points. Tin plate extras on charcoal 107 pounds or over are cancelled and a new series substituted. Further amplification is made of the scrap schedule to cover low phosphorus scrap and shell turnings, about which there has been some confusion.

Judge Gary's statement in making the announcement is as follows:

The committee on steel and steel products of the American Iron and Steel institute has received from a subcommittee reports based on information received from representative manufacturers of various lines of steel and steel products, and from such reports and other data available the committee has concluded that certain changes and modifications in the maximum prices, differentials, extras, etc., as heretofore recommended by the institute and published in its pamphlet dated January, 1918, are fair and reasonable, and the committee recommends that revised maximum prices, differentials and extras be adopted to take effect immediately, as follows:

PIG IRON

The base price of $33 per gross ton f. o b. furnace applies from and after April 1, 1918, to No. 2 foundry pig iron only.

Basic iron, $1 below base price.

Bessemer iron up to 3 per cent silicon, 10 per cent above price of basic.

For bessemer irons over 3 per cent silicon:

	Gross ton
3 to 3½ per cent silicon add.....	$2.00
3½ to 4 per cent silicon add.....	3.00
4 to 4½ per cent silicon add.....	4.00
4½ to 5 per cent silicon add.....	5.00

Above extras for high silicon bessemer iron are to be added to the base price of bessemer iron not exceeding 3 per cent in silicon.

Charcoal Iron

Southern or warm blast charcoal iron, ranging from 0.40 to 0.60 phosphorus.

For silicon up to 2 per cent, a maximum of $10 per gross ton over base.

For silicon over 2 per cent, add to above differential $1 for each ½ per cent of silicon above 2 per cent.

Cold blast charcoal iron, a maximum of $47 per gross ton above base, with customary reductions for lower grades, as recognized by the trade.

Northern semi-cold blast iron, a maximum of $22 per gross ton above base.

Lake Superior iron, $2.50 per gross ton above base for iron averaging 1.25 per cent in silicon. Other grades to be adjusted as per the custom of the trade, depending upon the silicon, phosphorus and manganese contents of the iron.

All of these charcoal iron differentials to be considered in connection with the base price.

High Silicon or Silvery Iron

For iron containing:	Gross tons
6 per cent silicon.....	$8.00 above base
7 per cent silicon.....	10.00 above base
8 per cent silicon.....	12.50 above base
9 per cent silicon.....	14.50 above base
10 per cent silicon.....	17.00 above base

Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over.

Low Phosphorus Iron

Iron containing phosphorus and sulphur not exceeding 0.04 and silicon not exceeding 2 per cent.

	Above base
For copper free iron—copper not exceeding 0.04	$20.00
For copper bearing iron, copper not exceeding 0.25	19.00
For copper bearing iron, copper not exceeding 0.50	18.00
For copper bearing iron, copper over 0.50	17.00

A sliding scale of $1.50 per gross ton advance for each reduction in phosphorus of 0.005 per cent below 0.04 and $1.75 per gross ton advance for each 1 per cent silicon in excess of 2 per cent.

For iron with phosphorus over 0.04 use following scale:

	—Add to base price per gross ton—			
Phosphorus, maximum	Copper 0.04 maximum	Copper 0.25 maximum	Copper 0.50 maximum	Copper over 0.50
0.040	$20.00	$19.00	$18.00	$17.00
0.045	17.50	16.50	15.75	15.00
0.050	15.00	14.25	13.50	13.00
0.055	12.50	12.00	11.50	11.00
0.060	10.00	9.50	9.25	9.00
0.065	6.50	6.50	6.50	6.50
0.070	5.50	5.50	5.50	5.50
0.075	5.00	5.00	5.00	5.00
0.075-0.09	——(Use bessemer price)——			

Other extras and differentials on pig iron remain as shown in the institute pamphlet of January, 1918.

IRON AND STEEL SCRAP

All prices shown on pages 14-a, 14-b and 14-c, as being effective on and after Feb. 21, 1918, are reduced $1 per gross ton on and after April 1, 1918.

The committee approves of and announces rulings of the sub-committee on scrap iron and steel as follows:

Low phosphorus steel scrap may only be dealt in under Schedule 2 (a) when it consists of material specifically named therein.

Shell steel scrap, ship-plate shearings and all other low phosphorus scrap, 0.04 and under in phosphorus and sulphur, must be sold under Schedule 2 (b), maximum $36.50.

Schedule 2 (c) may not be abused by the shipment of melting steel scrap to an acid or electric furnace. It shall consist only of low-phosphorus material which will not analyze 0.04 and under in phosphorus and sulphur and must be of a character similar to the material specified therein.

Low phosphorus turnings, including shell steel turnings, may not be dealt in at any price in excess of that announced under Schedule 9.

Shell steel turnings may only be sold under Schedule 9 (b), maximum $24, when the heavy cuts have been separated to conform with that schedule.

No charge for shearing or otherwise preparing scrap may be added to any of the differentials announced.

FORGING INGOTS

To the differentials for size should be added the following:

Under 20 inches diameter, add to base price	$5.00
For chilled mold cast ingots over 10 feet long add to base price.....	5.00

STEEL BARS AND SMALL SHAPES

Extras for bands as shown on page 20 and for hoops as shown on page 22 of the institute pamphlet are canceled. Steel hoop extras shown on page 25, 26 and 27 are also canceled.

BOLTS, NUTS AND RIVETS

Cancel price on large rivets and ⅞ x 6 inches smaller and shorter rivets shown on

page 82 of institute pamphlet and substitute the following:

Large rivets:

Structural and ship	$4.40 base
Boiler	4.50 base

⅞ x 6 inches smaller and shorter rivets, 50-10 per cent.

No change in price on machine bolts, carriage bolts, nuts, etc., as shown on balance of page 82 of institute pamphlet.

CAST IRON WATER PIPE

Change base prices shown on page 84 of institute pamphlet to read as follows:

$55.00 f. o. b. Birmingham, Ala.
61.35 f. o. b. New York.
60.35 f. o. b. Chicago.

STEEL CASTINGS

Cancel differentials for alloy steel castings shown on page 91 of institute pamphlet and substitute the following:

Alloy Steel Castings

For nickel or other alloy castings an extra charge will be made based on amount of alloy and cost of same.

SHEETS

To the differentials and extras for forming as shown on page 42 of the institute pamphlet add, per 100 pounds, the following:

Beaded ceiling	25c
Weatherboard siding	25c
Rock face brick (and stone) siding	25c

To the notation in regard to lengths on page 42 of the institute pamphlet add the following, "Or shorter than 60 inches" so that the last sentence of the notation will read as follows, "Flat sheets extras will apply on lengths over 120 inches or shorter than 60 inches."

To miscellaneous extras shown on page 43 of the institute pamphlet add the following, per 100 pounds:

Army flange steel elastic limit not exject to physical test	25c
Army flange steel (elastic limit not exceeding 40,000 pounds per square inch	50c
Navy medium steel	10c
Carbon over 0.40 to 0.60	25c
Carbon over 0.60 to 0.90	40c

To the quantity differential at the bottom of page 44 of the institute pamphlet add the following:

"Commercial practice permits of a tonnage weight variation of 2½ per cent either way on gages 17 to 30 inclusive, and 5 per cent either way on gages 16 and heavier as produced by sheet or jobbing mills."

TIN PLATE

Tin and Terne Plate

Cancel the extras for charcoals for 107 pounds basis and over and substitute the following:

ADD FOR CHARCOALS

Basis lbs.	A	2A	3A	4A	5A	Premier
107	1.00	1.55	2.00	2.90	3.80	4.70
128	1.80	2.15	3.05	3.95	4.85	5.75
135	1.80	2.15	3.05	3.95	4.85	5.75
148	2.40	2.75	3.65	4.55	5.45	6.35
155	2.40	2.75	3.65	4.55	5.45	6.35
168	3.00	3.35	4.25	5.15	6.05	6.95
175	3.00	3.35	4.25	5.15	6.05	6.95
188	3.60	3.95	4.85	5.75	6.55	7.55
195	3.60	3.95	4.85	5.75	6.55	7.55

To the differentials for specialties shown at the bottom of page 45 add:

Sanitary can stock, add 10c base.

Cancel extras on ternes shown at bottom of page 46 of institute pamphlet and substitute the following:

Ternes

(Per package)

8 pounds—100 pounds	$15.00
8 pounds—IC	15.30
12 pounds—IC	17.00
15 pounds—IC	18.00
20 pounds—IC	19.60
25 pounds—IC	20.60
30 pounds—IC	21.75
35 pounds—IC	22.75
40 pounds—IC	24.00

WIRE PRODUCTS

Barbed Wire

Add following at bottom of page 62, "Painting other than standard color and quality subject to negotiation."

Wire Rope

Add after terms of sale on page 69 of institute pamphlet the following:

Agents Re-Sale Prices

An agent or dealer of a wire rope manufacturer, on shipments direct from the manufacturer to the consumer, will invoice at the established schedule of prices of the manufacturer.

An agent or dealer may charge the consumer an additional 5 per cent for the service of handling a reel of rope from his (agent's) stock, or 10 per cent in the event of his being obliged to cut a specified length of rope from his stock.

No agent or dealer should sell to another agent, dealer or broker without the proper assurances that the consumer, to whom the rope will eventually go, will not be charged on a higher basis than set forth in the first and second paragraphs hereof.

IRON BARS

The exceptions on page 31 of the institute pamphlet reading, "No extra charge for hot sawing or shearing to lengths of 5 feet and over," is canceled.

STEEL PLATES

To the extras for irregular sketches shown on page 34 of the institute pamphlet add the following:

"Sketch plates (other than those sheared to a radius) will be invoiced at actual weight of the sketch, at the base price, plus standard card extras (including sketch extras), with an additional charge for waste, if any, to be determined by deducting the actual weight of each sketch from the estimated table weight of the smallest rectangular plate from which said sketch can be secured, the difference to be invoiced at the rectangular plate price, less an allowance for the value as scrap, at the price fixed by the government for No. 1 heavy melting scrap."

COLD ROLLED STRIP STEEL

Cancel first sentence, second paragraph, page 75 institute pamphlet, and substitute the following:

"All prices for cold rolled strip steel are f.o.b. maker's works with actual freight allowed to destination when not in excess of 31c per 100 pounds."

HOT ROLLED STRIP STEEL

All prices and extras shown on page 78 of institute pamphlet are canceled and hot rolled strip steel of all qualities is shown on the new list of bands, hoops and hot rolled strips.

CHAIN

Base price and extras for iron and steel chain recommended by the committee on steel and steel products of the American Iron and Steel institute, May 21, 1918.

Base price for 1-inch common steel proof coil chain, self-colored or blacked, per 100 pounds, f.o.b. Pittsburgh, $7.50.

CHROME ORE

Chairman Gary, on the subject of chrome ore, issued the following statement:

As a result of an investigation in the trade, made by the subcommittee on ferroalloys of the American Iron and Steel institute, and of a meeting of the consumers of chrome ore for refractory purposes in steel manufacture, held at Pittsburgh on May 7, pursuant to call of the subcommittee on ferroalloys, and from other data available, the committee on steel and steel products recommends to the steel industry that it restrict the use of chrome ore for direct refractory use to a maximum of 1½ pounds per ton of open hearth ingots; that it purchase for the above purposes only domestic or Canadian ores containing not to exceed 38 per cent chromic oxide, nor more than 35 per cent chromic oxide as an average, each carload to be considered as a separate unit for analysis. The committee recommends that the use of chrome brick and chrome cement do not exceed the equivalent of a maximum of ½ pound chrome ore per ton of ingots. The committee urges that every effort be made to find substitutes for chrome ore for refractory use in open hearth steelmaking, with a view to effecting the maximum possible reduction in the use of chrome ore, without curtailing steel production.

The committee further recommends that producers or sellers of chrome ore restrict the sales of such ores for refractory purposes to the above mentioned maximum and average percentages of chromic oxide.

The stocks of foreign ores on hand together with those to be brought in during the year ending April 1, 1919, will not permit the use by the ferrochrome and chemical trades of a chrome ore mixture averaging higher than 45 per cent chromic oxide. The committee recommends that the ferrochrome and chemical trades begin at once the use of such mixture, acquiring promptly the domestic or Canadian ores necessary therefor.

This committee will consider the requests of any steel manufacturer whose special conditions seem to require a greater consumption of chrome ore than above recommended, when such requests are submitted through the subcommittee on ferroalloys and have received its approval.

The above recommendations are made because of the necessity for the maximum possible conservation of shipping, and the consequent need to utilize domestic and Canadian ores to the greatest extent possible.

The committee relies on the patriotism and good faith of the iron and steel, ferrochrome and chemical industry to accomplish this, and expresses the hope that all connected with those industries, as well as the producers and sellers of chrome ores, will co-operate in the proper spirit to this end.

Seeks Ferro and Spiegel

Pittsburgh, May 22.—A consumer south of the Ohio river has put out an inquiry in this district for 500 tons of 70 per cent ferromanganese and 500 tons of 16 per cent spiegeleisen for last half delivery.

An allotment of 70,000 tons of plates for new boats placed with the Skinner & Eddy Shipbuilding Corp., has been made to the Carnegie Steel Co.

Structural Awards Grow

April Lettings Raised to 64 Per Cent or 115,200 Tons—Ship Material Orders Held Up by Price Differences

New York, May 21.—The Bridge Builders' and Structural society reports that bookings by fabricating shops during April amounted to 64 per cent of capacity, or 115,200 tons. This compares with 84,600 tons in March and 99,900 tons in February. A comparative statement follows:

Month	Per cent	Approx. tonnage
April, 1918	64	115,200
March	47	84,600
February	55½	99,900
January	53	95,400
December, 1917	121	205,200
November	77	138,600
October	61½	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Demand for bridge work and for miscellaneous government projects continues to make up the bulk of the activity in structural steel. Some small demands for railroad extensions are appearing but relatively little inquiry for this work is expected to develop before summer. The largest inquiry for railroad improvement is that for 2500 tons for the Baltimore & Ohio shops at Glenwood, Pa. Railroad bridge inquiries aggregate 1500 tons.

Shops Want Higher Prices

Philadelphia, May 21.—Price differences have held up the allotment of 140,000 tons of fabricated steel covering a recent new ship order of the American International Shipbuilding Corp. The Emergency Fleet corporation has wanted the fabricators to accept this business at the same prices as were accepted previously. The shops, however, all quoted higher prices on this lot than in their previous bids. The structural market in this district is featureless. Priority shape business is small.

Take Government Business Only

Pittsburgh, May 21.—Fabricators are taking government business only and can get steel for no other purpose. No further details are available regarding the plans of the government to build a fabricating shop. It is understood that work on the plant is to be started soon and that it will be rushed to completion so that additional fabricating capacity will be built to hasten the shipbuilding program. Nothing of an official character has developed with regard to the structural tonnage that will be required for the ordnance plant to be built on Neville island. Estimates vary from 30,000 to 100,000 tons. It is reported that the American Bridge Co. will do the fabricating work.

Small Contracts Placed

Chicago, May 21.—Occasional small tonnages of structural shapes are being placed in the west but for railroad and industrial purposes only. The largest tonnage during the past week involved 520 tons for four buildings for the Pan Motor Co., at St. Cloud, Minn. Other tonnages closed were small. Specifications continue to be received for material going to fabricating shops building parts for ships.

CONTRACTS AWARDED

Four new buildings for the Pan Motor Co., St. Cloud, Minn., 520 tons.

Girders and viaduct for the Western Pacific Railroad Co., at Altamont, Mont., 296 tons, to the Virginia Bridge & Iron Co.

Through plate girder and I-beam spans, Bridge No. 303, for the Great Northern Railway Co., at Lohmiller, Mont., 198 tons.

Four pier sheds, Norfolk, Va., for quartermasters department, 3100 tons, to American Bridge Co.

CONTRACTS PENDING

Shops for Baltimore & Ohio railroad, Glenwood, Pa., 2500 tons, bids being taken by Westinghouse, Church, Kerr & Co., New York.

Bridge work for the Pennsylvania railroad, 800 tons, bids being taken.

Bridge work for the New Jersey Central, 400 tons, bids being taken.

Bridge work for the Chesapeake & Ohio railroad, 300 tons, bids being taken.

Wire Nails

In Large Amount Required for Government Cars—Wire Allotted

New York, May 20.—About 30,000 kegs of wire nails, comprising 1200 to 1500 tons, will be required in connection with the government car program. It is expected that these will be allocated shortly and that the tonnage will be so placed that the various car builders will receive their nails from the nearest mill. A large amount of government wire business, involving wire rope, plain wire and nails is being placed right along. The larger portion is in direct government business. The total tonnage, although large, does not nearly equal the entire output of the mills, so that the latter are able to accept commercial wire tonnage unaccompanied by priority certificates. It is reported in the trade that the government is about ready to redistribute 50,000 tons of barbed wire for France, which it placed a few weeks ago and then cancelled.

Sell to Government Only

Pittsburgh, May 21.—Wiremakers are taking no new business for private users, except that occasionally they find small lots for this purpose which can be sold to regular customers without interfering with government work. Specifications are coming to mills but are being pared down to the minimum or are not being taken care of at all. Heavy demands are being made for nails by consumers who are engaged in government work.

Barbed Wire Allotted

Cleveland, May 21.—Large tonnages of barbed wire for export to the allies have been allotted to mills in this district. As a result, capacity in this line is engaged for about three months. It is believed some provision must soon be made to supply the farmers with barbed wire or fencing if increased acreage is to be sown. Shipments and business are being limited to essential needs. There is some talk that dealers in wire rope have been quoting higher than the maximum price.

Ore Movement Grows

Cleveland, May 21.—Lake vessels carrying iron ore are making good time. Delays at upper lake ports following the early rush of steamers have disappeared as the docks there are giving summer dispatch. Railroad car supply at lower lake ports is below the maximum necessary and some boats are being seriously delayed. Ore shipments this month will run more than a million tons above the May, 1917 figure, placing the movement up to June 1 well in advance of last year's total.

Small lots of ore continue to be sold. Allotment of ore on the basis of requirements is being given close attention. Railroad cars are being distributed in such a way as to adjust the supply to the needs of both the ore and coal trades. Coal shipments from the mines are rather light.

Industry To See Where It Stands

Joint Committee of Producers and Government Representatives, Named at Washington Conference, is Assembling Data on War Steel Requirements—Result Will Determine Future of Open Market—Will Shape Curtailment Policy

WASHINGTON, May 21.—The first definite and practical estimate of the maximum tonnage of steel likely to be placed with American mills by the United States and allied governments is to be determined by a special joint committee named by the war industries board and the steel and steel products committee of the American Iron and Steel institute at a conference here last Friday. Just when this estimate will be made is a matter of conjecture but the committee was instructed by Chairman Baruch of the war industries board to act and report as speedily as possible, and now is at work.

The committee is not to stop with ascertaining the war needs of the countries leagued against Germany and her allies, but is to inquire into the requirements of all steel consuming industries, to measure this tonnage in conjunction with the war orders against available mill capacities and to submit its findings and recommendations to the war industries board. This is preliminary to drastic curtailment steps which the board has under consideration and is to give to those steel manufacturers who pledged 100 per cent production for the government the first concrete idea of the meaning of that obligation.

Definite Needs Still Lacking

The meeting of the steelmakers with the government officials last week again emphasized and more forcibly so, that the government has asked the steel industry to give it all the steel it needs in preference to other consumers, but has not given a clear-cut idea of the extent of its own requirements. This situation, while meeting a ready response in the industry, was somewhat bewildering to both government and industry officials. The meeting was a sequel to the one in New York a fortnight earlier and resulted in the plan to allow representative steel men as well as chosen government agents to find out what the government really wants.

The war industries board last Friday was frankly told that the steel industry had been trying to find out for months just what the United States and the allies will require the mills to produce. The board, as in the case of the New York meeting, virtually asked the steel men what to do. At New York the answer was, "We'll give you all we've got and all we can get." Here the answer was, "We've promised you all we have, but tell us what you want." The latter is regarded generally as a franker statement to the government and a fairer one to all interested in production and consumption of steel.

Will Draw Essential Line

From the survey being made by this special committee, the war industries board, probably in another joint conference with representative steel manufacturers, will determine definitely the capacities to be reserved for American and allied war orders and those to be released for commercial production. Here is believed to hang the much mooted curtailment question which will be answered by a sharply drawn line between essential and nonessential industries with some plan for the distribution of such steel as may be the surplus above essential requirements.

Chairman Baruch and J. Leonard Replogle, member of the war industries board and director of steel supply, are of the opinion there isn't going to be a surplus, or at least that it will be so small that the government will have to supervise its allocation. The steel producers are of the opinion there is sufficient steel for all war requirements with a surplus which, with some slight curtailments, can be made to satisfy commercial needs. Which opinion will prove correct will depend upon the findings of this joint committee and, the manufacturers and war board officials agree, upon the service the fuel and railroad administrations will render.

It is said that the government's proposal to the steel industry virtually was "Increase your capacities, if you want to fill commercial orders." It was this attitude which forced the question of making known definitely the volume of government tonnage to be placed with the mills. As has been stated, the time in which the survey will be completed is a matter of conjecture, depending largely upon the frankness with which the army, the navy and the shipping board—and the allies, too—make their requirements known to the committee. Some are of the opinion this is going to be a difficult task, because daily developments on the western front frequently add new and unexpected details to the war program, requiring more steel of varying specifications.

The steel men who are on this special committee are James A. Farrell, president of the United States Steel Corp.; John A. Topping, chairman of the Republic Iron & Steel Co.; E. A. S. Clarke, president of the Lackawanna Steel Co.; Eugene G. Grace, president of the Bethlehem Steel Corp.; and H. G. Dalton, of Pickands, Mather & Co. The government will be represented by Director Replogle of the steel division; Judge Edwin B. Parker, priorities commissioner; Alexander Legge, chairman of the requirements committee, and Brig. Gen. Hugh L. Johnson, the newest member of the war industries board.

Representative Interests Present

These steel men attended the conference last Friday: Elbert H. Gary, chairman of the United States Steel Corp.; J. A. Burden, president of the Burden Iron Co.; A. F. Huston, president of the Lukens Steel Co.; Willis L. King, vice president of the Jones & Laughlin Steel Co.; L. E. Block, vice president of the Inland Steel Co., F. J. Hall, vice president of the Central Iron & Steel Co.; A. A. Fowler, Rogers, Brown & Co.; D. G. Kerr, vice president of the United States Steel Corp.; James B. Bonner, representing the American Iron and Steel institute in Washington; Louis H. Williard, assistant to Mr. Bonner, and the steel representatives on the joint committee.

Attending the conference for the government were the four men named on the committee and Chairman Baruch, Robert S. Brookings, Hugh Frayne, L. L. Summers, Jay C. McLauchlan, Paul Mackall, P. B. Noyes, George N. Peek, Rear Admiral F. F. Fletcher and H. P. Ingels, secretary of the board.

Northwest Steel Co., Portland, Oreg., has secured contract from the Emergency Fleet corporation for construction of eight additional 8800-ton steel ships.

Pushes Big Coke Expansion

Government Lends Financial Backing to Large Program of By-Product Extensions—Encourages Blast Furnace Building

WASHINGTON, May 21. — Governmental financial support is to be given to the construction of many additional by-product coke ovens at different locations. While formal details still are being shaped and are not ready for announcement, the report that 1500 will be the total number of ovens to be added is given credence in official circles. Along this line it is learned that the Laclede Gas Light Co., St. Louis, is to benefit in this manner through additions to be built to its present plant. Additional by-product ovens are to be built near Pittsburgh and Connellsville.

There is no official confirmation as yet to the report that the government also is to be an active factor in the construction of additional blast furnaces, although the subject has been under discussion. At the same time, it is known that the government is to finance the excess costs in building under present conditions, of some blast furnace projects which are ready to go ahead. A two-furnace blast furnace plant at St. Louis with the required by-product coke capacity and other equipment for a rounded-out plant, is one of the projects under consideration.

The government's financial backing of new coke ovens is to develop an increased supply of toluol and other explosives. Aid is to be given under war department capital expenditures division although this likely will be taken over by the war finance corporation. It is understood aid is to be given for the building of extensions to present plants rather than for erecting new ones as time and materials can be conserved considerably.

Coke shipments now are enroute to the Union Furnace at Ironton, O., and that stack will be blown in in a few days. It has been down since last November.

Becomes Page Head

B. Lissberger, of the firm of B. Lissberger & Co., Woolworth building, New York City, was recently elected to the position of president of the Page Steel & Wire Co., New York, Pittsburgh, Detroit and Chicago, whose works are at Monessen, Pa., and Adrian, Mich. Mr. Lissberger was appointed to succeed the late Austin Clement, of Chicago. He is interested in a large number of industrial plants for the manufacture of spelter, acid, brass and copper products and has been director and vice president of the Page company for several years.

Farrell Denies Report

With the statement that all of his time and energy are devoted to the production and delivery of steel for government requirements, President James A. Farrell, of the Steel Corporation, has denied the press dispatches that he had been called to Washington by the President to become director of operations of the United States shipping board.

Takes Over Steel Plant

Pittsburgh, May 22.—A syndicate in which the Universal Rolling Mill Co., Bridgeville, Pa., owns the controlling interest, has purchased the works of the Hussey-Binns Shovel Co., Charleroi, Pa., manufacturer of shovels. The consideration is said to have been $500,000 and covers entirely the investment of stockholders of the company which recently entered proceedings in voluntary receivership. All obligations also have been satisfied. The plant is producing and will be operated as a separate unit by the management of the Universal Rolling Mill Co. under the name of the Hussey-Binns Steel Co., of which the new president is Walter H. Baker, secretary and treasurer of the Universal company.

The Non-Ferrous Metals

Copper Lead Spelter Tin

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	**Aluminum	Spot antimony
May 15	23.50	.....	6.80	7.30	32.00	12.25
May 16	23.50	.....	6.85	7.30	32.00	12.12½
May 17	23.50	.....	6.90	7.30	32.00	12.25
May 20	23.50	.....	6.92½	7.30	32.00	12.25
May 21	23.50	.....	6.92½	7.30	32.00	12.00

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
**Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 32.10c; one to 15 tons, 32.20c.

New York, May 21.—While tin for spot delivery remains very scarce in the east, the market appears somewhat softer than a week ago. Spot Chinese No. 1 is now holding as low as $1.01, and it is believed that possibly this price could be shaded. The easier tone in tin is noted particularly in futures which may be attributed in part to reports that Banca tin shipments are to be resumed. Chinese for May shipment is holding today at 94c, New York, and 91c for June.

Spelter continued to maintain its strength during the past week, although trading was of smaller volume. Producers as a rule are quoting only for nearby delivery and are making no effort whatsoever to force metal upon the market. Prime western for prompt delivery is quoted at 7.25c to 7.37½c, St. Louis; June 7.37½c to 7.50c, and July 7.50c. Grade A spelter and sheet zinc prices as fixed by producers and the war industries board last Thursday and Friday are now before President Wilson for approval. It was recommended they be not changed. The government closed bids last Friday on 1000 tons of Grade C for the army, but as yet no announcement has been made as to prices involved. Brass special, which has been in greatly improved demand, is quoted 7.62½c to 7.75c, St. Louis. The war department has decided to accept 99.50 per cent metal, so that redistilling of prime western probably will strengthen the market.

Prices on lead have been tending upward under somewhat improved buying. Spot lead is being offered at prices ranging from 7.12½c to 7.50c, New York. Shipment metal is quoted in the outside market at 7.90c to 7.95c, New York, for prompt, May and June. The leading seller continues to quote 7c, New York.

Interest in the copper market is centered upon the meeting May 22 of producers and the war industries board, at which time it is expected that a price will be set for the next three months. It is the firm belief in several well informed quarters that at least an advance of three quarters of a cent will be made; however, nothing of a definite character will be known until after the meeting.

Antimony during the past week has been in small demand, with prices ranging from 12.12½c to 12.37½c, duty paid, New York, for spot delivery, but today the quotation is 12c.

The aluminum market is quiet and unchanged, with scrap now limited to 32c, while the actual market still remains under that.

The Influences of Surface Tension

The Hypothesis Has Been Proffered That Surface Tension Bears a Far-Reaching Influence on the Structure of Iron and Steel—Convincing Evidence Vindicates This Theory

BY F. C. THOMPSON

ATTEMPTS have been made to correlate the properties of metals, and in particular the elastic limit, with the effect of the surface tension which was supposed to act at the crystal boundaries. In view of the importance of the subject, and of the fundamental nature of some of the criticisms leveled against this hypothesis, it seems advisable to consolidate previous statements and to deal more fully with the questions which have been raised. As a result of present abnormal conditions no new experimental work has been carried out, although there are several directions in which investigation is required before full credence can be placed in the hypothesis tentatively proposed.

Does Surface Define Structure?

To the author the evidence available that surface can, and does, make its influence felt in defining the structure, and hence the properties of metals and alloys, appeared so overwhelmingly great that it was taken more or less for granted in the first paper. Since, however, no less an authority than Dr. Rosenhain was unable to believe that a surface tension of any appreciable magnitude could be expected between the crystalline phase and the intercrystalline amorphous modification, the author has in the present contribution reviewed the available evidence more fully, and extended it in several interesting directions.

The other main criticism of Dr. Rosenhain may perhaps be considered first, namely, that whether the surface tension hypothesis can be justified scientifically or not, it is unnecessary; the mere strength of the intercrystalline vitreous modification being sufficient to explain the whole of the phenomena.

So far as the explanation goes that fracture of a normal metal sedulously avoids the crystalline boundaries, passing by preference through the mass of the crytsalline grains, such a simple hypothesis may be sufficient. Immediately, however, this idea is used to explain more or less quantitatively the remarkable increase of elastic limit and of tensile strength imparted to a metal by an increase of the crystal boundaries. A single instance may be taken from the results previously recorded, which, however, is in full agreement with the results of general experience.

The maximum stress of the sample of iron containing 0.049 per cent carbon was in the annealed condition, 21.1 tons per square inch; and after normalizing, 21.8 tons. The small amount of Fe_3C being of the same amount and similarly distributed in each sample, the alteration of tensile strength must be attributed to the change in the crystalline size from 700 crystals per inch in the annealed state to 870 in the normalized. Now considering for simplicity the crystals to be squares in cross section, and the thickness of the films to be the mean of those of the iron and steel samples already calculated, that is, 1.5×10^{-6} centimeters, the difference in the area of the cement in inch square test bars of the two samples would be $2(870-700) \times 1.5 \times 10^{-6} \times 2.54$ square inches, or about 1.28×10^{-3} square inches, which area, if the simple strength of the cement is to explain the increased maximum stress of the normal over the annealed sample of iron, has a strength of 0.7 ton. The cement must therefore be credited with a tensile strength of almost 550 tons per square inch. Since the corresponding value for crystalline iron is in the region of 20 tons per square inch this high value is improbable, and some other factor than the mere strength of the amorphous modification must be sought. If material of such properties existed at the boundaries it is to be expected that it would make its presence apparent as a raised cellular structure on a merely polished surface, as cementite often does when it occurs in this form. Further, a Turner sclerometer scratch fails to change its width on crossing the grain boundaries, which would certainly be expected, however thin the films might be, if they were possessed of such high tenacities as they would act as a breakwater, strengthening the soft material in their immediate neighborhood. Surface tension supplies at once a plausible and, so far as the author can see, almost the only possible alternative to this simpler but insufficient view, that all that is required is that the intercrystalline films be "stronger per unit of area than the crystalline material."



FIG. 1 — DENDRITE OF LEAD WITHDRAWN FROM RESIDUAL LIQUOR DURING SOLIDIFICATION

Explanation Not Complete

This is, however, by no means all. It is not quite easy to see why the mere existence of a hard modification between the crystals should cause the latter to adhere at all. At any rate it affords no obvious explanation why the boundaries become the strongest part of the mass. The most that can be expected if two surfaces of a material are to be kept in contact by simple adhesion is that the union should be nearly as strong as the cohesion of the material itself. It is unthinkable that under such conditions the masses should be brought together so closely as to adhere more strongly than do the molecules lying on adjacent cleavage planes. There is further no reason to believe that the mere introduction between the crystals of another and harder material would increase the strength of the attraction of these crystals for each other, in fact direct experimental evidence is available in opposition to such a view. Bismuth is distinctly harder than pure gold, and yet the introduction to the latter of a trace of the former, practically the whole of which is found between the crystals of gold, renders the intercrystalline strength almost non-existent, the alloy being intensely brittle, devoid of ductility, and breaking with an intergranular fracture.

We are therefore again forced to the conclusion that the hypothesis of a hard intercrystalline cement is not sufficient to explain by any means all the phenomena which must be taken into account, and that a consideration of the possibilities of the surface tension hypothesis of intercrystalline strength is by no means unnecessary.

In much the same direction lies the weakness of Prof. Howe's criticism, and

This paper was presented at a recent meeting of the British Iron and Steel institute.

of his attempt to explain the remarkable strength of the crystal boundaries simply by the change in direction of the gliding planes upon which slip occurs on passing from one crystal to the next. Such a viewpoint is sufficient to explain several important facts, as, for instance, the increased resistance of the metal to the commencement of plastic deformation as the crystals become smaller, a fact which shows that empirically the elastic limit is proportional to $n^{1/3}T$ where n is the number of crystals per unit length. Some defects of this hypothesis of Prof. Howe's, however, lie firstly in the fact that again no explanation whatever is given as to why the crystals do not fall apart under even the smallest stress, and secondly in the failure to account for the perfectly definite dependence of the elastic limit of the metal upon its surface tension, a relationship abundantly shown in Fig. 3. The curve alone appears to the author to demonstrate beyond doubt the fact that the surface tension of a material is one of the factors which determines its elastic limit, and an exceedingly important one at that.

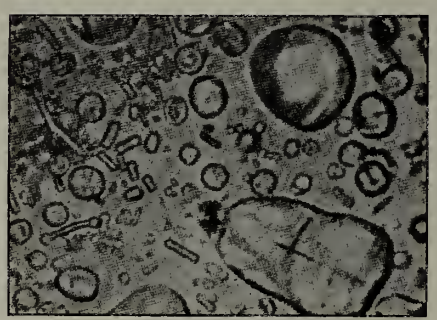


FIG. 2—CRYSTALS OF PARAAZOXYANISOL

In this connection, since it also satisfies Prof. Howe's second criticism, we may perhaps consider very briefly the reason for the dependence of the elastic limit upon the size of the crystals, when theoretically:

$$E = \frac{2T}{d}$$

where E is the elastic limit,
T is the surface tension,
and d is the thickness of the amorphous films,

a formula which does not involve a function depending upon the crystalline size. As Prof. Howe has pointed out, the cutting in two of a wooden bar, and the gluing together of the pieces again with an infinitely strong cement, does not increase its strength, since when broken the fracture finds another path. The analogy appears, however, to be somewhat defective when a crystalline aggregate such as a normal metal is considered. A truer one would be a criss-cross scaffolding, when the increased strength which accompanies a smaller lattice is readily understood. Such a picture does offer a true comparison, since on all crystal boundaries, except those parallel to the direction of an impressed force, there is found a resolved part of the surface tension attraction equal to $\frac{2T}{d}\cos\theta$, where θ is the angle between the boundary and the direction of the force. A tensile strength therefore may be assumed in each of the members of the scaffold, and hence in the scaffolding itself, which latter will become stronger and stronger as the number of poles forming it increases.

Relation of Density to Tension

Having thus seen that some such additional factor as surface tension is required in a presentation of an explanation of all the facts concerning the strength of aggregates of metallic crystals, we may proceed to a consideration of the objection raised that a surface tension of any magnitude cannot be expected between a crystal and the amorphous form of the same material, since the density of the two are almost the same. That difference of density is not the chief cause in determining the magnitude of an interfacial tension, is readily seen from the fact that at 20 degrees Cent. the interface tension of water and olive oil, the density of which is 0.914, is 20.56, a high value for such substances as oil, despite a density difference of only 0.086.

There are, however, abundant proofs that a surface tension of high order is found between the crystalline and amorphous modification of the same pure substance, and the following three examples chosen from several available ones may suffice.

Examples Offered as Proofs

Fig. 1 illustrates dendrite of lead withdrawn from the residual liquor during solidification. That surface tension between this and the liquid metal at the same temperature has been at work is evidenced by the rounding off the angles. The conditions at the crystal boundaries in a solid metal are strictly analogous to those here obtaining, when an appreciable surface tension is equally to be assumed. Tin and aluminum are other metals in which rounded dendrites are formed.

The second justification is supplied by a study of the liquid crystals. In many of these, as has been shown time after time, the external crystalline form is obliterated by surface tension forces, and a more or less spheroidal one is assumed. This occurs when the drops are suspended in the non-crystalline liquid of the same composition, temperature, state of aggregation, and closely identical density. Fig. 2 shows such crystals of paraazoxyanisol. Le Chatelier has drawn attention to the close analogy which exists between the growth of the crystals in a metal during annealing, and the coalescence under surface tension of liquid or plastic crystals, as a result of the common tendency to attain that state with the minimum surface energy.

Further confirmation may be drawn from an entirely different direction. As the state of division of a substance becomes finer, and the amount of surface increases, effects due to surface tension become more and more striking. Thus as Ostwald and Hulett have shown, the solubility of a substance is dependent on the size of the particles, and the phenomenon has been used for measuring the surface tension of substances in the solid state. The values so determined for calcium and barium sulphates are 1100 and 4000 dynes per centimeter, respectively, which are of great interest in showing the very high values of this constant in solids. For the solid metals, arguing from the very high value of the constant for liquid mercury compared with other liquids, the surface tension may be expected to be considerably higher still. It is, however, the effect of the surface tension of a solid upon the melting point which supplies the third proof of its effectiveness between the crystalline and non-crystalline forms of the same substance. It has been shown that granules of salol with a surface of 230-1300 μ^2 have a melting point 2.9 degrees Cent. lower than particles with a surface 100 times greater, that is, whose diameter is 10 times as great, a lowering produced by surface energy between the crystalline and non-crystalline.

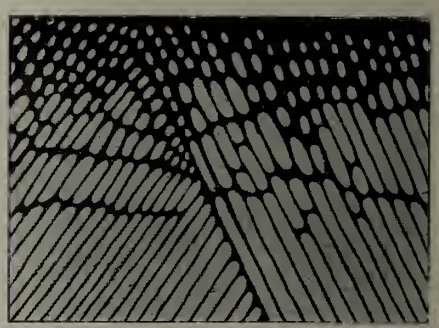


FIG. 3—ELASTIC LIMIT AND SURFACE TENSION ARE CLOSELY RELATED

The assumption of a surface tension in solid metals between the crystalline grains and the amorphous intercrystalline films is justifiable, nor is there reason to limit its value to a small magnitude. The criticism leveled against the surface tension theory of the elastic limit on that account, there-

fore, finds a completely satisfactory reply.

It now becomes of great interest to determine to what extent the application of the hypothesis to the more practical aspect of metallography yields valuable results. The complex changes which practically pure iron undergoes on recrystallization after cold work offer excellent scope for such an inquiry.

Work on this subject by Charpy, Le Chatelier, Sauveur and Chappell has resulted in elucidating the following facts: When iron is plastically deformed, by, for instance, pressure from a Brinell ball, though bending or other forms of stress yield corresponding results, and then annealed at temperatures from 650 degrees Cent. to 870 degrees

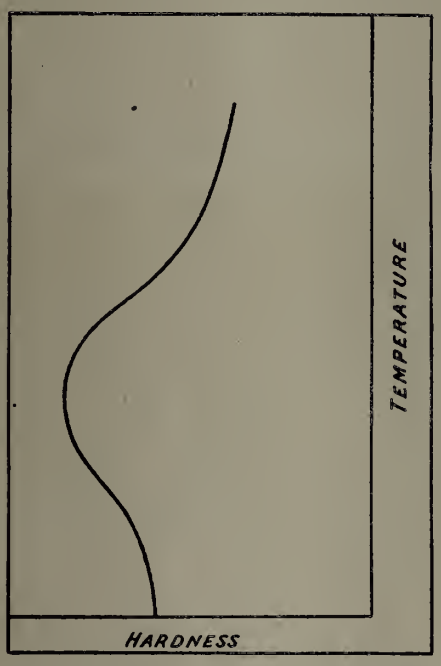


FIG. 4—THEORETICAL COURSE OF THE INFLUENCE OF TEMPERING UPON AUSTENITIC STEEL

Cent., a section cut through the center of the depression reveals three well-defined zones. In that nearest to the surface, in which the stress attained its maximum intensity, and in that farthest away, where the elastic limit was not reached, or but little surpassed, the size of the crystals is more or less unaltered. Between these two areas, however, an exceedingly coarse crystallization obtains, which is sharply localized where it comes against the least strained zone, but merges more gradually into the over-strained portion. This of course would not have been expected, it being reasonable to assume that any change induced by the deformation would be proportional to the distortion undergone.

Several explanations of the facts have been suggested, but since they are all, with the exception of that of Robin, insufficient and doubtful, they need not be considered here. The question is further complicated by the fact that, as shown by Chappell, recrystallization actually commences in the surface zone of greatest stress before it does in the middle one, in which, therefore, the rate of growth must be very greatly accelerated once it has commenced.

Action of Surface Tension Forces

Before proceeding to show that the application of the hypothesis of surface tension forces between a crystal and the surrounding vitreous modification is capable of reducing to order the whole series of results, it may be well briefly to recall a few fundamental facts regarding the action of such surface forces upon exceedingly small particles.

If a bubble of vapor of radius a is immersed in a liquid, the surface tension of which is T, the pressure within the bubble is greater than that outside by $\frac{2T}{a}$. For small values of a, this excess is very considerable, and on heating, the temperature must often be raised much above the boiling point before expansion of the bubbles can occur and the liquid boil. When this does happen, it does so suddenly and with violence, or, as it is usually termed, the liquid "bumps." The introduction to the liquid of a porous material containing air, by providing air-bells already of considerable size, eliminates this period of quiescence and normal boiling ensues. The converse process, the formation of drops of mist from a supersaturated gas, is equally important. In a dust-free atmosphere a high degree of supersaturation is required to produce a mist on account of the great tendency to evaporation of very small drops, another example of surface tension. Where, however, dust nuclei are present on the comparatively large surfaces of which dew can be formed, the production of mist is an easier process. In both these examples, it is in the case of the smallest globules when boiling or condensation is on the point of initiation that the inhibitive effects are so obvious. Once this stage is passed both proceed along more nearly normal lines.

Assumption Necessary

To apply these phenomena to the recrystallization of ferrite plastically deformed, one assumption only need be made, which, moreover, is so reasonable that it may be regarded as almost axiomatic. It is assumed that the effect of severe distortion in the cold is to reduce the originally crystalline aggregate to a debris of small remains of crystalline matter embedded in a vitreous matrix. This of course is Beilby's view, and his diagram, Fig. 3, so exactly illustrates the condition that it is here reproduced. A less severe deformation of the mass results in a localization of the effects. There is no longer a uniform crushing, the disturbance occurring to the greatest extent in the neighborhood of the planes upon which motion has occurred, while there exist in between islands of unchanged crystalline matter which grow as the strain becomes less and less until they constitute the whole mass. This increase in size necessitates of course a corresponding decrease in their number.

On reheating such a deformed material the tendency is for the crystal islands to grow again at the expense of the vitreous portion. Now in ex-

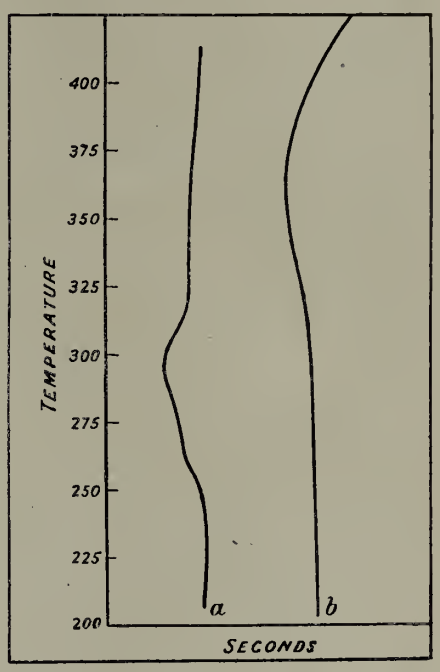


FIG. 5 — HEATING CURVES OF TWO STEELS DETERMINED BY (*a*) ARNOLD, AND (*b*) OSMOND

actly the same way that the liquid would not boil, that is, that small bubbles could not form and grow, and that the condensation of small drops of dew did not form in the supersaturated dust-free air, so it is reasonable to assume that the forces of surface energy prevent the growth of the smallest islands in the most severely deformed metal. Thus Chappell has shown that the disintegration of deformed ferrite crystals tends to occur at so low a temperature as 350 degrees Cent., as shown by markings which occur in the crystal on etching, but not until 500 degrees Cent. or over is reached is there visible change in the external boundaries or in newly recrystallized areas within the original crystals. When, however, this new crystalline growth from the crushed matrix does commence it proceeds with really remarkable rapidity, and at 570 degrees Cent. the crystal debris had



FIG. 6—MAGNIFIED 500 DIAMETERS

disappeared, a complete recrystallization having occurred, the new crystals henceforward growing steadily and normally up to the point Ac_3.

A Close Analogy

Now it may at first sight appear to many a very far-fetched analogy to compare this process of recrystallization of ferrite to the bumping of, for instance, sulphuric acid, but it is in reality exceedingly close, and since we have already seen that surface tension must be regarded as existing between the crystals in a metal, and since it is to a manifestation of surface energy that the irregular vaporization of the bumping liquid is certainly to be ascribed, both in its cause and in its effect, does the recrystallization of deformed ferrite appear to be a similar one. As Chappell remarks regarding the crystalline growth in deformed ferrite, once this has been initiated, "another conspicuous feature of the growth of deformed ferrite crystal is the rapidity with which union takes place."

Having thus seen that the hypothesis of surface tension between the crystals of a metal does afford an adequate explanation of the general conditions of



FIG. 7—*A*, COALESCENCE CEMENTITE GLOBULES UNDER SURFACE TENSION — *B*, BREAKUP OF Fe_3C PLATES UNDER SURFACE TENSION

crystalline growth when the plastically deformed mass is annealed, we may apply it further to explain the remarkable coarse structure produced as a result of reheating to 650 to 900 degrees Cent. after certain stresses. It has been abundantly proved that the recrystallization of a cold-worked metal does not occur by a simultaneous recrystallization throughout the mass, but by the growth of certain isolated grains specially favored. A satisfactory explanation of the reason that certain nuclei receive a preferential treatment will afford the key to the complex phenomena now to be considered. We have already seen that one of the effects of surface tension in iron is to prevent the growth of very small crystals—since it is in these that its action is most powerful—until at any rate a temperature is reached much above that at which it would otherwise commence. Further, the size of the crystal islets influences the result appreciably. Just as the solubility of calcium and barium sulphates, that is, the passage from crystalline to non-crystalline, increases as the particles become smaller, so does the tendency for growth of the ferrite remains decrease as they become smaller. It is, therefore, those ferrite particles of the greatest size which have survived the deformation which begin to grow again most rapidly when the minimum annealing temperature is reached. This has been realized for some time, but its essential dependence upon the forces of surface energy has not been so widely recognized.

Analysis of Phenomena

Now reverting to the fine superficial, the coarse-grained intermediate, and the unaltered most distant zones of the annealed Brinelled sample of iron, the first has its crystalline islets all very small and of more or less the same size. Thus, in the first place, the inhibitive effect of surface tension on recrystallization will be a maximum, while in addition the crystalline residues from which regrowth must start will be exceedingly small, very numerous, and of fairly constant size. The conditions, therefore, are all such as will result in a large number of small crystals on annealing. Passing on to regions less and less severely disturbed, islands will be retained which become gradually larger and larger, though around them along cleavage planes the finely committed crystal debris will be found as before. Such larger areas of crystalline material will, as we have already seen, grow preferentially, the matrix being deposited on them when recrystallization occurs. Hence, as they gradually increase in size, this fact of itself, and also as a result of their greater rarity and effectiveness as nuclei, will tend to produce crystals of gradually increasing dimensions in the annealed state. As we have seen, the passage from the small superficial crystals to those of the coarse band is gradual and not abrupt, which is as it should be on the surface tension hypothesis. Further, the smaller the strain to which the material has been subjected, provided of course that the yield point has been surpassed, the coarser will the structure of the annealed metal be. This, however, cannot go on indefinitely, since only when the elastic limit has been exceeded is there any debris along cleavage planes, and at the crystal boundaries, to cause crystal growth by their union with the unchanged parts. Hence from about the yield point another zone of essentially unaltered crystallization is found.

Explanation is Complete

A very complete explanation is thus afforded of the triple nature of the annealed structure, but the surface tension theory will carry the subject further and the influence of the temperature of annealing can be accurately predicted.

At temperatures below a certain minimum the viscosity of the material will obviously preclude the possibility of any regrouping of parts. At higher temperatures, however, a point is reached at which the difference of solution pressure between the minute crystal remains of the crushed debris, and the larger unchanged crystalline islands will assume such a value that growth of the latter at the expense of the former will occur. This growth, however, will, in its earliest stage, occur only where conditions are most favorable, that is, where there remain a comparatively small number of crystalline parts of fair size embedded in a considerable quantity of crushed matrix. The coarse-grained material found after annealing is therefore strictly localized, and only material subjected to just such a stress as to yield this condition will show marked growth. Thus it is that Sauveur, using the low temperature of 650 degrees Cent., was led to postulate a critical stress as necessary to cause the coarse crystalline growth, only a very narrow margin separating material in the ideal condition for growth from that which is too slightly, or, on the other hand, too strongly deformed. As a higher annealing temperature is utilized, however, less favorable structures are rendered sufficiently mobile to reform and thus produce a grain growth, and regions stressed to a widely different extent take part, the critical stress disappearing, as Chappell showed beyond doubt.

The foregoing explanation, based on fully established facts regarding sur-

face tension, is quite independent of any special property of iron. It should therefore occur, if the hypothesis be true, that a corresponding coarse grain growth should be found under suitable conditions in other metals. That Robin has observed this in many metals and alloys is, therefore, exceedingly valuable confirmatory evidence. The explanation put forward by that investigator is exceedingly like that given here, lacking, however, the consideration of the effects of surface tension as operating in (*a*) retarding the commencement of growth in the over-strained part until a comparatively high temperature is reached, (*b*) in determining the influence of the size of the large crystalline residue, and (*c*) in determining the effect of the temperature of reheating.

This subject has been treated in great detail on account of the remarkable confirmation which it supplies to the fundamental idea that there does exist a surface tension between the grains of ferrite. It is inconceivable that if the basis idea were erroneous the conclusions arrived at should coincide so absolutely exactly even in the smaller details with experimental discoveries. The recrystallization of deformed iron is further an instance of great industrial importance in which the value of the theory is evident.

Effects of Surface Tension on Steel

Recent results obtained by Professor Howe on the coalescence of ferrite and cementite needles and cell walls into more rounded patches as a result of annealing have already been ascribed, with perfect justification as the author believes, to the influence of surface tension in tending to reduce the area of contact of the different phases present. Thus Prof. Howe remarks: "The network system is a transient arrangement. Surface tension is always striving to break it down, and in the end to assemble all the cementite in one mass and all the ferrite in another."

Sulphide inclusions in steel exhibit well the effect of surface tension in rounding their outlines so that in the cast state they are in general perfect spheres. From the point of view of the present paper, however, their effects in other directions are even more interesting. In the literature of metallurgical research terms such as "nucleus," "germ," etc., are exceedingly common. The influence of nuclei are often of paramount importance, but it does not appear to have occurred to many writers that their modus operandi is evidence of surface phenomena. It has been already noticed that it is often impossible for drops of liquid to form in a supersaturated, dust-free vapor on account of the profound influence of surface tension upon very small drops, while under ordinary conditions dust particles present offer an already considerable surface for condensation. In much the same way do nuclei facilitate by their presence the initial stages of the precipitation of the new phases. This fact has probably something to do with, for instance, the falling out of cementite from a supersaturated steel on cooling from above the cementite line at the crystalline boundaries, since here the impurities may be supposed chiefly to find lodging. The particular example of this influence of immiscible impurities which will here be considered is the effect of manganese sulphide and slag in determining the banded structure of, for instance, a boiler plate. When such a steel cools down to Ar_3 there is the tendency for the precipitation of ferrite. Now in the complete absence of all extraneous material the difficulty for the precipitation of the first particle of this of almost molecular size would be as a result of surface tension forces very great. The difficulty, however, is removed if there is available a surface already of appreciable size on which ferrite can be deposited. As Brearley has shown experimentally the sulphide or slag rods do afford such surface, with the result that around each such non-metallic inclusion a thick envelope of ferrite forms, leaving the spaces between to be filled up with pearlite. The banded structure of such a steel is thus absolutely determined by surface tension phenomenon, and affords another excellent illustration of the profound importance of this property of matter in its practical application. This explanation meets fully the objection raised by Prof. Howe to Mr. Brearley's interpretation of facts. Prof. Howe asks: "By what piping does this Pied Piper entice the ferrite from within the austenite, draw it across considerable distances, and enwrap itself in it as in a garment?" The ordinary course of diffusion together with the surface tension effects thus afford a complete answer to this question.

Effects of Tempering

The explanation of the properties of hardened steels and of the effect of tempering upon them in one direction in which it is obviously of interest to apply our hypothesis. As will be shown, it is capable of yielding exceedingly suggestive results and of explaining a wide range of facts without, moreover, resorting to assumptions such as that of interstrained iron made by McCance, or of the influences of crystal twinning of Profs. Carpenter and Edwards.

Perhaps the most direct way of approaching the subject is by considering some results contained in the paper on "The Magnetic and Mechanical Properties of Manganese Steel," by Sir Robert Hadfield and Prof. Hopkinson. Briefly it was there shown that the effects of reheating an "austentic" manganese steel was to render it increasingly magnetic, hard, and brittle.



FIG. 8—MAGNIFIED 500 DIAMETERS

The following table gives a few of the typical results obtained:

Treatment	Specific magnetism	Hardness No.	Angle of bend
W. T.	*	207	180†
400° Cent. for 6 hours	0.2	340	12
450° Cent. for 48 hours	7.0	418	1¼
500° Cent. for 60 hours	42.0	444	nil

*Non-magnetic.
†Unbroken.

A Duplex Constitution

It is now usually considered that in austenitic steels such as the manganese one under consideration, the carbon is in a state of perfect solution. Now there can be little doubt that the explanation of the structure of "hardenite" or "martensite" given by Prof. Arnold and Dr. McWilliam is correct. This explanation is based upon the well-known tendency for ferrite or cementite, as the case may be, to fall out of solution during even the most rapid quenching in the case of ordinary steel, especially upon the cleavage planes, which are therefore emphasized, and in certain cases give rise to the interlacing needle-like structure which by some has

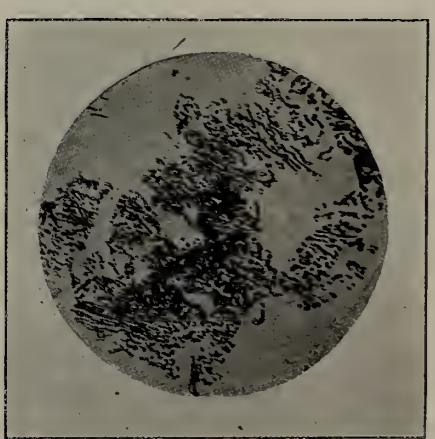


FIG. 9—MAGNIFIED 500 DIAMETERS

been considered to be characteristic of this constituent. Without dwelling further upon the origin of the structure there is every reason to believe that it is no longer homogeneous as in austenite, but duplex with unaltered solid solution and precipitated ferrite or carbide microscopically beyond recognition. In Hadfield and Hopkinson's manganese steel a series of "interlacing lines" was noted in the reheated hard samples. Now such micrographic change, which form a homogeneous solution yields a duplex constitution, results in the formation of a most intimate series of boundaries at each of which surface tension must make itself felt, with the result that a strong scaffolding begins to strengthen the mass with a consequent increase of hardness. Further, this increase must be in some manner related to the extent of the micrographic change, or in other words, to the duration and temperature of the annealing, as the tabluated results clearly show.

The general hypothesis would also, however, suggest that the increase in the hardness produced by the reheating should not be without limit. When a more or less complete resolution of the "austenite" into its constituents has occurred and further annealing tends to produce coalescence of the already formed particles (the troostitic stage), the surface area between the constituents across which attraction can occur is a maximum, and thereafter decreases. Hence it should be possible to produce to a certain extent at any rate a softening by further heating beyond that point which yields the maximum hardness, a fact, however, which was not observed during the greatest time used.

Two other points arising from the work performed for this research are of interest. The explanation of the structure and properties of hardenite does not in any way depend, being physical and not chemical, on the actual chemical composition, and it is therefore of interest that in replying to the discussion on their paper the authors say "those figures suggested that the change in carbon did not appear to play an important part in the change in the quality of the material from non-magnetic to magnetic condition." Almost the same explanation is available in other cases than that of hardened steel to account for similar changes in properties due to the partial break-up of a solid solution as occurs in several of the copper alloys, for example, copper-aluminum.

The second point arises from the statement of Hadfield and Hopkinson, where "it was suggested that the important part in the treatment was probably the speed of cooling rather than the prolonged heating which preceded it." Such a result is entirely in accordance with, and indeed might have been deduced from, the surface tension hypothesis of the increase of hardness, since an annealing above the critical range, where no decomposition occurs, can yield no surface of separation at which surface tension can act. Further, as the extent of the decomposition of the solution increases with time, this factor is of vital importance in determining to what extent the necessary surfaces are produced.

It is necessary to add very little to the foregoing to explain the properties of an ordinary hardened carbon steel upon the same basis, since the same series of changes are undergone though at a greatly increased rate, and the influence of tempering may be equally readily understood. Starting with a steel in which the whole of the carbon is in complete solution, the form usually designated "austenitic," we have already followed the first change which results in a partial decomposition, hardenite being formed, with, as a result of attractions set up at each surface of separation, a greatly increased hardness. The hardness becomes a maximum under the theory when the greatest surface is present. A further tempering, however, producing growth in the products of the disintegration of the solution, reduces the maximum surface area and hence softens the material. In Fig. 4 is shown the theoretical course of the influence of tempering upon an austenitic steel which will be compared with the actual curve as soon as conditions allow.

Influence of Alloys

Passing on to a brief consideration of the influence of the presence of special elements in the steel, it was mentioned in the earlier paper that the refining influence of nickel, manganese, vanadium, tungsten, or chromium upon the structure of a steel was readily explicable on the assumption that surface tensions existed between each grain and crystal. That the growth of crystals upon annealing is the result of the tendency of such surface forces to diminish the areas across which they act is almost beyond doubt. It is a hypothesis which has been frequently used, and is merely a special instance of the general tendency of a system to assume the form with the minimum potential energy.

Now if the elements mentioned act as impurities often, though not invariably, do, and lower the surface tension between the crystals, then that very factor, which actually determines growth is less effective, and for similar treatments the structure of the special steel will be finer than that of a plain carbon one. Since, further, the lowering of the surface tension increases as the quantity of the added "impurity" increases, the grain refining action will, within certain limits, increase with the amount of the special element present. At any rate in the case of the nickel steels this is an established fact.

It is, however, possible to follow the arguments in a further and exceedingly important direction. Not only does such a theory offer a rational explanation, so far as the author is aware for the first time, of the refinement of the crystalline size brought about by the addition of certain elements, but it indicates that the same additions, and for a similar reason, increases the resistance of the steel to tempering. In Fig. 5 are produced the heating curves of two steels determined respectively by (*a*) Arnold and (*b*) Osmond. Curve *a* was obtained on a hardened steel containing 0.89 per cent carbon and 0.09 per cent manganese, while the material on which curve *b* was determined contained 0.23 per cent manganese. The retardation produced by even 0.2 per cent of manganese on the evolution of heat which occurs when the velocity of tempering reaches an appreciable value is readily apparent.

There are two instances of immense practical importance in which this idea affords an absolutely new light. In the first case, as we have already seen, the effect of the special element which lowers the interfacial tensions in retarding the change and growth which accompany a tempering action increases as the quantity of that element is increased. We have also already seen that manganese, as far as it is at present possible to judge, exerts such an influence upon the surface tension. It is therefore reasonable to expect that where a sufficient content is present to exert its full influence no appreciable resolution will occur even on ordinary air cooling, or in metallographic terms the steel is austenitic. In both high nickel and high manganese steels this is found. That the explanation of the curious nature of the Hadfield manganese steel is due to such a slowing up, as distinct from a total suppression, of the change from the solution to the pearlite state is clearly shown by the fact that, as Hadfield and Hopkinson have shown, the Ar_1 point is still present about 674 degrees Cent. even with 12½ per cent of that element.

The Inland Steel Co. has placed a contract with Freyn & Co., engineers and contractors, Chicago, for a Brassert gas washer and dryer unit for No. 2 blast furnace at the Indiana Harbor plant.

Testing Efficiency of Gear Drives

Close Determination of the Efficiency of Gear Drives is Obtained by the Direct Measurement of the Loss of Power—Practical Application of the Method to a Bevel Gear Test

BY C. M. ALLEN AND F. W. ROYS

APPARATUS for determining the efficiency of gears and other drives recently has been developed and used for making tests in the mechanical engineering laboratories of the Worcester Polytechnic institute, Worcester, Mass. The fundamental principle of the apparatus embodies the direct measurement of the loss of power in the gear drive instead of determining the input and output and subtracting one from the other.

Since the efficiency of properly made geared drives is relatively high, the input and output are nearly equal, and any small errors in the measurement of these relatively large quantities will make a large per cent error in the difference, which is the power loss. It is therefore evident that a method by which the loss may be measured directly and independently of the input and output will be much more accurate.

Apparatus Used in the Tests

The apparatus which was used in the tests may be described as follows: An electric induction motor is hung in a cradle on double roller bearings, and an arm attached to the motor casing makes a cradle dynamometer. The motor shaft is connected directly to the drive shaft and an Alden dynamometer is put on the driven shaft. These dynamometers are so arranged that the force exerted by the end of the arms is downward. The arms of the dynamometers are of equal length and at the end of each is a fixed knife edge. A lever with three knife edges mounted upon it has the two outer knife edges adjusted so that the distance between them is equal to the horizontal distance between the dynamometer knife edges. The third knife edge divides this distance into segments whose ratio to each other is the same as the gear ratio. These three knife edges lie in the same straight line. The lever is now placed directly over the line between the dynamometer knife edges, and is supported by the third knife edge which rests on platform scales. The end knife edges of the lever are connected to the dynamometers in such a way that the high-speed dynamometer is connected to the long arm of the lever. A counterweight and a rider weight are mounted upon the lever. The layout of the apparatus is shown in Fig. 2.

The method of testing, so far as the operation of the lever system is concerned, is identical for all tests. The center of gravity of the Alden brake is nearly in the horizontal plane, so that a slight movement of the arm does not measurably affect its balance. The cradle dynamometer was so loaded that its center gravity was only a short distance below the shaft center, and a load of two pounds at the end of the arm was enough to entirely upset its equilibrium. The lever was then placed in position as described above and statically balanced by means of the counterweight shown in Fig. 2. A long pointer attached to the lever showed the position of the system relative to the initial condition of balance.

When the rider weight W was in its initial position, the load P_3 (Fig. 2) was noted as the initial reading of the platform scales.

The variables entering into the balance of this apparatus are then the forces P_1, P_2 and P_3, and the displacement of the rider weight. P_3 may be measured at any time while the apparatus is in operation, as also may the displacement of the rider weight. It should be noted that the amount of P_3 has nothing to do with the calculation of the power loss, which is found as follows:

It will be seen from the preceding description and from Fig. 2 that $P_1x = P_2y$ for 100 per cent efficiency; but since the efficiency is never 100 per cent, P_1x must exceed P_2y by the amount necessary to overcome the loss in moment. This difference immediately upsets the balance of the lever, of course, but equilibrium may again be restored by shifting the position of the rider weight in the proper direction. This displacement of the rider weight is therefore a measure of the change of moment, and when corrected for the speed of the apparatus it is a measure of the power loss.

Apparatus is Efficient

Here the input power is automatically balanced against the output, any change in the latter is immediately taken care of by the motor, and it is impossible for the apparatus to be out of balance except by the amount of the transmission loss. This is the feature of the method which distinguishes it. The power transmitted by the drive may be computed by noting the change in the load P_3 on the platform scales.

In operating it was found necessary to start the apparatus and let it run for several minutes before taking note of the initial position of the lever. The zero reading was frequently checked during the period of testing. The details of a test of a bevel-gear drive indicate the method.

Test of Bevel-Gear Drive

The gears were 5 per cent nickel steel, case-hardened, five pitch, 1½-inch face. They were cut by the Brown & Sharpe Mfg. Co., Providence, R. I., and were mounted on ball bearings especially designed for testing purposes. Following are the preliminary data employed:

Number of teeth in gear	52
Number of teeth in pinion	14
Ratio, 52 ÷ 14	3.714
Total length of lever between outside knife edges (see Fig. 1), feet	3.95
Length of long arm of lever, inches	37.344
Length of short arm of lever, inches	10.056
Length of dynamometer arms, inches	31.5

A force of two pounds at 31.5 inches is equivalent to 1-horsepower at 1000 revolutions per minute, for which the expression Z will be used.

Referring to Fig. 1, a force of 2 pounds at $P_1 = Z$. Therefore 2×37.344 = the inch-pounds of moment in lever necessary for Z, and if the rider weight is three pounds, then for this to balance Z, $3x$ must equal 2×37.344, whence $x = 24.893$, and therefore a movement of 24.893 inches of the rider is equivalent to Z for a three pound rider.

If the rider weighs but 1½ pounds, then the same displacement means only ½ Z. A paper scale was made according to these figures and was fastened to the lever. The readings for horsepower loss were taken from it throughout the test.

Referring to Fig. 1, since the initial load of P_3 was taken with the rider weight W already on the lever, a change in the position of W does not change P_3, but merely changes the moment. Therefore, in moment equations of the lever, regardless of where the center of moments is taken, the arm of the moment of W is always the distance from the zero position.

The force P_1 is a measure of the

Abstracted from a paper to be presented before the American Society of Mechanical Engineers at the spring meeting in Worcester, Mass., in June.

input power if the speed is known, and it is merely necessary to calculate this value in order to solve the problem Considering the moment equation of the lever, we have

$$0.838P_3 - 3.95P_1 + Wx = 0$$

whence

$$P_1 = \frac{0.838P_3 + Wx}{3.95}$$

If $W = 3$ pounds,

$$P_1 = 0.2122P_3 + 0.759x$$

if $W = 1.5$ pounds,

$$P_1 = 0.2122P_3 + 0.379x$$

x being the displacement of W measured in feet.

Referring to the accompanying table, for accuracy of recorded data the values in column 5 (x in feet) and column 10 (rider horsepower at 1000 revolutions per minute) should vary together, since they both refer to the displacement.

Column 10 is recorded for one purpose and read from the paper scale directly in horsepower at 1000 revolutions per minute, while column 5 is recorded for another purpose and the measurement is recorded in feet measured by an ordinary rule. It is necessary to read the values recorded in column 10 with as great accuracy as possible, but the approximate distance to the mean position as determined in column 10 is as close as it is necessary to record the values of column 5.

The values in column 10 after correction for speed give the total loss in power and become therefore the whole of the numerator of the equation for *loss* of efficiency, namely,

$$\text{Loss of efficiency} = \frac{\text{Horsepower loss}}{\text{Horsepower input}}$$

These values for horsepower loss are recorded to three significant figures, but the third is somewhat in doubt, and therefore the absolute accuracy is only through two significant figures.

In figuring horsepower imput it is necessary to use the value P_1, which is obtained by means of the equation $P_1 = 0.2122P_3 + 0.759x$, where x is the value in column 5. The maximum variation in feet from the mean position (column 10) is less than 0.1 feet,

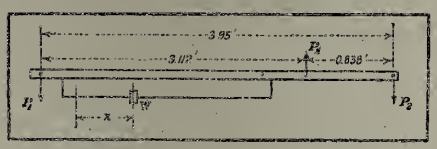


FIG. 1—DIMENSIONED SKETCH OF APPARATUS

but suppose that it was 0.1 foot; then column 5 might have been 1.8 instead of 1.7 as in the first recorded line.

To see what the effect of such a discrepancy would be, the following computations have been made, taking $x = 1.8$ and $x = 1.7$ respectively:

$P_3 = 200$; $0.2122\ P_3 = 42.44$

$P_1 = 42.44 + 0.759x$.

$= 42.44 + (0.759 \times 1.8)$ or $= 42.44 + (0.759 \times 1.7)$

$= 42.44 + 1.36$ or $= 42.44 + 1.29$

$= 43.80$ or 43.73.

As Z *input* $= \frac{1}{2} P_1$, then Z equals either 21.90 or 21.865, and

$$\frac{\text{Horsepower loss}}{\text{Horsepower input}} = \frac{\text{Rider horsepower at 1000 revolutions per minute}}{\text{Input horsepower at 1000 revolutions per minute}}$$

whence

$$\text{Loss or efficiency} = \frac{0.746}{21.90} \text{ or } \frac{0.746}{21.865}$$

It is thus seen that, measuring as accurately as possible, the numerator is only accurate to the second place, the third being in doubt; and that the second place in the denominator is sure, and the third fairly sure, although considered in doubt. Therefore the denominator is as accurate as the numerator.

The numerator is as accurate as the apparatus will allow data to be read, and therefore the inaccuracy of the data of column 5 has no effect on the final accuracy of the work.

In Test No. 1, the data of which are given in the accompanying table, practically no lubrication was used, the gears having been washed off with gasoline. Previous to this there had been oil and graphite on the gears, and some of the graphite still remained on the teeth. However, after running for a while they were practically non-lubricated. The three pound rider had to be used in this case because of the amount of the friction loss, which was sufficient to cause the gears to heat considerably.

The table presented herewith gives only a few of the results actually obtained, for the apparatus was started time after time and the balance by the rider gave the same results repeatedly.

The next test was made to see how much the efficiency would be increased with good lubrication. Accordingly some heavy oil and flaked graphite were mixed and used as a lubricant. The efficiency was so much increased that the 1½ pound rider weight was sufficient, and again it was found that the same results were obtained time after time. Later, after the graphite and oil had become more perfectly blended, another test was made.

The efficiency curves for these three tests are all given in Fig. 3. The difference between the results of non-lubricated and lubricated conditions is clear. The test with the more perfect blending of the lubricant showed results identical with the previous one, except as indicated by the dash line at the end of the upper curve. This showed that the lubricant was not squeezed out from between the teeth at quite so low a pressure.

The form of the curves and the con-

Data of Efficiency Test of Bevel-Gear Drive

PRACTICALLY NO LUBRICATION

R. p. m. of motor	Scale pan, lb.	P_3 lb.	$0.2122\ P_3$	x ft.	$0.759\ x$	P_1	Input, Z	Input, actual Hp.	Rider Z	Hp. loss	Output, Hp.	Efficiency, per cent
1	2	3	4	5	6	7	8	9	10	11	12	13
1115	5	200	42.44	1.70	1.291	43.731	21.86	24.37	0.746	0.832	23.532	96.6
1112	5	200	42.44	1.70	1.291	43.731	21.86	24.37	0.810	0.903	23.467	96.3
1112	5	200	42.44	1.70	1.291	43.731	21.86	24.37	0.770	0.859	23.511	96.5
1112	5	200	42.44	1.70	1.291	43.731	21.86	24.37	0.820	0.914	23.456	96.3
1119	5	200	42.44	1.70	1.291	43.731	21.86	24.37	0.806	0.899	23.471	96.4
1146	4	160	33.95	1.25	0.949	34.899	17.45	19.92	0.660	0.753	19.167	96.2
1146	4	160	33.95	1.25	0.949	34.899	17.45	19.92	0.615	0.702	19.218	96.5
1141	4	160	33.95	1.25	0.949	34.899	17.45	19.92	0.620	0.708	19.212	96.4
1143	4	160	33.95	1.25	0.949	34.899	17.45	19.92	0.612	0.699	19.224	96.5
1138	4	160	33.95	1.25	0.949	34.899	17.45	19.92	0.610	0.696	19.224	96.5
1160	3	120	25.46	1.00	0.759	26.219	13.11	15.14	0.486	0.561	14.579	96.3
1150	3	120	25.46	1.00	0.759	26.219	13.11	15.14	0.490	0.566	14.574	96.2
1150	3	120	25.46	1.00	0.759	26.219	13.11	15.14	0.486	0.561	14.579	96.3
1150	3	120	25.46	1.00	0.759	26.219	13.11	15.14	0.484	0.559	14.581	96.3
1172	2	80	16.97	0.62	0.471	17.441	8.72	10.25	0.316	0.371	9.889	96.4
1172	2	80	16.97	0.62	0.471	17.441	8.72	10.25	0.310	0.364	9.886	96.4
1177	2	80	16.97	0.62	0.471	17.441	8.72	10.25	0.308	0.367	9.883	96.4
1196	1	40	8.49	0.40	0.337	8.827	4.42	5.26	0.196	0.234	5.026	95.35
1196	1	40	8.49	0.40	0.337	8.827	4.42	5.26	0.204	0.243	5.017	95.35
1190	1	40	8.49	0.40	0.337	8.827	4.42	5.26	0.204	0.243	5.017	95.35
1205	½	20	4.245	0.37	0.281	4.526	2.26	2.72	0.184	0.222	2.498	91.9
1205	½	20	4.245	0.37	0.281	4.526	2.26	2.72	0.184	0.222	2.498	91.9

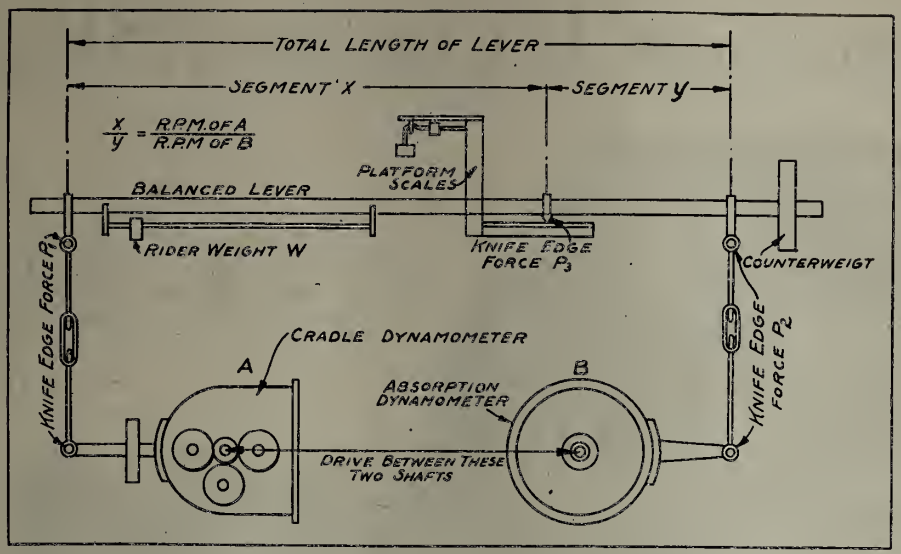


FIG. 2—GENERAL LAYOUT OF TESTING APPARATUS

sistency of the readings convinced the experimenters that reliable results had been obtained. It is accordingly concluded that this apparatus will measure accurately the efficiency of any positive shaft drive where both shafts are rotating at constant speed.

Finish Artillery Course

The training course for ordnance field service, which was started at the University of Pittsburgh last October and which was taken over by the war department in January, has been closed and the men under training have departed for Camp Hancock where all instruction in ordnance work has been centralized. Dr. J. T. Holdsworth, dean of the school of economics, has received a letter from Brig. Gen. W. S. Pierce, acting chief of ordnance, thanking him and the university for helping in training ordnance men. Lieut. John S. Keir has been in charge of the school.

Lets Oven Contract

The Citizens Gas Co., Indianapolis, has let a contract to the Wilputte Coke Oven Corp., 6 Church street, New York, for the construction of 40 Wilputte by-product coke ovens and erection of extensions to its existing by-product and benzol plant. Work has been started on the new plant and it is expected to be in operation by December, 1918.

Milwaukee to Build Ships

Steel, wooden and concrete ships are to be produced at a yard established in Milwaukee harbor by leading manufacturers and business men of that city. The Wisconsin Shipbuilding & Navigation Corp., with capital stock of $5,000,000, evenly divided into preferred and common shares, has been organized by Paul E. Thomas, president and general manager, Kempsmith Mfg. Co., Milwaukee, milling machines; Carl C. Joys, Vance & Joys, vessel agents; Alva P. Kletasch, Philip Schwab, George A. Schroeder, Paul Kremer, Dr. A. J. Puls, all of Milwaukee, and Frank W. McNeal, New York, marine engineer and constructor. Offices have been established at 831-832 Merchants & Manufacturers Bank building, Milwaukee. Government standards of construction will be followed and ships will be built for Atlantic service to pass through the Welland canal. Shops and berths will be built immediately and facilities will be arranged to lay two keels at one time. The company probably will take advantage of an offer by L. J. Petit and Fred Vogel Jr., leading bankers o Milwaukee, for the free use of a 20-acre tract of land along the Kinnickninnick river or the duration of the war. For the present the corporation's efforts will be confined to steel ships since fabrictaing and erecting shops are in the immediate neighborhood and now are shipping vessel parts to far distant points. Others interested in the new company are: Theodore Vilter, Charles Allis, William W. Allis, George Johnson, Johnson Lumber Co.; Albert O. Trostel, Louis W. Bunde, W. H. Upmeyer, Fred E. Turner, Adam Bloedel, Albert Vogel, Gerlinger Steel Casting Co.; John F. Knight, Cleveland., and H. J. Bawden, New York, engineer of the Terminal Panama Steamship Co.

Start Huge Warehouse

Work on the mammoth warehouse and terminal to be erected for the government in South Boston, commenced recently. Major Charles R. Gow, with a staff of assistants, supervises the work for the government, while the construction work, the contract for which was awarded the W. F. Kearns Co., is being carried on under the personal direction of General Superintendent H. L. Hemmingway. Capt. Henry C. Weare turned the first spade of earth April 29, in the presence of a number of government officials, including Major-General Goethals, acting quartermaster general.

Hamburg interests are contemplating the founding of a Company of International Enterprise similar to the American International Corp. The capital stock will be nearly $5,000,000 subject to increase later. The corporation will lend financial assistance to German enterprises in foreign countries, possibly owning some of them rather than promoting export trade. This is regarded as a move by Germany to re-establish herself in the commerce of the world after the war.

The Swedish Ballbearing Factory, Goteborg, is constructing a factory for the production of gear wheels of the kind invented by Engineer Erik Wingquist.

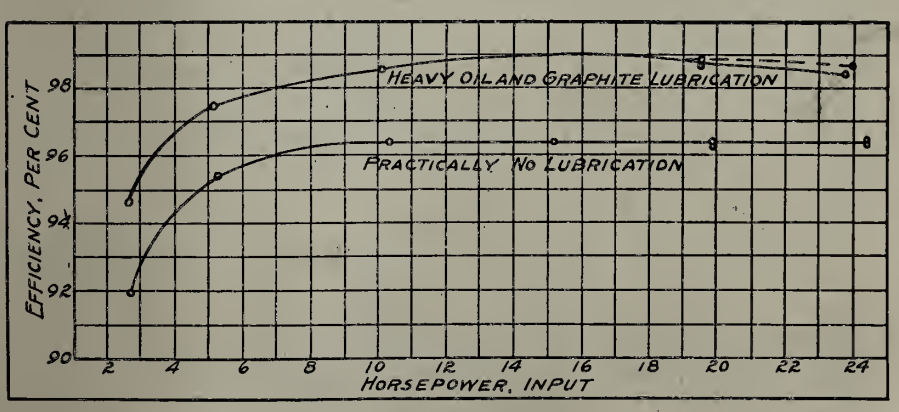


FIG. 3—HORSEPOWER-EFFICIENCY CURVES OF BEVEL-GEAR DRIVE

'Made in America' Guns and Shells

How the Midvale Steel and Ordnance Company is backing the men on the firing lines.

Eight-inch gun tubes, jacketed and awaiting the machining operations on the breech, outer surface and bore.





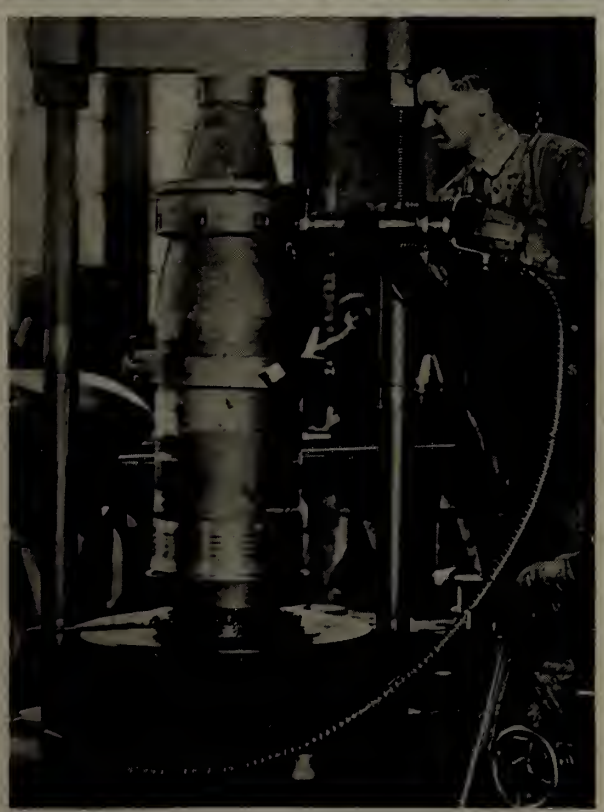
To the left is shown the threading operation on the breech end of the tube, while below a completed 8-inch gun is swung preparatory to the final assembling on the carriage.



Soon to Blast a Path to Germany

At the right a 14-inch shell is being forged under a steam hammer. Below is shown the capping operation on the same sized projectile.





Grinding and finishing the outer surface of a 14-inch projectile.



Released by the Committee on Public Information

German Wiles Gain Normandy Ore

Revelations of War Brings France to Realization of Harm—Its Native Mineral Wealth Was Exploited Against Its Own Safety—Billions of Tons of Iron Contained in Deposits Close by Paris

BY FRANCIS MILTOUN

Paris Correspondent of The Iron Trade Review

9 Rue Falguiere, Paris,
March 30, 1918

NORMANDY of the little cows is one of the most verdant, fertile fields of France. Its *sous-sol* is moreover lined with iron deposits of a vast extent. For centuries the local smiths, and farmers even, fused the ore and made a sort of home-made product in dribbling quantities ignoring its commercial possibilities. Then the Germans came and by insiduous means began to exploit the region, and the population round about was glad because of the money the operation put into local circulation. For every franc the German iron masters and mine exploiters put into circulation among the farmers of the cattle-grazing, butter and cheese-making districts of the old dukedom of Normandy they took a thousand back to Germany in their own ore boats from the ports of Caen and Ouistriham. It was all very subtle, and the French never paid attention or seemed to care, though they know now that this same iron by subtle processes of evolution has since been turned against their own plow shares in the form of German cannon.

Germans Made Initial Venture

The subterranean invasion of the boches into Normandy did not have the frankness of their operations in Lorraine where, as a result of the treaty of Frankfort, they shared the Briey and Longwy fields with France, rather the better and larger portion of it going to France. In the Orne and Calvados they went more slowly and less openly about their work, but the facts are out now, and it is time that they were made public throughout the metallurgical world.

This rich ore field in its first commercial development was purely a German venture. The French had forgot the traditions which had suggested that the sampling which had been done by their own people might be suggestive of a much more important development. The real exploitation of the region was just coming to its own when the war broke, though even then there were skeptics in the very region itself and in the iron trade circles of France. The Germans had even guarded the secret of their discoveries as to the extent and worth of these deposits and kept them for their own consumption.

Now France is coming to know herself. There are conservatively estimated 5,000,000,000 tons of excellent mineral almost immediately available, and to be had for the exploiting at a very moderate depth. This is the conservative estimate today and it may be greater as the German engineers Beyschlag and Krusch themselves estimated that the deposits would equal, if not exceed, 4,700,000,000 tons. Its average iron content is about 45 per cent. Thus it represents a theoritical holding of 2,250,000,000 tons of metallic iron lying almost at the very dooryard of Paris, and at least 250 miles from the frontier. It is practically free from any risk of invasion, whereas Briey and the Lorraine fields are today, as they have been since the first week of the war, still supplying German furnaces, at a cost of only that of the labor of extracting the ore.

In the five years previous to the war, powerful German firms had already planned for the complete absorption of these Norman iron deposits. Under the generic title of Gutthoffnungshutte was bound together the group of Krupp, through that of Thyssen. This German organization founded under French laws three mining companies—Société Miniere du Calvados, Société Française des Mines de Fer and the Societe des Mines et Carrières de Flamanville. At the same time, steps were taken to establish furnaces for smelting the ore on the spot and belching chimneys already had begun to punctuate the skies of the Parisians' favorite seaside playground of the summer months. It was a very efficiently organized scheme, and was destined to treat on the spot all possible operations—"all but the founding of cannon," says a French economist, one of the first to get his eyes open.

More German Intrigue

There was a well organized method in the consortium of the iron and steel trades of Germany to exploit these particular undeveloped fields of France. They evidently believed that the French were a troop of *gogos* who would fall for the fatuous appeal of a little cash spent in their midst, while the robbers were getting away with the bulk of the booty.

As early as 1910 three German companies were associated to carry the exploitation still further—the Phoenix, the Deutsch-Luxemburgisch and the Hoesch. They were to acquire and control the mines of Sainte André, the most famous of the Normandy group, coupled with those of Bully and Maltot. Looking for an intermediary in Paris they found a recently naturalized Frenchman, said to have acquired his nationality that he might act as stool-pigeon for this very purpose, who in his name bought the mine and organized a soi-disant French company, with a board of directors entirely French, but immediately after the organization all the shares were sold to the three German societies mentioned. It was then that Germany came to be the real master of the Norman iron fields, and by all possible means sought to relieve the French board of directors from all power of action, by compelling two of this board, Frenchmen above suspicion, to give their resignations whenever asked for.

French Are Duped

Chiefly these Frenchmen who were thus associated with the shady affair were naive local magnates, in some cases the landowners of the property on which the mines were located. Paid therefor in shares they were only too willing in most cases to turn them over to German purchasers to realize cash. This Societe des Mines de Saint André was thus able to shake off its French branches at the first opportunity in that the argument of cash for a director's shares was only to be made available for him upon his resignation, his forced resignation, no other. Germany then came to hold the cards and perform the functions of dealer. Uniquely it was German control and German capital and the product was solely destined for German uses, and this under the appearance of a company which in complexion and affiliations, and to a certain extent in personnel, was as French as the rich soil of the ancient provinces of old France which have furnished so much of natural *richesse* to one of the most

remarkable self-contained countries on earth.

Recently in the French press the cause of the development of these iron deposits of Normandy has found a champion in Leon Daudet, the editor of the *Action Francaise* and another in Maurice Barrés of the *French Academy*. The public, indifferent before, is now sitting up listening. Their efforts are worthy to rank with those of Engeurand on behalf of the recovery of the Basin of Briey. No more shall the *sous-sol* of France be exploited for the hegemony of the metal industries of Germany. There was a mystery of Briey as there was a mystery of Normandy, but the two seem apparently cleaned up once for all.

In all this time since the question of the Lorraine fields has been discussed as a war issue there has been but one sad note uttered in all the French press and that was by one Max Hoschiller. He has delivered himself of various screeds in one of the most conservative of French newspapers to the effect that the Germans have no need of the iron ores of Lorraine. No one seems to know what he means by this, nor can they follow his argument, but the fact shows plainly the underflow of current which metallurgy is playing in the great political and war game of Europe which to us in America can only be fully understood by coming at once to a realization of the prime necessity of the industry in the regime of peace to come.

"The Legend of the Basin of Briey" was an extraordinary phamphlet which should have been suppressed before its Russo-Austrian author had had the temerity to inflict himself upon the French public as a supposed authority. It is only fair to say, that neither in the *"Temps,"* in which his articles first appeared, nor in the *"Revue de Paris,"* are the arguments being longer presented, and it is the one big idea of all the French people today that the exploitation of their soil, whether above ground or below ground, belongs in the future to the French and the French alone. It is quite probable that they are right, for unquestionably the whole matter of international property rights is one which will undergo immediate revision as a result of the world war which has been inflicted upon us by Germany in an effort to impress its supreme will on the rest of the world who certainly does not need it—America and France least of all.

British Steel at High Mark

GREAT BRITAIN'S steel production in 1917 did not quite reach the 10,000,000-ton mark. But it was the largest in history by considerable margin. The total output of ingots and castings exclusive of crucible steel was 9,752,328 tons compared with 9,196,457 tons in 1916, an increase of 555,868 tons. Almost four-fifths of this gain was in basic open-hearth steel. The production of electric ingots and castings also showed a large proportionate increase reflecting the stimulus given to this branch of manufacture by the war demands for high grade material. Dr. Addison, formerly the minister of munitions, in an address before the house of commons, June 28, 1917, anticipated the year's increase in production when he stated that the total capacity had been increased to not quite 10,000,000 tons annually. He then stated that he would be greatly disappointed that if it did not reach 12,000,000 tons by the end of 1918.

Pig iron production in Great Britain in 1917 was enlarged by a fair margin over 1916 but still is considerably below its record for the years immediately preceding the war. The 1917 output of all grades including ferromanganese, spiegeleisen, ferrosilicon, etc., and direct iron castings was 9,420,254 tons. This represents an increase of 372,271 tons over 1914 when the total stood at 9,047,983 tons. It is however considerably less than the 1913 figure of 10,260,315 tons. The striking exhibit of the 1917 report is the sharp increase in the production of basic iron which corresponds to the growth of basic open-hearth steel manufacture. Foundry iron dropped off appreciably in 1917 from the preceding years. The statistics on the production of pig iron and steel for 1917 and for the preceding years is given in the accompanying table.

Electrical Society Visits McDonald Plant

A joint session of the Pittsburgh and Cleveland district sections of the Association of Iron and Steel Electrical Engineers was held May 18 at Youngstown, O., and was in the nature of an inspection trip to the McDonald and Ohio works of the Carnegie Steel Co. The McDonald plant is recognized as an important example of how efficient organization and co-operation assisted by executive administration may succeed in building up one of the largest and most modern steel mills of the day. Included in this plant are the following features: Six 8000 kilovolt amperes, 25 cycle, single phase, 4400-6600 volts, self-cooled, step down transformers, the largest of this type ever built.

The next meeting of the Cleveland district section will be held at Hotel Statler on May 25 when A. E. Hogrebe will give a talk on cranes. A special feature will be the dedication of a service flag. The next meeting of the Philadelphia section will be held on June 15 at Valley Forge.

Production of Pig Iron in 1917

District	Forge	Foundry	Basic	Hematite	Spiegel, Ferromanganese, ferrosilicon, etc.	Direct iron castings	Total
Cleveland	155,401	328,234	741,259* 538,754	700,518	89 201	9,686	2,563,143
Durham	1,635	3,636	848* 87,340	561,245	32,451	231	687,386
South and West Yorkshire	40,541	33,925	233,771	.....	.....	.....	308,237
Cumberland	.....	.....	.....	759,938	50,965	.....	810.903
Lancashire and North Wales.	17,044	12 007	233,083	388,148	110.811	792	759,685
Scotland	43,320	202,922	83,335	868,441	13,296	118	1,211,432
Midlands: (Derby, Leicester, Northampton & Nottingham)	318 217	390.452	192,613	.....	.....	6,903	908,185
Lincolnshire	48,593	13,868	502,988	.....	.....	116	565,565
South Wales and Monmouth	621	193	74,532	717,084	.....	950	793,380
North Stafford and Shropshire	141,990	59,656	166,108	.....	.....	313	368,067
South Staffordshire, Worcestershire and Wiltshire	97,307	118,089	227,931	.....	.....	944	444,271
Total 1917	864,759	1.162,982	3,082,562	3,993,374	296,524	20.053	9.420.254
Total 1916	899,467	1.418,824	2,290,549	4,042.014	291,845	105.234	9,047,983
Total 1915	1,024,063	1,573,575	2,272 684	3.564,276	255.484	103,577	8,793,659
Total 1914	3,369,516		2,002,500	3,225,403	326,354	.....	8,923,773

*Cleveland iron, sent in molten condition to steel works.

Production of Steel in 1917

	Bessemer Acid	Bessemer Basic	Open hearth Acid	Open hearth Basic	Electric Ingots	Electric Castings	All other steel castings	Total (Excluding crucible steel)
1917	1,059 281	602,265	4,413,843	3,421,170	57,156	11,693	186,920	9.752 325
1916	1,096,153	505,817	4,393,004	3,012,558	39,968	9,288	139,669	9,196,457
1915	821,408	479,816	4,090,752	2,958,968	20,000	2,000	177,071	8.550,015*
1914	797,072	482,444	3,680.848	2,874,749	.....	.....	.....	7,835,113*

*Includes crucible steel.

Trade Combines Under Webb Law

Legal Authority Who Aided Materially in Work of Framing Measure Setting Aside Anti-Trust Regulations in Foreign Trade Discusses Practical Methods for Realizing Benefits of New Law

BY GILBERT H. MONTAGUE

THE most vitally important fact to get fixed in mind in connection with the Webb-Pomerene bill is that after two conditions are met, there is almost no limit to what may be done in pushing the sale of American goods in foreign markets and in meeting competition abroad. What are these two conditions? They are merely that nothing be done to affect trade at home, and that no unfair methods be used against some outside American competitor, who is also engaged in American export trade.

The Webb act is merely intended to permit, in the American export trade, certain legitimate methods and arrangements that otherwise might be held to be in violation of the antitrust laws.

After meeting the two conditions above mentioned, the law was purposely designed to permit of the utmost elasticity in organization and operation. For this reason, it is impossible to lay down any ironclad rule for the guidance of procedure under it. Each branch of industry will have its own particular problems.

The best solution in some given situation may be a corporation or a partnership, or a common selling agency, or a nonexclusive agency or an individual sales agency, or a simple contract or understanding. It may be an arrangement that includes an entire industry, or one that includes only a few concerns or one that is limited to a single concern. It may require the apportionment of orders, profits, losses, business and territory or agreement regarding prices. In fact as long as the two conditions are satisfied there is practically no restriction on what may be done.

Companies Must Be Registered

Some members of congress insisted for a long time on an elaborate machinery to keep detailed check on every move of the export company. They finally agreed to compromise on the registration idea, however, placing in the government's hands data from which it may investigate complaints. This record will detail the names and locations of the companies forming the export corporation and all the facts about the organization itself, including names of officers, etc.

Undoubtedly it would have been simpler had understandings and combinations for export trade been permitted without the formality in all cases of a distinct organization, but I do not believe this provision will occasion any injustice or bring about severe hardship.



GILBERT H. MONTAGUE, counsellor at law, New York City, has had much to do in an advisory capacity with the movement extending over several years which led up to the enactment of the Webb-Pomerene bill. He served as counsel for the special committee of the American Manufacturers Export association, which was appointed at the time the bill was introduced in congress. He professionally advised and represented the committee while the bill was under discussion before the various committees of congress. In this connection he co-operated with representatives of other commercial and trade organizations and consulted with them from time to time regarding the advantages of the bill with respect to their own export trade. Mr. Montague was presented by President Wilson with the pen by which the latter signed the bill in recognition of his efforts toward putting the measure on the statute books in practical form.

It is to the class including chiefly smaller manufacturers which have no established foreign trade that the Webb law will be the greatest boon. In the first place, manufacturers considering entering the export field and taking advantage of the provisions of the law should not at the beginning attempt to organize on too ambitious a scale.

In many industries, any effort to form enormous national combinations at the outset will be likely to prove disastrous. The most sensible, and to my mind the only logical policy, for many of the essential industries, would be for a few competitors in the same district to organize in their respective districts at first. After a time when the district organizations are working smoothly and successfully they might well then combine into one great central body.

Procedure Is Outlined

In proceeding with the formation of an export corporation heads of competing concerns in their respective section of the country should first familiarize themselves with the provisions of the law, which in reality is by no means complex.

Then they should get together, and survey the export field from their viewpoint. Any number of avenues approaching the export field may suggest themselves as available. One must be chosen. How extensively they want to go into the export business must be decided upon as well as what market is to be gone after and in what particular part of the world. Then, too, the question of opening foreign branches, or whether established export houses should be employed in developing trade must be given consideration.

With respect to the export commission houses, some of them have taken a position of opposition to the Webb act because of fear that it would injure their business. On the contrary, it should help these houses. With their vast facilities spreading into every part of the globe, their export knowledge of foreign markets, and their control of shipping, I expect to see them largely employed by new export combinations.

In fact I should advise, in some situations, where a group of small companies without knowledge of foreign trade combined to enter the field, that

they take advantage of these commission houses' facilities at the beginning. Of course, when the company expands sufficiently to handle its own business abroad, it should do so. In case agreements are entered into with the commission houses care should be exercised not to contract agreements which would prevent breaking away in due time.

If it is decided to prosecute the foreign markets independently of the commission houses, it must not be forgotten that the export business is beset with the gravest difficulties. Combinations which fail to obtain the most highly trained and experienced men possible to get will be making a fatal mistake.

Perhaps the most common of all plans of organization for companies, not now in the export trade on a large scale, will be the formation of a corporation which will purchase the product of the component companies for export. However, this corporation need not purchase the product, it may merely represent the companies as an agent to handle their foreign trade or any other similar plan desired.

In a like manner the profits of this central company may be distributed on any plan, but one that seems likely to be popular is for the export organization to allot stock to the combined companies in proportion to the amount of product each company agrees to furnish.

Each company in the combination may be bound not to dispose of any part of its product for export in any manner save to the corporation.

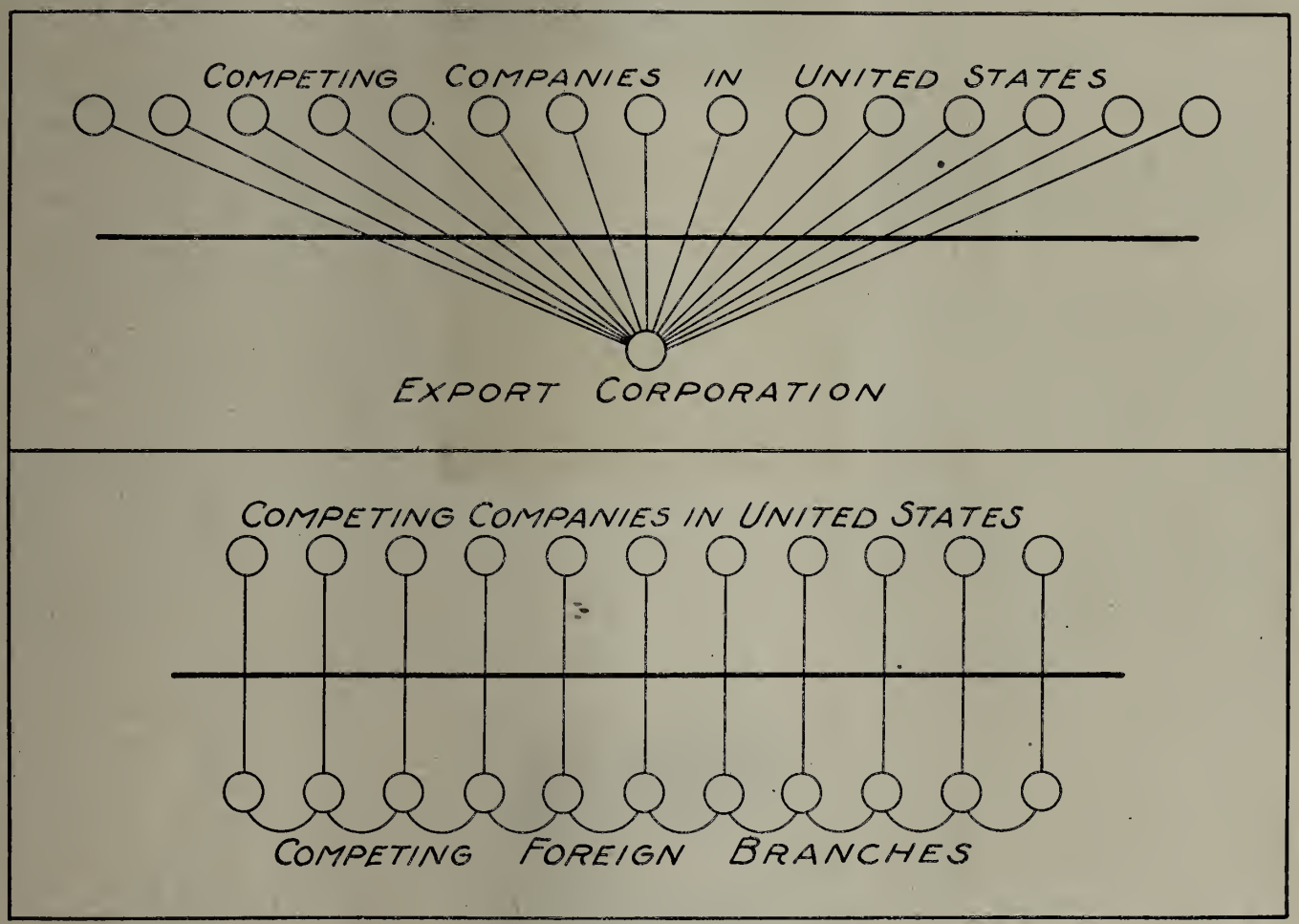
Extensive Sales Will Be Possible

Once the corporation is formed the companies may, as regards export trade, take broad steps to advance their export trade. The arrangements, under the law, may provide for the apportionment of orders, or price agreements and may be shaped and fashioned and changed according to the varying requirements of widely different exports in widely different markets and under widely different competitive conditions.

Many of the large manufacturing companies doing an extensive export trade have organized distinct companies to carry on this division of their business. These export branches of large corporations, provided they are solely engaged in export trade, may register in Washington within 60 days after the passage of the law and be in a position to take advantage of its provisions. Let us see how this might work out.

Take the agricultural machinery houses for instance. Suppose five large competing concerns were maintaining extensive sales branches in France or in Russia. Not only are these companies at an enormous expense in maintaining the foreign branches, but they are competing among themselves as well as against companies of the other countries.

If an understanding were entered into between these companies, whereby the branches should be merged or a price understanding and apportionment of territory be agreed on, these companies would be able successfully to compete with the great cartels of Germany and combinations of other nations, whereas now, in highly competitive nations, they are helpless.



TWO METHODS OF FORMING EXPORT TRADE COMBINATIONS UNDER WEBB-POMERENE LAW

Steel in Brazil

The first successful manufacture of commercial steel in Brazil was recently accomplished in the Engenho de Dentro works of the Central Railroad of Brazil, Rio de Janeiro. Native pig iron with a mixture of about 40 per cent scrap iron, without any steel scrap was used, a steel converter of 1-ton capacity being the melting unit employed. The native pig used, on analysis showed the following percentages: Silicon, 1.645; carbon, 3.50; phosphorus, 0.09; manganese, 1; sulphur, 0.02.

Stand Supports Stock in Cutting

An adjustable stock support which is used wherever long-bar stock, pipe, tubing, etc., must be supported has been placed on the market by the A. F. Way Co., Inc., Hartford, Conn. The support is shown in the accompanying illustration and operates in conjunction with hack saws, screw machines, bolt cutters, pipe-threading machines, etc. The base of the support which is made of cast iron, flares out at the bottom and overcomes any tipping action. A threaded yoke mounted at the top supports a roll which is notched in the center and prevents the bar or pipe from sliding off. The yoke is adjustable from 22 to 30 inches, the adjustment being obtained by means of a screw. A lock nut is provided and prevents the yoke from moving out of alignment.



AN ADJUSTABLE STOCK SUPPORT

Inspect Industrial South

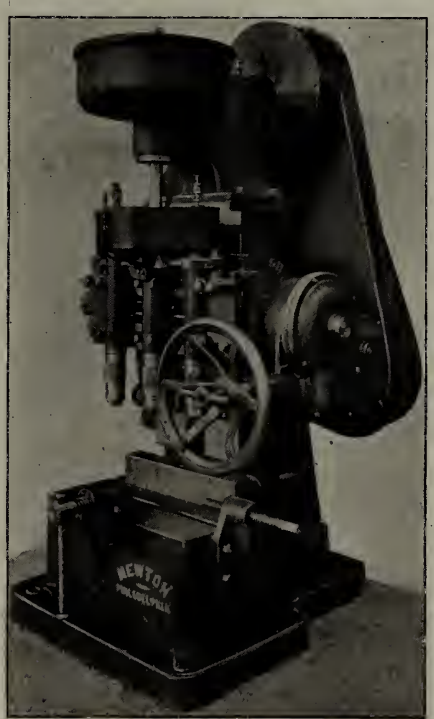
More than 150 members of the American Electrochemical society visited Birmingham and the immediate district recently on their southern trip. Local committees met the party in automobiles and took them to the blast furnaces, steel plant, by-product coke ovens, ore mines, water works, and the $20,000,000 development of the Tennessee Coal, Iron & Railroad Co.; to the wire mills of the American Steel & Wire Co.; and then through the residential section of the city. A dinner at the Tutwiler hotel was extended and a technical meeting followed, a feature of which was an address by Dr. Eugene A. Smith, geologist of Alabama. The party spent the day before coming to Birmingham at Muscle Shoals and from here went to Anniston, Ala., where electric furnaces, plants, etc., were inspected.

Drilling and Tapping Machine

The Langelier Mfg. Co., Providence, R. I., is building a single-spindle vertical drilling and tapping machine which embodies several novel features. The tapping spindle may be fed down by pressing on a foot treadle. Further feed may be secured through the treadle or through a hand lever. The machine has 4½-inch, tight-and-loose pulleys for a 1-inch belt. These are mounted on a horizontal shaft which also carries an idler and a tight pulley grooved for a ⅜-inch round belt. The shaft is mounted on a bracket which is adjustable to maintain the proper tension on the round belt.

A clutch is mounted between the spindle driving pulleys. This clutch is actuated by a snap fork and engages either forward or reverse pulleys. A depth stop on the yoke governs the time of the throw. The table is adjustable vertically and also has a radial movement.

For tapping large quantities of parts, such as stampings, where the pieces are to be clamped or jigged in a stationary fixture and where all the holes are to be tapped, are not likely to come exactly in the center of the work, an auxiliary flexible extension spindle is provided. This is gripped by the chuck on the regular machine tapping spindle which permits the tap readily finding its own center. This is said materially to reduce tap breakage. The machine will tap up to 3/16-inch diameter holes in steel and ¼-inch diameter holes in brass.



THREE-SPINDLE RAIL DRILLING MACHINE

Rail Drilling Machine

A new multiple-spindle rail-drilling machine has been developed by the Newton Machine Tool Works, Philadelphia. Its principle features are shown in the accompanying illustration. It is designed primarily for drilling simultaneously the three or four holes required in the ends of girder or other rails. The spindles operate separately and may readily be removed from the cross rail when desired. The spindle speed for heavy drilling is 125 revolutions per minute. Each spindle is 1⅞ inches in diameter. The minimum distance between spindle centers is 3½ inches and the maximum distance is 9 inches. The central spindle is stationary. The necessary adjustments, therefore, are made by moving the two outside spindles by means of hand-operated screws. The maximum clearance between the top of the table and the lower ends of the spindles is 19½ inches.

The work-table, which is 16 x 30 inches in size, is fitted with a slot in the top surface to hold the rails in position. The driving bearings are bronze bushed. The spindles, spindle gears and rack pinion are nickel steel. The gears are enclosed. The belt connecting the motor with the main driving pulley also is fully covered. The motor is mounted on a bracket on the left side of the machine. The power is transmitted from the main driving pulley to the spindles through bevel gears and spur gears. The saddle, which is counterweighted, is provided with vertical feed and hand adjustment. Vertical feeds of 0.04 and 0.007 inches per revolution of spindle are available. The driving pulley is 26 inches in diameter with a 5-inch face. The table is equipped with an adjustable back plate, a clamping screw and a reversing end-slot.

All three spindles are mounted on one saddle and therefore feed in unison. The base of the machine is surrounded by an oil pan. The lubrication tank is in the base of the machine, the lubricant being conveyed to the point of cutting by a pump provided with suitable pipe connections.

The American Society of Mechanical Engineers has issued its Year Book for 1918. The book contains the usual data and lists of officers and members. The growth of the society in the past year is evidenced by the additional thickness of the book, caused by 38 new pages in the section headed "List of Members."

More Women Needed For Works

Abolition of Military Exemption for Men Under 23 Intensifies Labor Problem for British Mills and Furnaces—More Steel Price Settlements Are Pending—Welcome Return by America of Borrowed Steel

Bureau of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 1.

KEENNESS to buy is concentrated chiefly on pig iron, especially forge and foundry material, the supply of which has been restricted by the transfer of certain Northamptonshire and Derbyshire blast furnaces to the production of basic. Production also is held back by the need of fuel and by a certain amount of congestion on the railways. Very few furnaces have much reserves of material, and the railways, like other organizations, are feeling the effect of the further demand for men. The midlands are getting a little relief, indirectly, from the improved production in the north of England, but all the Midland consumers want more supplies. It appears likely that, at the blast furnaces, the new military demand for men will have to be met by the introduction of more female labor. On the whole, women have done very well, but it is felt that blast furnace managers are approaching the limit in regard to the substitution of this kind of labor. The new order abolishing exemption from military service for young men under 23 can only have a limited effect at the blast furnaces, as special efforts have been made in the earlier recruiting movement to replace these young men. There are many complaints of coke scarcity.

Deliveries of Cleveland pig iron have been more satisfactory of late due to a steady increase in the production. This has enabled supplementary allotments to be issued. Consumers would be very glad to place heavy contracts. A different view of the matter is taken by makers, who are anxious with regard to future transport supplies, the maintenance of which is a very doubtful element. Exports to France show a tendency to increase. Italian exports make a less satisfactory showing. The warrant stock continues at 292 tons.

Steel Settlements Pending

The chief interest, for the moment, relates to finished and half-finished material. Several price settlements are known to be pending. The deputation of manufacturers appointed last week to confer on prices of gas strip with the ministry of munitions fully discussed the question in all its bearings, including the question of extras which is a matter of special concern. The manufacturers laid special emphasis on the necessity of imposing a proper limit upon the price of puddled bars. These bars have realized as much as £13 ($62.40), an impossible figure with unmarked bars being fixed at £13 17s 6d ($66.60). It is understood this material will be taken in hand and a suggested figure is £11 10s ($55.20). The makers of gas strip express their inability to accept the figure of £15 ($72.00) offered by the ministry as the new price, and it is believed that an agreement is likely to be arrived at on the basis of £15 5s ($73.20).

Another class of production in regard to which a price limit is expected, is small finished bars rolled from billets. These have shown extraordinary variations, quotations varying as much as £3 ($14.40) per ton. The selling rates of billets have still to be determined.

The forges and mills, especially the latter, are likely to be very materially affected by the new abolition of exemption from military service for young men under 23. This is rather a serious matter for mills, especially those dealing with small classes of iron, in which the operators are very largely young men coming within this age limit. This is not the kind of labor suitable for women, and older men with the requisite adaptability are not likely to be available. The present inclination is to make strong and united representations to the authorities as to the inevitable effect upon production, if this drastic order is indiscriminately applied to the staffs of the forges and mills.

America to Repay Steel

The announcement conveyed by THE IRON TRADE REVIEW cable, of the intention to repay 750,000 tons of steel borrowed from this country by General Pershing for the troops in France was very welcome. We have heard repeatedly of large orders for plain and corrugated sheets, wire, etc., needed for the American contingent, and if a good share of the repayment takes the form of half-finished steel of various descriptions it will be very welcome. Makers of sheets, tin plates and tinned sheets are all eagerly inquiring for the material needed.

The Staffordshire Tinned Sheet association recently advanced their prices by £3 ($14.40) per ton and lead-coated sheets were put up £1 ($4.80) per ton. This is a kind of material very largely called for for aircraft construction, and for certain kind of admiralty work. The enormous advance in the price of tin has directly affected this industry. It was impossible to get any large reserves of this metal, and tin actually has been bought at £350 ($1680) per ton.

Freight Rates Raised

New pig iron freight rates on the New York Central railroad from the Mahoning and Shenango valley furnaces to various points will go into effect May 9, the rate to Pittsburgh and Cleveland increasing from 95 cents a ton to $1.10; and to St. Louis from $3.18 to $3.70. New rates have gone into effect on the Detroit, Toledo & Ironton and Baltimore & Ohio railroads on pig iron from Ironton and Jackson, O., to these destinations: Chicago, being increased from $2.54 to $3 a ton; Cincinnati, from $1.20 to $1.40; to Cleveland, from $1.62 to $1.90; to Detroit, from $1.81 to $2.10; and to Indianapolis, from $1.58 to $1.80.

New rates on limestone from Marblehead, O., went into effect on April 25, these providing increases to the following destinations: Toledo, $0.37 to 0.40; Canton, $0.58 to 0.79; Erie, $0.74 to 0.90; Detroit, $0.63 to 0.70; Mahoning and Shenango valleys, $0.79 to 0.90; Buffalo, $1.36 to $1.50; Canal Dover, O., $0.58 to 0.70; Cleveland, $0.58 to 0.70; Wheeling, $0.63 to 0.70; Lorain, $0.32 to 0.40; Leetonia, 0.79 to 0.90; and Pittsburgh, $1.10 to $1.30.

Hartford Gets Meeting

The June meeting of the New England Foundrymen's association will be held in Hartford, but the program of the affair has not yet been made up. The July meeting, as has been the custom, will be omitted. An invitation has been extended by members in and about Providence, to have the August meeting held in that city.

War Work Forges Ahead in Far West

Pacific Coast Steel Co. Will Enlarge South San Francisco Plant—Coast Builders Get More Ship Contracts—Chrome Ore Output is to be Increased —Bethlehem Plants at San Francisco Enlarged

(Staff Correspondence.)

SAN FRANCISCO, May 18.—Work has been started by the Union Construction Co., San Francisco, on a new shipyard with four ways. It will employ about 3000 men and is located south of the Key Route mole in Oakland. A contract for ten 9400-ton steel vessels has been obtained from the Emergency Fleet corporation. The estimated cost of the new yard is $1,000,000 and the total contract price for the 10 vessels is more than $17,000,000. All of the work is to be completed within 22 months. Construction work on the first vessel is expected to start within five months. It will be completed within 11 or 12 months and after that the schedule calls for the completion of a vessel each month. The Union Construction Co. is a partnership formed by W. W. Johnson and H. G. Peake.

Work on another project involving an expenditure of $2,000,000 is to be begun at once at Hunters point, San Francisco, as a result of the government's acceptance of a proposal of the Bethlehem Shipbuilding Corp. to construct a large marine repair plant.

The Pacific Coast Steel Co., San Francisco, has recently authorized expenditures aggregating about $500,000 to increase the capacity of the company's South San Francisco plant. This works is now producing an average of 10,000 tons of open-hearth steel a month. A new 40-ton open-hearth furnace is being installed two of the 25-ton furnaces are to be enlarged to 40 tons capacity. A 28-inch mill has been authorized and a mill for rolling plates is under consideration.

In order to secure a steady supply of chrome ore, the Electro-Metallurgical Co., San Francisco, one of the largest producers of ferrochrome in America, has established the California Chrome Co., which is now in the field with an offer of $1.25 per unit for chrome ore containing 38 per cent of chromic oxide and upward.

Development of the properties operated by the Bethlehem Shipbuilding Corp. on San Francisco bay is not limited to any one plant. A new turbine shop has been added to the Alameda plant. It is 550 feet long and 160 feet wide and is served by one 60-ton and two 40-ton electric cranes in the main bay, with two 10-ton cranes in each side bay and two 5-ton cranes in each gallery. Another addition is soon to be made. The shops at the Risdon plant, which is now operated by the Bethlehem corporation, include a marine pipe and machine shop, 105 feet square; a blacksmith shop, 60 x 100 feet; a plate shop, 180 x 345 feet; a pattern shop 140 x 80 feet; a carpenter and boiler shop, 105 x 300 feet, a power house, 75 x 105 feet and a newly fitted galvanizing plant 75 x 77 feet. In the reconstruction of the plant a steel frame structure, 300 x 375 feet was raised 17 feet to permit of the building of ships on the five ways now constructed and the two soon to be laid down. This structure was raised by jack screws after the steel work had been cut loose from its foundations.

What Customs Compilations Show

Although there was a considerable decrease in the exportation of iron and steel from this port in the month of March, due to governmental embargoes, as compared with the immediately preceeding periods, some of the items, notably bar iron and steel, hoop iron and steel, steel rails, galvanized steel and iron sheets, steel sheets and structural steel, increased in volume and value over March, 1917, according to the compilations of the customs department here.

Steel plates show a heavy decrease in quantity when compared with March, 1917, and February, 1918. But the increased value of this product since a year ago is indicated by the customs figures which value 764 net tons at $151,264, during the current period and 6212 net tons and $580,781 in March, 1917. Tin plate amounted to 2418 net tons valued at $703,728. This is more than double in value and about one-third greater in quantity than the exportations during the same month a year ago.

Although there is a serious shortage of scrap iron here, some 199 tons, valued at $11,983, were shipped to China during the month. In March, 1917, 250 tons of iron were shipped to Japan, valued at only $5400.

Steel ingot shipments are conspicuous by their absence during March of this year. In the preceding month, 306 tons, valued at $23,040 left the port. Bar iron amounted to 338 net tons in March, 1917, were valued at $21,258. During March of this year 669 tons left the port valued $65,501. In February, 1918, 396 net tons, valued at $38,460, were exported.

The pig iron shipments during March, 1918, were negligible as compared with the preceding month of February and only about one-fourth as great as the exports of pig during March a year ago. The figures are: March, 1917, 84 tons, $3160; March, 1918, 20 tons, $1534; February, 1918, 465 tons, $41,760. Bar steel shipments were: March, 1917, 42 net tons; March, 1918, 6743 net tons, $686,628; February, 1918, 12,781 net tons, $1,387,117. Hoop steel and iron show a considerable gain over both March, 1917, and February, 1918. The figures are: March, 1917, 153 net tons, $13,879; March, 1918, 966 net tons, $172,385; February, 1918, 565 net tons, $90,206.

A comparison of other steel, iron and nonferrous products shows: Steel rails: March, 1917, 741 tons, $43,656; March, 1918, 1851 tons, $109,496; Febbruary, 1918, 3587 tons, $215,984.

Galvanized steel and iron sheets: March, 1917, 352 net tons, $46,702, March, 1918, 521 net tons, $98,320; February, 1918, 1296 net tons, $289,101.

Steel sheets: March, 1917, 650 net tons, $70,164; March, 1918, 2996 net tons, $389,546.

Structural steel: March 1917, 279 tons, $24,647; March, 1918, 1263 tons, $171,107; February, 1918, 4625 tons, $680,785.

A comparison by periods of the tin plate, lead pig and zinc sheet exportations gives the following:

Lead pig (from domestic ore): March, 1917, 90 net tons, $16,549; March, 1918, 65 net tons, $9068; February, 1918, 56 net tons, $789.

Lead pig (from foreign ore): March, 1917, 40 net tons, $7600; March, 1918, 280 net tons, $38,920; February, 1918, 784 net tons, $110,540.

Zinc sheets: March, 1917, 438 net tons, $18,677; March, 1918, 101 net tons, $44,319; February, 1918, 19 net tons, $9563.

Government to Take Iron

Canadian Munitions Board Agrees to Purchase Output of All New Furnaces—Consider Commandeering All Steel

TORONTO, May 20.—As a result of a recent conference between representatives of the steel companies, the Canadian government and the imperial munitions board, the government has agreed to purchase all pig iron produced in Canada by new blast furnaces erected during the next two years. Some of of the manufacturers strongly urged the granting of subsidies for the manufacture of pig iron, but after giving the matter thorough consideration, the government considered this inadvisable. The government will contract with any new producers to take all their output for a term of three years at a price to be regulated by the market conditions at the time.

Representatives of the larger steel companies were in conference with the Canadian government and the imperial munitions board at Ottawa recently regarding the maximum amount of steel which the companies can supply for war purposes. It is understood the question of commandeering the entire output of steel for war purposes was under consideration, but strong objections were raised on the ground that this would dislocate many departments of the plants and throw many men out of work. It was also urged that it would unsettle the trade of the companies and make it impossible to handle many lines of export trade. In view of this, it is hoped that some satisfactory solution of the problem may be found.

The Dominion Steel Corp. is making many extensions and improvements to its plant at Sydney, N. S., where much preparatory work is being undertaken for the construction of the ship plate mill of 100,000 tons per annum in accordance with its contract with the Canadian government. The ground is being cleared and the plans are in preparation. If sufficient labor is available it is expected the mill will be in operation before the time agreed upon. A new coke plant is being installed comprising two batteries of 60 by-product ovens each. They are of the Koppers type, 11.3 tons each, with a total guaranteed output of 1320 tons daily on 16-hour coking time. The first battery will be in operation in May and the second unit about a month later. The present coke oven plant comprises 620 Otto-Hoffman by-product 4 and 6¾-ton ovens, with a daily output of 1600 tons. This low production is due to the need of repairs which will be effected as soon as the new ovens are in operation. A Simon Carves coal washer is being erected to replace the present washer. The production of a better quality of washed coal is expected to improve the operation of the coke ovens.

A new bill to incorporate the Canadian Niagara Bridge Co. has been reported. The company, the list of whose directors is headed by Baron Shaughnessy, president of the Canadian Pacific railroad, and President Alfred H. Smith of the New York Central railroad proposes to construct a new international bridge across the Niagara river at some convenient point between Chippewa and Fort Erie on the Canadian side to the opposite side of the river in New York state. The approximate cost is estimated at $7,000,000. There was no objection to the plans of the company but there was some discussion as to details. The bill was amended to provide that the bridge should be 2 miles up the river from Chippawa creek so as not to interfere with the plans of the provincial hydroelectric commission and that a way for general traffic must be provided. The bridge is to be open to the use of all railways, the bill providing that the company may unite with any Canadian or American company or companies in building or maintaining the bridge. The work must be commenced within two years and finished within five years.

The steel and iron industries are but slightly affected by the war tax proposals of the Canadian government announced April 30. The business profits tax is continued and its scope extended so as to include all business employing a capital of $25,000, the rate of taxation on business using between $25,000 and $50,000 being fixed at 25 per cent of all profits exceeding 10 per cent. An excise tax of 10 per cent is placed on automobiles, gramophones, gramophone records and mechanical piano and organ players whether manufactured in Canada or imported. This tax will be computed in the case of imported articles on the valuation for custom entry, plus the duty, and in case of articles of domestic manufacture upon the manufacturers' selling price. Tractors and motors used for commercial purposes are not included. The Indian Peninsula Mining Co., a newly formed organization representing Cobalt and New York interests, has taken over a group of molybdenum claims situated on Indian Peninsula, on Lake Keewagama in the Hurricanaw river district, Quebec, some 20 miles south of Amos Station on the Transcontinental railway. A contract has been let for a 100-ton mill and three shafts will be sunk.

Fix Flange Steel Extras

On the recommendation of the subcommittee of sheet steel, the general committee of the American Iron and Steel institute has approved extras for flange steel, army specifications 434, under the sheet schedule. The extras over the base prices of No. 10 blue annealed sheets of $4.25, Pittsburgh, per 100 pounds are 50 cents per 100 pounds for flange steel and 25 cents per 100 pounds for flange steel commercial. These extras, which represent those quoted under normal market conditions by leading producers were adopted subsequent to the miscellaneous extras on sheets originally put out by the institute committee in connection with the base prices for the latter product. The government requirements for army flange steel have increased greatly since the general sheet extras were announced and this has been instrumental in bringing about the subsequent action of the institute committee.

Will Fly to Campus

Charles F. Kettering, president of the Dayton Engineering Laboratories Co., Dayton, will fly from the government Wright field from Dayton Columbus, May 25, to attend the annual alumni day festivities of Ohio State university. Mr. Kettering is an alumnus and trustee of the university. One of the features of the day's festivities will be the unfurling of a mammoth University service flag containing more than 3000 stars which represents the number of Ohio State men who are with the colors.

Leaders Will Dine

W. H. Donner, president of the Donner Steel Co., has invited a number of leading iron and steel men to a dinner the evening of May 29 at the Bellevue-Stratford, Philadelphia, to meet Charles M. Schwab, director general of the Emergency Fleet corporation. This promises to be a memorable gathering of the leaders of American industry.

Changes in War Industries Board

Steel Director Replogle and General Johnson Made New Members—Complete Line-Up of War Organization of Industries Showing Personnel of Various Divisions and Sections Announced by Chairman Baruch

WASHINGTON, May 21.—J. Leonard Replogle, director of steel supply for the government, and Brig. Gen. Hugh L. Johnson, the army officer who, as a colonel under Provost Marshal General Growder, is credited with the successful operation of the army draft law, have been made members of the war industries board, it became known definitely last week. They were appointed under the plan outlined by the President in his letter giving Bernard M. Baruch the chairmanship of the board, and which Mr. Baruch amplified later in a statement of what he expected to do in rebuilding the war machine.

While these men are to have definite places in the board, the entire organization is regarded as only tentative, likely to be changed materially by the operation of the new Overman bill which gives the President broad powers in reallocating the war authority of the various federal departments and bureaus. The board with its divisions as now functioning, is one of the most complex of the war bureaus. The general idea is that each division shall be made up of representatives of the more important war branches of the government.

The board and its subdivisions follow:

War Industries Board

Bernard M. Baruch, chairman; R. S. Brookings, Brigadier General Hugh L. Johnson, Rear Admiral F. F. Fletcher, Hugh Frayne, Judge Edwin B. Parker, George N. Peck, J. L. Replogle, L. L. Summers, Alexander Legge; H. P. Ingles, secretary; W. W. Phelps, assistant secretary.

Price Fixing Committee

Robert S. Brookings, chairman; B. M. Baruch, Hugh Frayne, H. A. Garfield, Brig. Gen. Hugh L. Johnson, Lieut. Col. F. S. Young, Commander John M. Hancock, W. B. Clover, Dr. T. W. Taussig; H. P. Ingels, acting secretary.

Labor Division

Hugh Frayne, chairman.

Allied Purchasing Commission

James A. Carr, business manager; James C. Leddy, F. E. Penick.

Requirements Division

Alexander Legge, chairman; B. M. Baruch, Judge Edwin B. Parker, priority; George N. Peek, finished products; J. Leonard Replogle, steel; L. L. Summers, Pope Yeatman, Col. George H. Estes, Capt. M. N. Taylor, Rear Admiral C. J. Peoples, J. L. Ackerson, Emergency Fleet corporation; T. F. Whitmarsh, food administration; M. B. Poole, Red Cross; T. C. Powell, railroad administration; Jas. A. Carr, allies; James Inglis, executive secretary.

Finished Products Division

George N. Peek, director; E. L. Crawford, assistant commissioner; Stanley Williamson, assistant.

Stored Materials Division

J. F. Wilkins, chief.

Statistical Division

Mills E. Case, acting drector.

Prortes Dvson

Judge E. B. Parker, prortes commssoner; Charles K. Foster, assstant to commssoner; Maj. Gen. J. B. Aleshire, any work othr than ordnance; George Armsby, agricultural implements, food, products and containers, mining equipment, pib tin, tin plate; H. H. Barbour, iron and steel products, sub committee on rating; Capt. F. E. Clark, navy; E. L. Crawford, finished products division; Col. W. W. Gibson, ordnance; C. P. Howland, Emergency Fleet corporation; Rear Admiral N. E. Mason, ordnance; Everett Morse, copper, wire, rope, woolen and cotton goods, tubing, etc.; Lucius P. Ordway, oil well and gas well machinery, lumber, etc.; T. C. Powell, railroad equipment and supplies; Lt. Col. F. S. Young, Rear Admiral A. V. Zane, F. H. Macpherson, chief of bureau of aplication and issue, Maurice Hirsch, secretary.

Priorities Board

Judge E. B. Parker, B. M. Barusch, Edward Chambers, director of traffic, railroad administration; Rear Admiral F. F. Fletcher, Alexander Legge, P. B. Noyes, director of conservation, fuel administration; Charles R. Piez, Emergency Fleet corporation; Clarence M. Wooley, war trade board; Brig. Gen. Hugh L. Johnson, H. G. Phillips, secretary.

Agricultural Implements, Animal and Hand - Drawn Vehicles and Wood Products

E. E. Parsonage, chief; P. B. Schravesande, assistant; Col. W. S. Wood, Major Seth Williams, marine corps.

Automobile Products

H. L. Horning, chief; H. J. Adams, master Howard S. Fisk, navy; Lt. Col. assistant; E. J. Hickey, Corker F. Clarkson, engineering matters; Pay- J. W. Furlow; Maj. Seth Williams.

Brass and Copper Tubing

Everett Morss, chief, J. W. Jasper, Emergency Fleet corporation; Seth Williams.

Building Materials

Richard L. Humphry, chief, S. I. Marks, navy, Capt. J. J. Mills, Major Seth Williams.

Chain

John C. Schmidt, chief Arthur E. Crockett, assistant, Lt. Commander S. R. Fuller, J. P. Bourke, Emergency Fleet corporation, Capt. Batcheller, Major Seth Williams.

Chemicals and Explosives

L. L. Summers, chief explosives; Chas. H. MacDowell, assistant, nitrates; J. H. Adams, mica; Albert Brunker, R. S. Hubbard and A. E. Wells, acids and heavy chemicals; C. H. Conner, wood distillation products, platinum commandeering and requisitioning; E. J. Haley, tanning materials, greases, tallows, vegitable oils and waxes;; J. M. Morehead, coal and gas products; Ira C. Darling, toluol distribution; A. G. Rosengarten, fine chemicals; H. W. Sanford, manganeses, chrome, etc.; Robert M. Torrence, glass-chemical carboys, chemical stoneware; William G. Woolfolk, brimstone, pyrites, etc.; Drs. H. R. Moody, Samuel Tucker and E. N. Weidlein, consulting staff inorganic chemicals, electrolysis, electrometallurgy, ceramics and refractories, organic compounds and die stuffs; Maj. Seth Williams; Donald Riley, S. R. Fuller, C. K. McDonald, S. I. Marks, C. M. Morford, navy representatives; Capt. Gelschen, Mr. Lockhart, Charles Rice, and Lt. Col. Spruance, army representatives.

Conversion of Industries

E. F. Bulmann, cranes; Alexander C. Brown, chief; L. P. Lipps, assistant; Capt. L. E. Stamp, assistant chief section, Capt. W. W. Houston, army; G. G. Green, navy; Major Seth Williams; H. L. Lewis, Emergency Fleet corporation.

Electric and Power Equipment

Walter Robbins, chief, L. W. Grothaus, assistant; M. M. Hughs, assistant; A. L. Bell, W. R. McCann, and Thos. B. Adams, Emergency Fleet corporation; Lt. Col. C. N. Black, ordnance department; Lt. Col. A. C. Christie, medical department; C. J. Katzenstein, bureau of supplies and accounts, navy deparment; H. R. Stuart, signal corps, Maj. Seth Williams.

Emergency Construction Committee

Col. W. A. Starrett, chairman, Capt. K. M. Murchison, Maj. C. Foster, Capt. A. H. Granger, Lieut. J. B. Talmage, W. F. Long, assistant section chief; F. L. Olmsted, John Donlin.

Fire Prevention

W. H. Merrill, chairman; Frank L. Pierce, W. E. Mallalieu, Geo. W. Booth

and Chas. H. Smith, secretaries and associate chiefs of section.

Hide, Leather and Tanning Material

C. F. C. Stout, chief; Maj. Jos. C. Byron, harness, bag, strap and belting leather; Henry W. Boyd, in charge of sole leather; Fred A. Vogel, in charge of upper leather; E. C. Shotwell, glove leather and sheepskins; E. J. Haley, tanning materials; Maj. Seth Williams.

Legal Section

R. J. Bulkley, chief; W. C. Saeger, H. M. Channing, C. W. McKelvey, H. A. Friedlich, Louis S. Weiss, F. T. Nelson, Adrian Ettinger, E. M. Dodd Jr., D. M. VanDoren.

Lumber

R. H. Dowman, chief; Chas. Edgar, Chas. H. Worcester, Walter E. Chamberlin, Frank H. Ransom, C. J. Winton, earl A. Smith, secretary; Maj. F. W. Leadbetter, C. M. Norford, F. K. Paxton, Emergency Fleet corporation; Maj. Seth Williams.

Machine Tools

G. E. Merryweather, chief; A. B. Einig, A. J. Baker, E. D. Crockett, Col. R. P. Lamont, Lieut. Com. S. R. Fuller, Maj. Seth Williams, Mr. Brill and H. L. Lewis, Emergency Fleet corporation.

Mica

H. J. Adams, chief; J. H. Magna, army representative.

Nonferrous Metals

Pope Yeatman, chief; E. C. Thurston, assistant; Capt. Corlies, Maj. Seth Williams.

Optical Glass and Instruments

Geo. E. Chatillon, chief; Capt. F. E. Wright, Com. W. R. Van Auken, Lieut. Pratt, supplies and accounts, navy; Maj. Seth Williams.

Power

Frederic Darlington, Maj. C. F. Lacombe, Maj. Geo. F. Sever, Capt. John C. Damon, Maj. Malcolm MacLaren, Capt. Carroll H. Shaw, Capt. A. M. Tinsley, Lieut. Chas. B. Lehmer, Lieut. Geo. K. Miltenberger, Lieut. W. W. Stanley.

Production Division

S. M. Vauclain, chairman; J. M. Hansen, car section; Henry R. Rea, locomotive section; E. F. Wood, Frank W. Morse and Admiral A. R. Couden, army and navy foreign section; G. M. Shaw, car section; Capt. H. W. Bells, Maj. Seth Williams.

Small Tools and Hardware

Murray Sargent, acting chiefs; Maj. Seth Williams.

Steel

J. Leonard Replogle, director; F. Purnell, J. C. McLauchlan, F. E. Thomson, Capt. W. L. McCleary, S. F. Fuller, J. W. Jasper, United States shipping board; Paul Mackell, Maj. Seth Williams.

Storage Committee

James Inglis, chairman; P. E. Forerder, vice chairman.

Supplies

Spencer Turner, chief; Grovenor Ely, H. L. Bailey, army representative; Paymaster Kane, Maj. Seth Williams, John P. Bourle, Walter C. Stitt, Lincoln Cromwell, cotton knitted goods; A. W. Lawrence, leather and rubber manufactured goods; Geo. F. Smith, cotton; linen thread and tapes; Sylvan Stroock, felts.

Tin

Geo. N. Armsby, chief; Lincoln Hutchinson, expert; C. R. Jasper, Capt. Corlies, S. I. Marks, Maj. Seth Williams.

Wire and Cable

Leroy Clark, chief; S. I. Marks, S. R. McCann, Emergency Fleet corporation; Maj. I. D. Hough, Maj. Seth Williams.

Wood Chemicals Section

C. H. Conner, chief; A. H. Smith, R. D. Walker, G. E. DeNike, Dr. W. Bean, signal corps; Maj. Seth Williams.

Prepare to Cut Down List of Farm Implements

Washington, May 21.—Efforts of the conservation division of the war industries board toward the elimination of the manufacture of unnecessary varieties and styles in farm implements has been making considerable progress. A call has been issued for one or more meetings at Washington, May 23, of representatives of various implement and dealers' associations, which will put the division in possession of data bearing upon the subject from all branches, both manufacturing and distribution. Questionnaires now are being circulated among the manufacturers to elicit information upon which the elimination of certain sizes and types of implements will be sought dating from Nov. 1, 1918. It is stated by the conservation division that it is its desire to eliminate as far as possible all nonessentials in farming implement production. In order that this matter may be handled prudently and fairly, the division will work in cooperation with the department of agriculture. Before any eliminations are determined upon, the department of agriculture will be consulted, as will also the farmers' advisory committee, which has been created to advise the department of agriculture and the food administration.

Capital Odds and Ends

WASHINGTON, May 21.—The automatic and other modern machinery used in making corks, crowns, discs and stoppers in this country is the most efficient machinery for the purpose in the world, according to the tariff commission in its report of the preliminary investigation of the cork industry. So efficient is some of the machinery now on the market that the element of labor plays a smaller and smaller role in cork manufacture and there is a tendency to employ female labor instead of male, as one girl can do the work that formerly required three men, the report says.

* * *

Increase in the rates on iron and steel, special iron, agricultural implements, fencing, grates, radiators, stoves and ranges and brick and fire clay, from St. Louis and points taking the same rates are sought by carriers.

* * *

Cancellation of the carload commodity rate of 5 cents per 100 pounds on mangesite is sought by the Pacific freight tariff bureau from Nadeau Park, Cal., to San Pedro, Cal., by way of the Atchison, Topeka & Santa Fe and the Los Angeles & Salt Lake railroads.

* * *

Railroads seek increases of from 1 to 42 cents per ton in the rates on scrap iron, billets, cast iron pipe and articles taking the same rates from Cincinnati, Evansville and Jeffersonville, Ind., Louisville, Ky., Cairo and Thebes, Ill., to Colona, Carbon Cliff and Silvis, Ill.

* * *

Increases of 1 cent and 3 cents per 100 pounds in carload and 1 cent per 100 pounds in less than carload rates on manufactured iron and steel articles are sought by the Buffalo, Rochester & Pittsburgh railroad from Pittsburgh and New Castle points to points on the Long Island railroad.

* * *

Additional regulations governing the prices of coke have been issued by the fuel administration for Colorado. The maximum price per ton of 2000 pounds, f.o.b. cars at ovens anywhere in the state for screened and sized crushed beehive coke is fixed at $9.80. The order was effective May 7.

* * *

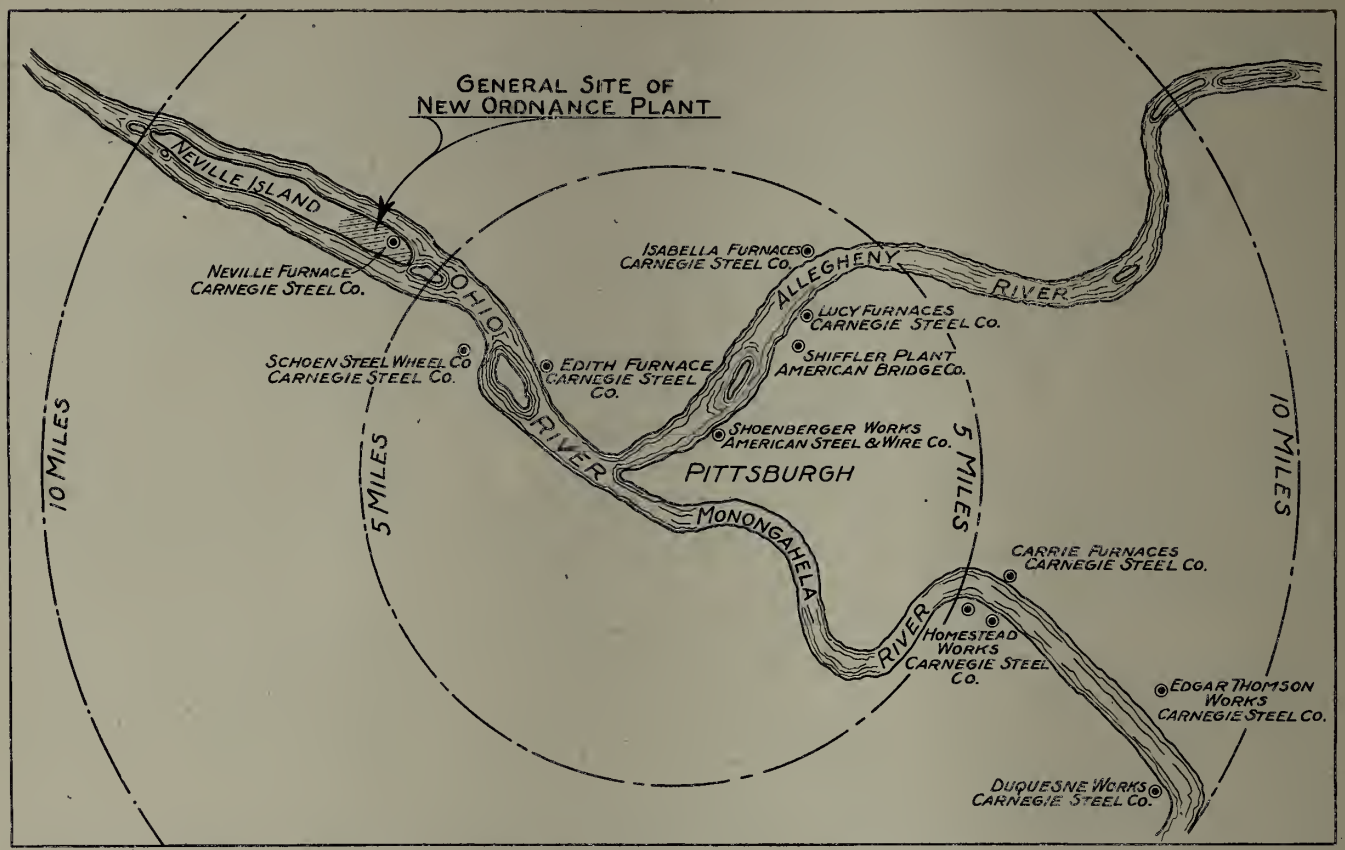
Establishment of a uniform scale of charges in the wharfage, storage and handling of iron and steel articles is sought by the Atlantic Coast Line railroad at Norfolk, Pinners Point, Va.; Wilmington, Newbern, Washington, N. C.; Charleston, S. C.; Savannah and Brunswich, Ga.; and Jacksonville and Port Tampa, Fla.

* * *

The fuel administration's coal price adjustments include $2.65 for run of mine, $2.90 for prepared sizes and $2.40 for slack, all on coal from mines operated near St. Charles, Va., by the Virginia Iron, Coal & Coke Co., the Virginia Lee Co., the Darby Coal Mining Co. and the Black Mountain Mining Co.

* * *

Increases ranging from 15 to 22 cents per ton in the rates on pig iron, billets and bloom, cast iron pipe and iron and steel rails are asked by the Southeastern Mississippi Valley association from southern producing points to Ohio and Missisippi river crosings, Gulf and Virginia cities, and establishment of through rates to points beyond these gateways to reflect the increases proposed.



Site of Neville Island Ordnance Plant and Its Relation to Steel Corporation Furnaces and Steel Works

Drive Ahead On Great Ordnance Works

PITTSBURGH, May 21.—Excavation work preliminary to the erection of the big ordnance plant on Neville island will begin as soon as rapidly developing plans are worked out. Because of its great size and the immense machinery and machine tool equipment that will be required it probably will be more than two years before the plant will be producing guns and projectiles. Essentially it will first of all be a machine shop with foundries, and open-hearth furnaces, which together with the Neville island blast furnace of the American Steel & Wire Co., operated by the Carnegie Steel Co., will constitute a complete unit from pig iron to the finished product.

The site probably will occupy the entire available space on the island, according to an official statement issued by Lieut. Col. C. W. Watson, of the staff of Col. Samuel McRoberts, who has been sent to Pittsburgh to act for the war department with the representatives of the United States Steel Corp. The island is about five miles long, and three-fourths of a mile wide. Besides the blast furnace of the American Steel & Wire Co., the island has on it several other industries, including the Witherow Steel Co., Pittsburgh-Des Moines Steel Co., Dravo Contracting Co., Republic Chemical Co., Graham Nut Co., Oil Petroleum Co., Concrete Products Co., and the Independent Bridge Co. The Jones & Laughlin Steel Co., also has a site on the island and has planned to erect a storage house for coal and ore there.

It is assumed that the plants of these companies will not be disturbed. In his statement Lieutenant Colonel Watson said the United States government proposes to purchase or condemn sufficient real estate to construct a munitions plant for the manufacturing of cannon and projectiles. The real estate value, he said, will be determined by a board selected by the representatives of the ordnance department and deeds will be taken directly in the name of the United States from those owners who will sell to the United States upon the basis of normal times and upon sales made prior to the approximate date of the public announcement of the proposed plant construction. Proper allowance, the statement pointed out, will be made for growing crops, farm implements and movable property, and the compensation of value will be fair and adequate. Commissions will not be paid and negotiations will be conducted directly with the respective owners of properties desired. If exorbitant prices are demanded, the army officers said, the lands will be acquired by condemnation. The statement added that the Steel corporation and its subsidiaries have no interest in the purchases and that the corporation's total compensation for constructing and operating the plant is $1.

The statement was issued following a conference with a committee of 10 Steel corporation officials who were selected to draft plans for the proposed plant and they are co-operating with John S. Oursler, who was general superintendent of the Farrell Works of the Carnegie Steel Co. Mr. Oursler has been selected as manager of construction of the plant and has opened offices in the Union Arcade building, Pittsburgh.

The committee of 10 consists of the following: John Reis, vice president, and William J. Filbert, comptroller of the United States Steel Corp.; Homer Williams, president of the Carnegie Steel Co.; Taylor Allderdice, vice president of the National Tube Co.; August Ziesing, president of the American Bridge Co.; C. C. Thorp, vice president of the Indiana Steel Co.; George G. Crawford, president of the Tennessee Coal, Iron & Railroad Co.; William Whigham, vice president of the Carnegie Steel Co.; C. L. Miller, vice president and general manager of the American Steel & Wire Co., and W. B. Schiller, president of the National Tube Co. Mr. Reis is chairman of the committee.

Following the selection of the committee, the United States Steel Corp. ordnance department was organized with Mr. Oursler as general manager; L. E. Thomas, chief engineer at the Gary works, chief engineer; F. W. Waterman, manager of the Gary works of the National Tube Co., assistant manager; George Brown, purchasing agent of the National Tube Co., purchasing agent; R. C. Cochran, traveling auditor of the American Sheet & Tin Plate Co., auditor. John Hulst, chief engineer of the Steel corporation; P. C. Patterson, chief engineer of the National Tube Co., and J. L. Bernard, chief mechanical engineer of the American Bridge Co., have been appointed to act with the general committee.

The men composing the United Steel Corp. ordnance department, including the general committee and engineers appointed, will devote their time to the work of building the ordnance plant and until this has been accomplished the Steel corporation will be deprived of their services to a great extent, which means a sacrifice both on the part of the men and the corporation.

Carnegie to Operate Plant

The plant, it is believed, will be built by the American Bridge Co., and will be operated by the Carnegie Steel Co. The corporation will supply its best engineering and steelmaking ability from its various subsidiaries and will so select them that the least disturbance possible in its regular organization will occur. The securing of some of the machinery and machine tool equipment may offer a serious problem. Some of the larger units include 18,000-ton hydraulic forging presses. Boring mills, larged sized lathes, drills, etc., also may be difficult to get. Foundry equipment, it is thought, can be secured in sufficient time. Nothing official has been given out as to whether the one blast furnace will be sufficient to meet requirements. Its daily capacity is approximately 400 tons. It is said unofficially that probably ten 60-ton furnaces will be built. Coke for the blast furnaces and cupolas will be brought up the Monongahela and Ohio rivers from the Clairton by-product plant of the Carnegie Steel Co., coal will come from nearby mines by river and ore at first will come by way of Lorain, O.

The finished product, according to reports, consisting of heavy guns and projectiles from 8-inch to 16-inch, will be loaded on barges, and sent down the Ohio and Mississippi rivers to New Orleans for distribution by ocean to their destinations. It evidently is intended to manufacture heavy seacoast guns for defenses on both the Atlantic and Pacific coasts and mobile guns for mounting on specially built rail lines. It also is assumed ordnance for use abroad will be made if the European war is not over when the plant is completed.

It is understood also that a town for laborers at the plant will be built on the island. Reports have it that at least 2500 experienced gun and projectile makers will be employed immediately after the plant is completed and this will be greatly augmented later. Employment bureaus will be opened by the government to secure labor, a question which is a serious one.

The plant will occupy the upper head of the island and will be built directly adjoining the blast furnace. The island itself has street car, train and river approaches and is above the flood lines. There are double tracks of the Pittsburgh Railways Co., extending the full length of the island, the cars entering by way of a bridge near McKees Rocks and leaving the island at Coraopolis. Traffic service may be changed considerably to better suit demands.

The present dam system insures for the plant a requisite slackwater and the erection of the new stationary dam at Elmsworth, which is to be the first step in supplanting of the movable dams on the Ohio, will give an even more advantageous water position to Neville island and particularly to that end of the island upon which the plant is to be erected.

To get river coal will be simple as position of the plant requires a short run down the Ohio river from both the Monongahela and the Allegheny rivers. From the Monongahela river will come its most immediate supply of river coal, because it is developed as the Allegheny is not and is better slackwatered. Monongahela mines could easily increase their supply to care for this plant. Lock No. 3 on that river passed through 16,000,000 tons of coal last year, and government engineer officers in charge of the rivers here said that this could be doubled without difficulty. In some sources the selection of Neville island was regarded as indicative of a conviction on the part of the government that the Ohio ship canal will be built. Otherwise, it is argued the plant probably would never have been located on a spot which will be on the direct ore water route if that project ever comes to an actuality. One of the principal arguments advanced in Pittsburgh in favor of the canal is that it would make a direct all-water ore route from Lake Superior mines and other upper lake shipping points to the mills in this section. That canal would strike the Ohio river near Beaver. In the light of that fact it is considered significant that the government has committed itself to a policy of dam replacements that will eventually put permanent dams all the way from Pittsburgh to Beaver, in place of the present movable structures.

Detroit's Steel Needs Rise

DETROIT, May 21.—Recent statistics show that in the Detroit industrial area are 220 plants, manufacturing, consuming and fabricating iron, steel and other metals. These plants have a capitalization of $85,000,000. Since Jan. 1 these figures have been greatly increased. Since the production of the first bessemer steel billets in the country, at the Wyandotte Rolling Mills, in 1853, Detroit has been among the biggest users of steel and iron. The first iron furnace west of Pittsburgh was established in the late forties on the Detroit river front. The first boiler shop was the pioneer of all, having been established in 1847. Copper smelting began in 1850, the first car works was built in 1853, and stove manufacture began in 1860. Three years later a bridge and iron works commenced operations and what now is the Great Lakes Engineering Co. started in 1863.

The first iron vessel for the Great Lakes was built at Detroit in 1872. Rolling of brass and copper sheets and the beginning of the manufacture of malleable iron featured the year of 1881. The first automobile company was established in 1891 and the Packard, Cadillac and Ford companies were incorporated in 1903.

Metal working lines, which have felt the shortage of labor more acutely than any other industry in the city, have been experimenting extensively with the dilution of man power by the introduction of female labor. Out of 260,000 industrial employes in Detroit, 176,000 or 68 per cent are engaged in the metal trades. One hundred and three thousand of this number are in the motor car and accessory division alone. In a recent survey to determine to what extent female labor now is being employed and the extent to which it could be employed, if necessary, companies employing 103,799 men reported that they could use female labor. The census was taken in plants employing a total of 113,699 persons, the largest of them engaging 37,000 and the smallest 150. Plants employing 9900 reported they could not use female labor. The extent to which women can be introduced into industries here varies from 3 to 33 per cent or an average of 19 per cent.

Nonessentials Must Be Set Aside

Machinery and Supply Manufacturers and Dealers in Concurrent Sessions of Four National Associations Deliberate War Problems and Emphasize Necessity for Subordinating Self-Interest in the Present Struggle

COMPLETE subservience of personal interest as the groundwork upon which to build victory was the theme of the convention of machinery and supply men, held in Cleveland during the week of May 13. The present uncertainty soon to take the form of a definite line between essential and nonessential was dwelt upon at length in the addresses at the sessions throughout the week. The National Pipe and Supplies association met on May 13 and 14 and during the following three days the Southern Supply and Machinery Dealers' association, the American Supply and Machinery Manufacturers' association and the National Supply and Machinery Dealers' association were in convention. At the various joint sessions which were held men of national prominence presented their judgment as to the war duties and responsibilities of the industries and organizations represented. Steel and iron, which together are so essential, and which have taken the lead in pledging 100 per cent war service, formed the background about which the whole question of the responsibility of machinery and supply men was developed. The conservation, perhaps better the consecration of iron and steel to war service was driven home by practically every speaker.

A year ago we had no conception of the demand the war would make on our industries, said John J. Kennedy, general sales manager of the National Tube Co., in speaking to the National Pipe and Supplies association. At a meeting in Philadelphia one month after the commencement of the war it was estimated the war needs would amount to from 4,000,000 to 6,000,000 tons of iron per year. Today the war is taking all the country can possibly produce. On April 26, just past, the principal steel manufacturers of the country met in New York and signed a pledge to subordinate all other lines to the business of war. At the same meeting J. Leonard Replogle stated that government orders then represented eight months output for the steel mills of the country at the rate they had been going during the three preceding months. These requirements will be met at the expense of any other consideration. Manufacturers of nonessentials must go. No one will be permitted to manufacture articles in greater amounts than the actual needs of the country require. The government will take care that materials do not go into nonessential uses. Keep that pledge in mind. It behooves us all to forget our own personal interests and do everything to aid in winning the war as soon as possible.

"Month by month more and more steel will go to the government," said W. E. Manning, vice president of the Youngstown Sheet & Tube Co. "The pledge of 100 per cent to the govern- was not taken on the spur of the moment, but after a full realization



L. C. HUESMAN,
Re-elected President of the National Pipe and Supplies association

of the situation. Dealers who are inclined to complain about deliveries must remember that the manufacturers are doing war work, and cannot deliver as well as they would like.

That the mill supply houses of the country should reduce their stocks of nonessential articles and concentrate their efforts on giving the war industries, railroads, and shipyards the supplies and machinery directly needed to win the war, was the advice of H. W. Strong, of Cleveland, in his annual address as president of the National Supply and Machinery Dealers' association. He stated:

It is probable that in the stocks of goods carried by all the members of this association there are some lines which, at the present time are far less likely to be active than in times of peace. With the rapidly changing character of the business of the country, and with the tendency so directly towards the business of the country all being put on a war footing, it is likely that we all have some lines of goods which minister to the strictly nonessential industries. There are some of our lines which possibly are carried by three or four or a half dozen other branches of the supply trade, and these, as well as the ones which are not strictly confined to the essential industries, it is my belief, should be either abandoned or materially reduced until after the war. I apprehend that in the city of Cleveland alone there are several hundred thousand dollars tied up in stocks in the various supply houses for which the demand is not great enough to warrant such an investment. If these stocks are sold out and the inventory allowed to run down, so as to be used in other lines which are directly contributing to the war needs of the country, it is of direct assistance to the government and it may be of direct assistance to ourselves as well. In this connection it is necessary to remember that it is only the increase in the amount of goods that we are obliged to carry as against the quantities that would suffice three years ago. It is also the advance in the cost of practically all of our lines which helps swell our inventory to such unwarranted proportions.

In 50 standard lines that we carry in stock the average advance in our cost during the past four years has been 135 per cent, and this enormous increase in cost per unit taken in addition to the necessary increase in quantities causes us to realize at once, why, in spite of excellent business, and the increased profits which are bound to show on the books as the result of a continuous rising market, there is an equally continuous shortage of funds. A rigid paring down of stocks which are in the nonessential class may be a distinct alleviation along this line, and we began to work this out some months ago, feeling that it was a necessity of the times.

H. W. Strong, the Strong, Carlyle & Hammond Co., Cleveland, president of the National Supply and Machinery Dealers' association, presided at a joint session of this body with the Southern Supply and Machinery Dealers' association. The opportunity for service on the part of the dealer was pointed out by a number of executives from manufacturing and sales organizations.

Melville W. Mix, president, Dodge Mfg. Co., Mishawaka, Ind., spoke on the problems of the manufacturers of transmission equipment in the light of the war. He recommended the substitution of stock sizes, especially in shafting, for those which by the

nature of the design were special. To attain this end, he suggested the speeding up and consequent reduction of area of section, the use of split wood pulleys where possible, and the substitution of list of ranges in size for a specific size in ordering from the manufacturer. He deprecated any speculation in stocks of shafting and similar material at this time, but recommended a stock list to be kept accurately and up to date. He stated that every effort by the individual would remove a part of the load from the steel camel's back.

Richard T. Lane, sales manager, the Standard Tool Co., Cleveland, summarized the shipbuilding, artillery, truck, and airplane requirements to show a few of the reasons why dealers could not receive under a 14-month delivery date on some lines of small tools. He stated that where his company formerly carried over 13,000 sizes of a particular line in stock, they are now reduced to a mere skeleton of that line. He, too, stated that speculation in stock should be avoided. He said:

"If the increased demand for small tools had been uniform, it would have been a comparatively simple problem, but it wasn't. On some sizes the demand has remained about the same, on others the demand has increased 400 to 500 times. When you stop to consider that the machinery we use is not to be found in the open market, but must be made in our own shop, you have some idea of the magnitude of the work.

Essentials Paramount

Farnham Yardley, president, Jenkins Bros., New York, called time on the nonessential, and put the question of a choice squarely before the dealers. He said:

There are not men and there are not materials enough in this country to supply the war needs and our normal needs, and as the business of the day is the winning of the war, the normal needs must be subordinated and priority must be given to the war needs.

For my part, I believe that as the war goes on we will of necessity differentiate, more than we have in the past, between the essentials and the nonessentials. The essentials, of course, are those things that are necessary for our health, for our efficiency, and for winning the war; the nonessentials are those things that can wait until after the war is over.

A nation at war is an insistent buyer of commodities. At the outbreak of the European war several such buyers entered our market. Their insistent buying power led to an intensification of the market demands. Industrial plants, in laying plans for expansion to care for war contracts went into the market bidding for capital in the form of buildings, new machinery, raw materials and labor.

It must be self-evident to all that there will be a shifting in the labor situation; that those who are now employed on the so-called luxuries will find employment in the making of essentials. The government will properly more carefully scrutinize the consumption of raw material, in order that there will be no waste of manpower in the making of things that are not required for the business in which this country is now engaged.

William E. Manning, vice president, the Youngstown Sheet & Tube Co., Youngstown, O., emphasized the 100 per cent pledge of the steel manufacturers, and called attention to the immense quantity of steel which is not available for machine and tool manufacture. Shells were classed as nonproductive in this sense, and it



MELVILLE W. MIX,
Elected President of the American Supply and Machinery Manufacturers association

is commonly stated that 35 per cent of many steel manufacturers is going into shell steel. He asked the cooperation of dealers to see that the steel products they sold were for government purposes solely, and stated that this was vitally necessary to secure what was essential for war production.

N. J. Clarke, secretary, Upson Nut Co., Cleveland, told of the vast quantity of nuts and bolts required in vital war work. He dwelt on the point that any dealer selling from stock to government purchasers, or to sources having priority, should at once avail themselves of the priority privilege of replenishing this stock against future requirements. He spoke of the enormous demands being made upon the nut and bolt manufacturers by the government and others he said:

"One instance is that of an order for 2000 hangars for housing airplanes, each with a capacity of four airplanes. This order required 6,000,000 bolts of one size, ¾-inch machine bolts.

"On an order for artillery wheels, 16,000,000 wheel bolts, all of one size, were ordered at one time.

"The freight car order just placed requires 15,000 tons of rivets.

"On one order for 129,000,000 bolts the industry was able to furnish 25 per cent of the order from stock, by calling on all manufacturers. Another order is for 51,000,000, all large machine bolts.

"As for the government demands I will say that the steel trade is on probation. It is being given a chance to give the government needs 100 per cent service on its own initiative. If the government does not get its 100 per cent it will begin to take steps to see that the raw material is properly distributed according to war needs."

Predictions of higher freight rates, increased wages to employes and the ultimate return of the railroads to private ownership after the war, were some of the high spots in an address given by Samuel O. Dunn, editor of *The Railway Age*, before a joint session of the National, Southern, and the American Supply associations.

Elect New Officers

L. C. Huesmann, of Indianapolis, was re-elected as president of the National Pipe & Supplies association. Vice presidents elected were: George V. Denny, Savannah, Ga., and Rolin F. Woodruff, Pittsburgh. George D. McIlvane, Pittsburgh, was continued as secretary-treasurer. W. M. Pattison, Cleveland, was chosen to head a committee to push the fight on unfair price-cutting.

J. D. Nicklis, of the Manning, Maxwell & Moore Co., New York, was elected president of the National Supply and Machinery Dealers' association; Anton Vonnegut, of the Vonnegut Machinery Co., Indianapolis, Ind., vice president, and Thomas Fernley, Philadelphia, secretary.

M. W. Mix, Dodge Sales & Engineering Co., Mishawaka, Ind., was elected president of the American Supply and Machinery Manufacturers' association; George T. Bailey, Oliver Iron & Steel Co., Pittsburgh, first vice president, and F. D. Mitchell, New York, secretary-treasurer.

W. B. Simpson, C. T. Patterson Co., Ltd., New Orleans, was chosen president of the Southern Supply and Machinery Dealers' association; W. J. Shaefer, Russell Hardware Co., McAllister, Okla., and J. H. Haslan, Georgia Supply Co., Savannah, Ga., vice president; and Alvin M. Smith, Smith-Courtney Co., Richmond, Va., secretary-treasurer.

Outline War Labor Board's Methods

National Body Arbitrates When Its Sections or Subcommittees Fail to Effect Settlements of Labor Controversies—Many Strikers Return to Work When Informed That It is Handling Their Cases

RECENT sessions of the National War Labor Board, on which ex-President William H. Taft and Frank P. Walsh serve as joint chairmen, have resulted in the announcement of its rules for taking up industrial disputes and the methods to be followed in the adjudication of controversies. This announcement provides for the appointment of subcommittees composed of two members to act for the board in every local controversy; the appointment of permanent local committees in cities and districts to act in difficulties arising therein and the sending of trained field agents by the board from Washington into territories for the purpose of making investigations, etc.

The board itself will sit in hearing upon cases only when its sections or subcommittees or local committees are unable to settle a controversy. In that event, it will sit as a board of arbitration, decide the controversy and make an award. It will hear appeals where the principles established by the President in his proclamation of April 8, have been violated; where an award made by a board has not been put into effect or where employes have refused to accept or abide by such an award. It too will determine questions of jurisdiction as between government boards.

Rule for Filing Applications

Individuals who desire to bring to the attention of the board, any issue between employer and employes, will deliver to its secretary a signed statement, giving a brief description of the grievance and the names of the persons or corporations against whom he complains with their postoffice address. When both employer and employes desire to submit a controversy, they are to sign and submit to the board's secretary, a joint statement, giving a description and requesting action by the board. When Secretary of Labor Wilson invokes action by the board, all documents are to be delivered by him to the secretary of the board who will file them in his office, indorsed with the date of filing. The secretary will keep one docket for the filing of all complaints, submissions and references, each case receiving a number. He will digest all cases presented and bring them to the prompt attention of the board for its action.

Three board members, two representing employers and one representing employes shall act for the board by appointment of the joint chairman, in every local controversy. This "section" of the board will hear and adjust cases assigned to it and failing in adjustment, will summarize and analyze the facts, presenting them to the board with its recommendations. To accompany such sections for the purpose of assisting in investigation, analyzing the evidence, etc., trained and experienced men of neutral attitude are to be selected by the secretary as examiners. Permanent local committees in any city or district may be appointed by the board to act in cases arising in these territories. Recommendations as to candidates for such service will be received by the board from employers' associations, etc. Board sections have the power to appoint temporary local committees where permanent ones have not been named by the board. Two special field representatives may be selected by the secretary from names submitted by the joint chairmen. These are to make an investigation of any complaint to ascertain facts before the intervention of the board section. When efforts of sections, local committees, etc., fail to settle a controversy, the board will sit as a board of arbitration, render a decision and make an award. If it cannot reach a unanimous conclusion, it will select an umpire to review the issues and render his award.

Since efforts of J. L. Spangler and E. P. Marsh, commissioners of conciliation of the department of labor to settle the controversy at the Bethlehem Steel Co., Secretary of Labor Wilson turned over all the data to the board with the request that it assume jurisdiction. Workers claim violation by the employer of certain principles governing industrial relations. A section of the board, composed of Thomas Savage, representing labor and Herbert H. Rice, representing employers was accordingly appointed to arrive at a settlement. When the 6000 striking machinists and electrical workers at Bethlehem were notified that this section had been appointed, they returned to work under existing conditions.

At Schenectady, N. Y., where 22,000 metalworkers employed by the General Electric Co., and other plants, are involved in a controversy, an agreement has been reached whereby the men return to work, pending a decision of a section of the board, composed of Fred. C. Hood, representing employers and Adam Wilkinson, representing labor. This section will also endeavor to settle a controversy at Pittsfield, Mass., where 6000 metalworkers went out on a strike recently, but who have returned to work, pending a settlement.

Chairmen Travel West

In harmony with its program the joint chairmen of the National War Labor Board will visit Kansas City May 24, to conduct an inquiry into a controversy between the Pittsburgh & Joplin railway and its employes and the day following will go to St. Louis to adjust the differences of the St. Joseph Lead Co., and its employes at the smelter at Herculaneum, Mo. On May 27, this section of the board will endeavor to adjust the dispute between the Detroit United railway and its employes at Detroit and on May 28, it will visit Cleveland and seek to conclude the controversy between the Cleveland Railway Co., and its employes.

Sale Price of Sheets and Tin Plate Recedes

The bimonthly sheet and tin plate wage settlement at Joliet, Ill., held in Joliet, Ill., showed a further recession in the average sales price of shipped products for the March-April period. Sales sheets when examined showed that during that period 26, 27 and 28-gage black sheets sold at an average of $5.10 per 100 pounds as against $5.35 in January and February, compared with $5.50 the last two months of 1917. Tin plate's average sale's price per base box was $8 against $8.40 the previous two months and $8.60 in November and December of last year. These receding sales prices carry a wage reduction for May and June of 7½ per cent for sheet workers and 8 per cent for tin plate operatives based on the base rate, which means an actual wage cut of about 3 and 4 per cent respectively from what sheet workers and tin plate men had been receiving.

The members voted down a move to ask for a base rate advance for tin workers. It was the sense of the convention that for the time being action along this line be confined to a move to improve working conditions.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

THOMAS K. GLENN, recently elected a director of the American Iron and Steel institute for the term ending in 1921, to succeed Col. J. C. Maben, retired because of ill health, has been president of the Atlantic Steel Co., Atlanta, Ga., since early in 1908. He then came to the company with a well-rounded business knowledge and executive experience. He began his business career in the office of Joel Hurt, president of the Atlanta Home Insurance Co., and later became connected with the street railway system as claim agent. He advanced steadily until he became vice president of the Georgia Railway & Electric Co., general manager of the street railway department of that organization and vice president of the Atlanta Northern railway. When David Woodward resigned as president of the Atlanta Steel Co. early in 1908, the duties of the office fell temporarily upon Charles E. Currier, vice president, until Mr. Glenn's services were secured. When in December, 1915, the Atlanta Steel Co., was sold to a company headed by the New York banking house of William Morris Imbrie & Co., the name was changed to the Atlantic Steel Co. The officers of the old organization were retained and Mr. Glenn has been serving as president ever since.

Clarence F. Bennett, vice president of the Stanley Works, New Britain, Conn., is chairman of the Red Cross drive in that city, this week.

Fred C. Deming, sales manager for the Carnegie Steel Co., in the Buffalo district has been made a director of that city's chamber of commerce.

J. O. Eaton, treasurer of the Torbenson Axle Co., Cleveland, has been elected to executive office in the newly organized Tractor Parts Co., that city.

C. M. Stowe, salesman in the Chicago office of Hickman, Williams & Co., pig iron dealers, recently entered the national army. He has reported at Camp Grant, Rockford, Ill., for training.

E. S. Edwards formerly of Detroit, will have charge of the New York office in the Singer building, to be opened by the Stalnaker Steel Co., Pittsburgh.

John T. Faig, a professor in the engineering department of the University of Cincinnati, has been appointed president of the Ohio Mechanics Institute to succeed Prof. John L. Shearer, who recently resigned.

F. E. Hurst has been made assistant to H. L. Innes, vice president and general manager of the Doble-Detroit Steam Motors Co., Detroit. Mr. Hurst was formerly assistant factory manager of the Chevrolet Motor Co., that city.



THOMAS K. GLENN

W. H. Peterson became affiliated with Charles Hubbard & Co., 81 Fulton street, New York, dealers in coke and metal products, upon his recent resignation as New York sales manager of the Penn Seaboard Steel Corp.

C. Oberstadt, resigned recently as superintendent of the Cleveland plant of the Elyria Iron & Steel Co., Elyria, O. After a vacation, he will assume new work concerning which no announcement has been made.

Evan F. Jones, treasurer and general manager of the Morgan Spring Co., Worcester, Mass., recently resigned as president of the Norcross Bros. Co., general contractor, that city. He remains as director and stockholder.

H. W. Coffin, vice president and general manager of the Alabama Co., Birmingham, was chairman of the third Liberty loan committee which made a highly successful campaign in the Birmingham district.

Leonard W. Williams, Park & Williams, Philadelphia, is now located in Washington where he will serve in the pig iron division of the war industries board as assistant to Jay C. McLauchlan, formerly of Cleveland.

Wilbur B. Driver, former vice president of the Driver-Harris Co., Harrison, N. J., recently retired from active participation in the business. First, second and third vice presidents are now Arlington Bensen, Leon O. Hart and Frank L. Driver Jr., respectively.

Frank B. Lounsberry, chief metallurgist of the Atlas Crucible Steel Co., Dunkirk, N. Y., addressed the regular monthly meeting of the Pittsburgh Foundrymen's association, Pittsburgh, May 20, on "The Manufacture and Development of High Speed Steel."

V. P. Signorelli recently resigned as secretary and assistant treasurer of the Southwark Foundry & Machine Co., Philadelphia, to become office manager and auditor of the foundation company —Carpenter-Watkins, Inc., Brunswick, Ga.

Henry D. Miles, president of the Buffalo Foundry & Machine Co., Buffalo, N. Y., has been made president of the chamber of commerce in that city, to succeed Archer A. Landon, who now is assisting John D. Ryan in charge of aircraft production.

G. Marshall Everson, 313 Sixth avenue, Pittsburgh, who until recently as assistant manager of the steel works of Henry Disston, Inc., Philadelphia, has taken over the business of his father, the late T. Bissell Everson. He will engage in the buying and selling of rolling mill equipment.

W. S. Murrian became president of the Southern Locomotive Valve Gear Co., Knoxville, Tenn., upon his resignation as superintendent of motive power and equipment on the lines east and west of the Southern Railway, with headquarters in that city. He succeeds General L. D. Tyson, now in active service of the United States army, who has been president since the company was organized. Mr. Murrian learned the machinist's trade and by hard work has won this latest honor, preceded by many promotions.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

R. W. H. ATCHERSON has been appointed superintendent of blast furnaces of the Inland Steel Co., at Indiana Harbor, Ind. He succeeds James B. McClure, who held this position one week, being promoted from assistant superintendent of blast furnaces on the death of H. Barren. Both Mr. Barren and Mr. McClure died of pneumonia, the latter almost as soon as he took up the work. Mr. Atcherson was born at Columbus, O., in 1880, and, his family moving to California, he completed his education in the west in 1899 and began work in the office of the general superintendent of the Pennsylvania Lines at Columbus, remaining there three years. In May, 1902, he began his blast furnace experience at the Bellaire, O., works of the Carnegie Steel Co., and rose through various positions to the superintendency. Four years and a half ago he was transferred to the Clairton blast furnaces of the Carnegie Steel Co. and remained superintendent there until he resigned to accept his present position.

Calvin P. Wolfe was recently made general superintendent of the Manufacturers' Foundry Co., and the L. J. Mueller Furnace Co., Milwaukee. W. L. Chatfield was appointed superintendent of the casting departments of the two plants.

L. Ashworth of Portsmouth, N. H., who formerly was affiliated with the Cleveland City Forge & Iron Co., Cleveland, in an important capacity, but who latterly has been in the employ of the government, is now manager of the new plant of the Western Drop Forge Co., at 301 Horton street, Seattle.

Charles M. Schwab, director general of shipping and president of the Bethlehem Steel Co., will be a guest of honor at the annual reunion of mayors of Connecticut cities in New London, Conn., May 25. Charles W. Morse of New York will likewise be a guest of honor on this occasion.

H. V. Jamison, advertising manager of the American Sheet & Tin Plate Co., was recently made president of the Pittsburgh Advertising club, to succeed J. C. McQuiston who has served during the past year. Mr. McQuiston is manager of the Westinghouse Electric & Mfg. Co.'s publicity department.

Simon Lake, president of the Lake Torpedo Boat Co., of Maine, Bridgeport, Conn., gave an illustrated talk on "The Modern Submersible, its Development and Possibilities in the Decision of the Present World War," before the electrical engineering society of the Massachusetts Institute of Technology, Cambridge, Mass., May 13.

George B. Hogaboom, New Britain, Conn., has been granted a leave of absence by the Scovill Mfg. Co., Waterbury, Conn., to accept an appointment as electro-plater advisor to the military authorities under the United States bureau of standards at Washington. The position is newly created and does not carry a commission. Mr. Hogaboom is an expert on electro-plating, etc.

William H. Mills resigned recently as president and director of Naylor & Co., 120 Broadway, New York, because of ill health, and has been succeeded by H. Edward Dreier. Other officers follow: A. H. Strong, first vice president; W. H. Pratt, second vice president; Philip L. Smith, assistant to president and Robert F. Ertz, secretary and treasurer.

Graham Macfarlane Jr. has resigned as secretary and treasurer of the Red River Iron Works, Clarksville, Tenn. He has been examined for a liteutenant's commission in the engineers corps, military railway department. At present, he is acting assistant to Lieut. Col. Trask, in Washington, but expects to be assigned to duty in the field in the near future.

Edward Buker, who for two years has been with the Galena-Signal Oil Co., Franklin, Pa., has been appointed western representative of the Rome Iron Mills, Inc., New York City and Rome, N. Y. His headquarters will be the McCormick building, Chicago. He is 33 years old and a graduate of the University of Illinois, with a degree of mechanical engineer.

Prof. John H. Nelson, who six years ago left the Case School of Applied Science, Cleveland, to become professor of strength of materials at the Worcester Polytechnic institute, Worcester, Mass., resigned his position in the bureau of standards at Washington recently. He now is research engineer for the Wyman-Gordon Co., at Worcester.

William Coxe, who was recently appointed supervisor of the privately owned shipyards along the Delaware river by Charles M. Schwab, has been elected a member of the board of directors of the Pennsylvania and New Jersey Shipbuilding Co.'s and the Pusey & Jones Co. Henry G. Barstairs, Baltimore, has been elected treasurer and director of these companies.

M. D. Lucas resigned recently from the sales force of the Stowe-Fuller Co., Cleveland, firebrick and builders' supplies, after 16 years of service. He has opened an office in the Citizens building that city as a representative of the North American Magnesite Co., Ltd., Montreal, Que., manufacturer of clinker magnesite with iron, which is being used by the largest steel manufacturers.

C. P. White, vice president and general manager of the Clarkson Coal Mining Co., Cleveland, with mines in eastern Ohio, has been appointed manager of Lake and Canadian coal distribution by the fuel administration. He formerly was connected with the coal department of the Wheeling & Lake Erie railroad and then spent 20 years in charge of Lake Superior coal dock properties, while located at Duluth, Minn., and Superior, Wis. He was then made general manager of the Pittsburgh Coal Co.'s operations north and west of Chicago, following which he served as vice president of the Carnegie Dock & Fuel Co., with headquarters at Minneapolis.

W. S. Henry has been appointed service engineer of the recently created service department at Rochester, N. Y., of the General Railway Signal Co., New York City, and Fred H. Jones succeeds him as resident manager in charge of eastern territory with offices at 30 Church street, New York. Mr. Jones has been connected with the General Railway Signal Co., since it was organized in 1904 and in the intervening 14 years, has held various important positions, including the resident managerships of the Chicago and San Francisco territories. Mr. Henry has been affiliated with the organization since the formation of the Taylor Signal Co. in 1900.

Iron and Steel Men in War Machine

Benedict Crowell, Assistant Secretary of War

BENEDICT CROWELL is one the half dozen or so names which on the business or production side are counted on most to win the war according to the recent judgment of a high authority. An important part himself of the nation's effective machine for making war, Mr. Crowell is credited with a larger share in bringing its component parts into smooth working order than any other individual. The President with Secretary of War Baker elaborated upon and perfected the reorganization plan for a business regime in conduct of the war at Washington, but its original draft was offered by Mr. Crowell. His was the job of working out the details. When the council of national defense was formed he figured prominently in its deliberations and became associated with the gun division of the ordnance department. His work was included under the functions of the general munitions board, especially in connection with steel production. A civil engineer by profession, he had been commissioned a major in the engineers corps, several months previously and placed in charge of the Washington bureau of the Panama canal, to relieve Lieutenant - Colonel Browne for field service. He resigned this commission when on Nov. 9, 1917, he was appointed assistant secretary of war to succeed Wm. M. Ingraham. When Secretary of War Baker made his recent inspection tour of the front line trenches in France, Mr. Crowell was made acting secretary of war and was in entire charge of that office.

It took Mr. Crowell just about a quarter of a century to reach this important post of authority in the biggest business in the world at the present time. His first position was that of chemist for the Otis Steel Co., Cleveland, the city of his birth in 1870. He had been graduated from Yale in 1891, but took a special course at Case School of Applied Science. He steadily advanced and when he resigned in 1896, he was rolling mill superintendent. He entered business for himself as a chemist and later as mining engineer. Three years later he formed the partnership of Crowell & Peck, which later was dissolved. For several years before his appointment as assistant to Secretary Baker, however, he was a member of the firm of Crowelll & Murray, Cleveland, chemists, and in that capacity became well known to the iron ore trade. He did much analysis work for companies mining and selling Lake Superior ores. With Mr. Murray, he is the joint author of "The Iron Ores of Lake Superior". When called to Washington, he was president of the Crowell-Lundoff-Little Co., large builders and contractors.



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BENEDICT CROWELL

President Wilson in his weekly conferences with heads of important war boards who are not members of the cabinet, follows a plan instituted by Mr. Crowell. For some time, the latter with a group of important men in the war department has made it a practice to call in the military committees of congress for a frank weekly talk, looking toward more effective co-operation.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

War-Time Opinion Favors Big Business

INDICATIVE of the more liberal attitude toward big business in general, the decision this week of the United States Supreme Court in the government's antitrust suit against the United Shoe Machinery Co., is regarded as a highly significant development. This majority opinion dismissing the government's petition gives room for speculation as to the effect on the biggest Sherman law case now pending, namely, the Steel corporation dissolution suit. The following paragraph of the court's opinion in the United Shoe Machinery Co. case is important:

"Considering the remedy prayed, which is extreme, even in its mildest demands, we may ask, what of the investments that have been made during these years of extension and development of the new company's business? How pick out from the new conditions the conditions of 1899 and restore them and the art of that time and rehabilitate the businesses that are alleged to have ceased to exist or to have become merged in the United company."

In this decision the Supreme Court emphasizes the difficulty of dissolving a business of this kind as an argument against such action. It is generally believed thereby a precedent has been established in this, the first antitrust case, to be decided by the Supreme Court, since the United States entered the war.

Dissolution Not Good Business

Enlightening as well as significant is the following section of the opinion: "The idea is repellant that so complete an instrumantality should be dismantled and its concentration and efficiency lost. The United Shoe Machinery Co. indeed has magnitude, but it is at once the result and cause of efficiency and the charge that it has been oppressively used, is not sustained."

That similar statements could be made with reference to the Steel corporation is clear. They would be peculiarly pertinent following the demonstration of efficiency now being given by the Steel Corporation in supplying the government with materials needed in its prosecution of the war. Eight months after the entry of the United States into the conflict Chairman E. H. Gary stated that 80 per cent of the government's requirements were being met by the Steel corporation and 75 per cent of the steel it produced was going to the government. Recent pledges have brought the figure up to 100 per cent. Now the government has appealed to the Corporation to build and operate a great ordnance plant as a further mark of its efficiency and value for National Service.

Steel Corporation Helps Greatly

Last May, when announcement was made through Chief Justice White that the Supreme Court had ordered a re-argument and when the case was postponed, Judge Gary said: "I regret exceedingly the delay incident to a re-argument. However, in the meantime, we shall proceed to enlarge our facilities to meet the requirements of the government to the utmost of our ability." This was soon followed by requests from the government for expansion in many directions including the shell capacity of the Illinois Co., Carnegie Steel Co., and the National Tube Co., involving the expenditure of over $7,000,000. Then followed last week, the government request that the corporation build the huge gun plant on Neville island near Pittsburgh, at a cost of upwards of $50,000,000, which, however, will be defrayed out of national funds.

Three Companies Merge

The Premier Printing Machinery Co., Boston, which has been incorporated under the laws of Massachusetts, is a consolidation of the United Printing Co., the Potter Printing Press Co. and the Whitlock Printing Press Mfg. Co. Offices have been established in New York, Chicago and San Francisco. The United Machine & Press Co., a subsidiary of the Premier Co., has been organized as a sales agent for the Premier Co., the Woonsocket Machine & Press Co., Woonsocket, R. I., the Chapman Electric Neutralizer Co., the Metals Coating Co. of America and the Framingham Foundries, Framingham, Mass. George U. Hatch is manager.

Krupp Earnings Drop

A recent issue of the *Frankfurter Zeitung* gives the approximate earnings for Krupp's works as $20,000,000 for 1916-17, a sharp decline from what they were in the 1915-16 period. A comparative statement follows, marks being worth under normal exchange 23.8 cents in American money:

	1916-17. marks.	1915-16. marks.
Sur. on year's working	89,065,000	95,928,000
Paid in dividends	25,000,000	30,000,000
Written off	88,425,000	90,143,000
Paid in taxes	30,899,000	28,649,000
Placed in reserve	7,048,000	4,482,000
Carried forward	14,679,000	11,002,000

Earns Liberal Rate

The annual report of the Vulcan Detinning Co. shows that in 1917 the company earned $197,643 after all charges except the excess profits tax, an increase of $156,051 in a single year. Deducting taxes of $11,858, the surplus available for dividends amounted to $185,785, equivalent to $12.38 a share on the $1,500,000 preferred stock outstanding.

Financial Crop Ends

Net earnings available for dividends, after charges, for the Charcoal Iron Co. of America, Detroit were $531,553 for the quarter ended March 31, 1918, as against $364,992 in the same period a year ago.

* * *

Decision was recently made by the liquidating trustees of Milliken Bros. Inc., to pay another $10 a share in liquidation on the preferred stock. Payment will be made June 1 to stockholders of record May 16.

* * *

In three Liberty loan campaigns, the Yale & Towne Mfg. Co., Stamford, Conn., has subscribed for $1,300,000; its employes $562,850, a total of $1,862,850. In the third campaign, the

company subscribed for $700,000 worth and 3545 of its 4255 employes bought $246,300 additional, making a total of $946,300.

* * *

The receivers of the Bijur Lighting Co. have been directed by the federal district court of New York to accept the bid of the General Electric Co., made on April 29 for the assets of the company. The purchasing concern agrees to organize a new company, provide $300,000 as working capital, and if necessary an additional $200,000.

* * *

President F. W. Blair of the Charcoal Iron Co. of America, Detroit, stated recently that net earnings after charges, but available for dividends, for the quarter ended March 31, 1918, were $531,553 as compared with $364,992 in the same period a year ago. Unfilled orders on hand March 31, totaled 99,130 tons. Current assets at the end of the quarter were $2,364,651, current liabilities $1,494,565 and surplus $1,935,615.

* * *

Receivers of the Federal Dyestuff & Chemical Co., New York, have been permitted by the federal district court to accept from a committee of note holders headed by Alvin Kreech, not more than $150,000 at any time, to operate its plant at Kingsport, Tenn., so that 9,000,000 pounds of picric acid for the government might be manufactured. The government is to pay 56 cents a pound for the picric acid.

* * *

While smaller profits were shown for the year ended Dec. 31, 1917, by the Steel & Radiation Co., Ltd., Toronto, Ont., a substantial growth in the ordinary business activities of the company is indicated. Sales of heating and steel products totaled $556,306, an increase of $100,000 over 1916. After deducting therefrom the bond interest and other interest charges aggregating $76,035, net profits of $213,516 remained.

* * *

A strong showing was made by the Art Metal Construction Co., Boston, in its earnings for the year ended Dec. 31, 1917. Profits before deductions for bad debts and other special reserves was $532,888 against $297,678 in 1916. This profit is equal to 62.1 per cent on the $857,120 outstanding stock, as compared with 34.7 per cent in 1916. Shipments made in 1917 totaled $3,387,200 in value as against $2,286,000 in 1918.

* * *

Since the Standard Screw Co., New York, changed its fiscal year recently from 12 months ending March 31, to the calendar year, its net profit after depreciation and taxes were deducted for the nine months from April 1 to Dec. 31, 1917, were $1,313,789. After deducting dividends of 6 per cent on preferred "A" stock and 3½ per cent on preferred "B" stock, the balance of earnings on the $2,500,000 common stock was equal to $48.13 per share. Surplus of $728,371 was added to the previous surplus of $6,249,476, making a total surplus of $6,977,847.

Excessive Prices

Charged Against Some Toluol Makers by War Industries Board

New York, May 18.—Members of the toluol division of the war industries board are indignant over what they regard as profiteering by producers of toluol. Some producers have charged as high as $5 to $6 per gallon which the government has permitted them to sell to commercial users. The committee takes the view that inasmuch as it is releasing toluol only for essential commercial uses, producers, in charging exorbitant prices, are taking advantage of the situation. The most important producers are charging for toluol released by the government $2 per gallon at producers' plants for lots of one to 10 drums, and $1.75 for lots of more than 10 drums. The regular price on tank cars to the government is $1.50 per gallon. No more toluol will be released for delivery to commercial consumers during May. It is learned that the amounts released for May equal approximately one-half of the quantities for which applications were made. Applications for toluol for June delivery must be in the hands of the toluol division of the war industries board by May 26. Practically the only releases which were made for May shipment were granted to dyestuffs and pharmaceutical manufacturers.

The phenol market is easier due to larger production and better shipping conditions. Manufacturers of phenol have been able to accumulate a fair spot supply. Spot now is 50 to 52 cents per pound.

The naphthalin market continues exceedingly strong. Producers are behind in deliveries to the extent of several million pounds. Only occasional small spot lots are being sold and are going at 10 to 12 cents per pound.

Sales of benzol do not make a large total, and the market continues easy at 28 to 35 cents per pound at both spot and contract. Solvent naphtha continues strong at 18 to 22 cents per pound for contract and at 18 to 25 cents for spot. The inquiry by the navy department has not yet developed into any business.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.28 to .35
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.50 to .52
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.55 to 5.60

Contract

Pure benzol	$0.28 to .35
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Plans Big Power Plant

Plans for the construction of a steam power plant at a cost of $1,200,000 and work will be started as soon as possible by the McKeesport Tin Plate Co., McKeesport, Pa. President E. R. Crawford advises negotiations with the government for the right to erect a wall 400 feet long and 15 feet high along the Youghiogheny river between the Thirteenth and Fourteenth street bridges, Port Vue, are pending. The site of the proposed power plant is a 7-acre plot adjacent to the mills. The new plant will occupy the plot of ground and it is believed that further additions to the company's tin mills, already the largest of the kind in the world, are contemplated.

President Crawford has announced that the company has purchased twelve 600-horsepower boilers, with stokers, pumps and other equipment for the new steam plant. The company is to make extraordinary efforts to have this plant installed by the middle of November so that it can have the use of it during the coming winter.

Will Supply Charcoal

Erection of a $600,000 hard-wood by-product plant is to be started on at once at Shelby, Ala., a few miles south of Birmingham, by the Shelby Chemical Co., in connection with the blast furnace properties of the Shelby Iron Co., of which Morris Bush is president. The furnaces at Shelby operate on charcoal and coke. Contracts are said to have been closed covering the by-products, wood alcohol, acetone and acetate of lime. The charcoal will be used at the furnaces. The plant is to be completed and in operation by August.

The Electric Furnace Construction Co., Philadelphia, has taken a contract from the navy department for the installation of a 6-ton electric furnace of the Greaves-Etchells type, for installation at the Mare Island navy yard, San Francisco.

Obituaries

EDWARD L. BILLINGSLEA, who was resident partner of Rogers. Brown & Co., Chicago, died May 16 at his home in that city, after being confined but four days. Death was caused by selective toxaemia which followed a stroke of paralysis several days ago. He was born in Maryland, 50 years ago and had been connected with Rogers, Brown & Co., for more than 25 years. He commenced as office boy and clerk in the Cincinnati office and rose to the partnership about 14 years ago by reason of his efficiency and ability. About 20 years ago, he was placed in charge of the Chicago office. Mr. Billingslea was one of the vice presidents of the Iroquois Iron Co., prior to the time it was sold to its present owners and he contributed much to its success. He was well known and highly regarded by iron and steel men everywhere and possessed rare personal traits which won him many firm friends. His honesty of purpose at all times, often was displayed to his own cost in an effort to avoid doing an injustice to others. During recent market complications, his often-expressed wish was to remain on the safe side when any question arose as to duties or responsibilities. He was largely responsible for the development of the Rogers Brown Iron Co. When the company was organized, it immediately commenced to look around for ore fields. Mr. Billingslea made several investigation trips through the ore country. His company became one of the early and prominent holders of territory in the Cayuna range and obtained title to the territory due to his initiative and enterprise. At one time the Rogers Brown Iron Co., was the largest holder on the Cayuna range. It opened the first mine, which subsequently became the most important, the Kennedy mine. For a season or so it was the only operating mine in that territory. In the success of the first foundrymen's convention in Chicago in 1914, Mr. Billingslea was a prominent factor. He had always taken a great interest in the development of the foundry industry in the middle west He was a member of the Chicago Foundrymen's association and the American Iron and Steel institute as well as many Chicago clubs.

Horace Pratt Tobey, who for nearly 60 years was principal stockholder and chief executive officer of the Tremont Nail Co., Wareham, Mass., and who retired as president recently, died at his home in that city, May 14. He died in the room in which he was born, having lived continuously in the same house for 81 years.

John J. Cummings, who has been president of the McGuire-Cummings Mfg. Co., Chicago, railroad cars and track materials, died in that city on May 4.

Alfred Saeger Weinsheimer, aged 72 years, secretary of the Pullman Co., died May 11 at his home in Chicago. He was born May 12, 1846, at Allen-



EDWARD L. BILLINGSLEA

town, Pa., began work as telegraph operator for the Lehigh Valley Co., in 1860, served four years in the quartermaster department during the Civil War and entered the service of the Pullman Palace Car Co. at Chicago in 1871. He remained with this company and its successor, the Pullman Co., until his death.

John Jordan Bullock, who formerly served as secretary of the Bullock & Whireard Foundry Co., New York, more recently engaged in advertising work on Chicago newspapers, died of apoplexy May 17 at his son's home in Chicago, aged 68.

J. L. Lanigan, sales representative of the International Molding Machine Co., Chicago, died May 15, at Crouse Irving hospital, Syracuse, N. Y. Prior to becoming affiliated with the International company, he gained a wide experience in the foundry business as a salesman in Ohio, western Pennsylvania and western New York. Due to the intimate knowledge of the foundry business obtained in those years, he became invaluable to the International company as a salesman, making an enviable record in that capacity.

N. V. F. Wilson died May 7, at his home in Pittsburgh. He was well known in steel and engineering circles having located in Pittsburgh and obtaining employment with the Linden Steel Co., many years ago. He later was identified with the Aetna-Standard Steel Co., Bridgeport, O., the Portsmouth Steel Co., Portsmouth, O., and the Western Steel Corp., Irondale, Wash. For a number of years he was district manager at Muncie, Ind., for the American Sheet & Tin Plate Co. He was born in Northumberland, England, 56 years ago. He was a member of the Engineers' Society of Western Pennsylvania.

Charles Skryne Powell, well known electrical engineer, died May 11, at his home in Cleveland and was buried in Cincinnati, May 14. He was 47 years of age. For many years he represented the Westinghouse Electric & Mfg. Co., in Cleveland and in 1902, he was transferred to London, where he assisted in establishing a branch office for the Westinghouse Co. A few years ago he returned to Cleveland to engage in electrical engineering. Mr. Powell was educated at Ohio State university. He was a member of various technical societies and of the Phi Kappa Psi collegiate fraternity. His brother, Thomas C. Powell, vice president of the Southern railroad, is a member of the war industries board.

William Douglass Hyde, for many years a leading steel works' engineer in this country, died May 17 at Brooklyn, in his 88th year. Mr. Hyde, for at least 35 years, was associated with the late Thomas Bray, during which period they built numerous steel plants, and took over and operated numerous plants for the United States Steel Corp. Among the mills which they constructed were the Pittsburgh Steel Works, the Pennsylvania Steel Works and the Elba Iron Works. Mr. Hyde also erected the tube mill at Benwood, W. Va., which now is a subsidiary of the National Tube Co. Mr. Hyde was member of the naval veterans' association, having served in the United States navy during the Civil war.

Big Problem to Get Ordnance Tools

Second Great Works to be Built by Midvale Steel & Ordnance Co. Will Increase Pressing Machinery Needs to $15,000,000 Says Col. Reed—Small Portion in Sight—Tool Builders Meet

A GRAPHIC outline of the tremendous machine tool needs of the ordnance department set tool builders' ideas awhirl at the annual convention of the National Machine Tool Builders' association, at Atlantic City, N. J., May 16 and 17. Col. H. W. Reed, of the ordnance department, took advantage of the occasion to tell machine tool builders exactly what will be required of them in realizing our gigantic ordnance program. His talk revealed a startling scarcity of heavy tools suitable for making large caliber guns and projectiles. Provision for increasing the capacity for such large tools, he said, is a responsibility which the ordnance department expects the machine tool industry to shoulder. The necessities of the government are such, Col. Reed said, that no machine tool plant can be permitted to slow up production because its particular product is not badly needed. The time has arrived when manufacturers must abandon old lines and make the tools needed by the government.

In order that the needs of the government may be met, close contact between the machine tool builders and the machine tool section of the war industries board is imperative. Col. Reed also reminded his hearers that it is imperative that machine tool builders maintain their engineering service departments, which, due to present conditions, in many cases have been neglected. Many contracts are being let by the government to people who have had very little experience in the kind of work called for. Hence, they need help and advice as to what tools to buy and how to do the work. As an illustration of the pitfalls which beset many government contractors, he mentioned an instance where a company recently was on the point of buying more than 100 lathes for which it had no use. Furthermore, Col. Reed said that profiteering is not to be tolerated and he asked the aid of the machine tool builders in stifling any tendency toward asking outrageous prices.

As an illustration to the extent to which large tools will be needed, Colonel Reed enumerated the requirements of the large government cannon and projectile plants which are to be built by the United States Steel Corp., near Pittsburgh, and the Midvale Steel & Ordnance Co., near Philadelphia. For these plants, approximately $10,000,000 worth of large tools will be needed initially, while $5,000,000 worth of all kinds of tools must be purchased later. At the present time, the ordnance department knows where it can buy only about $1,500,000 worth, leaving $13,500,000 worth to be provided for. Colonel Reed read a list of nearly 600 large tools which will be required for these plants. It is possible that even double this number of large tools will be required, he said; the exact requirements will be known in two or three months. In addition to the requirements of the two ordnance plants, Colonel Reed said that $5,000,000 to $10,000,000 worth of small tools for making pistols and rifles will be needed. No difficulty is anticipated in getting these particular tools. In addition, a huge amount of machinery for making small arms ammunition must be purchased. In fact, the present small arms ammunition capacity of the country must be more than doubled.

THE appalling shortage of skilled labor in this country was revealed in a paper by H. E. Miles, chairman of the section on industrial training for the war emergency of the council of national defense, whose paper was entitled "Women in Industry". Figures showing the number of men who apply for jobs as skilled workers are exceedingly misleading, since very few of the applicants measure up to requirements. Of 10,868 skilled men who applied for jobs in Massachusetts in one month, only 1200 were found to be competent machinists. Of 8000 skilled men who applied for work in another state during one month, only 172 proved to be dependable machinists. It has been demonstrated that only one of 10 applicants for work in which skill is required, are really skilled men. It, therefore, is necessary in order to provide workers in the immense numbers that will be needed to train them for the jobs they are to fill. Mr. Miles said that good instruction is most difficult to secure and he enumerated instances where, by careless instruction, learners absorbed more undesirable than good methods. Good results have been obtained in recruiting the ranks of the teachers in certain trades from allied trades. By this system, machinists have been given charge of the training of patternmakers and patternmakers have been charged with the training of machinists. By giving a skilled man charge of training in some line in which he is not daily occupied, he is found to exercise more patience and attention to details, with the result that the learners become proficient in a much shorter period of time.

Women Workers Excel Men

Mr. Miles recommended the employment, on a large scale, of women in the machine tool industry. He mentioned numerous instances where women have far eclipsed the records of the men. For instance, in a certain shop in this country a girl made $9 a day almost from the start because a man who operated the machine before her had satisfied his employers that $5 worth of work was all that could be produced. In another shop girl operatives turned out work in one 9-hour shift that had required two shifts of men. At a certain shop in Dayton, O., male workers turned out 20 pieces per hour of a certain fuse part. Owing to dissatisfaction with the piece rate, the men practiced various methods of curtailing output, such as putting oil on the belts, and the production accordingly dropped to 12 per hour. Realizing that emphatic measures must be taken, the company trained women in this work. The latter almost from the beginning produced at the rate of 25 pieces per hour and later raised the output to 55. Mr. Miles illustrated his talk with numerous slides which showed that women are doing even the heaviest work satisfactorily and without physical deterioration. These slides showed particularly the work that is done by women in England, who in countless cases are setting up their own tools and doing work to very

close tolerances as inspection showed.

One of the principal causes for the higher rate of production which in many cases is being attained by the women in the machine shops in this country is the dissatisfaction which exists among the men owing to piece rates. They have found that it is customary after their total pay exceeds a certain figure, for their employers to reduce the piece rate. Therefore, feeling that there is a limit to the amount of pay they may receive, they are anxious to obtain the highest possible figure for the smallest amount of work. The remedy for this evil is the adoption of intelligent methods for computing piece work rates. These should be established as a result of careful investigation, after which the men should be informed that the rates will not be changed during the period of the war. Such a system, he thought, would result in stimulating output. A well informed New England machine tool builder, Mr. Miles said, stated that the machine shops of New England are only 70 per cent efficient. This showing is due almost entirely to dissatisfaction with piece rates. As opposed to this condition in New England, Mr. Miles spoke of numerous machine shops in England, where women employes predominate, which, on the same comparative basis, are 125 to 200 per cent efficient.

Austin Babcock, of the Guaranty Trust Co., New York, spoke on the problems which will confront business in this country after the war. In the midst of carrying out our obligation of winning the war, we must prepare for peace, and however far off peace, may be, its known problems are so important as to require immediate attention. In fact, it is only by looking ahead toward peace that we can appreciate the real significance of the past four years, and realize what is involved by the expenditure of about $100,000,000,000 for making war. One vital effect of the war has been the stimulation of development of resources in all countries, and the speeding up of commerce and production. Another vital effect is the control which governments have assumed over commerce and industry. In this country the government has clasped hands with business in a manner which indicates a pronounced paternalistic policy for the future.

A great danger to our future, said Mr. Babcock, is that we generally do not appreciate the efforts which our allies will make to reorganize their foreign trade after peace comes. In all of their present plans for the future, foreign trade is the keynote, since it is only by selling products abroad that they can hope to pay their debts. Fortunately, our method of financing the war, like that of our allies—by heavy taxation and borrowing, does not mortgage our future to the same extent as in the case of Germany, which is relying largely upon loans and only to a very small extent upon taxation. It also is fortunate for us that after the war we shall have a merchant marine for carrying our products to all parts of the globe. It is vitally important, however, said Mr. Babcock, that the restrictive legislation hindering our maritime power be repealed and replaced by laws more favorable toward maritime development.

Reasonable Prices Called For

At his opening address at the convention of the National Machine Tool Builders' association, President J. B. Doan said that advances in machine tool prices, despite the greatly increased costs of production, have been modest. It is the duty of the machine tool builders to keep their selling prices within bounds of reason, he said, and to help the country at this time by quoting prices which embody only a legitimate profit. Mr. Doan deplored all ill founded criticism of the government at this time, saying that this accomplishes more harm than good. He especially warned against criticism of delays unless the full circumstances are known. For instance, he said, the criticisms of the execution of the aircraft program are due to lack of appreciation of the amount of time which of necessity is required in preparing for the manufacture of aircraft on a large scale.

Admiral R. S. Griffin, engineer-in chief, United States navy, congratulated the association on the fact that while prices now naturally are high, he could not remember a single case where a machine tool builder asked an exhorbitant figure of the navy department. He regretted, however, that he could not say the same of all machine tool dealers. Such quotations have not proved harmful, as where the price was considered too high, the navy department has commandeered the tool.

"Just now we are too busy, but some day there is going to be an accounting," said Admiral Griffin. "We want our record clean and we will not permit any profiteering. Anybody guilty of profiteering is sure to hear about it after the war." Admiral Griffin stated that the navy department does not contemplate any large requirements and has only routine purchases in sight. He emphasized the necessity, however, of making quick deliveries on all orders from the navy department.

Following Admiral Griffin's address, President Doan, of the association, rose to a defense of the machine tool dealer. Although a few dealers have not been in line, they have been marked exceptions, said Mr. Doan, as most of the dealers have exhibited a consistently patriotic attitude. He voiced the willingness of the association to subordinate all other requirements to those of the government, and he expressed it in line with the association's ideas for the government to exercise its right of commandeer in all cases where there is a tendency to demand outrageous prices.

Charles T. Foster, vice president of the American Radiator Co., and assistant commissioner of priorities, stated that the machine tool industry has been placed on the fuel preference list, so that in case of a fuel shortage next winter, machine tool builders will be among the users whose plants will be kept going. Mr. Foster described the great scope of the work of the priority committee and he explained that in directing this work, the committee is actuated solely by necessities of our government and its allies. The committee does not want to run anybody's business, and in order to prevent mistakes, is desirous at all times of receiving suggestions and complaints. The work of the committee, Mr. Foster said, serves to simplify the problems of manufacturers. For instance, the army and navy departments and Emergency Fleet corporation have agreed not to exercise their right of commandeer until they have given the priority committee an opportunity to secure the material they want. As a result, a great deal of industrial disturbance which the general exercise of the right to commandeer would entail, has been eliminated. Mr. Foster requested that all manufacturers and government contractors leave questions of priority entirely to his committee and that they establish no priority agreements of their own, as these serve to complicate the priority committee's work.

In an inspiring address about the war, Isaac F. Marcosson warned the machine tool builders against optimism. The Germans never before were as strong as they now are, while the situation of the allies never has been so uncertain. The principal obstacle toward allied successes, he said, has been the diliatory policy which has been pursued. On all fronts the allies hitherto have been too late. Haste in executing our own war program, therefore, is vital, and he exhorted the machine tool builders to

remember that theirs is a basic industry and that each day lost in production and in making deliveries is a blow to the allied cause. Mr. Marcosson said that in his trips abroad he found indisputable evidence that the Germans are preparing to make use of Spain, Holland, Russia and Switzerland in regaining their foreign trade after the war. Therefore, goods made in these countries should be viewed with suspicion. Mr. Marcosson dwelt upon the deplorable effects of pro-Germanism in neutral as well as belligerent countries and he urged the harshest treatment of German propagandists here.

Urges Adoption of Trade Acceptance

Maurice T. Fleisher, of Philadelphia, characterized the trade acceptance as a commercial instrument which is as beneficial in its workings as an improved tool which makes it possible to increase production at lessened expense. He explained the use of the trade acceptance and urged its general adoption.

The Becker Milling Machine Co., Hyde Park, Mass., and the Defiance Machine Co., Defiance, O., were elected to membership in the association. The resolutions committee at the convention consisted of O. B. Iles, chairman; E. M. Woodward and Charles H. Alvord.

At an executive session held Friday morning, the association was addressed by George Merryweather, of the machine tool section of the finished products division of the war industries board and by H. W. Dunbar, of the Norton Grinding Co., who spoke on "Safety Devices on Machine Tools".

Prices for Car Castings Are Fixed

WASHINGTON, May 21.—In agreeing on fixed prices for malleable castings for cars, the United States railroad administration officially recognizes the importance of malleable iron to the great government car-building program. The new fixed prices, which are shown in detail in the accompanying table, were agreed upon by a subcommittee of the general advisory railroad purchasing committee and a committee of malleable casting manufacturers who met in Washington on May 15. The railroad administration's subcommittee consisted of H. C. Pearce, of the Seaboard Air Line; W. G. Phelps, purchasing agent, Pennsylvania Lines West, and W. C. Bower, purchasing agent, New York Central railroad. The new price schedule has been approved by the American Iron and Steel institute. Under its provisions thousands of tons of malleable castings will be ordered for the 100,000 railroad freight cars to be built for the government. Malleable iron castings have always occupied a prominent place in the railroad car construction and the recent announcement made by the subcommittee representing the railroad administration in this particular case is as follows:

"Orders are to be placed by the car company at prices quoted today with the understanding that these prices are to be reviewed by the war industries board. If that board finds these prices too high, it will revise them, revised prices to apply on all orders, and any excess made to be refunded to the railroad administration."

The approval of the prices by the iron and steel institute, however, makes it certain that no changes are contemplated at the present time, and the new schedule will stand as issued until further general price revisions are in order.

Prices for steel castings also have been agreed upon by representatives of the manufacturers and the railroad administration. The detailed figures are presented in the accompanying table.

Fixed Prices for Car Castings

MALLEABLE CASTINGS

Miscellaneous Freight Car Castings

Quantity ordered	Under 25 pcs.	26 to 100 pcs.	101 to 250 pcs.	251 to 500 pcs.	Over 500 pcs.
Draft lugs	8.90c	8.00c	7.35c	7.15c	7.00c
Journal box wedges	8.90c	8.00c	7.35c	7.15c	7.00c
Spring seats	8.90c	8.00c	7.35c	7.15c	7.00c
Striking plates	8.90c	8.00c	7.35c	7.15c	7.00c
Truck columns	8.90c	8.00c	7.35c	7.15c	7.00c
Rail braces	8.90c	8.00c	7.35c	7.15c	7.00c
Center plates	9.00c	8.10c	7.40c	7.25c	7.10c
Center plate supports	9.00c	8.10c	7.40c	7.25c	7.10c
Center sill separators	9.00c	8.10c	7.40c	7.25c	7.10c
Coupler carriers	9.00c	8.10c	7.40c	7.25c	7.10c
Push pole pockets	9.00c	8.10c	7.40c	7.25c	7.10c
Side bearings	9.00c	8.10c	7.40c	7.25c	7.10c
Back stop castings	9.05c	8.15c	7.50c	7.35c	7.20c
Bolster center fillers	9.35c	8.45c	7.75c	7.60c	7.45c

All Other Miscellaneous Freight Car Castings

Quantity ordered	1 to 5 pcs.	6 to 25 pcs.	26 to 100 pcs.	101 to 250 pcs.	251 to 500 pcs.	Over 500 pcs.
Under 2 lbs.	26.25c	21.25c	17.00c	12.50c	11.00c	10.25c
From 2 lbs. to 7 lbs.	21.25c	17.00c	12.25c	10.25c	09.75c	09.25c
Over 7 lbs. to 15 lbs.	14.75c	11.50c	10.25c	09.25c	08.75c	08.50c
Over 15 lbs. to 25 lbs.	12.25c	10.75c	09.75c	08.75c	08.25c	08.00c
Over 25 lbs.	11.50c	10.25c	09.00c	08.50c	08.00c	07.75c

All orders subject to above prices.

Above prices are f. o. b. foundry with car load of freight allowed to points within the territory bounded by the Mississippi river on the west, and the Ohio and Potomac rivers on the south. Car load rate of freight only to boundary will be allowed on shipments to points outside of the above territory.

Any pattern equipment necessary to be furnished by or at the expense of customer.

Any castings of intricate design or necessarily of very light section will be charged extra as will be hereafter agreed upon.

STEEL CASTINGS

Name of castings or division of weight	Under 50 castings	50-249 castings	250-499 castings	500 castings and over
Bolster center fillers	11.25c	9.95c	9.05c	8.60c
Center plates	10.25c	9.25c	8.25c	7.95c
Draft lugs	10.25c	8.95c	8.20c	7.80c
Journal box wedges	13.25c	11.60c	10.60c	10.05c
Push pole pockets	10.25c	8.95c	8.20c	7.80c
Roping and jacking castings	13.25c	11.60c	10.60c	10.05c
Side bearings	13.25c	11.60c	10.60c	10.05c
Striking castings	10.25c	9.25c	8.25c	7.95c
Other castings ½ pound	22.75c	20.05c	18.15c	17.40c
Other castings ⅓ pound	18.75c	16.55c	15.05c	14.25c
Other castings 11/25 pound	15.40c	13.55c	12.25c	11.75c
Other castings 26/50 pound	12.75c	11.25c	10.25c	9.75c
Other castings over 50 pounds	10.75c	9.40c	8.60c	8.15c

Patterns extra, unless 500 or more castings are ordered from one pattern at a time.

Enormous Tool Demands in Sight

Heavy Ordnance Plants and Railroad Requirements Combined Will Furnish Unprecedented Purchases in the Near Future—Manufacturing Facilities Will Be Taxed to Meet the Machinery Needs Now Impending

EVERY indication points to an unparalleled demand soon in machine tool lines. With the construction of the Neville island ordnance plant for the Steel corporation and a similar undertaking by the Midvale Steel & Ordnance Co., heavy equipment will be required in great quantities. It is estimated by the ordnance department that over $10,000,000 worth of heavy machinery will be needed on these projects, while almost $5,000,000 of miscellaneous tools will also be required. Extensive railway lists are also making their appearance, and new requirements are expected within a few weeks. Director McAdoo has announced budgets amounting to $479,686,531 for equipment, $440,071,013 for additions and betterment, and $18,203,774 for extensions for the railroads, chiefly those engaged in carrying war materials. These expenditures obviously will carry large machine tool requirements. Actual inquiries during the past week have been light, and have indicated the low point of the curve preceding the stupendous business now in sight. In the central west, a few odd war contracts have made their appearance carrying, however, only replacement orders for tools. A feature of interest in the Chicago district is the appearance of some small arms or more properly cutlery work for the ordnance department. This initial order for a new type of knuckle knife for trench use, coming at the same time with some orders for heavy shells is a mark of the diversity of requirements to come in the western machine tool market. As noted a few weeks ago, the Japanese government has been in the market for a large list of machinery for naval and shipbuilding work. Difficulty has been experienced, for reasons based on the shortage of some lines of tools, and the Japanese importers are still asking for large lathes, drills, grinders and planers. S. Noda, president, Roku-Roku Shoten, Ltd., Tokyo, Japan, has recently been making inquiries in Canada with a view to purchasing machinery. Chinese importers are also asking for tools for use in the Orient. The crane situation is improving rapidly. Shipbuilding continues increasingly active.

Ordnance Needs Will Side-Track Nonessentials

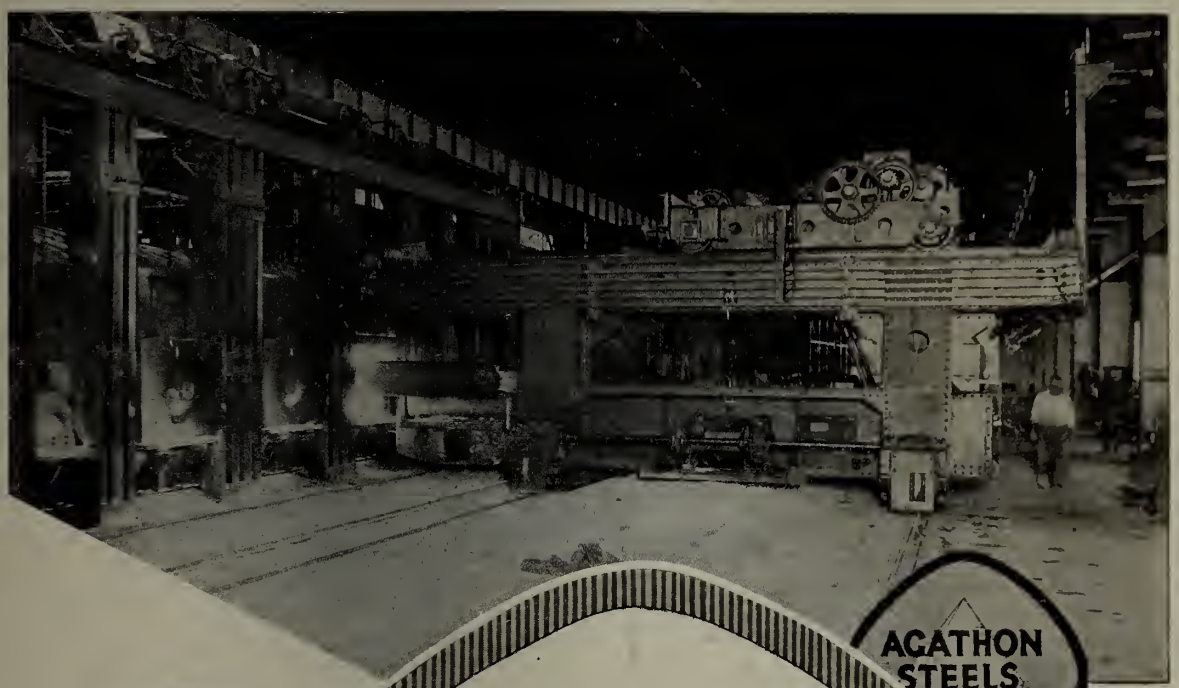
A STARTLING shortage of heavy machine tools for making guns and projectiles of large caliber now dwarfs all other phases of the equipment market. The vast machine tool requirements of the government's gun and projectile program for the first time were defined at the annual convention of machine tool builders at Atlantic City last week. According to Col. H. W. Reed, who addressed the convention as a representative of the ordnance department, a minimum of $10,000,000 worth of heavy tools will be required initially for the two huge ordnance plants to be erected at Neville island, near Pittsburgh, by the United States Steel Corp., and at a site near Philadelphia, by the Midvale Steel & Ordnance Co. In addition to the $10,000,000 worth of heavy tools, some $5,000,000 worth of miscellaneous tools will be required for these plants.

Of the entire $15,000,000 worth, Colonel Reed stated, only $1,500,000 worth of these tools is now in sight. The remainder must be provided for. He put squarely upon the shoulders of the machine tool builders the responsibility of furnishing these tools. They must not only extend their plants, but must abandon, at least temporarily, the production of less essential tools for those the government now needs. He stated that approximately 600 heavy tools, a list of which is given on page 1338 in this issue, would be needed for the Neville island and Philadelphia plants during the coming months. This number of tools he gave as the minimum; as a matter of fact, he said the number might be doubled. The exact requirements will be determined in the next two or three months.

A large inquiry to come out in the eastern market during the past week is that of the Wright-Martin Aircraft Corp., New Brunswick, N. J. This company, which recently closed on about $900,000 worth of tools, is now asking bids on about $400,000 or $500,000 worth of additional equipment for its newly purchased plant at Long Island City, N. Y. Demand from railroads continues to come out in better volume, several sizable lists now being before the market. In addition to the Santa Fe and the Chicago, Burlington & Quincy, the latter of which is now placing business, the Central railroad of New Jersey, the New York Central and the Erie have issued lists calling for from 50 to 100 tools. The Baltimore & Ohio is also understood to be in the market. As yet manufacturers of railroad equipment have not come into the market on an extended scale, although demand from these interests is steadily increasing. Prices on machine tools generally are strong and during the past few days a leading builder advanced quotations on turret lathes and screw machines 15 per cent.

Tool Inquiries from the Orient

A feature in the transactions of the week is the purchase of a number of miscellaneous tools for export to Japan. Another prospective purchaser of tools for the Orient is L. I. Ying, an engineer of the Chinese ministry of war. He is in this country for only a short time and is making his headquarters at the Chinese consulate, 18 Broadway, New York. The Standard Oil Co. of New York is expected to close this week on a large amount of tank shop equipment for its new plant at Providence,



AGATHON STEELS

AGATHON STEELS TRADE MARK

Splendid examples of the ingenuity which has made modern alloy steel manufacture possible are the huge charging machines which charge the open-hearth furnaces. Controlled from the cab at its side, this almost-human machine accomplishes in a few minutes an operation which formerly took hours of toilsome labor.

By the installation of modern electrically-operated machinery throughout our plant, we have not only been able to keep abreast of the demand for Agathon Alloys, but we have also secured added impetus toward the realization of our ideal—Perfection.

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Chicago Office: 1370 People's Gas Bldg. 122 S. Michigan Blvd. C. H. Beach, District Representative.
Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager.
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AGATHON
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"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon

R. I. The Robbins Drydock & Repair Co., Brooklyn, is inquiring for a few tools. The navy department is asking for equipment for its yard at Portsmouth, N. H.

The Nathan Mfg. Co., which has a government contract for the manufacturers of valves, has recently purchased some equipment for its 106th street plant, New York. The Vulcan Iron Works, Jersey City, N. J., which is building a new boiler shop, will issue a list in about two weeks. The Foundation Co., New York, is also expected to be a large buyer shortly. The Morse Drydock & Repair Co., Brooklyn, has recently bought additional equipment for its new forge shop. The Chevrolet Motor Co. is erecting a large addition to its plant at Tarrytown, N. Y., for which equipment will be needed. The Cresson Morris Co., Philadelphia, will build a $35,000 foundry.

Increasing Crane Demand Noted

Demand for cranes continues more active, several large inquiries being before sellers. The Westinghouse, Church. Kerr Co. is inquiring for 10 electric cranes for the Baltimore & Ohio shops, at Glennwood, Pa. Specifications call for two 100-ton cranes, with 87½-foot span; one 30-ton, 39-foot; 15-ton, 57-foot; 15-ton, 50-foot; 15-ton gantry; and four 3-ton traveling jib cranes. The Sun Shipbuilding Co., in addition to the 25-ton traveling crane recently noted, is in the market for one 35-ton, one 10-ton, one 5-ton and seven 15-ton traveling cranes. The American International Shipbuilding Co., Philadelphia, is inquiring for two 10-ton traveling cranes for its plant at Hog Island. Two 10-ton travelers are to be bought by the Ingersoll-Rand Co. for its plant at Phillipsburg, N. J. The New Britain Machine Co., New Britain, Conn., which recently increased its capital stock from $1,250,000 to $1,500,000 for further plant expansion, is now in the market for two traveling cranes of 5 and 10 tons capacity. The Bethlehem Steel Co. is inquiring for one 10-ton bucket crane, 18-foot span, for its plant at Sparrows Point, Md. The Merchant Shipbuilding Co., 165 Broadway, New York, has just bought a 15-ton gantry crane, and is now in the market for two or three gantry cranes of similar capacity. The Virginia Shipbuilding Co., Alexandria, Va., is expected to close shortly on two 7-ton cranes, 76-foot span. The Thompson-Starrett Co., New York, is inquiring for several locomotive cranes. The Morse Drydock & Repair Co., Brooklyn, has recently purchased a 20-ton crane from the Northern Engineering Works, Detroit. The William Cramp & Sons Ship & Engine Building Co. has bought four 10-ton traveling cranes, 106-foot span, for which inquiries were issued several weeks ago. The Cramp company has still to act on the list of 18 cranes more recently issued.

Munitions Work Stimulates Chicago Market

ASIDE from continued large demand for single tools from miscellaneous sources, the machine tool industry in Chicago is receiving heavy inquiry from concerns which have taken or are preparing to take contracts for munitions. This includes hand grenades, 155-millimeter shells and also a new sidearm. Distribution of these orders is stimulating demand for small lathes and sensitive drills, a considerable order for which was filled during the present week for a Wisconsin manufacturer of hand grenades, and grinders and heavier lathes for larger shells. Among those interested in the hand grenade contracts is the International Harvester Co., which is inquiring for punch presses and small lathes. The new sidearm is said to be different from the knives or swords formerly carried, having a steel blade of triangular section, 14 inches long, with needle point and keen angles. The first contract is said to be for 100,000 with others to follow until the entire overseas force is equipped. This will require grinders and special machinery for making the hilts, which are somewhat similar to brass knuckles. On most government munition contracts, four months are allowed for equipping, ready for production, and dealers have been able for the most part to promise machinery within that time. The Chicago, Burlington & Quincy railroad has placed orders for most of its recent inquiry, especially for standard machinery requiring no special investigation and is now going over the remainder of the list, which probably will be placed shortly. It is said this road has adopted the policy of paying on receipt of invoice, instead of the former method of sending invoices through complicated red tape, which usually produces delay. The Invincible Blow Pipe Co., Chicago, is building a two-story factory. The Sanitary District of Chicago is taking bids on a sewage pumping station and its equipment. The Jackson Milling Co., Grand Rapids, Wis., is preparing to build a hydro-electric plant at Stevens Point, Wis. The Consolidated Press Co., Hastings, Mich., is having plans prepared for a gray iron foundry.

Inquiry is Light in Pittsburgh

INQUIRIES in the Pittsburgh district for machine tools are not numerous. Steel mills which have been running as fully as conditions permitted for almost three years are expected to be forced into the market for new equipment before long to replace that which has had to stand exceptionally hard wear and tear without being given the necessary attention for repairs. Makers of machine tools report that practically all business is for the government either direct or indirect and that it is impossible to get steel for any other purpose. Machinery and machine tool builders will be called upon to furnish a vast quantity of equipment for the big ordnance plant to be built by the United States Steel Corp. on Neville island in the Pittsburgh district for the government. Large hydraulic presses, lathes, boring machines, cranes, drills and motors will be among the demands which will be made for this plant.

Market Remains Quiet in Cleveland District

INQUIRIES were spasmodic in the Cleveland district during the past week. A few manufacturers have inquired for small lots of equipment but little real activity was evident. Buying for private commercial ends is almost nonexistent as a feeling prevails that the machine tool resources of the entire country will be severely taxed when the full weight of the impending shell and ordnance work descends. Some surprise has been expressed by dealers who have had orders for machinery for shipyard use, that a higher class priority has been given in some cases to the same equipment wanted for arsenals. Deliveries of large lathes, vertical boring mills and heavy drill presses remain slow, but smaller machinery in most cases can be had promptly. The New York Central railway has an extensive tool list under consideration, which will be issued within the next week or two. The Lake Erie & Western has replaced with used tools and a few machines from stock, the equipment which was destroyed by a recent fire at Lima, O. The Nickel Plate railroad has withdrawn its inquiry which was issued a few weeks ago, and contemplates buying only occasional machines in the near future. The Gent Machine Co., Cleveland, desires two small screw machines and two small lathes. The Electric Materials Co., Northeast, Pa., is inquiring for two 3-spindle drills. The Lakeside Forge Co., Erie, Pa., will purchase a 30-inch lathe, die sinker and a 24 to 30-inch shaper. The Cleveland Pneumatic Tool Co., Cleveland, is building a plant addition.

DOING YOUR "BIT" with ROLLING MILL JIM



Say Fellows! D'you know that there have been quite a few Marine engines for the wooden boats delivered to the Government, and castings in the first engine delivered were "HUBBARD" castings?

Believe me! They are there on deliveries. Try 'em!

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

These Machines Are Needed by the Ordnance Department

Quoting G. E. Merriweather, chairman of the machine tool section of the war industries board, Col. H. W. Reed stated the present requirements of the ordnance department for machine tools as follows:

COMBINATION BORING AND TURNING LATHES

Size	Quantity
85 inches x 50 feet	16
75 inches x 50 feet	6
52 inches x 30 feet	2
72 inches x 50 feet	15
52 inches x 50 feet	2
72 inches x 20 feet	5

VERTICAL MILLERS

No. 6	2
No. 5	8
No. 3	2
No. 4	2

TURNING LATHES

36 inches x 6 feet	2
60 inches x 6 feet to 26 feet	17
54 inches x 6 feet to 24 feet	29
70 inches x 50 feet	8
72 inches x 30 feet	22
85 inches x 50 feet	10
60 inches x 50 feet	4
48 inches x 30 feet	5

PLANERS

48 inches x 12 feet	12
72 inches x 16 feet	10
60 inches x 14 feet	5
48 inches x 14 feet	6
36 inches x 12 feet	25
96 inches x 24 feet	5
120 inches x 30 feet	14
64 inches x 24 feet	8
42 inches x 16 feet	3
120 inches x 24 feet	1
72 inches open side	4

HORIZONTAL BORING MILLS

4 inches	29
5 inches	6
6 inches	5
3 inches	3

SLOTTERS

36 inches	6
30 inches	1
24 inches	5
12 inches	6
48 inches	3
14 inches	8
26 inches	11
10 inches	3
18 inches	3

RADIAL DRILLS

6 feet	8
5 feet	13

BORING LATHES

54 inches x 12 feet to 22 feet	28
40 inches x 50 feet double end	5
50 inches x 25 feet double end	18
40 inches x 25 feet	8
32 inches x 25 feet double end	1
72 inches x 30 feet	2

FLOOR BORING MILLS

7 inches x 7 feet	3
7 inches x 5 feet	2

VERTICAL BORING MILLS

14 feet	1
20 feet	8
12 feet	1
10 feet	5
48 inches	8
72 inches	7
66 inches	3
90 inches	8
60 inches	11
50 inches	3
96 inches	1
Special	3

RIFLING MACHINES

50 feet	3
30 feet	2

MILLING MACHINES

6 inch spindle, horizontal	4
No. 6 vertical	7
No. 5 vertical	6
No. 3 universal	2
No. 5 universal, horizontal	2
No. 4 plain	3
No. 4 universal	3
No. 3 plain	6

MISCELLANEOUS

48 inch gap lathes	18
60 inch gear cutters	3
24 inch gear hobbers	2
24 inches x 8 feet grinders	3
72 inch gear cutters	3
Draw shapers	2
No. 4 gear cutters	1
No. 5 gear cutters	3
16 inches x 50 inches grinder	1
10 inches x 72 inches grinder	1
18 inch rotary saw	1
26 inch shapers	3

RECAPITULATION OF TOOLS FOR WHICH A SCARCITY EXISTS

Boring lathes	$1,239,000
Turning lathes	1,747,000
Combination boring and turn'g	1,535,000
Radial drills	83,000
Milling machines, general	165,000
Milling machines, vertical	33,000
Milling machines, horizontal	306,000
Vertical boring machines	1,150,000
Horizontal boring machines	306,000
Slotters	332,000
Planers	2,118,000
Rifling machines	146,000
Floor boring machines	52,000
Miscellaneous	170,000
Total	$9,382,000
Balance, value available tools	924,000
Total estimated cost	$10,306,000

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

ABINGTON, MASS.—A $100,000 addition, one story high, 40 x 130 feet, will be built by the Liberty Mfg. Co., of which William Marsh is president.

BOSTON.—The Panco Mfg. Co. has been incorporated with $200,000 capital by William J. Saunders, M. Mackay and Frank B. Locateli, of Somerville, Mass.

BOSTON.—The Federal Construction Co. has been incorporated with $50,000 capital by Robert Hamilton, George Barry and John J. Moore, Milton, Mass.

BOSTON, MASS.—Bids close May 20 for a fireproof 10-story, 180 x 180-foot, storehouse and a 2-story addition to the present warehouse, to cost $950,000, for the government at the Charleston navy yard.

BOSTON.—Densmore & LeClear are receiving bids on the construction of a 3-story, 80 x 160-foot plant for the Mason Regulator Company.

BOYNE CITY, MICH. — Frank Kedan, John Bergy, W. L. Martin, W. S. Shaw and Wm. Rapelin have incorporated the Boyne Traction Motor Co., for $75,000. A plant now is being equipped.

HUDSON, MASS.—The Universal Boring Machine Co. has abandoned the plan of building a 1-story, 40 x 100-foot addition to its plant.

NORTH ANDOVER, MASS.—The Davis & Thurber Machine Co. will make alterations to its forge shop, costing $20,000.

PORT HURON, MICH.—The Foundation Co. has absorbed the Reid Wrecking Co. drydock and shipbuilding plant. The plant will be enlarged and keels laid for 10 steel trawlers, 150 feet long.

PORT HURON, MICH.—The plant of the American Machine Corp. was damaged by fire with a loss of $200,000. The fire started when heated shell cases were dipped in an oil bath. The plant will be rebuilt.

SAGINAW, MICH.—Wickes Bros. pattern shop were damaged by fire with a loss of $10,000. They will be rebuilt.

SOMERVILLE, MASS. — The Cambridge Color & Chemical Co. has been incorporated to do manufacturing with a capital of $100,000, by William T. Beattie, K. L. Beattie and A. M. Gorham, Watertown, Mass.

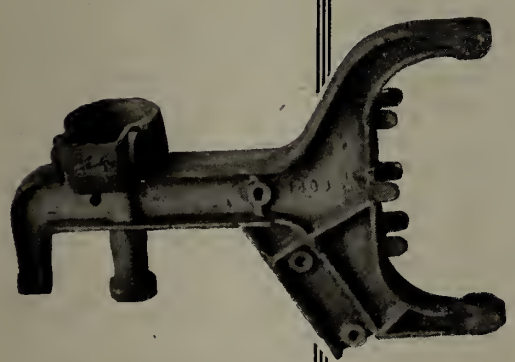
SPRINGFIELD, MASS. — A permit has been issued to the United Electric Light Co. for a brick, steel and concrete, 3-story, 110 x 60-foot, switching station to cost $102,000, at the foot of State street.

WORCESTER, MASS.—The New England Power Co. will build a brick, 2-story and basement, 40 x 70 foot, office building to replace the one damaged by fire recently.

PAWTUCKET, R. I. — The Narragansett Machine Co. is making alterations to its place.



Steering Arms



Tractor Yoke



Gear Blanks

Small Castings for Dependable Service

We specialize in small castings of unusual resilient qualities for the construction of AUTOMOBILES, MOTOR TRUCKS, TRACTORS and MACHINE TOOLS.

FARRELL-CHEEK CASTINGS

are helping to establish reputations for safety and endurance for the products of many of the largest manufacturers in the country.

FARRELL-CHEEK CASTINGS are particularly adapted to their purpose because they are made after an analysis formulated especially for light castings of high resilience.

We also manufacture BLANK GEARS; Carbonizing Boxes; and Case Hardening Boxes.

Let us know your requirements.

Farrell-Cheek Steel Foundry Co.

SANDUSKY, OHIO

Branch Offices

NEW YORK PHILADELPHIA CHICAGO

DANIELSON, CONN. — The Assanaga Woolen Co. is to build a 94 x 194-foot addition to its mill.

NEW BRITAIN, CONN. — The Stanley Works will build a hollow tile 1-story, 31 x 43-foot building, to be used as an office for the hot rolling plant.

NEW BRITAIN, CONN.—The North & Judd Co. will build a brick 20 x 21-foot furnace building and two 20 x 120-foot and 20 x 80-foot storage buildings.

NEW LONDON, CONN.—Bids close May 20 for a wood, 35 x 321 x 41 x 51 foot pier and a 13-foot high steel frame, metal covered storage shed to cost $65,000, for the government.

STAMFORD, CONN.—The H. & H. Foundry, 778 Pacific street, plans the erection of another building, to be used as a steel foundry.

Along the Middle Atlantic Seaboard

ALBANY, N. Y.—The Machine Tool Engineering Co. recently was incorporated by L. S. Love, G. L. Steinle and others, with a capital stock of $100,000. The company will manufacture machinery.

BROOKLYN, N. Y.—The Doehler Die Casting Co., Huntington street, has awarded the general contract to M. J. Moran, 198 Patchem avenue, for the construction of a plant addition.

BROOKLYN, N. Y.—The Improved Appliance Co. has filed plans for a $10,000 plant addition. W. B. Wills, 1181 Myrtle avenue, is architect.

BROOKLYN, N. Y.—Plans for a $45,000 factory building for Cornelius Weiss, 258 Front street, are being revised. The proposed structure, according to new plans will be two stories high, 87 x 100 feet.

BROOKLYN, N. Y.—A $15,000 factory addition will be erected at the plant of Isaac H. Cary, 200 Fulton street.

BUFFALO.—The Donner Steel Co., 475 Abbott road, plans the erection of a 1-story brick blowing mill and locker room, at a cost of $5380.

BUFFALO.—The Acme Steel & Malleable Iron Works, Inc., 245 Milford road, is taking bids on a 1-story addition, 100 x 175 feet.

BUFFALO.—M. J. McNiven, this city, has had plans prepared for a 1-story machine shop at Niagara street and Burd avenue.

BUFFALO. — The Buffalo Wash Tray Works, 579 Tonawanda street, will build a plant here soon.

BUFFALO.—The L. C. Ritter estate has had plans prepared for a 1-story forge shop, 21 x 100 feet, at 815 Seneca street.

BUFFALO. — The Standard Art Mirror Co., this city, will build a 2-story factory, 84 x 119 feet.

DUNKIRK, N. Y.—Plans are being drawn for a 1-story, 85 x 120-foot plant addition for the American Locomotive Co.

DUNKIRK, N. Y.—The United States Radiator Co., this city, will build an addition to its plant.

LITTLE VALLEY, N. Y.—G. F. Miller & Son, Salamanca, N. Y., are understood to have received the general contract for expanding the plant of the Cattaraugus Cutlery Co. Three buildings will be erected at a total cost of $60,000.

LITTLE FALLS, N. Y.—The Catarogus Cutler Co., this city, is having plans prepared for a 2-story plant, 60 x 100 feet, to cost $60,000.

LONG ISLAND CITY, L. I., N. Y.—Plans are being drawn for a $35,000 foundry for the John Polachek Bronze Iron Co., 480 Hancock street. R. Holestein, at the same address, is architect.

LYONS, N. Y.—The Columbia Concrete Barge Co., 60 Broadway, New York, con-

NEW YORK.—The Chelsea Storage Warehouse, 426 West Twenty-sixth street, is having templates the erection of a shipbuilding plant in this city.

ing plans revised for a $70,000 addition. Architects Wortman and Braun, 114 East Twenty-eighth street, are drawing plans which

Business Changes

THE Woodruff Coal & Iron Co., Pittsburgh, recently moved into larger quarters in the Oliver building, that city. It has taken over the business of the Fobewood Coal & Iron Co. W. W. Woodruff is president. The company handles coal, pig iron, coke, castings and various steel products.

V. Baudin, engineer, has removed his office to 21 East Fortieth street, New York.

The Mahr Manufacturing Co., Minneapolis, Minn., has removed its Chicago office to 812 Hearst building.

The Grip Nut Co. has moved its offices from the McCormick building to the Railway Exchange building, Chicago.

Pilling & Crane, Philadelphia, have moved their New York office from the third to the thirteenth floor, 71 Broadway.

The Clarage Fan Co., Kalamazoo, Mich., has removed its Chicago office to the Conway building, 111 West Washington street. Gardner I. Thomas is manager.

new call for a 7-story structure, 25 x 100 feet.

NEW YORK.—The Oceanic Engineering stock of $100,000 to manufacture diving apparatus and raise sunken ships.

NIAGARA FALLS, N. Y.—The National Carbon Co., Cleveland, will erect two factory buildings at its plant in this city, at an aggregate cost of $27,000. One structure will Co. has been incorporated with a capital be four stories high, 50 x 60 feet, while the other will be one story high, 48 x 88 feet. Brass Bros. will be in charge of the construction.

SHOOTERS ISLAND, N. Y.—The Standard Shipbuilding Co. is drawing plans for a 1-story, 60 x 400-foot boiler shop.

SYRACUSE, N. Y.—Work on the erection of a $15,000 warehouse addition for the Harvest Milling Co. has been temporarily postponed.

UTICA, N. Y.—A $30,000 factory addition will be erected by the Bossert Co. The proposed building will be two stories high, 63 x 116 feet. Charles Kiehn is architect.

WATERTOWN, N. Y.—The sulphite mill of the International Paper Co. was badly damaged by fire. The loss is estimated at $100,000.

WATERVILLE, N. Y.—While the erection of an electric plant is being contemplated by the Waterville Gas & Electric Co., Syracuse, New York, the architect has not yet been selected.

EDGELY, PA.—Bids are being received by Architect Harry A. Hill, Trenton, N. J., on a $20,000 plant for the Chain Products Co. The plant will be one story high, 40 x 104 and 40 x 80 feet.

HAZELTON, PA.—Engineer G. T. Hand, 143 Liberty street, New York, will build a plant here for the Lehigh Valley railroad to repair engines.

HAZELTON, PA. — MacCue and Moran, this city, will build a bottling plant on West Broad street at once.

HAZELTON, PA. — The Lehigh Valley railroad has decided to build shops and round houses at Ashmore, Pa., at a cost of $1,200,000.

INDIANA, PA.—A $500,000 mill and general factory building will be erected by the Consolidated Lumber & Supply Co.

LOCK HAVEN, PA.—This city proposes to spend $100,000 for improving its water supply. H. P. Shoemaker is city engineer.

MANHEIM, PA.—The Hershey Foundry Machine Co. has temporarily postponed work on a $30,000 foundry and pattern shop.

MEADVILLE, PA.—E. Z. Van Raalte is manager of the Buffalo branch of the Niagara Silk mills, which will build an addition to its plant here.

MIDDLETON, PA. — The Middletown & Swatara Consolidated Water Co. will build a reservoir here in the near future.

PHILADELPHIA.—Separate bids are being received on the construction of a $15,000 factory by William C. Gruhler.

PITTSBURGH. — The Pittsburgh Iron Folding Bed Co. has purchased land on Pike street here and plans the erection of a building to cost $110,000.

POTTSVILLE, PA.—The Pottsville Iron & Steel Co. has plans prepared for a 1-story foundry 99 x 120 feet.

BLOOMFIELD, N. J. — American Spark Plug Co. has been incorporated with $125,000 capital to manufacture spark plugs. J. S. Fauth, S. R. Kerlin, of Bloomfield, and Robert MacDonald, of East Orange, are the incorporators.

CAMDEN, N. J.—Camden Forge Co. will erect "victory shop," 75 x 480 feet in size,

100

ROLLING MILLS

Of Our Design and Manufacture

79 in the United States of America

5 in Canada	1 in France
5 in England	1 in Belgium
4 in Germany	1 in Austria
3 in India	1 in Australia

AS CONSULTING ENGINEERS

we prepare estimates and make drawings for contemplated rolling mills. Our services include electrical engineering.

AS MANUFACTURING ENGINEERS

we enter into contracts for complete rolling mills, producer-gas machines, and wire drawing equipment.

MORGAN CONTINUOUS ROLLING MILLS—
STANDARD OF THE WORLD

MORGAN CONSTRUCTION CO.

Worcester, Mass., U.S.A.

of brick and metal, and an addition, 31 x 160 feet in size.

HOBOKEN, N. J.—Hudson Pump Co. has been incorporated with $10,000 to manufacture pumps, by John J. Marnell, Francis T. Morgan and Alma B. Borrack, Hoboken.

JERSEY CITY, N. J.—New Jersey Car Spring & Rubber Co. has been incorporated with $1,000,000 capital by W. M. Pepper, New York; G. W. Henne, Mansfield, O.; and G. W. Stephens, Chicago.

MAYS LANDING, N. J.—Bethlehem Loading Co. contemplates the erection of big power plant near South river.

NEWARK, N. J.—The Butterworth-Judson Corp., 421 Roanoke avenue, will erect a 2-story frame and tile factory, 20 x 134 feet, and four 1-story frame storage buildings, 10 x 11 feet, at a cost of $13,400.

NEWARK, N. J.—Work will be started soon on a plant addition for the Central Stamping Co. The steel contract has been awarded the American Bridge Co.

NEWARK, N. J.—August Fink & Sons will erect a 1-story dock and engine room at a cost of $14,000.

NEWARK, N. J.—The New Process Pipe & Tube Bending Co. has filed a certificate of dissolution with the secretary of state.

OGDENSBURG, N. J.—The New Jersey Zinc Co., 55 Wall street, New York, contemplates rebuilding its power house in this city at a cost of $15,000.

PLAINFIELD, N. J.—Accurate Engineering Co. has been incorporated with $35,000 capital to manufacture tools, etc. The incorporators are C. P. Crouch, Anton Johnson and G. W. V. Moy, all of Plainfield.

RIVERSIDE, N. J.—It is reported that the Pennsylvania railroad will erect new car and repair shops near here.

TRENTON, N. J.—The John E. Thropp Sons Co. have completed preliminary plans for a $50,000 foundry, 1-story high, 100 x 350 feet, and a 1-story power plant.

FORT PENN, DEL.—The Marlin Rockwell Leading Co., care of the Marlin Rockwell Arms Corp., 14 Wall street, New York, contemplates the erection of a plant in this city.

CUMBERLAND, MD.—Plans for a $1,000,000 manufacturing plant, to be erected for the Kelly Springfield Tire Co. in this city have been completed by Architect Edward Nercersukmer, 507 Fifth avenue, New York.

RICHMOND, VA. — The Mineral Ridge Manganese Corp. contemplates the immediate erection of an iron furnace of 100 tons daily capacity.

Activities in the Central States

FOND DU LAC, WIS.—Because of a large increase in business the Curtis Tool Co. has moved into larger quarters at Macy and West Second streets. It is probable the company may buy several machines.

GREEN BAY, WIS.—W. P. Wagner will build a 1-story machine shop addition, 38 x 45 feet, to his garage at 1030 Monroe avenue.

MANITOWOC, WIS.—The capital stock of the Stangel Hardware Co. has been increased from $50,000 to $125,000. The concern has just completed a new warehouse, office and store building at Eighth and Quay streets at a cost of $40,000.

MILWAUKEE, WIS.—The Milwaukee Die Casting Co. has awarded contracts for the erection of a $10,000 addition to its plant at 295-297 Fourth street. Architect A. C. Clas is in charge.

MILWAUKEE.—The capital stock of the Magnetic Mfg. Co., 601 Enterprise building, has been increased from $15,000 to $25,000.

MILWAUKEE. — The Pfau Motor Pump Co., 248 Fourth street, is planning a new plant for the manufacture of electrically operated compressed air pumping systems, following its recent incorporation with $30,000 capital stock.

RIB LAKE, WIS.—The Rib Lake Lumber Co. is having plans prepared for a machine shop to take care of all repairs and new construction of machinery and equipment of its big sawmill and planing mill. The investment will be about $20,000.

SHEBOYGAN, WIS. — The Black Cat Hosiery Co., Kenosha, Wis., has awarded a contract to Walter W. Oeflein, 86 Michigan street, Milwaukee, for building a 1-story factory addition, 50 x 150 feet, which will cost about $30,000, with machinery and electric motor equipment.

WATERTOWN, WIS. — The Monarch Tractor Co. will build a machine shop addition, 40 x 150 feet, and an erecting shop and foundry addition, 90 x 100 feet.

WEST ALLIS, WIS.—The Federal Malleable Co., Sixty-fourth avenue, is planning to enlarge its foundry.

WEST ALLIS, WIS.—The Universal Machinery Co., E. C. Devin, president, will build a plant costing $250,000. F. E. Gray, 86 Michigan street, Milwaukee, is architect.

ALMA, MICH.—At the annual meeting of the stockholders of the Ex-Cell-All Co. held here recently, it was decided to build an addition to their plant, 30 x 100 feet.

ANN ARBOR, MICH.—The Forge Products Corp. will build a 1-story machine shop, 52 x 100 feet, and a forge shop, 52 x 80 feet.

DETROIT.—The Commerce Motor Car Co., J. J. Kellogg, secretary, Solvay and Mackie avenues, will build a 1-story factory, 50 x 200 feet. Fred J. Winter, 2331 Dime Bank building, is architect.

DETROIT.—The National Twist Drill & Tool Co. is building a 5-story brick and steel addition.

DETROIT. — The Flower Stephens Mfg. Co., John W. Flower, president, Clayton and Parkinson avenues, will build a foundry addition, 37 x 150 feet, costing $18,000.

DETROIT.—The Detroit Automatic Scale Co. will build a 5-story addition, 113 x 121 feet.

PORT HURON, MICH.—The Great Lakes Foundry Co. has increased its capital to $50,000 and contemplates extensive additions to the plant. The firm recently changed its name from the Theisen-Braithwaite Co., Inc.

SAGINAW, MICH.—The Wolverine Tractor Co., 1895 Ford building, Detroit, will build a 1-story plant 80 x 200 feet.

BLOOMINGTON, ILL. — The city will probably build an incinerating plant, at a cost of from $10,000 to $12,000. A. G. Erickson is in charge.

CAIRO, ILL.—The city is considering the erection of five city terminals for interchange of freight between steam railroads and the Ohio and Mississippi rivers. It is estimated the cost of the structures will total $550,000.

CARLINVILLE, ILL. — Carlinville Home Builders' association plans 300 new houses to be occupied by families of miners attracted by four new mines of the Standard Oil Co. E. A. Ibbetson is president of the association.

CHICAGO.—The Acme Castings Co., capitalized at $10,000, has been chartered by E. H. Levinstein, Joseph B. Brennan and Frank R. Dalton.

CHICAGO. — The Wieboldt Construction Co., Van Buren street and Ashland avenue, will build a 1-story garage 100 x 180 feet, to cost $30,000.

CHICAGO.—The plant of the Diamond T Motor Car Co. is to be enlarged. Approximately 7200 square feet will be added to the company's present plant, requiring an investment of $15,000. An up-to-date tool room is also to be installed.

CHICAGO.—The William Ganschow Co., manufacturer of gears, 1001 Washington street, has bought a site and will build an addition.

CHICAGO.—The Peoples Gas, Light & Coke Co., 122 South Michigan avenue, will build a gas plant in four sections at a cost of $30,000,000. Rudolph Schenck is architect and G. C. Lowell is engineer, both care of the company.

CHICAGO.—The Electric Steel Co., Thirty-first and Wood streets, has let a contract to the E. W. Sprowl Co., 1120 West Thirty-fifth street, for a 1-story foundry addition, 130 x 300 feet, to cost $75,000. S. Scott Joy, 1118 West Thirty-fifth street, is architect.

CHICAGO HEIGHTS, ILL.—The Indiana Car Works has bought the plant of the Hick Car Works and will build additions.

DE PUE, ILL.—Fire has destroyed the east unit of the ore crusher plant of the Mineral Point Zinc Co.

EAST ST. LOUIS, ILL.—The Excelsior Tool & Machine Co., Thirty-first and Ridge streets, will build a 1-story addition, 50 x 166 feet, to cost $12,000.

EAST ST. LOUIS, ILL.—The Erber & Cohn Co. will erect a new fireproof theater here, to seat 2232 persons. It is estimated the building will be erected at a cost of $225,000.

EAST ST. LOUIS, ILL.—Outside capital, aided by local subscriptions, plans an 11-story hotel with 330 rooms and a convention hall. Address Fred W. Mollman, mayor.

FOX LAKE, ILL.—Bids are being taken until May 22 by the village of Fox Lake for the construction of several bridges and culverts.

BOONVILLE, IND.—Plans are being prepared for the construction of a number of bridges in the various townships of the county, and the county auditor will advertise for bids within the next 30 days.

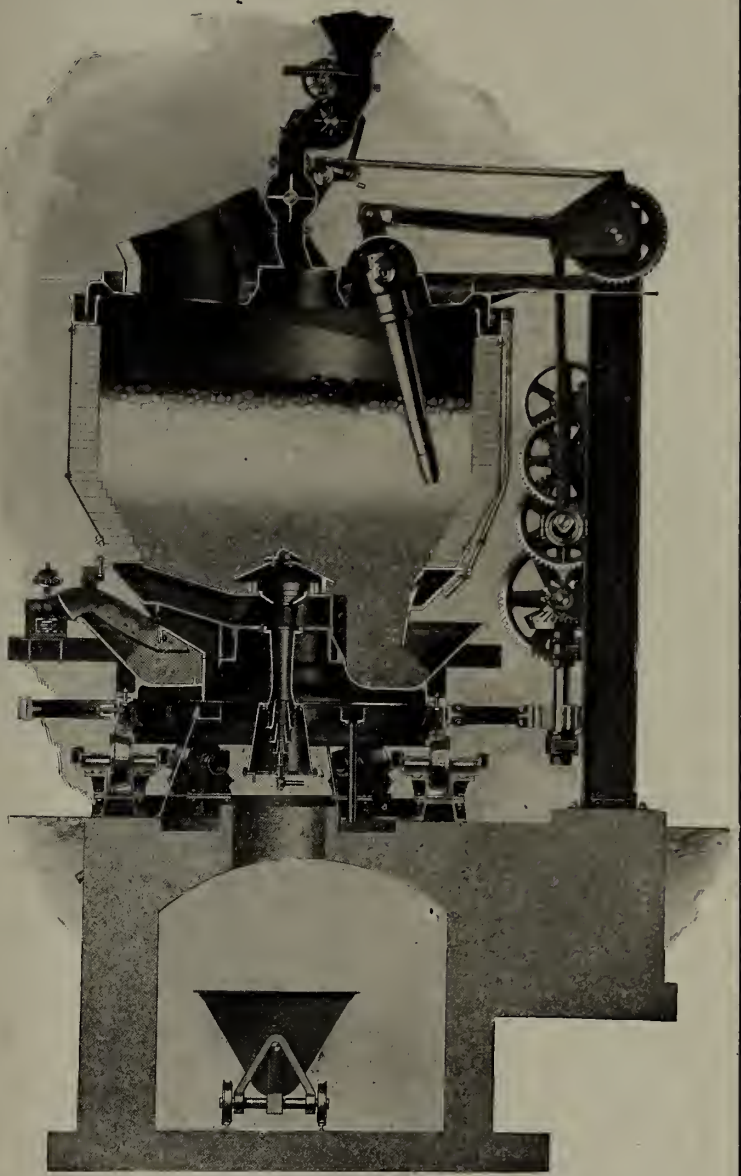
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.95

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	27.50 to 28.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melt'g steel, Birming.	22.50 to 24.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, coupiers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. quar. & east. Pa.	36.50
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.00 to 20.50
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis, St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.50 to 30.50
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	46.50
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1 Chgo.	29.00 to 29.50
Busheling, No. 2, Chgo.	19.25 to 20.25
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cleveland	18.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	17.50 to 18.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	45.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	33.00 to 35.00
Iron rails, St. Louis	36.00 to 36.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	18.00 to 18.25
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 17.50
Machine turnings, Chicago	17.50 to 18.00
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 2, Chgo.	31.00 to 31.50
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	31.25 to 31.75
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	36.50 to 37.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 27.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.50
Cast, No. 1, Cincinnati	31.00 to 31.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	28.50 to 29.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola. East Pa.	33.00
Maleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.00 to 31.50
Malleable railroad, St. Louis	28.50 to 29.00
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	36.00 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	41.00 to 41.50
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, May 30, 1918 *No. 22*

Increased Costs Become Real Factor

Addition of $1 to $1.50 Per Ton to Pig Iron Through New Freight Advances May Have Weight in Price Deliberations—Remaining Commodity Rates Attacked—Pittsburgh May Get Federal Fabricating Plant

PROSPECTIVE high scale additions to profit taxes and to freight rates on raw materials are forcing a new reckoning with the cost factor in iron and steel. The advances of 25 per cent in freight rates, effective June 25, taken in conjunction with the recent 15 per cent advance and the April wage increase, promise to exercise an influence upon the quarterly adjustment of iron and steel prices which is scheduled to come up about that time. By the new tariffs, iron ore will be raised flatly 30 cents per ton, coke from 15 to 75 cents, and coal from 15 to 50 cents, depending on the present rate. Pig iron costs accordingly will be elevated from 75 cents to $1 a ton in the more favored locations, and from $1.25 to $1.50 in the more remote districts. Joined with the general advance is another freight proposal of the railroads to practically wipe out the remaining iron and steel commodity rates in central freight association territory by putting them on the class or mileage basis. It is highly interesting that the ground advanced for this movement is that competition between the railroads, which created the commodity rates, no longer exists.

Steel Survey is Lagging

Light apparently is not to be shed on the government's exact requirements of iron and steel for the conduct of the war. A joint committee of iron and steel producers and representatives of the war industries board which has been making a survey of the situation has met with difficulties that raise doubt whether it will be able to carry out its original aims. Certain of the government departments, it would seem, are unwilling to give a frank statement of their needs on the ground of military caution, or are unable to measure their own requirements because of the day-to-day changes. As the results of the proposed survey were to go far in determining whether there is to be any steel for an open market, that question must remain a subject of divergent opinion. The war industries board in an official statement of policy dissipates the idea that any formal classification of nonessential industries is to be attempted. Rather readjustment is to be effected through the priority regulation of raw materials, so that designated purposes shall be served first. Since it is declared the basic supplies in various lines will be practically exhausted by the government needs, the final result for nonwar industry will be the same.

Big war undertakings continues to mature. It is reported that Pittsburgh will secure the proposed government plant to fabricate ship material. Greater demands for shell steel upon the home mills will result because circumstances have brought it about that France no longer is able to supply the American expeditionary forces with such material.

Much Iron is Allocated

Shortage of basic and low phosphorus iron is reflected in the heavy tonnage allocated in the week for various consumers who are producing essential lines. The basic involved was about 25,000 tons and the low phosphorus about 10,000 tons. Owing to the numerous buyers of iron who have not been able to cover themselves fully for the last half, it is thought the government will be obliged more freely to procure tonnage for essential work as midyear approaches. In the meantime, the checking up by the furnaces of present uses of iron by the consumer is going ahead. Slowness of returns in some districts, notably in the east, has inspired a fear that the questionnaires may not bring out the desired information.

Gray iron plants will be helped considerably by the substitution of their product for malleable iron in hand grenades now being made by the war department which bears out the previously published statements. Shops now making malleable grenades, if so equipped, will complete their orders in the new form; if not, they will drop out of this production. The ordnance department has decided, however, that the making of malleable rifle grenades will continue.

MAY 30, 1918

THE IRON TRADE REVIEW

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What Happened to One Prediction

THE relative merits of the steel or wood shipbuilding programs have held little interest for the general public for months past. Barely a year ago, the question was occupying almost the most prominent position in the public discussion of war problems. The intervening 12 months have solidified the sentiment in favor of any and all kinds of ships as a stop gap for the submarine depredations. Steel manufacturers now can look back to the forgotten controversy with the satisfaction of knowing that they have more than held up their part.

Last spring, Mr. Denman, former shipping board chairman, pointed out that "the supply of skilled steelworkers is limited. When it became apparent that the building of merchant ships would be delayed on that account, the board started work on its plan of standardizing wooden construction." By Oct. 1, last year, he predicted we would be turning out wooden ships at the rate of 200,000 tons a month. By today, 800 to 1000 such ships would be in commission.

Several weeks ago the first completed wooden ship ordered by the government started on its maiden trip. The program is beginning to bear fruit now, but hardly in the roseate way predicted by Mr. Denman. Launchings are approximating a ship a day and the growing fleet of these useful carriers will soon be an important influence in our maritime trades, particularly in coastwise service.

The steel shipbuilders, however, are rapidly approaching the mark set by Mr. Denman as certain of attainment with wooden ships, but impossible for steel. Deliveries in the first 23 days of May numbered 29 steel ships of 175,000 deadweight tons. For the full month, the figures should run well over 200,000 tons. This record, of course, is aside from the heavy construction work for the navy department which has engaged practically the full capacity of most of the old, established steel shipyards.

The burdens of the war program have proved heavier than anyone in the steel industry anticipated. In the record of steel ship construction, tangible proofs are being presented daily to show how the steel industry is meeting these unexpected drafts on its productive capacity.

Putting His Plant on Record

CONSIDERABLE progress is being made in the collection of data by the individual furnaces showing the extent to which their customers are requiring pig iron to fill direct and indirect war orders dating from May 1. The statistical survey of the consuming side of the industry is being made in behalf of the committee on pig iron, iron ore and lake transportation of the American Iron and Steel institute, which in turn is acting as the representative of Steel Director Replogle. This is necessary before the pig iron industry may be put on a war footing and systematic distribution be inaugurated which will insure a steady supply of metal where the government needs it most. The exhaustive and detailed character of the investigation makes it probable that it will require weeks before all figures can be compiled.

Sufficient progress has been made, however, to disclose some interesting facts. The proportion of war business has been larger with the eastern than with the western plants, but it apparently has been increasing with the latter. The steel plants, as was to be expected, are more fully engaged than the foundries. Nevertheless, some of the latter make a showing only slightly inferior and curiously many of them have been reporting a larger amount of indirect war business. It is to be noted from the partial returns so far received that the larger part of the so-called essential work which both the foundries and steel works are performing is of the indirect class.

A large middle western furnace interest, on partially-complete returns to date, found that its consumers of gray iron had 63 per cent of their capacity on indirect war work and only 11 per cent on direct. The division of work showed 2 per cent direct and 4 per cent indirect for Emergency Fleet corporation; 2 direct and 2 indirect for the navy; 3 direct and 10 indirect for the army; 1 direct and 1 indirect for

the allies; 3 direct and 1 indirect for the railroads; and nothing direct and 2 indirect for government work. The remainder was made up of 29 per cent for agricultural castings, 1 for mine supplies and 15 for machine tools. The same interest found it was furnishing malleable and basic at the rate of 15 per cent direct and 67 per cent indirect, or 82 per cent in all. The greatest portion of the work was for the army with 2 per cent direct and 19 indirect, and for the railroads with 9 per cent direct and 10 per cent indirect. Agricultural implement business was absorbing 9 per cent.

Another furnace company serving a more eastern district found that 18 per cent of the capacity of the gray iron foundries which reported was on direct war work and 58 per cent on indirect. The division was 2 per cent direct and 3 per cent indirect for Emergency Fleet corporation; nothing direct and 4 indirect for the navy; 3 direct and 19 indirect for the army; nothing direct and 2 indirect for allies; 12 direct and 2 indirect for the railroads; 5 for agricultural implements, 8 for mine supplies and 7 for machine tools. The malleable and basic grades of this producer were being used at the rate of 15 per cent direct and 71 per cent indirect. The largest factors were 10 per cent direct and 14 per cent indirect for the war department and 18 per cent indirect for the allies. Agricultural implement demands were 6 per cent.

It is manifest from the data so far compiled that the report now being returned by the average consumer of iron will represent his silent pleader at court. Without a return his status both as a possible producer of war material or as a consumer of iron of the preferential class will be in doubt. The government is determined that essential production shall be carried to its highest point. This means both the full utilization of all available capacity and the furnishing of enough raw material to make this maximum output possible. Other work must stand aside. It is manifest from every standpoint that the best insurance a consumer of iron can have today is to put his plant on record. Really he has no alternative if he would safeguard the future of his business.

The Foundryman's War Problem

PRELIMINARY figures compiled from the survey of pig iron consumption now being conducted by the subcommittee on iron ore, pig iron and lake transportation of the American Iron and Steel institute, indicates that roughly 40 per cent of the gray iron and malleable foundry output of the country falls within the nonessential classification. It is self-evident that an extensive readjustment of the foundry production is in order, in view of the shortage of pig iron for war work. The production of so-called non-essential articles of cast iron will not be entirely eliminated, but it is almost certain to be greatly curtailed. To the individual foundryman, with only a small percentage of essential war work on his books, the problem is one which will not admit of temporizing, since in these days of high prices and resultant high overhead expenses, output cannot be permitted to fall below a certain figure without serious results.

Thousands of foundrymen, therefore, must answer the question, "What kind of work must I obtain in order to be certain that my production will not be seriously curtailed?" It is true that during the past year there have not been many opportunities for either gray-iron or malleable foundrymen to engage in direct war production, but as our military plans expand this situation will change and already there are numerous avenues of opportunity open which were not evident even a few months ago. For instance, the greatly enlarged shipbuilding program will call for a vastly increased tonnage of gray-iron castings for ship-propulsion machinery of all sorts, including steam turbines, reciprocating engines, pumps, condensers, etc.

The various malleable interests of the country have less opportunity in the marine field, but with the great railroad car-building program in full swing, a substantial portion of their capacity is destined to be absorbed on essential production. Also, it is still felt in well-informed circles that on account of the congested condition of the steel foundries, the government must eventually turn to the malleable-casting industry for a sufficient output of military truck wheels. Malleable-iron wagon fittings and saddlery hardware also form another outlet.

Turning again to the gray-iron shops, we find the whole field of grenades, trench-mortar shells and light artillery shells opening up. It is now probable, the gray-iron plants will be called upon to turn out a large proportion of the hand grenades formerly made in the malleable foundries. Contracts for 500,000 gray-iron Newton-Stokes trench-mortar shells already have been let to gray-iron shops. Extensive experiments on other forms of cast semi-steel shells are under way.

On a large proportion of this work, including both marine castings and projectiles, a high order of technical ability is necessary to achieve satisfactory results. Nearly a year ago Major Edgar Allen Custer pointed out that to meet the requirements of shell manufacture, the foundry must be run on a strictly scientific basin. "There can be no guesswork or slipshod methods," he stated, adding that it was doubtful if at that time there was a single foundry in the United States that could qualify at once for shell work without material changes in procedure. This latter prophecy has since been fulfilled. The requirements of essential war production are extremely rigid. Many foundrymen, therefore, are face to face not only with the necessity of seeking new lines of work, but of vastly improving their practice. These changes can and must be accomplished, in order that our casting plants may properly support our fighting men in the front line in France.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1404

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.30
Basic, Pittsburgh	33.10
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.60
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	34.10
No. 2 foundry, Cleveland	34.10
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	45.50
Silveries, 8 per cent, Chicago	48.50
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon, furnace	50.00 to 52.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern to 2 per cent silicon	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00 to 77.00
Spiegel, contracts, furnace	75.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	150.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00 to 160.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in., proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	63.35
Six-inch and over, Chicago	60.35
Four-inch, New York	64.35
Six-inch and over, N. Y.	61.35
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Hot rolled strip steel, Pitts.	3.50c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets ⅞ in. & small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products May 29, average for April, 1918, average for February, 1918, and average for May, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 29, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Bessemer pig iron, Pittsburgh..	$36.30	$36.15	$37.25	$44.95
Basic pig iron, Pittsburgh.....	33.10	32.95	33.95	42.15
*No. 2 Foundry pig iron, Pitts.	34.10	33.95	33.95	43.55
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	43.20
Lake Superior charcoal, Chicago	37.50	37.50	37.50	49.25
Malleable, valley	33.50	33.50	33.50	42.70
Malleable, Chicago	33.50	33.50	33.50	43.20
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	32.00	33.00	40.75
**No. 2X Virginia, furnace....	33.50	33.50	33.50	41.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	43.25
Ferromanganese, 70%, delivered	250.00	250.00	250.00	425.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	85.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	88.00
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	88.00
Open-hearth billets, Pitts.....	47.50	47.50	47.50	85.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.50
Steel bars, Chicago.....	2.90	2.90	2.90	3.84
Iron bars, Philadelphia.....	3.50	3.50	3.50	4.109

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices May 29, 1918	Average prices April, 1918	Feb., 1918	May, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill.....	3.50	3.50	3.50	3.39
Beams, Chicago	3.00	3.00	3.00	4.34
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.185	3.185	4.659
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	5.49
Tank plates, Philadelphia.....	3.435	3.435	3.435	7.559
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	7.00
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	6.65
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	8.80
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.50
Connellsville furnace coke.....	6.00	6.00	6.00	8.00
Connellsville foundry coke.....	7.00	7.00	7.00	8.50
Heavy melting steel, Pitts.....	29.00	29.00	30.00	28.40
Heavy melting steel, eastern Pa.	28.50	28.30	30.00	26.00
Heavy melting steel, Chicago..	29.00	28.65	30.00	28.70
No. 1 wrought, eastern Pa....	34.00	34.00	35.00	40.75
No. 1 wrought, Chicago.....	33.50	33.50	35.00	36.40
Rerolling rails, Chicago.....	34.00	34.00	35.00	36.80

(For Additional Prices See Page 1404)

Freight Rise Boosts Iron Costs

Higher Haul on Ore, Coke and Limestone Will Add $1 to $1.50—Valley Increase Figured at $1.10—Steelmaking Tonnages Are Allocated Including 35,000 Tons of Basic and Low Phosphorous

Pittsburgh, May 28.—Plans of the railroad administration to increase freight rates on June 25 have greatly interested blast furnace interests. According to published schedules, the increases will mean practically an additional cost of $1.10 in making pig iron, valley basis. The present rate on coke from Connellsville to Youngstown, O., is $1.35 per net ton and this will be increased by 40 cents or to $1.75; ore will be increased 30 cents and limestone 20 cents. Considering one ton of coke, two tons of ore and one-half ton of limestone to a ton of pig iron, the increased cost of production through the new rates will be $1.10 a ton. Added to this, wages were increased 15 per cent April 15, or about 40 cents a ton. The total increased cost of production since the price of pig iron for the second quarter were fixed accordingly will be $1.50 a ton. Moreover, the prices were reduced April 1, basic being cut $1, and when this is taken into account, the net loss to the furnace will be $2.50 a ton. The consumer will absorb any increase that may be made in the freight rate on pig iron inasmuch as iron is sold on a basis of f.o.b., furnace. The increase in the rate of coal will not mean much to pig iron makers except in bringing about a higher cost of by-product coke. The advances are held to constitute a good argument for the maintenance of the existing prices on pig iron for the third quarter, if not for an increase. Reports from producers and consumers in connection with the survey of the pig iron situation are coming in more slowly than was expected and efforts are being made to speed them up. Reports also are heard that some consumers are piling stocks and that others have specified greater tonnages than they will need for the production of essentials. The war industries board, it is said, is investigating these reports. Piling of stocks and asking for iron not needed for essential manufacture, are opposed by the government. Demand for iron still is strong, despite the fact that consumers know nothing is available. Some are begging for iron whether small or not, as off grade. One consumer in New York has been scouring this market for about 5000 tons of No. 2 foundry iron. Production is estimated at between 90 and 95 per cent of capacity.

Unsatisfied Needs Pile Up

Boston, May 27.—Orders for iron continue to accumulate in the offices of local pig iron brokers and furnace agents, for while some rather pressing needs have developed as a result of melters taking more business than they were covered on, little or no success has attended the efforts to place the business. The main aim of the furnaces still seems to be to get clear of old orders before accepting much new business. Inquiries even for comparatively small tonnages get no greater attention than do the larger ones. An inquiry for 200 tons of No. 2 foundry for third quarter and another for 200 tons each of No. 2 plain and No. 2 X for last half have been on the market and efforts to place them at several points have not borne fruit. In the matter of deliveries, matters are quite satisfactory as far as Alabama and northern irons are concerned and some improvement is noted on Virginia shipments. Ala-

bama furnaces, as a result of comparatively clear routing, are reported to be almost caught up on arrearages. In connection with the improvement in the deliveries of Virginia iron it is reported that the furnaces are asking where contracts call for 2.50 silicon or better that they be permitted to ship lower silicon. The coke situation is understood to have something to do with this request. The questionnaires distributed by the furnaces at the instance of the American Iron and Steel institute are being sent in freely. The fact that the distribution of the blanks was made by agents and brokers instead of by the furnaces direct has meant more or less duplication and this has led to some confusion, since practically all consumers have been getting more than one blank. The replies indicate a very heavy percentage of New England production is for direct or indirect government use.

Fill in Questionnaires

New York, May 27.—Pig iron questionnaires during the past week were circulated among their customers by all eastern blast furnaces, and many of them already have been filled in and returned. It is expected that all of these questionnaires will have been received and sent to Cleveland before the end of the week. The eastern pig iron market is at a standstill as far as business is concerned, but many inquiries continue to come out, principally for small tonnages, since consumers realize the futility of trying to cover for large tonnages at this time. No sales of any kind have been reported during the past week, and even the customary spot sales of off iron were lacking. A few furnaces report that due to the improved production resulting from the present adequate supply of coke, they expect to have some iron to sell before July 1. A feature of the week was the granting of licenses by the government for the shipment of moderate tonnages of foundry iron to China. None of this business apparently was put through as the prospective buyers are having trouble in locating the iron.

Returns Come in Slowly

Philadelphia, May 28.—Fears are expressed in the pig iron circles that the questionnaire now being circulated among consumers by the furnaces by the committee of pig iron ore and lake transportation, will not bring out the information required to tabulate the exact situation in the industry. It has been suggested that more effective results might be obtained by inquiring for the exact information in each grade of iron instead of calling for statistics of such a general character. Some consumers are slow in filling in the blanks owing to doubts as to how their reports will be received when they disclose they have sold their output only a few months ahead, although they have covered on their pig iron requirements for the rest of the year. Some furnaces have not yet heard from any of their customers. No sales of iron are reported although inquiries continue numerous. Pottstown and Eddystone, Pa., steelmakers are to be supplied with 10,000 to 15,000 tons of basic for war work through allocations made in their behalf by the pig iron committee. The Old Dominion furnace, Roanoke, Va., has been switched from foundry iron to spiegeleisen for E. E. Marshall, Philadelphia.

Demand is Maintained

Buffalo, May 28.—The pig iron situation in this district continues dull though the demand is as strong as it ever has been. There is no selling of iron and makers are not prepared to say when they will resume quoting. The whole matter of the resumption of regular trading is in a hazy condition but most furnacemen assume that the government will more than keep them busy for an indefinite time, so are not thinking about any other business. Attention is being given to the circulation of questionnaires to consumers, which when filled out will be sent to the subcommittee of the American Iron and Steel institute which has the allocation of government business. "A thousand customers want to buy iron," said the sales representative of one furnace interest, "but we can give them nothing." As far as can be learned not a single order of the smallest nature has been booked during the past week. One Tonawanda furnace of the Donner Steel Co. is due to go in on ferromanganese May 29.

Steelmaking Grades Allocated

Cleveland, May 28.—Steelmaking irons have figured heavily in the week's allocations for war requirements. It is thought that in basic iron especially this reflects a severe shortage in this grade, which has blocked the efforts of consumers to buy on their own account and which was predicted would reach an acute stage about July 1. A Monessen, Pa., consumer wants 14,000 tons at the rate of 1750 tons monthly, beginning in May; an Eddystone, Pa., steelmaker, 7500 tons, to be delivered 1000 tons monthly beginning in August, for Fleet corporation work; and a Pottstown, Pa., plate mill 4000 tons for eight months' shipment, covering business for the Fleet corporation and the British war commission. The Watertown, Mass., arsenal has been seeking large lots of low phosphorus iron for ordnance department needs. One lot of 6400 tons, May to December delivery, and another of 600 tons of prompt iron of another analysis were placed with the Pottstown, Pa., producer. The arsenal now is seeking 1600 tons of copper-bearing iron for May-December delivery. The American Car & Foundry Co. is out for 700 tons of standard bessemer for June-December delivery at Detroit for ordnance work. The Portsmouth navy yard wants 400 tons of low phosphorus of two kinds. Other demands up for allocation include 2000 tons of Nos. 2 and 3 foundry for last half for the Cramp shipyard, Philadelphia, which is Fleet corporation work; 3500 tons of No. 2 for 10 months in equal installments for a Minneapolis user, also Fleet business; and 250 tons of Nos. 2 and 3 foundry and 50 tons of 10 per cent bessemer ferrosilicon for the Panama canal. Open market inquiries still are appearing including 15,000 tons of last half basic for southern Ohio delivery. There are quite a few inquiries for next year. Makers in this territory are unwilling to accept additional business now. If later on they accept any orders in the open market, these will be made subject to a contract clause permitting cancellation or postponement as the iron is called for by any war agency.

Inquiry for 1919 Iron

Chicago, May 28.—An inquiry for a small tonnage of Lake Superior charcoal iron for 1919 delivery has been received by a Chicago seller, the first sign of interest in that distant delivery. Books have not been opened for next year and the inquiry was not entertained. Otherwise the situation is little changed from the weeks that have preceded. Some inquiry for lots of 500 to 1000 tons are being received, usually from melters who have bought from other sources in the past. They appear to be taking chance in an effort to obtain something somewhere and somehow, after being unable to get further supplies from their regular dealers. These inquiries are not productive of results. An Illinois manufacturer of sewing machines continues to seek 1000 tons and a pump manufacturer with an order for trench pumps wants 200 tons for immediate delivery. The situation seems to be drifting rapidly toward the point where melters with government work will receive iron and those without it will not be able to obtain much metal. Returns on the questionnaire indicate that most foundries have iron on their yards for about three months use, a

condition that appeared on a recent survey by a local seller. Southern sellers are not booking business, though they are not sold completely for their output for the year. Fuel uncertainties seem to be holding them back until they can see their way more clearly.

Urging Forward Shipments

Cincinnati, May 27.—Any rumors that the freight rate on pig iron from Birmingham to Cincinnati had been changed from $2.90 per gross ton are without foundation. The scheduled advance of 25 per cent on all freight rates which sellers and consumers understand is to take effect on June 25, has caused a lot of melters to urge shipments forward. They will only be partially successful in this because cars are not yet plentiful enough to move the iron as wanted. Any number of inquiries are received for foundry iron, but the furnaces are holding back on selling what they can spare for last half shipment. As it is recognized that government needs are paramount over all other calls, makers of iron are not willing to take any new business. In many instances the furnaces have sold practically their entire outputs for this year. This is especially true in the Ironton district. Shipments from the south have been partially relieved by the raising of embargoes to points above the Ohio river.

Inquire For Next Year

St. Louis, May 25.—New inquiries for pig iron this week have fallen off materially, due, according to dealers and producers, entirely to the fact that consumers know the futility of trying to get metal. The demand before the market, however, continues enormous, as virtually none of the inquiries received earlier in the month have been filled. Among the few inquiries heard of were a number for delivery in 1919, all of which were pigeonholed. There was an inquiry from a Milwaukee user for 1000 tons of No. 2 southern for delivery up to December, and several for minor tonnages of the same grade from Buffalo. Commercial users here have been greatly concerned by the questionnaires issued by the pig iron committee of the American Iron and Steel institute. They are taken as a confirmation of the opinion that July 1 will find the market on a purely war basis. Southern blast furnaces are speeding up production as much as possible, and shipments from Birmingham have been closer to normal than at any time since the cold weather. Southern producers, however, are complaining of labor scarcity as well as lack and poor quality of raw materials. Eastern and northern furnaces are averaging well on deliveries.

Cars Keep Ahead of Ovens

Railroad Service to Connellsville Coke Region Better Than Production—Market Activity May Develop Soon

Pittsburgh, May 28.—Supplies of coke are moving freely from the Connellsville region and are meeting fully the requirements of furnaces. Some consumers are reported to have been able to accumulate tonnages in excess of immediate needs. Occasionally complaint is made by pig iron producers that difficulty is experienced in getting coke on account of freight congestion, but this is unusual. The supply of cars continues to be greater than the present rate of oven production. The Monongahela railroad still is being given a 100 per cent supply and the average on the Pennsylvania for both yesterday and today was 97.6 per cent, as about the same as for the past two weeks or more. Virtually no free coke, either furnace or foundry is being offered but the trade would not be surprised to see an open market develop soon. Sellers are not contracting for the future requirements of furnaces. The fact that prices are regulated by the government is held by some coke interests to make it unnecessary to take contracts. According to reports from Washington, freight rates of coke will be advanced June 25. The flat increases per net ton, will range from 15 cents where the existing rate is 49 cents or less to 75 cents where the existing rate is $3 or more. This will mean an increase of 40 cents a ton from Connellsville to Youngstown, O., the present rate being $1.35 and 25 cents from Connellsville to Pittsburgh, the present rate being 90 cents. This added charge will fall on blast furnace interests, as coke rates are made on a basis of f.o.b., ovens. Production for the week ending May 18 totaled 343,270 tons, as compared with 341,110 tons for the preceeding week, according to *The Connellsville Courier*.

Drawing on Local Supply

Boston, May 27.—Connellsville coke now being entirely shut out of this territory, there is nothing available except the local product, of which there is a very satisfactory movement. It is hinted in some quarters that New England consumers are ordering as much as double the amount of coke that they can use or handle, but in explanation, it might be stated that a good many foundries ordered Connellsville coke when there was only a slight chance of getting it and that they at the same time ordered local coke.

By-product Furnace Sold

New York, May 27.—The New Jersey by-product coke maker has made numerous sales of its product to eastern furnaces lately. A large tonnage was involved since a fairly large proportion of this maker's output is furnace coke. This business is for delivery the remainder of this year and for the year ending July 1, 1919. The New Jersey maker also has booked considerable additional foundry tonnage for the same deliveries. Demand for by-product foundry coke, however, now is less active, most consumers in this district having covered their forward requirements.

Offer By-Product Fuel

Cleveland, May 28.—Local by-product interests now are offering some coke to foundries in this district at the fixed price of $8.75, ovens, plus the switching charge. Sales are being limited to spot delivery. The offering is from a surplus created by better coal supplies.

Complaints Still Prevalent

Cincinnati, May 27.—The production of coke is holding up well and the car supply is also very good. The comparatively fast movement of coke from producing districts is continuing. It would seem that in the circumstances there should be no complaints from the consumers. This is not the case and complaints are just as numerous as ever and probably a little more insistent. Consumers of the fuel are anxious to get a stock ahead, as last winter's experience was a very bitter and costly one.

Stringency Is Acute

St. Louis, May 25.—No relief in the coke stringency has materialized this week and the volume of inquiries has been as heavy and urgent as during any seven-day period since the war started. The personal equation and every other possible subterfuge is being resorted to to get hold of even one car but dealers find themselves in the position of being unable to furnish anything. Ovens in the Connellsville and Virginia fields, according to their local representatives, have nothing to offer for months ahead.

No Fuel Being Offered

Birmingham, Ala., May 28.—No coke is being offered on the open market in the Birmingham district although inquiries are numerous. Producers of coke apparently have promises out to accept business as old contracts expire and very little is being said of the expiration of old orders.

Scrap Activity is Spotty

Most Districts Report Lively Demand and Better Movement—Quiet Conditions at Chicago and St. Louis—Supplies Scarce

FOR COMPLETE SCRAP PRICES SEE PAGE 1404

Buffalo, May 28.—The scrap market in this district remains active with every grade in strong demand. There is no change in prices, however. There is distinct improvement in the stocks of various consumers, due to a steady flow of material throughout the past week. Receipts of material have been better during the past week than for many months past. Big tonnages of shell turnings are coming into the market from shell plants of the district. Most of the turnings are consumed in the district, with some tonnages going to Pittsburgh. No complaint of car trouble has come out for some time, and the transportation situation is reported satisfactory.

Demand is Insistent

Boston, May 27.—There continues to be a very keen demand for everything in scrap that this section of the country develops but the actual turnover is of rather moderate proportions owing to the fact that supplies are extremely limited. Actually, the demand exceeds the supply. Between the shipments made on old orders, which were held up during the winter by the severity of the weather and the poor transportation facilities and a brisk demand since, practically all accumulations have been reduced to the vanishing point. New England really is facing something of a scarcity of scrap and wholesale dealers still report little trouble in obtaining full government maximums plus commissions because of the supply situation.

Rejections Confined to Steel

Philadelphia, May 29.—A feature of the scrap market in eastern Pennsylvania district which tends to illustrate the present relation of supply and demand is that rejections now are confined almost entirely to heavy melting steel. There are practically no rejections in wrought scrap which is exceedingly scarce and difficult to obtain. No sizable transactions in scrap are being made. Prices remain steady.

Demand Continues Active

New York, May 27.—Dealers in iron and steel scrap in this district continue to report a good demand for practically all grades. Prices, consequently, are firm with most of them at the government maximum. Despite the current volume of trading no marked scarcity of material is noted, with the possible exception of cast scrap. Foundries still are making a heavy drain on this material, as a result of the continued shortage of pig iron. Railroads now, almost without exception, are selling their entire output of scrap direct to consumers. No fluctuations in quotations have been noted during the past week.

Tonnages Move More Freely

Pittsburgh, May 28.—Tonnages of scrap are moving more freely in this district. While most dealers say there is a scarcity of all standard grades, they report that the market is in a much more satisfactory condition than it has been in a long time. Permits from railroads to make shipments are easier to get, and deliveries are going to consumers without difficulty. Mills are inquiring for all the leading grades and practically all of them are willing to pay dealers the commission of 3½ per cent on sales. The leading consumer, however, it is said, is not willing to do so. Considerable dealing still is being done directly between consumers and dealers, although the practice is much less general than it was before the war industries board consented to allowing the payment of a commission. The market is firmer. Sales made to consumers in this district during the past week, in all of which a commission was paid, included 4000 tons of machine shop turnings, which went at the maximum price of $19, delivered; 2500 tons of unguaranteed low phosphorus material at $33.50, delivered, 50 cents under the maximum; 2000 tons of cast iron borings at $19, delivered, the government maximum, and 1000 tons of heavy cast scrap for open-hearth consumption at the maximum of $29, delivered.

Dealers Absorb Increase

Cleveland, May 28.—Until present contracts run out, scrap iron and steel dealers will have to carry the load of the increased freight rates Director General McAdoo has announced will be effective June 25. After that the dealer will pass the increases along to the producer of scrap. Machine shop turnings and borings are somewhat stronger, though not enough to mark prices up. Users of scrap in the Mahoning valley and in Canton are reported in the market for fair amounts. Heavy melting steel continues the grade showing the most activity. A large Pennsylvania railroad list is expected to be out next week. Dealers already are speculating on third quarter prices, and the general belief is that a $1 reduction all around can be looked for. No. 1 busheling may be reduced further, some dealers predict.

Railroad Offerings Larger

Chicago, May 27.—As a general proposition, the scrap market is unusually quiet, with comparatively little material moving and not much coming out from usual sources. In advance of bookings by bar iron mills, of car-building material, which is expected to increase demand for rolling mill grades, and in view of the small supply of this material now coming out, some activity has resulted recently as dealers have sought to obtain a supply to meet the expected demand. Railroads are marketing somewhat larger tonnages than recently but not sufficient to meet probable needs. The Rock Island railroad offers 3500 tons, which includes 500 tons of No. 1 steel rails and 400 tons of No. 3 steel rails, the latter being short lengths. The Monon offers 1300 tons, of which 400 tons are steel rails. The Santa Fe offers 1900 tons, the Chicago, Milwaukee & St. Paul 900 tons and George W. Jennings & Co., 230 tons.

Prices Much Firmer

Cincinnati, May 27.—Dealers are busy filling some orders for scrap to be shipped promptly and they have also sold considerable material for future delivery. Prices are very much firmer. While the limit has been reached on some grades, a few can stand further advances before reaching the maximum quotations at consuming points. The freer movement of scrap to Pittsburgh territory has done something to make the market a little stronger, and the scarcity of some kinds of scrap also has been a factor. Foundry melters are buying ahead as far as possible.

Sales at Minimum

St. Louis, May 25.—The scrap iron and steel situation is about as quiet as it can be. During the last 10 days sales to consumers have been at a minimum, and none of the melters is displaying the least interest in securing supplies. They are pressing dealers for deliveries on old contracts, however. Some few sales between brokers have

been made from day to day, but with the speculative element eliminated, the market shows no life. Prices remain stationary, but the trend of values is somewhat easier. Heavy melting steel, which heretofore has enjoyed relative popularity, is more plentiful and a shade easier. General conditions of fuel and labor with the plants are favorable, and consumption continues at a high mark. Railroad offerings were as follows: Chicago, Burlington & Quincy, 3600 tons; Louisville & Nashville, 2750 tons, and Chicago & Alton, 1200 tons. Country supplies have been unusually light this month.

Uncertainty Still Prevails

Birmingham, Ala., May 28.—Uncertainty still prevails in the southern scrap market. Deliveries are being made on old contracts and these are beginning to be worked out. Stocks are dwindling as the dealers are making no effort to stimulate the gathering of country scrap.

New Ore Rates

Are Being Studied Closely—Boats Are Delayed on Lower Lakes

Cleveland, May 28.—Increases in freight rates are arousing deep interest in the ore trade. Ore rates are advanced 30 cents a ton, an increase of more than 40 per cent over the present rate to the valley and of smaller percentages in the rates to more distant points drawing their ore from lower lake ports. The influence of this increase upon costs is being studied.

Upper lake docks are handling ore more freely and the congestion prevalent there a few days ago has shifted to the lower lakes. The car supply is fair, but boats are meeting some delays in unloading ports. The Thursday holiday will result in increasing this congestion.

Ore traffic from the Lake Superior ranges to upper lake ports will be under the direction of a committee recently appointed by the railroad administration. W. W. Walker, Duluth, vice president, Duluth, South Shore & Atlantic railroad, is chairman. Other members are W. A. McGonagle, Duluth, president, the Duluth, Missabe & Northern railroad; F. S. Elliott, Superior, Wis., general superintendent, Great Northern railroad; E. D. Brigham, Chicago, Chicago & Northwestern railroad; W. E. Tyler, Green Bay, Wis., Chicago, Milwaukee & St. Paul railroad. This committee will co-operate with the vessel, coal and steel committees now handling lake trade, in order to facilitate the transportation of ore and grain to upper lake ports.

France Needs Own Steel

Will Be Able to Supply No More Shell Material—Specifications Still Cause Trouble—Government Looks Into Discards

New York, May 29.—Certain conditions have come about whereby the French will be unable to furnish our government with any more shell steel. The shutting off of this material means that the mills here will have to speed up production as never before. Just how they will do this in the face of the scarcity of steel is not known but several shell steel makers are of the opinion that the entire country will be combed and all steel which is not absolutely needed for other purposes will be placed at the disposal of shellmakers. They declare the only forging steel now reaching the commercial trade is that of off-grade heats. Shell steelmakers are of the opinion when the shortage of heat-treating facilities are taken into consideration that the mills in this country should adapt themselves to the making of shell steel under British specifications. These specifications call for a thick-wall shell which requires little heat treatment and is less liable to buckle in the gun when fired. Under these specifications it is declared the production of shells would also be increased on account of the chemical requirements having wider limits. This would lessen the number of off-heats. A shell-steel maker in the Cleveland district who for the past month has been enlarging his heat-treating plant and during this time had ordered all incoming shipments of shell bars stopped, now reports that the plant is completed.

Looking Into Discards

Philadelphia, May 29.—Sheet steel discards are being produced on such a large scale or of a tonnage almost equal to that of shell rounds and it is learned the government now is investigating how it may use this tonnage for war business. Practically the only activity in the Eastern semi-finished market is, at present, in shell discards. An Eastern maker has been allotted 1000 tons of billets for Italy. Consumers performing government work are beginning to inquire for billets and slabs for third quarter.

Using More Bessemer Steel

Pittsburgh, May 28.—Makers of sheets and tin plate are resorting to a freer use of bessemer sheet bars because of their inability to get open-hearth steel. The supply of semi-finished steel, including sheet bars, billets and slabs, is entirely inadequate to meet the inquiries. Middlemen have searched the market carefully to find tonnages for their regular trade, but have met with only small success and some of them have abandoned further efforts. Some large producers even have tried to get greater tonnages of both semifinished steel and ingots and have been able to obtain but light tonnages. One interest whose ingot output is extremely large is in the market for as large a tonnage of raw steel as may be offered. The market for discard steel also has become narrower and offerings are limited to small lots. In many cases the prices asked are higher than consumers are willing to pay. Some sellers of discard billets are asking levels that are equal to or only slightly under those fixed for soft steel. Sellers apparently consider the maximum price of low phosphorus scrap, $39, plus the cost of rolling and a profit, so that it is not unusual for them to name a price of $47.50, the maximum price fixed for soft 4 x 4 billets. Small lots of forging billets have been sold recently at $75, Pittsburgh, or more. Wire rods are in active demand, but makers are out of the market. Occasionally they find light tonnages for their regular customers.

Shell Steel Required

Cleveland, May 28.—A round tonnage of shell steel will be called for by a local motor car manufacturer who has just received a large contract to produce 6-inch shells. Most of this contract is to be filled at a branch plant in another northern Ohio city. There is some talk that further differences over shell steel specifications have developed between the producers and the government and the latter has been asked to make additional modifications. Sheetmakers continue in trouble to get steel supplies. One maker has sought to induce the mills to roll sheet bars from shell steel discards.

Demand for Strip Steel

Pittsburgh, May 28.—Heavy demand prevails for both hot and cold rolled strip steel practically all of which is wanted either directly or indirectly for the government. Production of hot mills is estimated at 80 per cent and of cold mills at about 85 per cent. Makers of the latter are complaining of a shortage of steel.

Car Axle Orders Divided

Distribution of 392,000 is Stated—Rivet Reduction Surprises —New Government Bar Demands Not So Heavy

Philadelphia, May 29.—Distribution of 392,000 axles for the 100,000 cars recently ordered has been made by the railroad administration. Of this number, the Carnegie Steel Co., received 95,000, the Illinois Steel Co., 84,000, the Pollock Steel Co., 149,000, the Laclede Steel Co., 16,000, the Pittsburgh Forge & Iron Co., 18,000, and the Midvale Steel Co., 30,000. Large tonnages of re-enforcing rods rolled from discards have been distributed for government construction work. These include 15,000 tons for the army supply base in South Brooklyn of which the Bethlehem Steel Co. will supply 5000 tons.

Car Axles Placed

Chicago, May 27.—Although the order has not come through officially, it is understood that axles for the government's order of railroad cars has been divided. The information is that the Carnegie Steel Co. will furnish 110,000, the Pollak Steel Co. 132,000, and the Illinois Steel Co., 84,000. The remainder of the 400,000 axles are understood to be divided among smaller makers. These axles are said to be somewhat over ordinary weights, which will run up the tonnage. Government orders have not been placed with western mills in as heavy volume during the past week as previously with the exception of these axles. Other buyers are unable to place contracts with any steelmaker.

Bar iron is quiet without large volume of new business, although there is constant demand for small tonnages to use in place of steel bars. This is all for immediate delivery and no last half business is being asked. Some assistance in this delivery is expected when material for freight cars is divided.

Hard steel bars rerolled from rails are in strong demand but mills will sell only in proportion to their receipts of steel rails. Inasmuch as the latter are scarce, it is not possible to assume much additional tonnage.

Are Operating Heavily

Pittsburgh, May 28.—Makers of iron and steel bars are operating heavily and are keeping up with their schedules in a satisfactory manner. Demand for both iron and steel bars coming from railroads and industrial interests is large and practically all of the tonnage is for the government either direct or indirect. Implement makers are being supplied freely with steel bars. Makers of iron bars will meet next month with members of the Amalgamated Association at the regular annual convention in Atlantic City to discuss scales of wages for the year beginning July 1. The association convention at Joliet continued existing basis rates and made few minor changes in some details. Manufacturers have not denoted what their attitude will be, but it is not believed any fundamental changes will be suggested by them.

Demand is Heavy

Chicago, May 27.—Although several million nuts and bolts were placed with manufacturers by the government during the past few days this takes care of only a portion of the large order which has been pending for several weeks. This is understood to be 25 per cent of the carriage and machine bolt requirements, which are to be filled from stock for immediate shipment, leaving 75 per cent yet to be placed and a large number of other forms in addition. General demand for nuts and bolts is heavy and all makers are well supplied with orders.

Reduction is Surprise

Pittsburgh, May 28.—Makers of rivets say they are unable to explain the action of the committee on steel and steel products of the American Iron and Steel institute in reducing the price of that product. The reduction amounts to $5 per ton. The price of structural rivets was cut from $4.65 to $4.40 per 100 pounds, Pittsburgh, of boiler rivets from $4.75 to $4.50 per 100 pounds, Pittsburgh, and of small rivets from 45 and 10 off to 50 and 10 off, Pittsburgh. The prices of bolts and nuts were left unchanged. The car-building program will call for 15,000 tons of rivets and 18,000 tons of bolts and nuts, according to official estimates of the railroad administration. The administration has received quotations from makers of nuts, bolts and rivets, which are strictly in accordance with set figures and builders of the 1,000,000 cars for which orders recently were placed will buy at these levels from the plants nearest their works or with which they have been doing business. Operations of nut, bolt and rivet makers are heavy, some of them being on a 100 per cent basis. War demand is brisk.

List is Rearranged

Pittsburgh, May 28.—Rearrangement of the hoop, band and bar list is brought about by the action of the steel and steel products committee of the American Iron and Steel institute. This step forms a separate card of extras for band steel, differentiating between bands and bars which heretofore took the same list of extras. It removes 3/16-inch and lighter sizes from the bar card onto a special band classification of extras. Minor changes were made in the hoop card. The price of bands and hoops now is $3.50, base, Pittsburgh, with special quality and carbon extras applying. This increases the band price $12 per ton. Stamping quality 0.20 and under of carbon was advanced 50 cents per 100 pounds. Special extras also were provided for slitting, pickling, cutting, etc. Hoop steel is in active demand, a considerable portion of which is for makers of oil barrels and producers are able to supply consumers rather freely.

Government Buying Shafting

Pittsburgh, May 28.—Large sizes of cold rolled shafting are being bought either directly or indirectly for the government, while demand for smaller sizes also is active. Makers are making deliveries in four to six weeks. Inquiries from the automobile and screw stock trade are light.

Price Range

Shown in Spiegeleisen—English Ferro Sellers Seek Licenses

New York, May 27.—Disparity in the prices of prompt and future spiegeleisen continues. Some makers are quoting spot 16 per cent at $75 to $77, furnace, and futures at $70 and 18 per cent at $77 plus $3.50 for each additional unit. Other makers name $74 to $75, furnace, for all deliveries, and $82 for 18 per cent. Several thousand tons of 18 per cent have been sold at the latter price, and sizable sales of 16 per cent for future delivery at $74 to $75, although recent sales have been done at $70. The Andrews Steel Co.'s inquiry for 18 per cent still is open.

Several thousand tons of domestic ferromanganese have been sold during the past week at $250, delivered, for 70 per cent metal, and fair inquiries continue pending. Since the war trade board, as reported in last weeks issue of The Iron Trade Review, agreed to permit the importation of 12,000 tons of English ferromanganese, all the

importers have made applications for tonnages which they believe will represent their share of this total, and which they expect their principals will be able to export from England.

Much variation continues to be shown in prices on 50 per cent ferrosilicon. Carloads are being sold right along at $155, delivered, and large tonnages at $150, by the leading maker. Higher prices are being obtained on spot metal by other makers, but little difficulty is had in securing general offers of $160 or less, from most makers.

Large sales of ferrotungsten have been made at $2.25 to $2.30, furnace, per pound of metal contained, for 70 per cent, and at $2.35 for 80 per cent.

On 60 to 70 per cent ferrochrome, containing 4 to 6 per cent carbon, spot may be had at 40 to 45 cents per pound, furnace, while 6 to 8 per cent carbon metal is quoted from 35 to 40 cents.

Market Becomes Quieter

Pittsburgh, May 28.—Activity in the market for ferroalloys diminished during the past week. The tone is strong and there are reports in circulation that higher prices will be asked soon for ferromanganese and spiegeleisen. A Cleveland consumer has put out an inquiry for 500 tons of 16 per cent spiegeleisen. The La Belle Iron Works, Steubenville, O., has bought 1000 tons of 40 per cent spiegeleisen and is said to have paid a price slightly below $4 per unit, furnace, for the tonnage. The market for 70 per cent ferromanganese remains firm at $250, delivered. Spot 16 per cent spiegeleisen is quoted at $75, furnace, and contract tonnages at $70, furnace, although quotations of about $5 higher than these are being named by at least one producer. The market for 50 per cent ferrosilicon is not active. It is quoted at $165 to $175, delivered, for spot shipment, and $155, delivered, for future shipment.

Spiegel is Sought

Cleveland, May 28.—A local steelmaker is inquiring for 500 tons of spiegeleisen for last half. A northern Ohio consumer in the week bought several hundred tons for similar delivery. Ferroalloy prices are unchanged.

Alloy Sales Steady

Chicago, May 28.—Demand for ferromanganese and spiegel is steady and selling is being done at a good rate. Prompt spiegel is somewhat scarce. Ore conditions continue satisfactory for the present.

Await Car Steel Orders

Reported Awards of 500,000 Tons of Plates and Other Forms Not Officially Established—Corporation Mills Credited With Most

Pittsburgh, May 28.—Allocation of plate, shape and bar tonnages in connection with the car building program, if made, has not been announced officially, according to producers here, and until that is done they say they do not know how the steel will be distributed. Car builders also are waiting for Washington to act so that they can get their tonnages and proceed with the building of rolling stock for the railroad administration. It is reported that the plan of allocation will be announced in a day or so. At the same time there is a report that orders for approximately 400,000 tons of steel for cars actually have been placed and the remainder has been allocated. This report has it that Steel corporation mills will produce practically 50 per cent of the plates and has received specifications for more than 130,000 tons.

Expect Orders to be Bessemer

Philadelphia, May 28.—Large tonnages of plates covering the recent government car order soon to be placed with various mills by the railroad administration, will be mostly of bessemer steel, it is believed. Plate mill schedules are being gone over by the Emergency Fleet corporation so that urgent requirements of the ship yards shall be placed ahead of the less pressing needs, and also that the mills nearest the fabricating plants will supply the steel. This is to obtain greater efficiency in ship production and to eliminate transportation wherever possible. Several thousand tons of additional plates for France were placed this week with eastern mills.

Allocation Still Awaited

Cleveland, May 28.—No allocation of the large tonnage of ship steel required for the additional vessels awarded to lake yards by the Emergency Fleet corporation yet has been made. The hull and boiler steel requirements for the 60 ships awarded to the American Shipbuilding Co. now are placed at 110,000 tons. It is believed all or most of this will be supplied by Steel corporation mills.

Plate Mills on Full

Chicago, May 27.—Although some steel mills have rolling capacity in excess of ingot production, the available supply of raw steel is not being divided equaliy among the various products. Inasmuch as steel plates for shipbuilding are considered of paramount importance, plate mills are being kept at maximum production and other products are sacrificed as being kept at maximum production and other products are sacrificed as being less essential to the war program.

Higher Price

On Tin Plate Demanded by Tin Situation, Say Makers

Youngstown, O., May 29.—At a recent meeting of tin plate manufacturers in Pittsburgh the pig tin situation was discussed at length and makers expressed the opinion that the base price of tin plate is too low to meet present conditions. At the time the base price of $7.75 was established pig tin was selling around 65 cents per pound. As the matter now stands makers declare they are paying close to $1 per pound for pig tin whenever they can get it. Each box of tin plate requires approximately 2 pounds of pig tin. Some producers who were present at the meeting, stated that any further increase in the price of pig tin would force them to close their mills unless the price of tin plate is advanced to $8 or more per base box. Most of the mills here are in operation but are hard pressed for tin bars. The entire production is going to the government indirectly for meat containers and is being shipped to the packing houses in the Chicago district.

Tin Plate Cargoes Beached

Pittsburgh, May 28.—Two cargoes of tin plate en route to Alaska have been battered and beached along the coast of that territory, according to reports received here. It is not certain that other cargoes, which made up a fleet going to Alaska to be worked up into cans for containers for fish, were not lost. Operations of the tin plate industry continue at about 95 per cent of capacity. Stocks in warehouses are approximately normal and shipments are satisfactory. By a ruling of the war industries board shipments have been shut off for consumers making different products which were held not to be war essentials. These included, among others, tobacco and paint cans.

To Get Government Shop

Pittsburgh Reported Will Be Location of Government Fabricating Plant—Big Projects Brewing—Place Ship Steel Nearby

Pittsburgh, May 28.—Reports which appear to be reliable have been received here that the government has selected the Pittsburgh district as the site for its proposed fabricating plant. Work of actual construction, it is understood, will begin in the immediate future. Details regarding the size of the shop are not known but the purpose is to erect it as quickly as possible in order to hurry the shipbuilding program. This activity is only one of numerous fast-developing moves denoting plainly that the government is going to assume a still closer supervision of the steel and allied industry. There is no doubt that the government has worked out plans for further and various war activities calling for immense tonnages of steel of all kinds and it is said that when these programs are announced officially, they will amaze even well-informed men in the trade. Already there is a report in circulation that requirements in sight involve an output of not less than 45,000,000 tons of ingots, or approximately 2,000,000 tons in excess of the total capacity of the entire industry. The demands being made on fabricating capacity by the government are extremely heavy and large orders are being placed regularly. No other work is being turned out or accepted and fabricators say it will be at least one year, if not more, before they can take any commercial business.

Eastern Demand Improves

New York, May 27.—Demand for structural steel for direct and indirect government work has increased somewhat. Included in the week's business, both placed and pending, are a number of railroad bridges, extensions to two manufacturing plants which are engaged on war work, and 10 additional buildings for the government at Lake Denmark, N. J. An unusual order was placed with the American Bridge Co. during the week; this involves the remodeling of the old railroad bridge across the Thames river at New London, Conn., into a highway bridge. This job calls for about 500 tons. Commercial jobs are practically absent. Priority shape orders during the week included only small tonnages, mainly for ship work.

Will Minimize Transportation

Philadelphia, May 28.—Determiation of the Emergency Fleet corporation to distribute fabricated steel awards for ships so that they involve a minimum of transportation, it is learned is the reason for the withholding of contracts for the material for 60 additional vessels for the American International Shipbuilding Corp. It is the desire of the Fleet officials to distribute the work to shops favorably located geographically instead of awarding it to plants without regard to the distance the material must travel as has been the case heretofore.

To Increase Tractor Output

Cleveland, May 28.—Tractor builders in this district will greatly increase their output this year over last. One of them is planning a production of 10,000 and now is in the market for the steel, about 1000 tons. An inquiry for 1800 7-inch channels of one length has been current from a local buyer.

A local motor car builder has received an order for about 2000 gun carriages for 3-inch field pieces and other types from the ordnance department. This is calling for from between 3000 to 4000 tons of steel.

War to Get Material

Chicago, May 27.—With mills unable to furnish structural steel except in cases required by the government for war work, and with warehouses and store stocks depleted by the heavy demand they have met for months, it is difficult for even a small job to be put through a fabricating shop. Where it has been possible in the past to pick up sufficient material from warehouses and yard stocks, it is found now that these are so broken as to make it practically impossible. The only important tonnage pending at present involves 450 tons for a shop building for Pawling & Harnischfeger, at Milwaukee, which will be devoted to the production of government necessities.

CONTRACTS PLACED

Bridge for Central Railroad of New Jersey, at Easton, Pa., 400 tons, to Phoenix Bridge Co.

Extension to plant of David Lupton's Sons Co., Philadelphia, 800 tons to American Bridge Co.

Shops for Baltimore & Ohio railroad at Glenwood, Va., 2500 tons reported to have been awarded to John Eichleay Jr. & Co.

Remodeling railroad bridge across Thames river at New London, Conn., into a highway bridge, 500 tons to American Bridge Co.

Colored Men's Y. M. C. A. building, West 135th street, New York, 200 tons, to George A. Just Co.

Kent avenue power house, Brooklyn, to American Bridge Co.

Building for National Aniline & Chemical Co., Buffalo, 250 tons to Pittsburgh Bridge & Iron Works.

Plate and shop for the New York Shipbuilding Co., Camden, 2500 tons to L. F. Shoemaker & Co.

Bridges for Pennsylvania railroad 800 tons to the Phoenix Bridge Works.

CONTRACTS PENDING

Ten additional buildings for government at Lake Denmark, N. J., 400 tons, bids being taken.

Two bridges for Chesapeake & Ohio railroad, 600 tons, bids being taken.

Extension to plant of De Laval Steam Turbine Co., Trenton, N. J., 300 tons, bids being taken.

Three bridges for Pennsylvania railroad, 750 tons, bids being taken.

CONTRACTS PENDING

Mill creek flood abatement plant, Dunkirk, N. Y., 275 tons of reinforcing steel required.

Wire for British

Allotted to Different Makers—Nail Orders Are Large

New York, May 27.—The most important business of the past week in the wire market was the allocation of 50,000 tons of barbed wire for England. This business was distributed through the wire subcommittee of the American Iron and Steel institute. It is learned that of the 50,000 tons of barbed wire for France, which was placed several weeks ago, and then countermanded, 5000 tons have been reordered, and that the remaining 45,000 tons are likely to be placed shortly. It has been decided not to allocate the 25,000 kegs of wire nails which will be required in building cars for the government.

Included in business allocated during the past two weeks were 40,000 kegs of wire nails for the bureau of supplies and accounts, navy department. It is understood that most of these nails will be shipped to France. It is learned that the 48,000 kegs of nails recently placed by the quartermaster's department at New York, all went to the Pittsburgh Steel Co.

Big Tonnages Allocated

Pittsburgh, May 28.—Mills in this district have been awarded a portion of 50,000 tons of annealed unpainted barb wire for military use for the British government which was recently allocated through the subcommittee on wire of the American Iron and Steel institute. Shipments are to be completed in September. It is reported that a large maker has been awarded a contract for 47,000 kegs of nails by the war department.

Steel Checks Sheet Mills

Inadequate Semifinished Supplies Still Upset Production—Work Up Inferior Material—Sheet Demand Remains Far Beyond Supply

Youngstown, O., May 29.—Valley sheet mills continue to operate unsteadily due to the scarcity of sheet bars. At nearly every plant all the units will be in operation one day and the next probably only one-half will be running. There seems to be little relief in sight. Even makers who are self-contained have mills idle from time to time because the government has asked that part of their bar output be shipped to nearby sheet mills turning out government orders. Recently an off-grade open-hearth heat which was too high in carbon content for the commodity intended for, was converted into sheet bars. These were sold without any trouble to a certain sheetmaker. This illustrates how hard pressed sheet mills are for sheet bars. The only objection the companies have to a high-carbon bar is that it plays havoc with their rolls. If sheets 36 inches wide are going through the mill and the order calls for 100 tons, the chances are that only part of this tonnage can be rolled before the rolls become grooved. When this condition presents itself, the rolls are either changed, which necessitates shutting down the mill, or the next smaller size sheet is passed through the rolls. The latter course is usually pursued, the only drawback being that the rolling of the balance of the order is delayed. Buyers continue to come to the valley and beg for sheets. Mostly black and galvanized are wanted.

More Tonnage for France

Philadelphia, May 28.—Eastern sheetmakers have received additional tonnage of blue annealed material for delivery in France. Some additional government business also has been placed with them.

Operations Increase Somewhat

Pittsburgh, May 28.—Operations of sheet mills have been increased somewhat during the past week. The American Sheet & Tin Plate Co. now is producing at a little more than 60 per cent of capacity. It is estimated the industry is operating at about 85 per cent. This improvement has been brought about by a slightly increased supply of sheet bars. Virtually all of the output of sheets is for war purposes, direct and indirect. It is claimed that even a portion of the trade itself does not fully realize the enormous consumption of sheets for strictly military and collateral uses. Large orders are being placed steadily. Galvanized, blue annealed and black sheets in large lots soon will be required in connection with the shipbuilding program. The car building program also will take heavy tonnages of corrugated sheets, the gage of which is not yet known. Makers have concluded that they will replace tonnages furnished by jobbers for the government where the jobbers can show the government order, although priority will continue to be given to direct government orders. Mills are sold up well beyond the third quarter.

Small Faith

Shown by Builders that Cars Can Be Rushed—More Delay

New York, May 27.—While railroad administration officials feel confident that the iron and steel requirements of the carbuilders will be forthcoming in good volume shortly, builders generally are not so optimistic. It appears to be their belief that little in the way of actual construction can be undertaken for at least four months, despite the fact that nearly one-half of the 1,000,000 tons of steel required has now been allocated. Builders state that they have little iron and steel on hand, and as for the wood entering into the construction, virtually all of this material is yet to be cut. This state of affairs, of course, reverts back to the delay of several months in the making of awards at Washington. Much of their early supplies of plates, builders believe, will be made up of material falling short of shipbuilding specifications, although suitable for other commercial purposes. Negotiations continue at Washington relative to specialties. Most of the locomotive specialties have been determined, but the majority car specialties has yet to be decided upon.

Inquire for Standard Spikes

Pittsburgh, May 28.—Small lots of standard spikes are involved in several inquiries that have come to makers in this district. The Pennsylvania lines are asking for 8000 kegs of this size and 414 kegs of boat spikes for July-October delivery. Quotations are being made on this business by some makers. The price of standard spikes is $3.90 per 100 pounds, mill, and of boat spikes $5.25 per 100 pounds, base, mill. Limited lots of 7/16 and ½-inch sizes also are available, but producers are sold up on 5/16 and ⅜-inch sizes, which are in strong demand by jobbers. Scarcity of steel has left considerable idle capacity for standard spike production.

Plans More Locomotives

Philadelphia, May 28.—The railroad administration is reported contemplates ordering additional locomotives soon. The government, acting in behalf of the French high commission, has placed 5000 tons of locomotives with various makers for the French railways. Lots of rails, mainly bessemer, of 500 tons or less are being sold from stock from $60 to $62.50, eastern mill. Otherwise there is no activity in the rail market.

Light Rails Active

Chicago, May 27.—Light steel rails for domestic use and for export are being sold steadily at a rate about equal to production, but standard rails are not available except occasional small tonnages of seconds or slight excesses of rollings.

Preferred Class

For Cast Pipe for Cities Asked—Iron Shortage Troubles

New York, May 27.—Pending efforts to obtain preferred classification for cast iron pipe, eastern makers continue to cope with a shortage of pig iron. Many of the foundries are largely booked with government business, and for this work are being given priority certificates; however, with private and municipal work, the situation is exceedingly difficult. Several manufacturers met in Washington during the past week to urge that a preferred classification be allowed in the interest of public health. Many of the cities engaged in war work have grown so rapidly, it was pointed out, that the building of a large number of new houses is necessary. It is reported that the government may allow manufacturers to obtain southern iron for this work, and confine their requirements to this grade alone, leaving the better northern iron available for other purposes.

Demand is Heavy

Pittsburgh, May 25.—Development of oil fields for the government is calling for large tonnages of iron and steel pipe, 6 to 8 inches in diameter. Makers are booking this business freely and are producing it as quickly as conditions will permit. Active demand also is being made for 4-inch lap weld iron and steel pipe.

Can't Define Steel Needs of War

Co-operative Survey of Government's Requirements Undertaken by Representatives of War Board and Industry Likely to Miss Fire—Reported Little Progress Has Been Made—Another Conference is Likely

WASHINGTON, May 28.—Apparent unwillingness on the part of the government to make known its possible maximum steel requirements seems to foretell failure of the war industries board's survey of steel production and consumption. This conclusion is not held by the war industries board itself but the opinion expressed in other branches of the government is to this effect. Failure of the survey evidently would mean, in the absence of some far more drastic step, that stricter adherence to the present priority system, supplemented by a comprehensive preferential list of steel consumers, will be the course to be followed.

The survey was placed in the hands of a joint committee representing both the war industries board and the steel and steel products committee of the American Iron and Steel institute, following a hastily called meeting here May 17. Just what the committee has been doing or what response it has met with on the part of government officials who may be reluctant to state their needs, has not been divulged. The statements of some of these officials has, however, indicated that the necessary frankness on their part has been missing.

The opinion has been ventured that the war department, the navy, the shipping board and the allies, as far as requirements of steel produced in this country is concerned, certainly should know approximately per man the number of tons of steel each will require. It is known, in each department, the amount of food, the number of pieces of clothing, the amount of ship tonnage, etc., required per man to clothe, feed, equip, transport, etc., each. Why, the question is asked, shouldn't this information also be known as regards steel?

Why Not Fix Steel Need?

One government official, in the shipping board, has declared that it is impossible for the Emergency Fleet corporation to know its own needs. The task is so great, he says, is so changing, that an estimate today may be far off tomorrow. This is also said to be true of the army where daily changes on the western front subsequently show their effect in the steel orders the department places. Then, too, the opinion has been expressed by some army officers that to divulge the possible maximum tonnage desired, even on a flexible maximum, would be to show a vital part of Uncle Sam's hand to Germany. It has been argued, in refutation of this attitude, that Germany already knows the capacity of the American mills and undoubtedly has figured on the entire output going into ships, guns, munitions, etc.

If the survey fails, as opinions here seem to think it will, it is altogether likely the advice of E. H. Gary, chairman of the United States Steel Corp., given at the meeting in New York when 100 per cent production was pledged to cover the government's war needs, will have to be followed even more closely. This advice was, "Use your conscience. And if you have any doubt about it, make inquiry." But to reduce the necessity of asking questions to the minimum and as a further guide to steel consumers as well as to producers, it is probable a list of preferred consumers, similar to that showing to whom coal should be shipped first, will be drawn up by the priorities division of the war industries board and subsequently announced.

For the present there is no change in the priorities system. It is highly probable that nothing will be done until after another conference of the war industries board and the steel manufacturers. Chairman Baruch of the board has declared that he does not want to act in this matter until after the question has been fully discussed by the board and the representatives of the industry. This policy was followed when the New York pledge meeting was called and also at the meeting here May 17, so Mr. Baruch evidently intends to permit of full consideration. However, his instructions to the joint committee were to act at once and to report as speedily as possible. Some developments may be expected at any time, 10 days already having passed.

Attack Competitive Iron and Steel Rates

WASHINGTON, May 28.—Competitive rates on various iron and steel products which were built up by the railroads under conditions of private operation, are not to be maintained while the government is running the carriers, if the interstate commerce commission passes favorably on new petitions for increased rates in central freight association territory just filed by the various lines within the prescribed zone.

The proposed increases affect long-haul rates on pig iron and billets, rates on cast iron pipe, proportional rates from the Ohio river on pig iron, billets and cast iron pipe and short-haul rates on manufactured iron and steel. Charcoal pig iron producing points in zones C and D in Michigan are excepted in the pig iron schedule. The various advances are in addition to the 15 per cent rise recently put in force. It is believed the petitions are forerunners to the general increase of 25 per cent in freight and passenger rates which the railroad administration has just announced, effective June 10 and June 25 respectively.

The revision is aimed at the substitution of the present commodity rates in pig iron, billets and cast iron pipe, car loads, by new tariffs based on the mileage system of class rates. The bases proposed are the sixth class for billets, 90 per cent of the sixth class for pig iron, fifth class for cast iron pipe and 90 per cent of the local rates on the several commodities for proportional rates. Short-haul manufactured iron and steel products, are asked to be put in the fifth class.

In pig iron it is set forth the present rates are widely divergent for the same length of haul; and that in many cases a given rate applies to different lengths of haul. It is declared that the rate of $2.54 applies to 27 hauls of varied

length, the minimum being 285 miles and the maximum 423 miles a spread of 138 miles. A maximum variation of 86 cents and a minimum of 11 cents per ton for substantially equal hauls is pointed out.

Rate tables compiled show that the present commodity rates on pig iron from different points of origin to all destinations, average 84.5 per cent of the sixth class rate on these hauls, indicating that the proposed increase only is a matter of 5.5 per cent. Pig iron producers, however, point out that these compilations are very misleading since they include rates from distant furnace points to various destinations which actually are inactive rates so far as selling competition in iron is concerned. The effect of the inclusion of these virtually non-competitive rates, it is declared is to swell the percentage average of the present commodity rates to sixth class rates. The real advance, therefore, involved in putting pig iron at 90 per cent of the sixth class rate is much more than that disclosed on the face of the data presented.

Taking Indianapolis as a typical non-producing point, the comparison between the proposed and existing rates is as follows:

PIG IRON

	Miles	Present 6th class rate	Present pig iron rate	90 per cent 6th class	Increase
Buffalo	450	$3.40	$2.80	$3.10	.30
Pittsburgh	371	3.20	2.70	2.90	.20
Youngst'n	340	3.00	2.30	2.70	.40
Cleveland	284	2.90	2.10	2.60	.50
So. Ohio	245	2.70	1.80	2.40	.60
Zanesville, Ohio	238	2.70	1.80	2.40	.60
Canton, O.	296	2.90	2.10	2.60	.50
Dover, O.	282	2.90	2.10	2.60	.50
Cambridge, Ohio	265	2.80	2.10	2.50	.40
Columbus	180	2.40	1.70	2.20	.50
Hamilton, Ohio	99	1.90	1.40	1.70	.30
Chicago	184	2.50	1.70	2.30	.60
Detroit	276	2.80	1.80	2.50	.70
Toledo	222	2.70	1.80	2.40	.60

On billets, it is stated by the railroads, the common rate of $2.10 applies to 64 different hauls, ranging from 178 to 351 miles. On a given haul, the variation is from 11 to 90 cents. It is claimed by putting the billet rate in the sixth class, it will fit in properly with the present next higher group of manufactured iron and steel products which are in the sixth class and with the next lower group, pig iron. It is declared that prior to the 15 per cent advance, the billet rate from Pittsburgh to the 29 destinations given averaged 99.3 per cent of the sixth class and that the average of all producing points was 93 per cent.

Taking Columbus as a typical point on billets the relation between the proposed rates and the sixth class rates is as follows:

BILLETS

	Miles	Present billet rate	Present 6th class rate	Increase
Buffalo	320	$2.70	$3.00	.30
Pittsburgh	191	2.30	2.60	.30
Youngstown, O.	181	2.00	2.50	.50
Cleveland	138	1.80	2.20	.40
Canton, O.	130	1.80	2.10	.30
Dover, O.	102	1.70	2.00	.30
Cincinnati	116	1.60	2.10	.50
Hamilton, O.	104	1.60	2.00	.40
St. Louis	421	2.70	3.40	.70
Chicago	305	2.90	3.00	.10
Detroit	183	2.10	2.50	.40
Toledo, O.	124	1.70	2.10	.40
Muncie, Ind.	135	1.90	2.20	.30
Terre Haute, Ind.	252	2.20	2.80	.60

Pipe Rates Show Spread

In cast iron pipe, it is set forth the present rate of $2.36 applies to 33 different hauls ranging from 237 to 371 miles. For substantially equal distances, the spread is from 11 to 94 cents.

An illustration of the proposed increase in cast iron pipe in the case of Chicago is as follows:

CAST IRON PIPE

	Miles	Present commodity rate	Present 5th class rate	Increase
Buffalo	511	$3.60	$4.30	.70
Scottdale, Pa.	530	3.60	4.60	1.00
Cleveland	339	2.70	3.80	1.10
Massillon, O.	350	2.70	3.90	1.20
New Comerstown, O.	371	2.70	4.00	1.30
Coshocton, O.	357	2.70	3.90	1.20
Columbus	305	2.70	3.70	1.00
Cincinnati	285	2.70	3.60	.90

The revision of the short haul rates on manufactured iron and steel products, it is declared is necessary to complete the application of fifth class rates as a uniform basis for commodities of the character. Rates on manufactured iron and steel products on hauls of 85 miles or more now are of the fifth class.

IRON AND STEEL PRODUCTS

(Cents per 100 lbs.)

	Miles	Present commodity rates	Present 5th class rates	Increase
Pittsburgh	65	.06	.105	.045
Washington, Pa.	97	.07	.12	.05
Steubenville, O.	83	.07	.115	.045
Wheeling, W. Va.	107	.07	.125	.055
Beaver Falls, Pa.	35	.05	.09	.04
New Castle, Pa.	20	.04½	.075	.03
W. Middlesex, Pa.	20	.04½	.075	.03
Farrell, Pa.	14	.03½	.07	.035
Sharon, Pa.	13	.03½	.07	.035
Sharpsville, Pa.	16	.04½	.075	.03
Shenango, Pa.	27	.05	.085	.035
Greenville, Pa.	30	.05	.085	.035
Lowellville, O.	8	.03	.07	.04
Struthers, O.	5	.03	.065	.035
Girard, O.	5	.03	.065	.035
Niles, O.	9	.03	.07	.04
Warren, O.	14	.03½	.07	.035
Cleveland	67	.06	.11	.05
Canton, O.	65	.06	.105	.045
Ambridge, Pa.	49	.06	.10	.04

Many Ovens Are Awarded

IN connection with the proposal of the government to stimulate additional construction of by-product coke plants in order to increase the supply of high explosive bases, plans for the building of 538 additional ovens of the Koppers type are announced. The proposal of the government to bring about the construction of 1500 additional ovens in which it will have a financial interest, was outlined in last week's IRON TRADE REVIEW.

Principal in importance as to size and capacity is the new plant of 300 ovens for which contracts have been awarded to the H. Koppers Co. by the Jones & Laughlin Steel Co. This plant will be located at the Eliza furnace department and will have a carbonizing capacity of approximately 2,000,000 tons per year and will replace beehive coke capacity to that extent. The plant will be equipped for the recovery of ammonia in the form of ammonium sulphate, of tar and of benzol and of toluol as pure products. The ammonium sulphate and pure toluol will be sold to the government for war purposes. The company will use the gas in its steel plant operations.

The recent announcement of the incorporation of the Fairmont By-Products Corp., Fairmont, W. Va., means the construction of a new by-product coke plant. The H. Koppers Co. has received a contract for the construction of 110 ovens with the necessary boiler capacity and accessories. Ammonia and sulphate and pure toluol for government purposes and tar and benzol for general industrial use will be produced. The plant also will deliver a large amount of coke oven gas to the relief of the shortage of natural gas in the Fairmont district. A site for the plant has been selected near Fairmont and a number of houses will be built for employes.

Recent announcement is made that the H. Koppers Co. will build two more batteries of by-product ovens, totalling 128 ovens, for the large plant of the Carnegie Steel Co. undergoing construction at Clairton, Pa. In addition to the 640 ovens of this plant which are about to begin producing, another unit of the same size is under way so that finally there will be 1408 ovens in the plant. This will be the largest in the world. It will require approximately 10,000,000 tons of coal annually, and will produce about 6,500,000 tons of coke in that period. The output of by-products annually will be, roughly, 22,000,000 gallons of tar, 65,000,000 cubic feet of gas, 28,000,000 pounds of ammonium, and 64,000,000 pounds of ammonium sulphate.

Made Resident Manager

A. O. Sonne has been appointed resident manager for Rogers, Brown & Co., at Chicago, succeeding E. L. Billingslea recently deceased. Mr. Sonne has been associated with this interest in the Chicago field for the past 18 years, and has a wide acquaintance with the trade.

War Business to be First

Heavy Hardware Association Pledges Sales to Essential Requirements—Seek Priority to Replenish Steel Stocks

AN accurate and complete accounting of all steel used by members of the American Iron, Steel and Heavy Hardware association, was urged by Samuel L. Orr, chairman of the war service committee, at the annual convention held at Atlantic City, May 21 to 23. He stated that aside from such action being a patriotic duty, it will serve to determine whether or not members are to be further favored when the time comes for additional restrictions by the government. In applying for priority certificates, Mr. Orr said that it is incumbent upon members to consider carefully whether the material will be used effectively in helping to win the war and if not, they will succeed only in damaging their own case.

In commenting further, Mr. Orr said: "It is the belief of the war service committee that the acute scarcity of steel, will apply more particularly to plates, large rounds, etc., required in shipbuilding and in munitions manufacture. There is little to the production of any one given class of material so that all steel could not be used in its manufacture and there would be tonnage available for other steel items in which the situation might not be so serious. It is our information that the priority board is disposed to consider applications for priority certificates for stock and also to recognize when tonnage justifies a government order number for replenishment. We jobbers are in a peculiar position since we do not have available the government order numbers or know accurately the ultimate uses of our steel at the time we place orders. Unless we are able to secure some preference our stocks are bound to become depleted and our service to our customers impaired. In making application for priority, which must be made out on regular blank, it is necessary to state the uses to which the material will be put as laid down by the regulations."

As to the committee's effort in connection with extras, Mr. Orr stated: "Your war service committee has endeavored to secure uniformity of practice in the matter of warehouse steel extras—in some localities full extras are added, in others 'mill extra' is used and still in other communities so-called 'warehouse extra' prevails. We recommended as a compromise that 'warehouse extra' be used universally but so far we have been unsuccessful in securing its establishment. If there is any justification for mills to charge extra for certain sizes on account of higher costs or limited sale, these same reasons would entitle the distributor to an extra profit as well. Our arguments were met with the assertion that the fixed spread of profit allowed to jobbers was purposely made larger to cover this extra and that therefore 'mill extra' should be used on all the larger warehouse business."

E. A. S. Clarke, secretary of the steel and steel products committee wired his regrets at being unable to attend the meeting. He expressed appreciation of the fine spirit of co-operation that was manifest in the association's observance of the price fixing regulations. He took the opportunity to assure warehouse men and jobbers that they would receive their fair proportion of steel products based upon the extent of their war business.

At the close of the convention, the members passed a resolution pledging themselves to sell first for direct and indirect requirements of the government and second for essential uses as may be directed by the priorities division.

The following officers were elected for the ensuing year: President, F. H. Butts, Butts & Ordway Co., Boston; first vice president, W. H. Grant, Bonniwell-Calvin Iron Co., Kansas City, Mo.; second vice president, S. L. Orr, Orr Iron Co., Evansville, Ind.

Grenade Orders

Now Are Being Shifted From Malleable to Gray Iron

Washington, May 28.—Gray iron as recently stated by THE IRON TRADE REVIEW is to supplant the malleable iron in large orders for hand grenades about to be placed by the war department, according to information now developed in official circles here. Not only is the new order to require gray iron, but those grenades yet to be made on the first orders which approximated 40,000,000 grenades are to be of gray iron also. This change has been urgently requested by General Pershing. Malleable foundries equipped to make the grenades of gray iron may retain their order, making the substitution, but those not so equipped likely will have to give up the contracts.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	**Aluminum	Spot antimony
May 22	23.00	.....	6.92½	7.30	32.00	12.00
May 23	23.50	.....	6.97½	7.25	32.00	12.00
May 24	23.50	.....	6.97½	7.25	32.00	12.00
May 27	23.50	.....	6.97½	7.25	32.00	12.00
May 28	23.50	.....	7.05	7.20	32.00	12.00

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
**Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 32.10c; one to 15 tons, 32.20c.

New York, May 28.—President Wilson has approved the agreement between the war industries board and the producers of zinc, fixing a price of 12c a pound for grade A zinc, f. o. b. East St. Louis, the agreement to be operative from June 1 to Sept. 1, 1918. Prices for other products were 14c a pound for plate zinc, f. o. b. plant, and 15c for sheet zinc, subject in both cases to the regular differentials, extras or discounts, that were in effect Feb. 13, 1918.

No official announcement has yet been made of the conclusions reached by the war industries board following recent conferences with representatives of copper producing companies, but it is generally reported the board has recommended the continuance of the present 23.50c maximum price for 75 days, or until Aug. 15.

The market for Chinese tin has declined the past week. A week ago May shipment from China was held at 98.50c to 99c. Today there are offerings of this position at 87c to 88c. Spot on the Pacific coast is held at 92c to 93c. Banca for reasonably early shipment from Batavia is held at 92c to 93c, subject to conditions and Straits for June and July shipment from Singapore is nominally quoted 92c to 93c. No spot Straits or Banca is reported available.

The market for prime western spelter has eased slightly, sales for prompt shipment now being reported at 7.20c, St. Louis.

The lead market is firmer, outside holders are now quoting a parity with the leading interest's price, 7c to 7.10c, New York.

The antimony market is inactive.

Design and Layout of Condensers

Pointers on the Selection of the Proper Condenser Installations Under Various Conditions—Auxiliaries and Cooling Facilities Are Important Considerations in Choosing Equipment

BY D. D. PENDLETON

THE types of condensers are surface, jet and barometric. For high duty work, 28-inch vacuum or better, the type of condenser to be selected should be studied, taking into consideration the engineering, physical and commercial conditions, and particularly the question of water with respect to quantity, quality (clean, dirty, acid, etc.), pumping head; source (natural or artificial) and average temperature.

From these points may be determined the commercial vacuum which it is practicable to maintain, always bearing in mind that the average log of a properly designed, rated and operated surface condenser will show a better vacuum than a jet machine, and the latter in turn better than a barometric machine, due principally to the conditions as to air leaks, air to be handled by air-pump and exhaust piping losses. The surface machine also reclaims the condensate in the shape of pure distilled water for boiler feed, thus requiring only a moderate amount of make-up water.

In some localities the choice of condenser is determined by a practice of long standing, or by prejudices, and sometimes without investigating all phases of the situation. Pittsburgh and vicinity for a long time had the barometric habit, this perhaps being due to the fact that the manufacturers of mill equipment, in a great many cases had only the barometric to offer. Later the low type or centrifugal jet condenser appeared and was advocated for the same reason, the surface condenser usually being condemned without a hearing. Now the operating engineers are studying their own problems, and in most cases using the type best suited to conditions. After considering all the possible factors which have been mentioned above, and which apply to each individual case, the choice of a condenser should be made according to the power requirements and operating cost.

Assume a case of 40,000 pounds of steam per hour, 28-inch vacuum, based on 30-inch barometer, and temperature of water 70 degrees Fahr. The power requirements under these conditions will vary.

The water required for a surface condenser is usually based on 15 degrees difference and for this case would require 5000 gallons per minute. Since the discharge should be sealed in order to obtain the benefit of the siphon effect, a head of 10 feet should be ample under ordinary circumstances. This would require a water horsepower of 12.5, and with an efficiency of 75 per cent on the centrifugal pump, a total pumping horsepower of 16.66 would be required. Using the wet and dry system the air-pump would require approximately 6 horsepower and the condensate pump about 2½ horsepower, or a total of approximately 25 horsepower. If a turbo air and condensate pump were used, 40 horsepower would be required, making a total of approximately 56.66 horsepower.

The water requirements of the low type jet condenser can be figured at a temperature difference of five degrees. This will require less water than the surface condenser, or 3100 gallons per minute. The efficiency of the tail pump or removal pump on any jet condenser should not be figured at more than 50 per cent. In some cases it has been known to go as high as 60 or 65 per cent. This however, is extreme. A total pumping head of 36 feet is usually figured, this being the discharge head from the condenser, plus friction at the tail pump nozzle, which in this case would require approximately 27.9 water horsepower. At 50 per cent efficiency a total of 55.8 horsepower would be required for the removal pump alone. The direct-acting, reciprocating air-pump would be twice as large as for the surface condenser and would require about 12 horsepower, making a total of 68 horsepower for the jet system. If a turbo air-pump were used, 55 horsepower would be required, instead of 12 for the reciprocating pump, making a total of 111 horsepower.

The barometric condenser will require the same amount of water as the jet type, but the water may be lifted to the condenser head against the total static head, from which may be subtracted the suction effect of the vacuum. With the source of the water at approximately the same level as the hot-well discharge the net head on the barometric can be considered at 30 feet, making a total of 23.25 water horsepower. The efficiency of the supply pump should be at least 70 per cent, making a total of 33 horsepower for same. The air-pump being the same as for the jet, namely, 12 horsepower for the reciprocating, direct-acting pump and 55 horsepower for the turbo

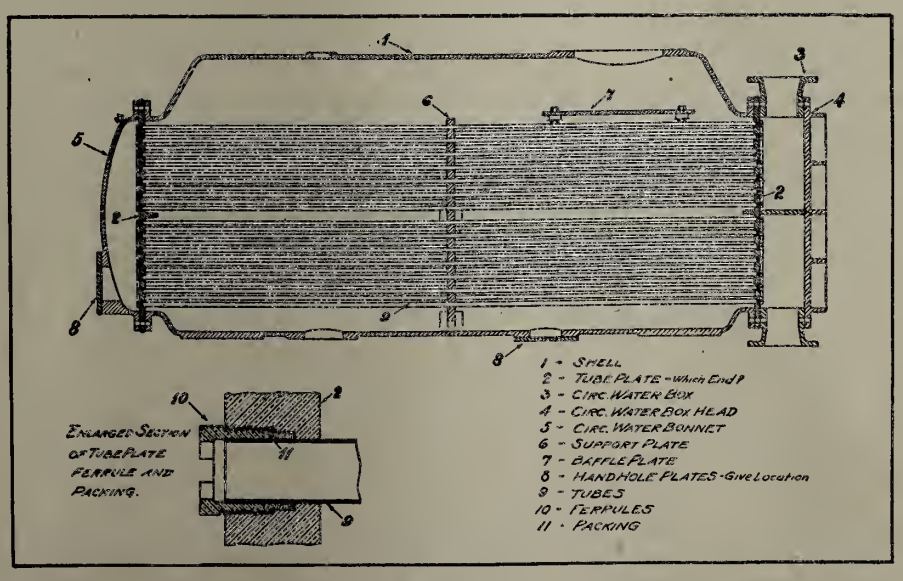


FIG. 1—GENERAL ARRANGEMENT OF A STANDARD SURFACE CONDENSER

From a paper presented at a recent meeting of the Engineers' Society of Western Pennsylvania. The author, D. D. Pendleton, is district sales manager of the Wheeler Condenser & Engineering Co., Pittsburgh.

air-pump, would make the totals 45 and 88 horsepower, respectively. The steam-pump would materially increase the air jet in place of the previously mentioned air-removal power requirements.

There is no limit to the size of surface equipments—they are now being made in sizes from 100 square feet up to 70,000 square feet. The barometric is limited owing to the expensive exhaust piping for large units. The low level jet is also limited as to size, due to the removal or tail-pump and air-pump limitations and the power required for driving them. The practical limit for these two types seems to be 7500 to 10,000 kilowatts, although there have been

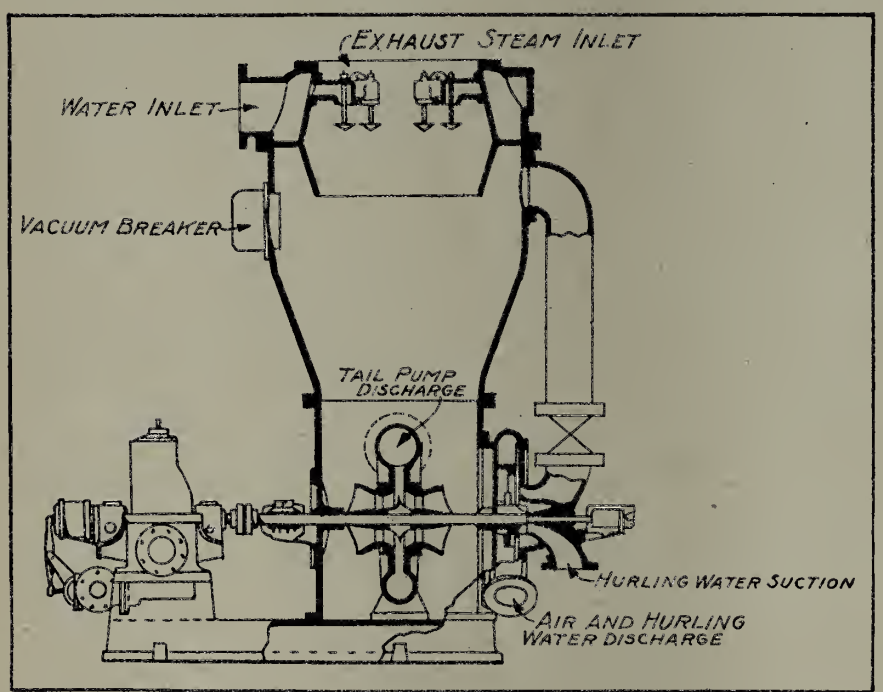


FIG. 2—SECTION SHOWING A LOW-HEAD JET CONDENSER WITH TURBINE DRIVEN INTERNAL SUBMERGED TAIL PUMP AND TURBO AIR PUMP

installed in certain cases twin jets on machines up to 45,000 kilowatts. This was not through any engineering or practical condition, but principally a matter of personal preference.

For example, a 20,000-kilowatt turbine at 12.5 pounds per kilowatt-hour, or 250,000 pounds of steam, would require at 15 degrees difference for surface work 31,250 gallons of water per minute at 70 degree water and 28-inch vacuum, against a 10-foot head. This would require approximately 100 horsepower.

The air and condensate pump of the hydraulic type requires 140 horsepower additional, or a total of 240 horsepower with one set of auxiliaries only. These can be duplicated, using one set as spare auxiliary equipment. If the wet and dry system is used the air-pump and condensate pump will only require 56 horsepower, making a total of 156 horsepower.

The jet at a 5-degree difference would require 20,000 gallons of water per minute against a 40-foot head if no booster pump were required, or approximately 400 horsepower. The air-pump would require about 250 more, making a total of 650 horsepower. The auxiliaries would have to be in pairs, with no possibility of having spares in reserve. There is no single dry vacuum pump manufactured large enough for this service.

The development of the steam turbine during the past few years has been so rapid and the vacuum requirements by the manufacturers so severe in order for them to make certain guarantees as to economies, that condenser requirements have been slighted in order to obtain a specified vacuum. For this high duty, which is required in most cases, a hardship as to first cost and operating cost of the condenser has been placed upon the purchaser, and it is in most cases doubtful if the overall efficiency will justify this extra cost.

Turbine Design

It should also be borne in mind that a turbine should be specially designed as to the low pressure blading, so as to handle without undue throttling the enormous volumes of steam due to high vacuum. If not so designed a back pressure is set up in the low pressure stages, thus defeating the results even though the condenser is designed for that specific duty. The failure to maintain specified overall duty is in most cases blamed on the condenser.

After fixing the type of condenser to be used the next step should be a study of the auxiliaries for the equipment. These can be divided into two kinds, motor-driven and steam-turbine or engine-driven. It is easy to analyze the power requirements of the motor-driven air-pump, circulating pump, hot-well pump, etc., power being taken from the switchboard and representing power not available for sale or other use.

The steam-turbine or engine drive, however, brings up the question of the return of heat to the feed-water, or heat balance, which often so complicates matters that the true power consumed is overlooked. Roughly, 90 per cent of the steam heat of the auxiliaries will be returned as heat to the feed-water, provided there is enough water of a suitable temperature to absorb this heat. The amount of feed-water available for absorbing this heat varies with the load of the main unit. The result is that at times of light load there is a grave danger of showing an excess of exhaust steam. This militates to some extent against the use of steam-driven auxiliaries, and has led to the development of combined drives using turbines and motors. Another feature to be taken into consideration is the growing use of economizers in connection with the boilers; the colder the water the more work is done by the economizers. This also emphasizes the need of avoiding an excessive amount of exhaust steam. These conditions have drawn attention to the economy of auxiliary turbines, and this in turn has resulted in the use of high-speed turbines with reduction gears.

Air-pumps are divided into several classes, as follows: The direct-acting wet pump; the flywheel direct-acting wet pump; the direct-acting rotative low speed dry vacuum pump; the hydraulic or turbo air-pump; and the steam-jet pump.

The old type direct-acting wet pump is usually a standard steam-driven pump, sometimes of the suction valveless type. This cannot produce above a 26-inch vacuum.

The rotative or flywheel direct-acting wet pump is similar in type to the Edwards, Mullen, etc. All these have their good qualities but produce a vacuum of less than 28.5 inches under any conditions, and they are limited in size and capacity, being impracticable for over 40,000 pounds of steam per hour with a 28-inch vacuum. They are rarely used except for surface work.

The direct-acting rotative low-speed

dry vacuum pump, when used with a proper condensate pump, is really the most efficient in point of power consumption, and where space is available is practicable up to about 250,000 pounds of steam per hour with a 28-inch vacuum, but for jet or barometric work at the same vacuum for only about one-half that amount of steam.

The hydraulic or turbo air-pumps, such as the Leblanc, or other types, are very generally used and, although large consumers of power, they are well adapted to all types of work where economy of space, convenience of arrangement and layout make them more practicable.

The steam-jet has so far been confined principally to marine and ice-machine work, by reason of the high steam consumption. A steam-jet using 1600 pounds of steam per hour from tests, shows an air-handling capacity of about 13 cubic feet of free air per minute at 1.5 inches partial pressure. This means on the same basis nearly 4 per cent of the main unit power. The hydraulic pump using the same amount of steam with turbine drive would handle about 32.5 cubic feet of free air per minute under the same conditions. A rotative, dry vacuum pump of the same capacity, 32.5 cubic feet per minute, would require about 900 pounds of steam per hour, with a steam pressure of approximately 100 pounds.

Choosing an Air Pump

In specifying an air-pump, due consideration should be given the requirements under winter conditions with cold water. If condensing equipment is designed for a 28-inch vacuum with 70-degree water, the purchaser should reasonably expect a corresponding vacuum with colder water. With water at 35 degrees for surface work the theoretical vacuum, based on a 15-degree difference, with a properly designed machine, should produce a 29.354-inch vacuum, and the same for barometric or jet condensers based on a 5-degree difference. Such a guarantee can be made only by designing and furnishing a decidedly abnormal air-pump or air-handling equipment.

Condensate pumps are of the single or two-stage standard centrifugal, steam-turbine or motor-driven or of the direct-acting duplex type, with some means of control such as a float to insure continuous supply of water to the pump. Circulating or supply pumps are usually of the centrifugal type, turbine or motor-driven, or a combination of both.

The surface requirements depend upon the amount of water available, or the advisable amount to be pumped from an unlimited supply, the temperature and the rate of heat transfer per square foot of surface per mean degree of temperature difference. This rating as to surface depends principally upon the amount of heat that can be dissipated by each square foot of surface. This is determined by the heat transfer per degree difference between the mean temperature of the circulating water and the temperature of the vacuum attempted. With a vacuum of 28 inches, having a temperature of 101 degrees Fahr. and with 70-degree water at a 5-degree difference (that is, a final water temperature 5 degrees below the temperature of the vacuum), there is a 26-degree rise or 13 degrees mean temperature rise, giving a mean water

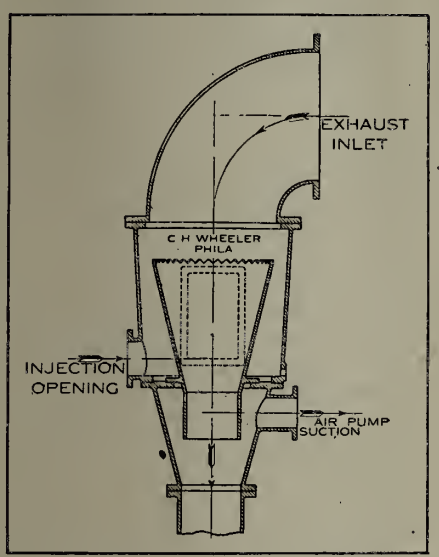


FIG. 3—SECTION OF BAROMETRIC EJECTOR CONDENSER HEAD

temperature of 83 degrees Fahr., or 18 degrees mean temperature difference. Assuming 300 B. t. u. heat transfer per mean degree difference, each square foot of surface should then absorb 5400 B. t. u.

At 10 degrees difference there is a 21-degree rise, or 10.5 degrees mean rise, or a mean water temperature of 80.5 degrees. This constitutes a mean temperature difference of 20.5 degrees, which at 3000 B. t. u. heat transfer would require each square foot of surface to absorb 6150 B. t. u.

At 15 degrees difference we have 16 degrees rise, 8 degrees mean rise, 78 degrees mean water temperature, 23 degrees mean temperature, difference at 300 B. t. u. heat transfer, or 6900 B. t. u. per square foot.

At 20 degrees difference we have 11 degrees rise, 5.5 degrees mean rise, 75.5 degrees mean water temperature, 25.5 degrees mean temperature difference at 300 B. t. u. heat transfer, or 7650 B. t. u. per square foot.

The water quantities for each pound of steam at 1000 B. t. u. per pound would be in the above cases 38.5, 47.6, 62.5 and 90 pounds, respectively.

At high vacuum the specific volume of steam becomes enormous; 339.6 cubic feet for a 28-inch vacuum, and 1259 cubic feet for a 29.5-inch vacuum, and the addition of surface or baffles to a condenser of ordinary design may entirely defeat the purpose of the designer because of the increased resistance to the flow of steam between the tubes and through the condenser. Particular attention should therefore be paid to providing steam lanes, and to the proper arrangement of tube banks, so as to keep down this resistance of flow to a minimum. In some cases removal of 10 to 20 per cent of the tube surface has materially increased the vacuum.

Factors Which Determine Vacuum

The quantity of water available and the temperature usually determine the practical vacuum. This quantity can be varied for the same vacuum by varying the assumed terminal temperature difference, which will directly vary the surface for any given rate of heat transfer. A terminal temperature difference of 5, 10, 15 or 20 degrees and a ratio of heat transfer from 300 to 500 can be used. For standard commercial work a terminal temperature difference of 15 degrees is usually conceded to be the best practice, and a heat transfer of from 300 to 350 is the most conservative. This gives an idea of what may be accomplished in relation to water quantities, and of course if the surface be reduced in proportion to the

Table I

Capacity and Power Ratios

Station	Turb. capacity	Sq. ft. surf.	Sq. ft. per kw.
Waterside No. 2	22,000	25,000	1.14
Waterside No. 2	30,000	50,000	1.66
Boston Elevated	35,000	50,000	1.43
Gold Street, Brooklyn	22,000	35,000	1.59
Fisk Street, Chicago	25,000	40,000	1.60
Northwest, Chicago	30,000	50,000	1.66
Seventy-fourth Street, New York	30,000	50,000	1.66
Buffalo	20,000	33,000	1.65

rate of heat transfer (350, 400, 450 and 500 B. t. u. per mean degree difference) it will materially reduce the cost, but decrease the margin of safety for overloads and fouled tubes.

Ratio of Surface to Power

There has been much discussion regarding the surface per kilowatt. No condenser is ever rated by kilowatt, but by pounds of steam per hour, and in all cases the B. t. u. per pound of steam should be given. In a recent paper before the Boston societies a statement was made as to surface for certain installations, which is summarized in Table I. Other recent installations with the surface specified and guarantees are given in Table II.

Some engineers have advocated water velocities for surface condensers as high as 10 feet per second, stating emphatically that 8 feet is conceded to be practical and standard. Since from tests of a number of large condensers a water velocity of 4.7 feet per second seems to be the average, assume a velocity of 5 feet. Suppose that this velocity be increased to 8 or 10 feet, the excessive power requirements for such conditions will be apparent. Eight to 10 feet per second seems to be absurd in view of the fact that there are very few commercial plants in practical operation under this condition.

By plotting the curve of head lost in the condenser against the discharge in gallons per minute on logarithmic paper, it is found that the head lost varies as the 1.75 power of the discharge; but since the velocity varies directly as the quantity of water, the head lost varies according to the 1.75 power of the velocity. This exponent is but slightly lower than the exponent 1.87, given in the American Civil Engineers' pocket book, or the exponent 2 generally conceded an average value. As the water horsepower depends upon the quantity times the head, the horsepower should vary as the cube of the velocity. It is found, by plotting the water horse-

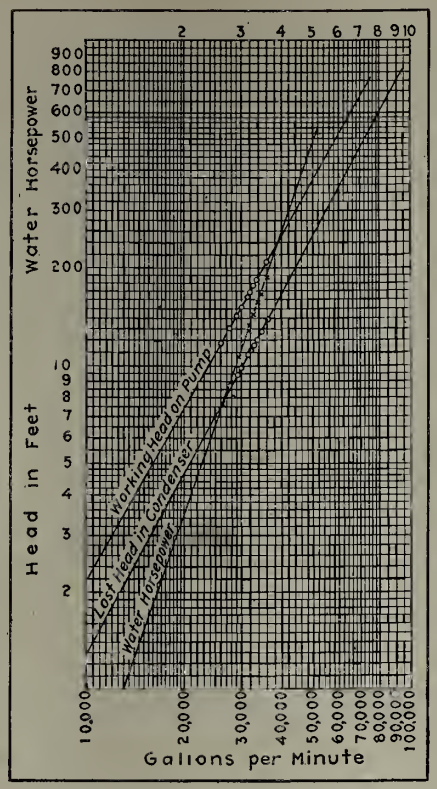


FIG. 4—CURVES OF CENTRIFUGAL PUMP TEST

power curve that the exponent is 2.9. That is, the horsepower varies as the 2.9 power of the gallons per minute, or of the velocity through the condenser tubes. Assuming a water velocity of 5 feet per second and 30,000 gallons per minute, by increasing this velocity to 10 feet per second the head loss in the condenser would be 35 feet, making a total head of 52 feet, instead of 10 and 15 feet; and a water horsepower of over 800, instead of 112.

Low Level Jet Condensers

Water quantities are usually figured at a 5-degree terminal difference as standard practice, although results have easily been obtained at the temperature of the vacuum or at 100 per cent water efficiency. The removal or tail-pump requires the larger amount of power. With the usual river conditions the water has to be supplied to a cold well by a booster pump, drawn into the condenser by suction, and expelled against the vacuum plus any friction and outside static head. The booster pump power has not been considered in the example of power requirements for the types already given. The air-pump is required to remove air coming in with the water, as well as air entering through leaks in the exhaust or other piping, and air entering with the steam.

Barometric Condenser

With the barometric condenser also the water quantities are figured as in the low type jet machine. The water supply can be more easily obtained in that it can be pumped directly to the barometric head without booster or auxiliary pumps. The air-pump requirements are the same as in the low type jet. The efficiency of the booster pump for the low type jet, when required, and of the supply pump for the barometric can be assumed as standard, consistent with good centrifugal pump design at a given head and quantity. But the removal pump efficiency for the jet is seldom over 50 to 60 per cent, owing to the low velocity of the entering water in the impeller when pumping from a vacumm. The barometric type, therefore, as far as power requirements are concerned, is more efficient than the jet and less efficient than the surface type. No condensate is reclaimed for boiler-feed purposes in either case.

Where water supply is a serious problem some artificial method of cooling a given supply of circulating water is employed. This is done by some kind of cooling tower or spray pond. Cooling towers are of the natural-draft, enclosed type, the natural-draft, open or rack type; the forced-draft; or the combined forced and natural-draft.

In standard cooling tower practice it has been determined that with the air temperature at 75 degrees Fahr. and at 70 per cent relative humidity, the most economical vacuum to attempt is 27 inches, based on a 30-inch barometer, or a vacuum having a temperature of 115 degrees Fahr. Rating all three types of condenser on a 5-degree difference, requiring a minimum uniform amount of water, it will be necessary to cool the water from 110 degrees Fahr. Commercially, under the given air conditions, it has been found practicable to cool to only 85 degrees Fahr. or sometimes to 80 degres Fahr., giving a 25 or 30-degree cooling range, which with steam at

Table II

Specified Surface and Guarantees

Turbine cap. kw.	Sq. ft. surface	Surface per kw. sq. ft.	Lb. st. per hour	Vacuum guar. in.	Temp. cir. water deg. Fahr.
10,000	19,000	1.90	125,000	28.00	75
20,000	44,000	2.20	240,000	28.50	75
10,000	20,000	2.00	130,000	28.20	70
10,000	25,000	2.50	135,000	28.00	80
20,000	40,000	2.00	220,000	28.50	70
15,000	35,000	2.33	200,000	27.25	80
20,000	35,000	1.55	260,000	27.25	85
20,000	35,000	1.75	268,000	27.00	83
25,000	45,000	1.80	285,000	28.00	75
30,000	45,000	1.50	385,000	28.40	70
15,000	26,000	1.73	190,000	28.00	70
30,000	60,850	2.02	345,000	28.50	70
15,000	26,300	1.75	147,000	28.55	70

1000 B. t. u. per pound would require 40 to 33.3 pounds of water per pound of steam, respectively.

The type of equipment will depend upon existing local conditions, such as space available and power consumption. The natural-draft open type requires more ground space and can be placed only where the vapors and driftage will do no harm to surrounding buildings or property. This type requires a pumping head of approximately 30 feet and no other power. The natural-draft, enclosed chimney type takes less ground space The chimney or stack is usually about 75 feet high. This causes a positive draft at all times. A pumping head of about 25 feet is required and the system is practically independent of wind conditions. The forced-draft type requires less floor space than any other type, but requires a pumping head of about 30 to 35 feet, and an additional amount of power for driving the fans, giving a draft independent of atmospheric conditions. The combination forced-draft and natural-draft tower requires less floor space than the chimney type natural-draft machine and more than the forced-draft machine, and requires about the same pumping head as the natural-draft chimney type machine, plus the power to drive the fans when operating under forced-draft conditions. This type has the advantage of conservation of power under favorable atmospheric conditions.

Layout of Spray Ponds

It is impossible to state generally the area of a pond required for a given quantity of water, but, generally speaking, at a working pressure of six to seven pounds on the spray nozzles, a pond of three square feet per gallon of water sprayed will be necessary. There are quite a number

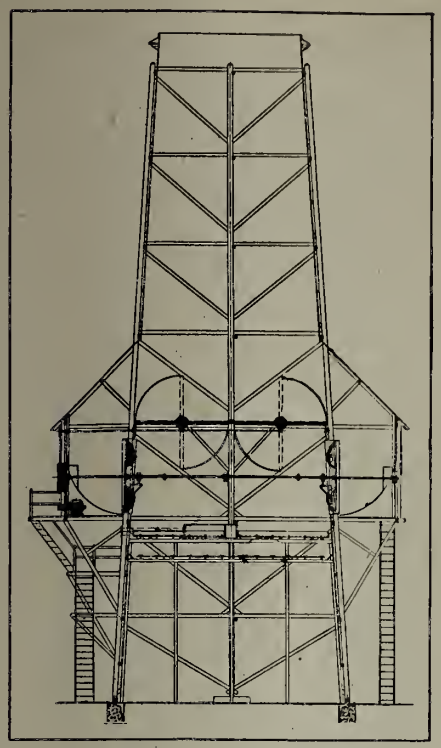


FIG. 5 — SECTION OF COMBINATION NATURAL AND INDUCED DRAFT COOLING TOWER

of details to be considered, all having vital bearing on the subject of spray nozzle cooling. First, for spray nozzles the cooling effect can be increased by increasing the pressure at the nozzle. An increase of from 5 to 20 pounds would show an increase of from 1 to 12 per cent in cooling. The size of the nozzle should also be considered. Assuming a given size nozzle as rated at 100 per cent, an increase of up to 135 per cent can be obtained by decreasing the size, while by increasing the size a decrease of 60 per cent will be shown in the rated efficiency or cooling effect. The size of the pond or its storage capacity is a very valuable asset, in that the greater the storage volume the more time it requires in continuous service to pass it through the condenser. This time is what is called the lag in the pond temperature. The greater the lag the lower will be the average temperature in the pond. Therefore, the mean atmospheric conditions over the lag period can be assumed. Sprays are usually arranged in groups, so that free access of the air can be obtained at all times. The groups are arranged in single or double deck, depending upon the space conditions.

Natural Cooling Ponds

The area of a natural cooling pond obviously should be large, as the heat dissipated per square foot depends upon the relative humidity, the temperature of the water and the velocity of the air currents. These are naturally, on account of varied conditions, very discordant.

Quoting from G. F. Gebhardt's "Steam Power, Plant Engineering":

"It appears from tests that under ordinary conditions, in the northern part of the United States, with engines using 15 pounds of water per horsepower hour and a vacuum of 26 inches, a reservoir having a surface of 120 square feet per horsepower would be ample for cooling the condensing water."

This would mean about 60 square feet for each gallon of condensing water for a 26-inch vacuum, which, of course, would be greatly increased for a higher vacuum. The advantages are, of course, with spraying under pressure. In any water-cooling device 90 per cent of the cooling effect is through evaporation, and it is therefore of vital importance that sufficient unsaturated air be given free access to the proper quantity of water. The air in all cases should go off the tower or pond in a saturated condition.

Structures of Acetylene and Arc Welds

IN this contribution Zay Jeffries, instructor in metallurgy, Case School of Applied Science, Cleveland, discusses S. W. Millers' paper entitled "Some Structures in Steel Fusion Welds" which was presented at the annual meeting of the American Institute of Mining Engineers. Mr. Miller's paper was published in the March 21 issue of THE IRON TRADE REVIEW. Mr. Jeffries says:

"I have had occasion to study the structures of acetylene welds, as well as arc welds used in various welding materials. Regarding the formation of the needles, I am of the opinion that they are not cementite. Their etching characteristics are not at all like the etching characteristics of cementite, either with picric acid or other reagents. If they were cementite, they should remain brighter than the surrounding material when etched with picric acid, and darker than the surrounding material when etched with sodium picrate."

The formation of the free cementite under the stated conditions disobeys the phase rule so completely that I think we might almost discard the idea of free cementite at once. I realize, of course, that the formation of cementite globules disobeys certain features of the phase rule, and that the phase rule is not what we want to go by—we want to go by facts—but let us see what those needles would have to do in order to form in the free cementite under the conditions existing during the cooling of that weld.

Ferrite, not cementite, should separate at the grain boundaries first, and then if diffusion cannot take place rapidly enough, the ferrite should begin to separate in the cleavage planes of the austenite. The cementite would remain

in solution in the steel until it concentrated to 0.9 per cent in carbon, and then should form either pearlite, sorbite, troostite, or martensite, according to the rate of cooling. For the cementite to form in the free needle state under those conditions would be contrary to all laws of phase equilibria now recognized. But we do not need to consider that the needles are free cementite in order to explain its occurrence.

Rate of Cooling Compared

The formation of those needles will vary with the rate of cooling, through the critical range. The acetylene weld cools much more slowly than the electric weld. That is due to the fact, as Mr. Miller has mentioned, that the acetylene torch heats large adjacent areas of the steel to be welded, whereas in the electric weld a small portion of the steel is heated; the rest of it remains comparatively cold. The needles occur only occasionally in the acetylene welds I have examined. In the electric welds the needles are most prominent.

Osmond found that steel containing as little as 0.10 to 0.12 per cent of carbon, when quenched a little above the upper critical range, produced only a little martensite, but when quenched from 1200 to 1300 degrees produced more martensite. We have the condition, in these electric welds, of quenching from the melting point, or 1500 degrees. We have the second condition of a lower carbon content.

If those needles were cementite, the area represented would be sufficient to produce steel of 0.6 per cent carbon so that their quantity is out of proportion to the quantity of cementite which could form. We know nothing about the limiting side of martensite from the low-carbon end. I have made welds containing fairly high carbon and would always get martensite, and they are hard. The electric welds, therefore, cooled fast enough to produce martensite, when there is enough carbon to recognize martensite in its familiar form. If we decrease the carbon content gradually, where is the formation of that martensite going to stop? I cannot say that there is a point between 0.10 and 0.09 per cent carbon above which we will get martensite, and below which we will not.

I believe that the needle structures (the ones which I have examined at any rate) have a direct bearing on the formation of martensite. The needles are in the same direction and position as the martensitic needles, and all of the needless which Mr. Miller has discussed are in the cleavage planes of the austenite grains. So are martensite needles in the cleavage planes of the austenite, etc. As we increase the grain size of the austenite from which the martensite was formed, we make the needle structure more and more pronounced, but as we decrease the carbon content may we not increase the distance between needles; and if we reduce the carbon very low, may the distance between needles not be something on the order of that which is found in the electric welds?

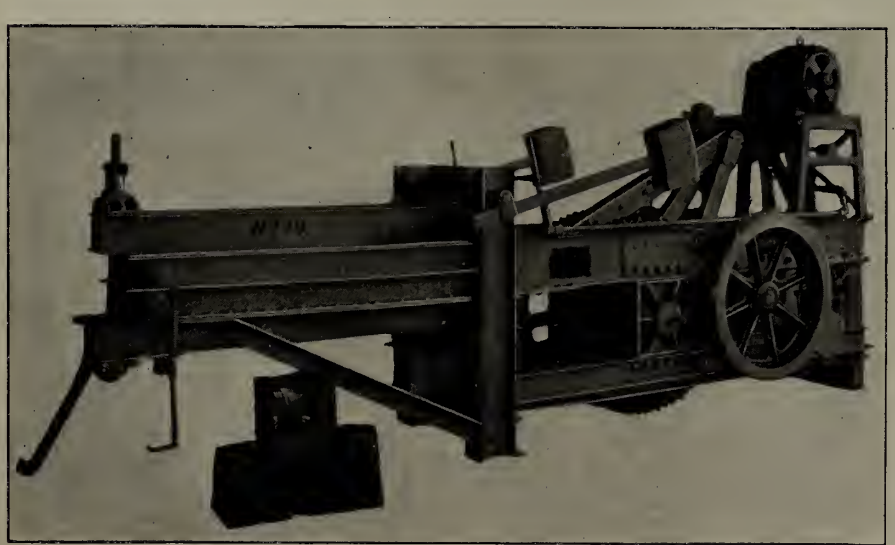
Relation of Needles

I have another reason for supposing that those needles relate particularly to the formation of martensite, namely, the material in that condition is harder than it is after being heated above 900 degrees and cooled in the furnace; or, in other words, even though the grain is smaller after grain refinement, the hardness seems to be less.

I wouldn't attempt to say why the martensite looks as it does. Nobody knows what martensite is; nobody knows how many needles, side by side, we must have before we can call it martensite; nobody knows how far apart those needles must be in order to call the material martensite. In other words, most of our work on martensite has been with steels containing more carbon than these steels with which Mr. Miller has been working. There is no reason, however, why the formation of martensite should not be gradual, from zero carbon up to the highest quantity of carbon. The conditions noted by Mr. Miller, namely, the speed of cooling, high temperature previous to cooling, the increased hardness, the position of the needles being the same as the position of the needles of ordinary martensite, and the softening of the weld by annealing, all tend to give one the idea that those needles are of martensite origin.

One thing more about the nitride. Why should any nitride form in the few seconds in which the electric-welded steel is heated to the high temperature, when oxygen is so abundant? That is, we should have to use up the oxygen before the nitrogen would begin to act; and the evidence is that the oxygen has been active. Then, as yet, we have no evidence that the nitride of iron can be broken up by heating it above the *Ac* point; however, this needle structure can be, and so can martensite.

I have suggested to Mr. Miller that if the needles are martensite they should be broken up by heating below Ac^3. This would also be the case if they were lines of deformation. I am of the opinion that if these needles be considered as lines of deformation that martensite needles should be considered as substantially the same thing.



MOTOR-DRIVEN MACHINE FOR BALING LIGHT SCRAP METAL

Baling Scrap Metal

Considerations of economy in storage, handling and shipping demand that scrap metal, particularly light material, should be compressed to occupy the least possible space. Scrap steel from punching and stamping machines, wire and turnings are all bulky and inconvenient to handle in the condition in which they come from the machines. Baling in some form of press has been found to be the most practical method of reducing the bulk of these forms of scrap. The resulting bales bring better prices on the scrap market. The baler shown in the accompanying illustration therefore has a practical application. The loose metal is placed in the trough shown at the left and the plunger arm, actuated through gears by the motor shown on the elevated platform, moves forward and "cabbages" the metal with one stroke. The arrangement of hinged wings attached to the end of the plunger or piston, together with the tapered sides of the compression box, result in the pressure being applied on all sides of the loose metal in the compression box. This pressure is said to be in the neighborhood of 1000 tons. The scrap is compacted into a block or billet which may be handled and stored conveniently.

Kaiser Blackmails German Industry

Iron and Steel Manufacturers Forced to Pledge Large Sums to Support Hohenzollern War Policy—Promised Great Holdings in Conquered Territory and Financial Backing in Return for Their Help

BY HERR THYSSEN

I AM writing this pamphlet because I want to open the eyes of Germans, especially of the business community, to facts. When the Hohenzollerns wanted to get the support of the commercial class for their war plans, they put their ideas before us as a business proposition. A large number of business and commercial men were asked to support the Hohenzollern war policy on the ground that it would pay them to do so. Let me frankly confess that I am one of those who were led to agree to support the Hohenzollern war plan when this appeal was made to the leading business men of Germany in 1912-13. I was led to do so, however, against my better judgment.

In 1912 the Hohenzollerns saw that the war had become a necessity to the preservation of the military system, upon which their power depends. In that year the Hohenzollerns might have directed, if they had desired, the foreign affairs of our country so that peace would have been assured in Europe for at least 50 years. But prolonged peace would have resulted certainly in the breakup of our military system, and with the breakup of our military system the power of the Hohenzollerns would come to an end. The emperor and his family, as I said, clearly understood this, and they therefore, in 1912, decided to embark on a great war of conquest.

But to do this they had to get the commercial community to support them in their aims. They did this by holding out to them hopes of great personal gain as a result of the war. In the light of events that have taken place since August, 1914, these promises now appear supremely ridiculous, but most of us at the time were led to believe that they would probably be realized.

Promises of Vast Conquest

I was personally promised a free grant of 30,000 acres in Australia and a loan from the Deutsch bank of £150,000, at 3 per cent, to enable me to develop my business in Australia. Several other firms were promised special trading facilities in India, which was to be conquered by Germany, be it noted, by the end of 1915. A syndicate was formed for the exploitation of Canada. This syndicate consisted of the heads of 12 great firms; the working capital was fixed at £20,000,000, half of which was to be found by the German government.

Voice of Steel Leader

AMERICAN iron and steel men especially are interested in the astounding revelations by Herr Thyssen of the methods used by the Hohenzollerns to bludgeon the commercial interests of Germany into support of despicable warfare. Herr Thyssen long has been one of the chief iron, coal and steel magnates of Germany and is well known to iron and steel leaders in the United States. With the British, French and German iron and steel associations, he visited this country in 1890. He was active in the proceedings of the international conference of iron and steel makers at Brussels in 1911, at which Judge Gary presided. He has been the owner of great docks and shipbuilding works at Vlaarindingen, near Rotterdam and has controlled the Vulcan Iron & Steel Steamship Building Co., of Germany. At the beginning of the war his holdings included mines, ironworks, docks and even harbors in British India, in British colonies, as well as in France and Russia, all of which were sequestered by these respective governments. He is 78 years of age. The pamphlet which he wrote attacking the Hohenzollerns in some way reached this country. Joseph G. Butler Jr. obtained a copy and has had reprints made from it to which he has given wide circulation. Herr Thyssen now is said to be in Switzerland.

There were, I have heard, promises made of a more personal character. For example, the "conquest of England" was to be made the occasion of bestowing upon certain favored and wealthy men some of the most desirable residences in England, but of this I have no actual proof.

Every trade and interest was appealed to. Huge indemnities were, of course, to be levied on the conquered nations, and the fortunate German manufacturers were, by this means, practically to be relieved of taxation for years after the war.

These promises were not vaguely given. They were made definitely by Bethmann-Hollweg on behalf of the emperor to gatherings of business men, and in many cases to individuals. I have mentioned the promise of a grant of 30,000 acres in Australia that was made to me. Promises of a similar kind were made to at least 80 other persons at special interviews with the chancellor, and all particulars of these promises were entered in a book at the trades department.

But not only were these promises made by the chancellor; they were confirmed by the emperor, who, on three occasions, addressed large private gatherings of business men in Berlin, Munich, and Cassel in 1912 and 1913. I was at one of these gatherings. The emperor's speech was one of the most flowery orations I have listened to, and so profuse were the promises he made that were even half of what he promised to be fulfilled, most of the commercial men in Germany would become rich beyond the dreams of avarice.

German Flag Over All

The emperor was particularly enthusiastic over the coming German conquest of India. "India," he said, "is occupied by the British. It is in a way governed by the British, but it is by no means completely governed by them. We shall not merely occupy India. We shall conquer it, and the vast revenues that the British allow to be taken by Indian princes will, after our conquest, flow in a golden stream into the fatherland. In all the richest lands of the earth the German flag will fly over every other flag."

"I am making you no promises that can not be redeemed, and they shall be redeemed if you are now prepared to make the sacrifices which are necessary to secure the position that our country must and shall occupy in the world. He who refuses to help is a traitor to the fatherland; he who helps willingly and generously will have his rich reward."

All sounded, I admit, tempting and alluring, and though there were some who viewed rather dubiously the prospect of Germany being able to conquer the world in a year, the majority of business and commercial men agreed to support the Hohenzollern war plans. Most of them have since wished they had never paid any attention to them.

According to the promises of the Hohenzollern, victory was to have been

achieved in December, 1915, and the promises made to myself and other commercial men in Germany when our money for the kaiser's war chest was wanted were to have been then redeemed.

But this is what has happened in reality: In December of 1916 the chancellor, Bethmann-Hollweg, began to have interviews once more with business men. The purpose of these interviews was to get more money from them. Guarantees were asked from 75 business men in Germany, including myself, that they would undertake to subscribe £200,000,000 to the next war loan. I was personally asked to guarantee a subscription of £200,000. I declined to give this guarantee; so did some others. I was then favored with a private interview with Bethmann-Hollweg's private secretary, who told me that if I declined to give the guarantee and subsequently the money I would lose on a contract I had with the war office. But not only that—I was threatened with the practical ruin of my business if I did not give the guarantee.

I described this demand as blackmail of the worst sort and refused to guarantee a mark to the war loan. Two months later I lost my contract, and the greater part of my business has been taken over at a figure that means confiscation. Moreover, I am not to get paid until after the war, but am to receive 4 per cent on the purchase price. Every man who declined to promise a subscription to the amount he was asked has been treated in the same manner.

The majority of men, however, preferred to pay rather than to be ruined, and so the Hohenzollerns in the main got their way. But, apart from the blackmailing of men who refused to pay any more money into the Hohenzollern war chest, let us see how the Hohenzollerns' promises are working out. A circular was sent out last March to a large number of business men by the foreign trade department which contained the following suggestion:

Preparing for the Reckoning

"It will be wise for employers who have foreign trade interests to employ agents in foreign countries who can pass themselves off as being of French or English birth. German agents and travelers will probably for some time after the war have difficulty in doing business not only in enemy countries, but in neutral countries. There will undoubtedly be a personal prejudice against Germans that would probably make it difficult for representatives of German firms to do business. Although this prejudice will not interfere with German trade, as it will be merely of a personal character, it will facilitate trading transactions if employers will employ agents who pass as French or English, preferably, or as Dutch, American, or Spanish."

So this is the prospect we are faced with after the war. The meaning of this circular in plain language is this: So loathed and hated have Germans become outside their own country that no one will want to have any personal dealings with them after the war.

A large number of businesses are, moreover, being secretly bolstered up with state aid. A condition of this aid is that the owners of the business receiving it shall agree to accept a considerable degree of state control over their business after the war. This is part and parcel of a plan on the part of the Hohenzollerns to get the commercial classes thoroughly into their grip before the end of the war, and so minimize the chances of a revolution.

These men who have agreed to accept aid now for their business, and state control after the war, have received a notification from the foreign trade department to the effect that, with proper organization, Germany ought to recover her pre-war trade three years after peace is declared. Here is the Hohenzollern method of redeeming promises. We are to get back our pre-war trade three years after peace is declared, and to do this we must submit to have our trading transactions controlled and supervised by the state.

Can any German to whom such prospects are held out by the emperor fail to see that he has been bamboozled and humbugged and fooled into supporting a war from which the utmost he can hope to gain is to come out of it without national bankruptcy?

Grinding Liberty Motor Cylinders

ONE of the important war problems that American manufacturers had to solve was the internal grinding of the new steel liberty motor cylinders to be used on airplanes. The grinding of ordinary gray iron or semisteel automobile cylinders caused little or no trouble because the metals used were comparatively soft and easy to machine. Also there was plenty of metal to stand up under the cut without great chances of distortion.

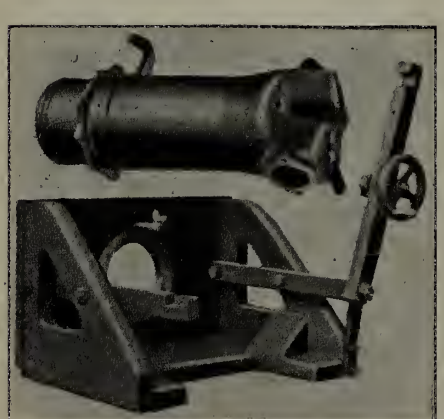


FIG. 1 — LIBERTY MOTOR CYLINDER AND GRINDING FIXTURE

But the thin, tough steel sleeve that was developed for the liberty airplane motors presented new and troublesome features, especially in the grinding operation. Of course, one object in the design was to get a motor of maximum horsepower per pound of weight and hence the cylinder walls had to be extra thin, necessitating the use of a tough, durable steel. Then, in addition to this, the diameter of the cylinder was increased somewhat over usual bores found in automobile cylinders and the cylinders were lengthened out greatly, thus increasing the area of the ground surface materially.

These conditions coupled with strict requirements for accuracy and finish put a new problem up to the grinding machine and grinding wheel makers but they have it practically solved.

The cylinders are being ground on a Heald No. 60 cylinder grinding machine and also on Bryant internal grinding machines. The Heald company has designed a special fixture for holding these cylinders, as shown in Figs. 1 and 2. Fig. 1 shows the cylinder itself and also the fixture thrown open ready to receive a casting. Fig. 2 shows the cylinder in place in the fixture, ready to grind.

This fixture was designed to hold by

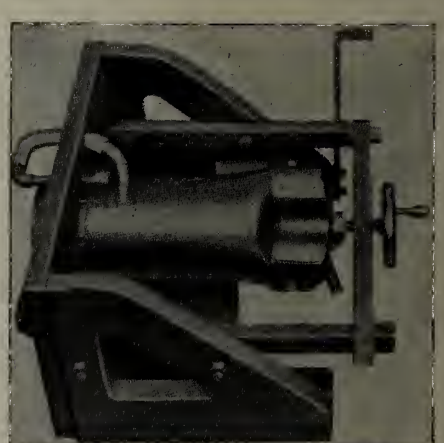


FIG. 2—CYLINDER IN PLACE READY FOR GRINDING

end pressure, thereby eliminating as much out of roundness and distortion as possible. The cylinder fits in a hole about 0.002 inch larger than the outside diameter, and has the flange pressed against the back of the angle plate by a loosely fitting collar on a screw turned by the small wheel at the rear.

Water is forced through the jacket from below and coming out at the top is carried by a hose and perforated pipe to the projecting skirt, which it runs over and envelopes completely, dropping off on the bottom of the cylinder. This keeps the cylinder always cool and even the skirt, within 10 seconds after a heavy cut, is cold.

The cylinders are made of special light yet tough steel, with the water jacket welded on.

There has been a slight difference in the grit and grade of grinding wheels that have been found satisfactory for this operation at the various airplane factories. This is undoubtedly due to the possibility of slightly different heat treatments affecting the physical properties—but mostly to such conditions as the personal factor, different finish requirements, different amounts of metal to be removed by grinding, slight wheel and work speed variations, and other local factors.—*Grits and Grinds.*

Designs Heavy-Duty Type Boring Mill

THE boring mill shown in the accompanying illustration has just been developed by the Bullard Machine Tool Co., Bridgeport, Conn. The design embodies many features that the Bullard company has found practicable since it built its first boring mill 35 years ago.

The control of the machine by the operator is centralized. The clutch and brake for starting and stopping the machine is conveniently arranged for the operator no matter on which side of the machine he happens to be.

All bearings and gears having a fixed relation to the machine bed are lubricated by means of a continuous flow system. The oil is screened and filtered which eliminates, as far as possible, any scoring of shafts and journals. The oil is circulated by a pump directly connected to the main drive shaft.

All gears and shafts throughout the drive are heat-treated alloy steel. The gearing is encased but is readily accessible. The tool slides are of high tensile strength cast iron, cast in box form. The tool holders are of the inserted type. The slides have a vertical movement of 36 inches and are actuated by a rack and pinion. The tool slides may be swiveled to 45 degrees either side of the center.

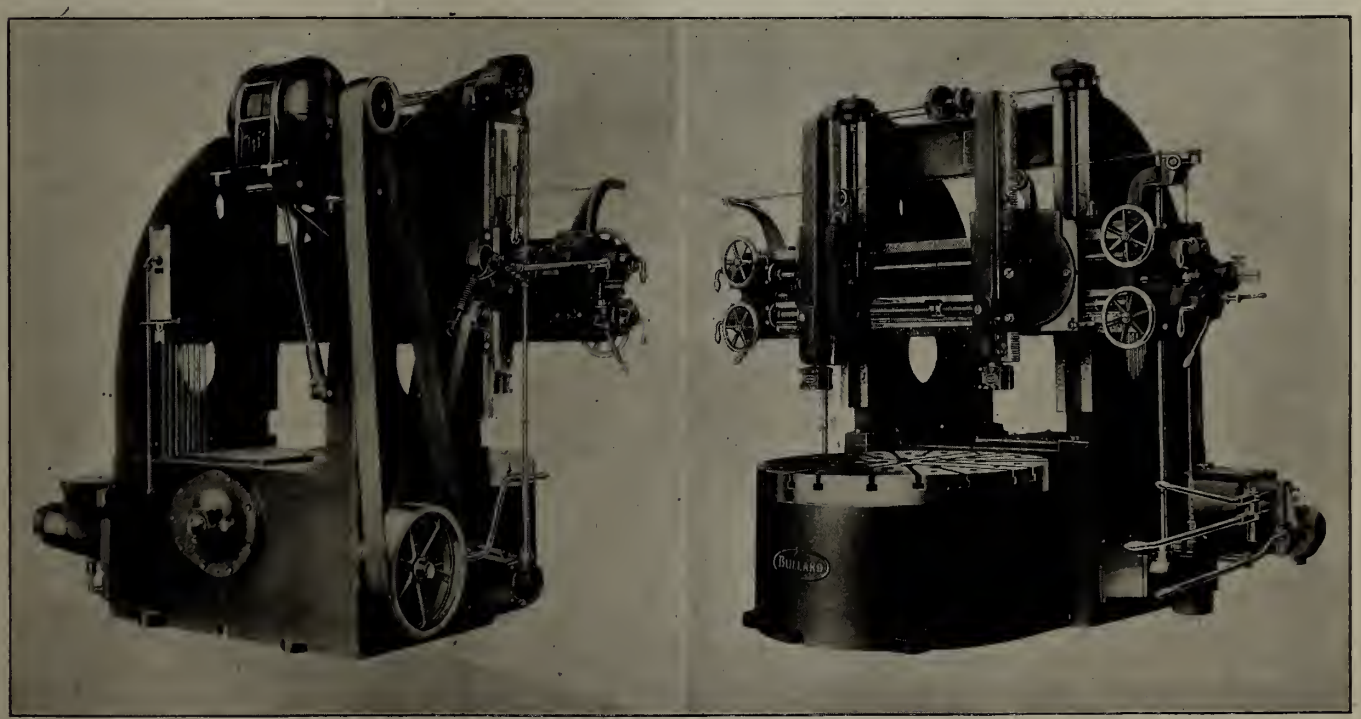
With the object of increasing the operator's ability to make fine settings, hand wheels have been installed in place of crank handles. This feature also eliminates any possibility of danger that might arise from swiftly revolving crank handles, due to rapid traverse motions.

The cross rail and the tool slides are equipped with graduated scales to facilitate accurate settings while finer readings, that is readings in thousandths of an inch, are determined through the medium of accurate micrometer dials.

The machine has a capacity of 63 inches in diameter while 52 inches can be swung under the tool holders. The table is 61 inches in diameter and is equipped with parallel T-slots which permit the use of four face-plate jaws.

There are 12 changes of table speeds ranging from 2.5 to 42.18 revolutions per minute. These speed changes are obtained by sliding gears and friction clutches which interlock with the clutch and brake levers.

The machine is designed for two drives; by a belt from an overhead countershaft or by means of an independent motor. For the motor drive a 15-horsepower constant speed motor is mounted on a bracket at the rear of the machine and connected to the driving pulley by a belt. The driving pulley is 24 inches in diameter with a 5½-inch face.



FRONT AND REAR VIEWS OF NEW BORING MILL. THE VIEW AT THE RIGHT SHOWS THE SPEED CONTROL LEVERS, POWER TRAVERSE FOR HEADS, HAND WHEELS FOR FINE ADJUSTMENT AND POWER ARRANGEMENT FOR RAISING AND LOWERING THE CROSSRAIL. THE VIEW AT THE LEFT SHOWS THE OILING SYSTEM, LEFT HAND CLUTCH AND BRAKE LEVER, POWER TRAVERSE FOR HEADS AND LEFT HAND FEED WORKS

Complex Stresses in Machine Parts

Determining Stresses Incident to Starting and Stopping With Special Consideration for the Factors of Inertia and Elasticity—The Influence and Nature of External Forces is Considered

BY F. HYMANS

THE cycle of operation of a machine can be divided into three more or less distinct periods, namely, the start, the run at constant speed, and the stop.

The design of machine parts follows at present one of two methods. The first assumes a state of equilibrium, which permits the application of the known processes of statics to determine the forces acting. The state of equilibrium, however, exists only when the machine runs at constant speed or is at rest. The second method assumes all of the machine parts to be rigid. The calculations are based on the external forces as they exist during stop or start, from which the forces acting on each part are determined by means of the dynamics of rigid bodies.

Present Methods Not Accurate

Neither of these methods leads to correct results. The first may be dismissed altogether, since no consideration is given to the quite different phenomena occurring at starting or stopping. In the second such a consideration is attempted, but the proof is based on wrong premises. If the assumptions in the second method are correct, the forces acting on the machine parts merely depend on inertia and on the magnitude of the external forces. From experience, however, it is known that the forces acting on a machine part do not depend alone on the two factors previously assumed, but also on the nature of the external forces. A feeble periodic force of the proper frequency, for instance, may cause the breakdown of a machine where a constant force of several hundred times its magnitude would easily be withstood. It is plain, therefore, that the methods mentioned neglect the consideration of some property through which in the resulting formulas the influence of the nature of the external forces vanishes. This property is the elasticity of the machine parts.

It is the object of the author to present a method whereby the forces acting on the machine parts during the start or stop may be determined with a degree of accuracy sufficient for technical purposes. While the method is explained in general terms for application to any machine, it is more specifically applied to the determination of the motion and rope tensions during the starting of the hydraulic machine shown diagrammatically in Fig. 1.

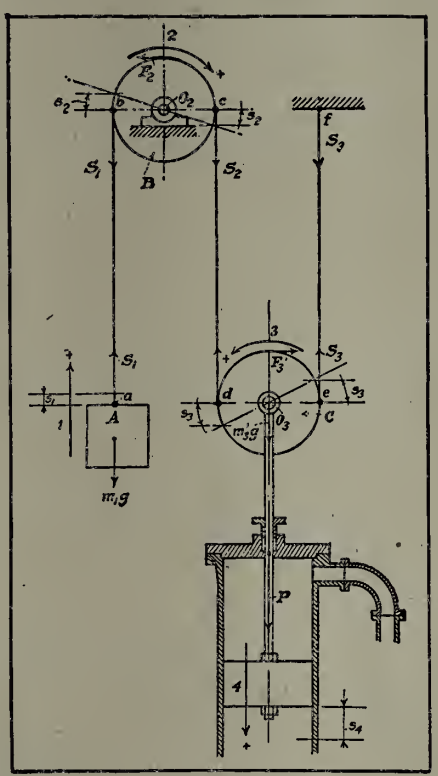


FIG. 1 — DIAGRAM OF HYDRAULIC MACHINE FOR DETERMINING THE STRESSES ON STARTING AND STOPPING

The machine consists of a vertical cylinder with a piston, adapted to lift the load *A* through the intermediary of a piston rod, a traveling sheave *C*, a stationary sheave *B*, and the ropes *ab*, *cd* and *ef*. The force *P*, acting on the piston and causing the motion of the machine, will be called the motive force, in distinction to all other external forces, such as the weight of load and machine parts, and the frictional forces.

Elasticity Considered

According to the foregoing, it is necessary to consider not only the inertia of the machine parts, but also their elasticity. Strictly speaking, all machine parts are elastic. Fortunately, however, there are always a few which have elasticity to such a predominating degree that other parts in comparison with them may be considered to be rigid. Thus any machine may be approximated by a system of parts, of which some have elasticity and others inertia only.

In the machine of Fig. 1, for example, it is at once evident that the ropes *ab*, *cd* and *ef* may be considered as the only elastic members. Their mass is small and may be neglected. The remainder of the machine parts, that is, the load *A*, sheaves *B* and *C*, the piston and piston rod, will be considered rigid.

The suggested method is based on the general energy equation of the machine, from which are derived all of the equations required in the further calculations. According to dynamics, this equation states that the gain in kinetic energy plus the gain in potential energy equals the work done by the external forces.

Deriving the Kinetic Energy Equation

To derive the energy equation of the machine certain displacements are assigned to the rigid machine parts, such as s_1, the linear displacement of the load *A*; s_2 and s_3, the circumferential displacements of points *b* and *c* of sheave *B*, and of points *c* and *d* of sheave *C*; and s_4, the linear displacement of the piston and the parts rigidly connected thereto. Since the velocities of the rigid parts are the first time derivatives of their displacements, it is quite simple to derive for each of them the expression of the kinetic energy. The kinetic energy of the machine then is the sum of the kinetic energies of its constituent parts.

The elastic machine parts—here the ropes *ab*, *cd* and *ef*—are the seat of the potential energy of the machine. By virtue of their elasticity they are capable of sustaining deformations, and so long as they are stressed below the elastic limit there is stored in them an amount of energy equal to the energy that produced the deformation. This energy is called the potential energy.

Considering the rope *ab*, it is evident that if the end *b* has moved through the distance s_2, and the end *a* through the distance s_1, the rope has suffered an elongation equal to $s_2 - s_1$. Knowing further the elongation which a tension of one pound will cause in the rope, it is merely necessary to apply the well-

From a paper to be given at the meeting of the American Society of Mechanical Engineers on June 4. The author, Frederick Hymans is engineer for the Otis Elevator Co., New York.

known laws of statics to determine the energy necessary to produce the deformation $s_2 - s_1$.

This process is also applied to ropes *cd* and *ef*, and the potential energy of the machine will be the sum of the potential energies of its constituent elastic parts. The derivation of the work done by the external forces needs hardly any elucidation.

From the foregoing it will be evident that, after having determined which of the parts shall be considered elastic and which rigid, the derivation of the general energy equation of the machine will not present any considerable difficulties. It will also be quite clear that the machine parts to be considered rigid are those wherein either the stress or the deformation, or both, are so small that the amount of potential energy stored in them is negligible. Further operation with the general energy equation is facilitated by the resolution of the absolute motion into two components, which may be termed rigid and relative motions. This is based on the following considerations.

The tension in rope *ab*, Fig. 1, changes from instant to instant during the start of the machine. If the tension decreases, the rope contracts, causing points *a* and *b* to approach each other. Vice versa, if the tension increases they recede from each other. These varying elongations, however, are merely varying increments in the free length of the rope *ab*. It follows at once that the motion of points *a* and *b*, that is, the motion of the load *A* and of point *b* of sheave *B*, consists of two components. One of these components is common to both, and is a motion wherein the linear distance between the points *a* and *b* is preserved and remains equal to the free length of the rope. The second component is superposed on the former, and corresponds to the varying elongations due to the elasticity of the rope.

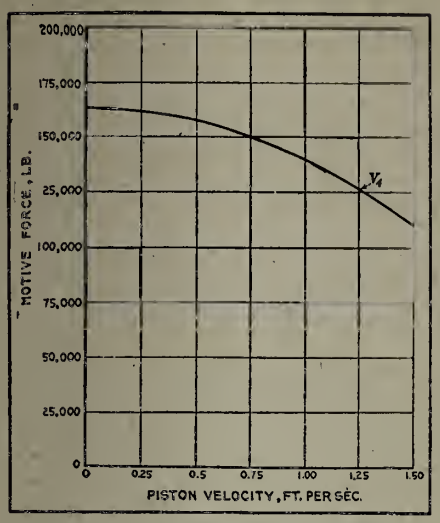


FIG. 2—MOTOR CHARACTERISTICS CURVE

Machine Part Motions

The component first named is the motion which would take place if the rope *ab* were non-extensible. In general, the motion of each machine part is the same as the motion which it would have if all of the machine parts were rigid, superposed by a motion relative thereto. It is this relative motion which is neglected if the calculations are based on the assumption of a state of equilibrium, or if all of the machine parts are assumed to be rigid.

The energy equations for the rigid and relative motions are easily derived from the general energy equation, and may be integrated separately. To prepare for the integration of the energy equation of the relative motion, the so-called theory of normal co-ordinates is used. By means of this theory the displacements s_1, s_2, etc., may be expressed as the sum of a number of normal displacements, each of these being the product of a normal constant into a normal co-ordinate. Of the normal constants and co-ordinates only a few general types need be determined.

All of the external forces active on the machine are constant with the exception of the motive force *P*. Strictly speaking, the frictional forces also are variable, and are really functions of the motion of the machine. On the other hand, the coefficient of friction depends on a number of factors which are only imperfectly known. In addition, the frictional forces are, as a rule, small as compared with the other forces acting on the machine parts. There is therefore no advantage in introducing needless refinement, and it is sufficient to consider the frictional forces as constant.

If it were possible to express the motive force in an explicit function of the time, the previous integrations could be executed easily, either mathematically or graphically. For machines yet to be built this is impossible. However, there is available for the further calculations

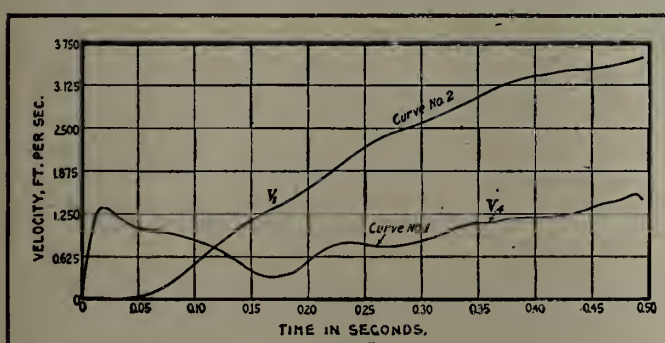


FIG. 3

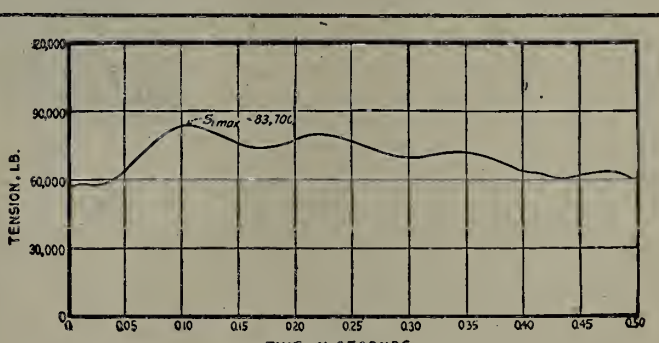


FIG. 4

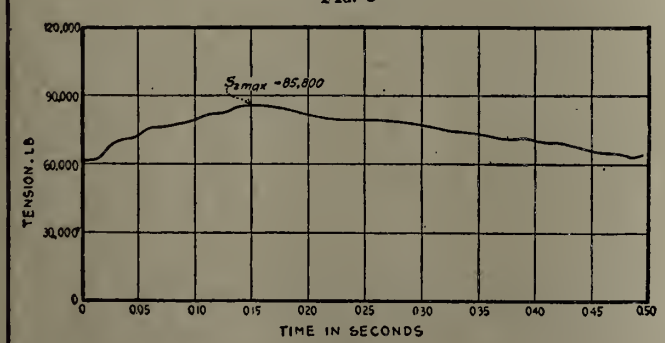


FIG. 5

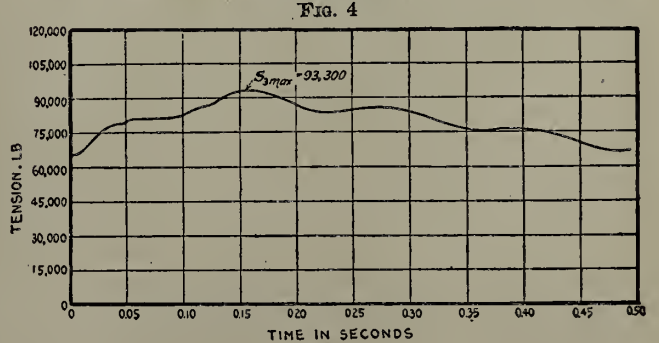


FIG. 6

FIG .3—ABSOLUTE VELOCITIES OF PISTON (CURVE NO. 1) AND OF LOAD (CURVE NO. 2)

FIG. 5—TENSION S_2 IN ROPE *cd* OF FIG. 1

FIG. 4—TENSION S_1 IN ROPE *ab* OF FIG. 1

FIG. 6—TENSION S_3 IN ROPE *ef* OF FIG. 1

what is known under the name of the motor characteristics.

The motor in general will be that machine part which is the seat of the motive force, irrespective of the latter being due to electric, hydraulic, steam or gas pressure. The force or torque exerted by these motors varies with the motor speed, although the manner in which these variations take place is frequently too complex to be expressed adequately in a mathematical formula. Fortunately, the latter is not necessary for the purpose in hand, since it is always possible from tests with the motor alone to derive a graph showing the variation of the motive force with the motor speed.

In the present case, the motor characteristics will be the performance of the piston alone when operating in the cylinder under the given conditions as to piping and water pressure. They are represented by Fig. 2, which shows the net force P which the piston rod will exert at various piston speeds.

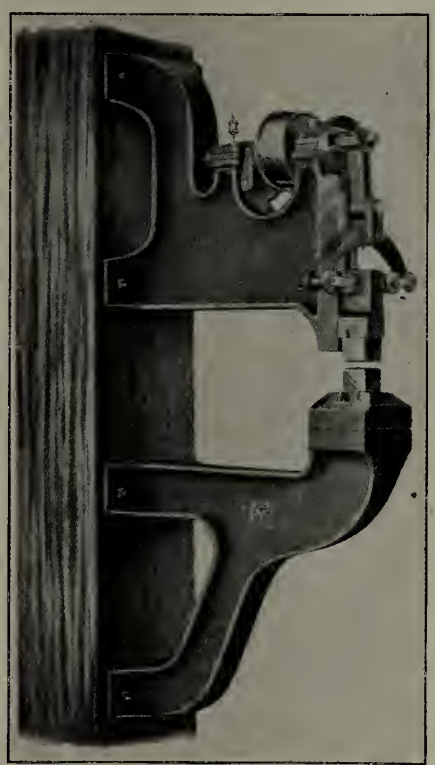
Calculating Factors in Starting

The calculations proceed by dividing the starting period into time intervals of so small duration that the motive force during any such interval may be considered constant, without that an appreciable error is committed.

For the first time interval, beginning with zero piston speed, it is found from Fig. 2 that the motive force P amounts to 163,000 pounds. For the entire duration of this interval, taken at 0.005 seconds, the motive force is assumed to remain constant at 163,000 pounds. Under these conditions the various displacements, rope tensions and piston speeds are determined. At the end of the first time interval the piston speed amounts to 0.578 feet per second, when from Fig. 2 it is at once found that a motive force of 155,200 pounds corresponds to that speed. For the second time interval the motive force is then assumed to be constant at 155,200 pounds and the calculations are repeated.

The results of the calculations are shown in the various graphs, of which four are here given in Figs. 3, 4, 5 and 6.

Fig. 3 is particularly instructive in regard to the phenomena occurring at the start. Curve No. 1 represents the velocity of the piston, and curve No. 2 the velocity of the load A. Owing to the small inertia of the piston masses, it is to be expected that at the application of the motive force the equilibrium of the piston will be violently disturbed, while the effect on the heavy load will be less severe. This is clearly reflected in Fig. 3, where the piston speed rises from zero to 1.35 feet per second within about 0.02 seconds, whereas the velocity of the load after a lapse of even 0.05 seconds amounts to only 0.03 feet per second. That such conditions do not lead to heavy stresses in the ropes is due to the nature of the motive force. Large variations in the piston velocity cannot persist, since the motor characteristics are such that an increase in the motor speed corresponds at once to a drop in the motive force (Fig. 2), and vice versa. The motive force, therefore, has the tendency to counteract large variations in the piston speed, as is witnessed by the smoother course of curve No. 1, Fig. 3, after the first violent rise. If the ropes of the machine of Fig. 1 were non-extensible, or under conditions active when the machine is running at constant speed, there would be a 2:1 ratio between the motion of the load and that of the piston. Owing to the elasticity of the ropes, however, there is no vestige of any such ratio during the start, as will be seen from Fig. 3. After a lapse of 0.05 seconds, for example, the ratio between velocities of load and of piston is as much as 1:35; after 0.117 seconds it is 1:1; after 0.3 seconds it is approximately 3:1.



POWER HAMMER FOR FORMING SHEET METAL

The rope tensions as they vary with time are shown in Figs. 4, 5 and 6. In the state of equilibrium $S_1 = 58{,}000$ pounds, $S_2 = 61{,}000$ pounds, and $S_3 = 64{,}300$ pounds. During the start, however, $S_{1max.} = 83{,}700$ pounds, $S_{2max.} = 85{,}800$ pounds, $S_{3max.} = 93{,}300$ pounds, exceeding the former by 44.2 per cent, 40.5 per cent, and 45 per cent, respectively. It will be seen that in the present case the forces S_1, S_2 and S_3 are not greatly in excess of the values which they have as soon as the machine runs at constant speed. This is primarily due to the nature of the motive force, as already explained.

From the foregoing it follows that the stresses in a machine at starting or stopping depend on a number of factors. The effect of a locomotive, for example, placed at the head of a string of cars, will be quite different than when placed in the middle. The elasticity of the individual machine parts and the distribution of the elasticity throughout the system have a prime effect. If, for instance, the equilibrium of the motor is liable to be violently disturbed at the start, the stresses in the machine will be less if the motor is coupled to the remainder of the machine by elastic members. The nature of the motive force deserves great attention. In the hydraulic machine of Fig. 1 the drop in the motive force is approximately proportional to the square of the piston speed. Had the motor characteristics been such that the drop in the motive force was only proportional with the piston speed, far larger stresses would have resulted.

Balanced Forming Hammer

A power hammer for forming and planishing various shapes of sheet metal such as automobile bodies, cowls, hoods, carriage bodies and other curved sheet products, has been placed on the market by the Yoder Co., Cleveland. Several sizes are built to accommodate diversified classes of work. The smallest size, which weighs 900 pounds, is shown in the accompanying illustration. The main shaft bearings are of the cap type. They are separate castings apart from the main frame and are bronze bushed. The bearing block may be removed from the frame, bushed and placed in the original position without removing the hammer from its position. All bearings are equipped with sight-feed oil cups.

The force of the stroke of the hammer is controlled at the head of the drive shaft. The connecting rod is adjustably secured to the drive shaft head by a pin bolt, one end of which is engaged in a dovetailed slot in the head. The lower end of the connecting rod is attached to the spring block which is provided with a large dovetail that slides vertically in a dovetail groove in the face of the main frame. This groove is provided with an adjustable bronze jib. The hammer block and spring move in a vertical direction only and it is claimed that all of the wabble in the spring and the consequent vibration is eliminated. The upper die block is made of extra heavy cast steel and is reinforced at the dovetail groove.

Will Take French Industrial Census

Bureau of Statistics Will Canvass All French Manufacturing Plants—Machine Tools in Good Condition will be Classified so as to Prepare for the Industrial Revival After the War

BY FRANCIS MILTOUN
Paris Correspondent of THE IRON TRADE REVIEW

9 Rue Falguiere, Paris,
March 30, 1918.

IN MOST of the non-professional walks of life, France is not a country of mechanical aid to existence. Even the automobile is in the same category, a fact which is well recognized when it is recalled that the registration of automobiles in France before the war was not much more than 150,000. The number of typewriters was small, so were the numbers of motor boats, machine tools and agricultural machinery. This is not saying that such things did not exist, but with the farming community alone, an old bible-time wheel and bucket irrigation appliance often served the purpose of an electrically or gasoline-driven pump and the scythe and sickle, the modern reaper. This was accounted for largely from the fact that the exploitations were not of the proportions where it was thought that anything but hand and rudimentary forms of labor could be advantageously used. These views were wrong perhaps, but the ideas of tradition did the rest.

In industrial enterprises much the same state of affairs existed. The workman, who was at least an artisan, filed away by hand, worked penibly at hand or low power-driven machinery and seldom made any effort to augment his business to proportions which would warrant his changing his equipment. It is no injustice to French industrial enterprises to consider the subject from this viewpoint, in that France was essentially a country of small industries.

Scope of Census

In view of a satisfactory solution of the French industrial problem after the war, the chamber of deputies is considering measures to be taken towards recensusing all the resources and facilities and equipment of the various classes of French industry. A law which is expected to be passed within a few weeks, provides specifically for a census of industrial machinery.

The chief phase of the problem alludes to the possible utilization of the large supply of metal besides industries and factories which are at present engaged in making government munitions. The development of these vast new factories has gone on all over France. Small factories with a few hundred employes have seen themselves grow over night into companies with many thousand employes, and from half an acre in extent to five acres. Within their walls have been massed batteries of machine tools such as never were dreamed of in times of peace. The question is, what can they all be used for after the war? It is not so difficult to answer this question as might first appear. The problem has to be worked out with that true parentalism which is the foundation of the French government. It is the government which will bear the responsibility. It will point out the way in which the vast resources may best be used for future economic prosperity of the nation.

In the industrial domain we shall see the same results produced in France that we have seen produced in other ally countries. Large quantities of material were required for general consumption which formerly came from Germany and included wire nails, magnetos, files, machine tools of a portable nature, barn door hinges, and steam heating installations. It seems appalling that so much came from Germany—and so little of a like nature was produced in France. Hinges to a great extent were hammered out by hand by the local blacksmith and steam and gas fittings were usually a local product so far as their assembling was concerned where these things came into the category of home production. The French people lacked most if not all the first principles of standardization.

It is proposed to begin the classification of these industrial establishments by dividing them into two classes, one working for government interests and the other for the domestic trade. In the first classification two distinct divisions will be established, one comprising the unadaptible and the other including those elements which by transformation can be adapted to other needs than for making armament, ammunition, explosives or equipment. A close study will be made of conditions. There will practically be a mobilization of all factories and organizations which may render an immediate service and ease the pressing economic needs of the country.

Some difficulty may be anticipated by the employment of the processes of bureaucracy, but the expert opinion will prevail in the long run under the able guidance of the minister of labor whose forces are largely recruited from practical men not mere theorists. This is to be the specialty of this branch of the government, aided as far as possible by other departments. The actual recensusing will be in the hands of the general statistics bureau of the government, but the classification will be the work of specialists.

Such a document once it is prepared and standardized will be an aid towards the reconstruction of economic France. It will indicate the number of tools in good order and number of men required to keep them at maximum efficiency. This will help greatly in adjusting the labor disorders which are bound to arise when the 5,000,000 soldiers are demobilized. There must also be taken into consideration the disposition of the 1,500,000 women workers who have found new employment in most industries, notably in that of the metal trades, during the war.

Lack of Confusion

Factories working today on machine guns and cannon, may thus be transformed with the least possible delay into establishments capable of building tools and machines of production in the arts of peace. These machines must be of the automatic or semiautomatic type, because of a labor shortage which is bound to come after the war.

The foregoing is the new program for France. The fact that it was not put into effect before explains why Germany was able to import into France such materials as French nails, electric lamp bulbs, electric fittings and rails. The French manufacturer was satisfied with the amount of orders for these materials which came from Germany but did not over-exert himself to get the trade and keep it at home. The French manufacturer, like the French financier, was often far more interested in going out into foreign markets than he was in catering to the home market. Money was loaned to Turkey on the security of the Ottoman loan and an order for millions for building and equipping Turkish lighthouses was obtained in return. At the same time France bought magnetos in Stuttgart and glass eyes for the famous French dolls in Meissen.

The figures are not available as to how much of this business can be kept in France in the future, but at all events France will not depend on Germany for

mechanical toys. There are 4000 women working in the Saint Chamond steel works today screwing fuses into shrapnel shells. When the war is over and these women are no longer needed in the steel industry they can build mechanical toys for children, carburetors for automobiles, tend automatic screw machines or what not.

A curious and potent side light is that which appeared in a Paris paper as these lines are being compiled. It was a protest on the part of 185,000 metal workers in the Paris district alone protesting against the men of their craft allying themselves now, or ever, with any international trades union. "France for the French" is the slogan in all trades and in no branch of the industry is the note sounded louder than in the iron and steel business.

Measuring Air-Flow From Rotary Blowers

TESTS to determine the volume of gas delivered by centrifugal exhausters are more easily and more frequently made than the corresponding tests of rotary exhausters, because the discharge of the latter is pulsating. Nozzles or orifices cannot be used to measure pulsating flow unless the pulsations are eliminated. These tests are seldom performed on rotary exhausters chiefly because every rotary exhauster is a meter of the displacement type, so that the speed of the exhauster is a measure of the quantity of gas delivered. A definite quantity of gas is imprisoned during each cycle and delivered positively, except for the leakage or slip. The latter is constant regardless of speed, depending only upon the inlet and outlet pressures, and upon the density of the gas being exhausted.

In each rotary exhauster there is a speed, commonly referred to as the slip, at which the leakage accounts for all of the gas handled by the exhauster. Above this speed the exhauster delivers its full displacement to the discharge system. The probable delivery, therefore, is found by multiplying the difference between the slip speed and the actual speed by the displacement of the exhauster per revolution. Evidently, the volumetric efficiency increases with the speed. When the speed of the exhauster is 10 times the slip speed, the volumetric efficiency is 90 per cent. Some operators of rotary blowers and exhausters believe that other factors enter into the rate of delivery. The belief is rather general that pressure drop due to friction in the intake pipe reduces the delivery and counteracts the increase in efficiency due to the higher ratio of actual speed to slip speed.

These theories were investigated by Professor W. Trinks of the Carnegie Institute of Technology who made tests on a rotary blower which was built by the P. H. & F. M. Roots Co., Connersville, Ind. The arrangement of the testing apparatus is clearly shown in Fig. 1. The air enters the right-hand tank through standard nozzles. This tank is closed at the top by a thin rubber diaphragm, the mass of which is so small that it vibrates with the pulsations of the air in the intake pipe and maintains practically a steady flow of air through the nozzles. When the blower is in operation the oil in the draft gage near the blower vibrates with the pulsations in the air column, while the oil in the draft gage at the measuring tank is motionless. The water seal at the extreme right in Fig. 1 saves the rather expensive rubber diaphragm in case the blower is started with all the nozzles closed. The intermediate tank between the measuring tank and the blower is not absolutely necessary in this test, because the vacuum produced is not greater than the rubber diaphragm will allow.

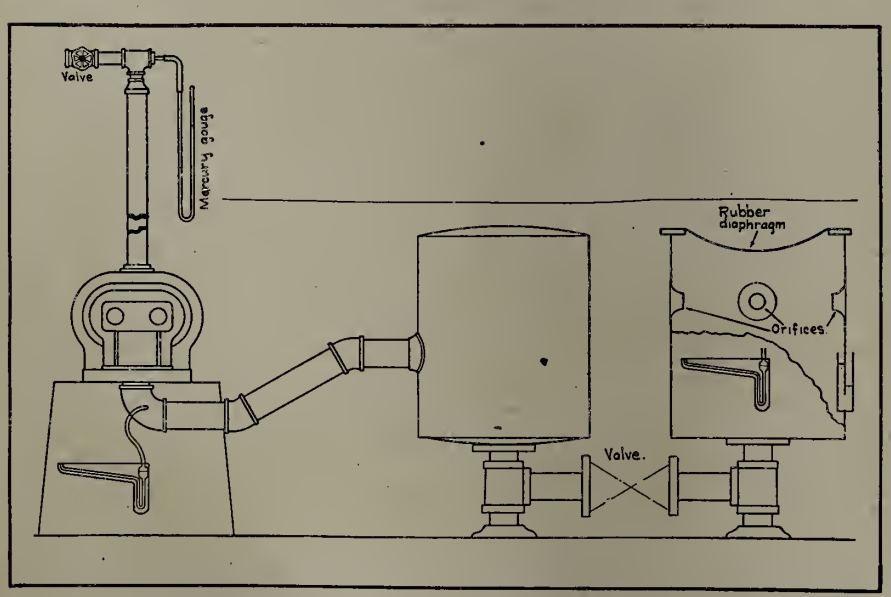


FIG. 1—ARRANGEMENT OF APPARATUS FOR TESTING ROTARY BLOWERS

The relation between the quantity of air delivered and the speed of the blower is shown in Fig. 2. The test of the blower produced the left-hand curve. The results were so surprising the tests were repeated with a larger slip speed. In order to obtain the latter the head-plates were removed from the blower and more red lead was put into the joint. The right-hand curve was obtained from this test. It will be seen that the character of both curves is exactly the same. The length and shape of the inlet pipe were varied and the location of the pressure gage on the outlet was changed; but these changes had no appreciable influence on the shape of the characteristic curves. In these tests the discharge pressure was five pounds per square inch. At lower pressures the slip speed is much less.

The actual delivery falls below the probable delivery at lower speeds and rises above it at higher speeds. Vibrations of the air column undoubtedly explain this peculiarity. At low speeds the whole column is accelerated and retarded, but as the speed increases the inertia of the column causes vibrations of a sound-wave character to appear. At certain speeds, the phase of these vibrations corresponds with the opening of the blower to the suction and an extra quantity of air is shoved into the blower, thus increasing the delivery. This case is parallel to that of blowing engines with air-intake pipes and automatic-inlet valves where the delivery is likewise increased by the inertia of the air in the intake pipe.

Vibrations have a phase-lag against the impressed vibration of the blower. This may explain why attempts to furnish an engine torque coinciding with the static torque of the blower have not been successful. Vibrations occur not only in the intake but also in the discharge pipe. It has been thought that perhaps at high speeds these vibrations might become destructive. It is true that vibrations increase with the speed but only up to the point where they become sound-waves. Above this speed the pitch of the sound, i. e.,

frequency of vibration, increases; but the amplitude, i. e., loudness, remains constant. The maximum vibration depends upon the ratio of outlet-pipe size to fluctuation of displacement. The smaller the outlet pipe for a given blower, the worse the vibration becomes. With the average size of outlet pipe the vibration to either side from mean does not exceed 10 per cent of the absolute average outlet pressure. In unusually long pipes, however, resonance might increase this somewhat.

Boring Machine of Heavy Design

The horizontal-spindle machine shown in the accompanying illustration has been developed by the Defiance Machine Works, Defiance, O., for boring, milling, drilling and tapping. All moving parts of the machine are enclosed and oil-tight. An oil pump is used to pump oil through the head, speed box and feed box. All journals have heavy ball or thrust bearings. Ball thrust bearings are used in the spindle and on all actuating screws. All other bearings are bronze-bushed. Eight control levers are used to make all necessary changes and these are placed within easy reach of the operator.

The bed of the machine is of box construction and is heavily cross-ribbed. The machine is self-contained and rests on the floor at three points. The column is of box section, flaring out at the bottom to give a large bearing surface where it is bolted to the bed.

The spindle is hammered high-carbon steel. The spindle sleeve is a high-carbon steel forging with a conical journal at the front revolving in a solid bronze box. It has an adjustable taper sleeve at the rear. This arrangement permits large milling cutters to be bolted directly to the large flange on the end of the spindle sleeve.

The spindle head has an ample bearing and a gib on the front side is set up for a free sliding fit. A binder screw back of the gib is provided for locking the head to the column. The spindle head and tail block are raised and lowered together. They are connected by a shaft and bevel gearing.

The platen has a large working surface with T-slots of sufficient depth to insure strength. The gibbing to the saddle is of the square lock form. A binder screw is used to clamp the platen in place. The movement of the platen is regulated by a throw-out device.

The saddle is extended out beyond the bed to give support to the platen at its extreme front and rear positions. It is gibbed to the bed and a tapered gib is provided for taking up wear.

The feed is applied to the spindle in or out of the spindle head and tail block, up or down to the saddle along the bed and to the platen across the saddle. Two levers operate the shift with two sets of cone gears, four in one and three in the other. This gives 12 changes of feed per revolution of spindle. Fast travel to all parts having feed is obtained by a lever which gives travel in either forward or reverse operation.

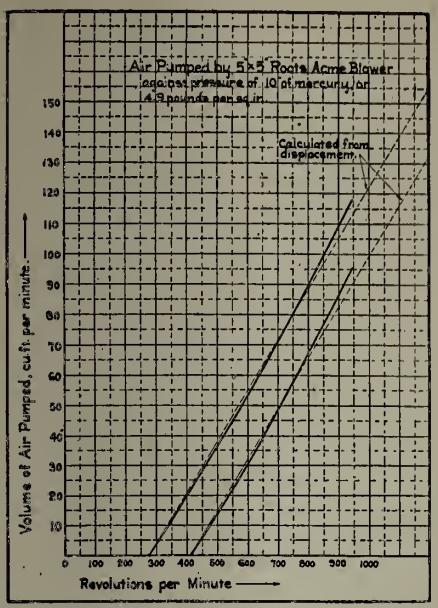


FIG. 2—RELATION BETWEEN QUANTITY OF AIR DELIVERED AND SPEED OF BLOWER

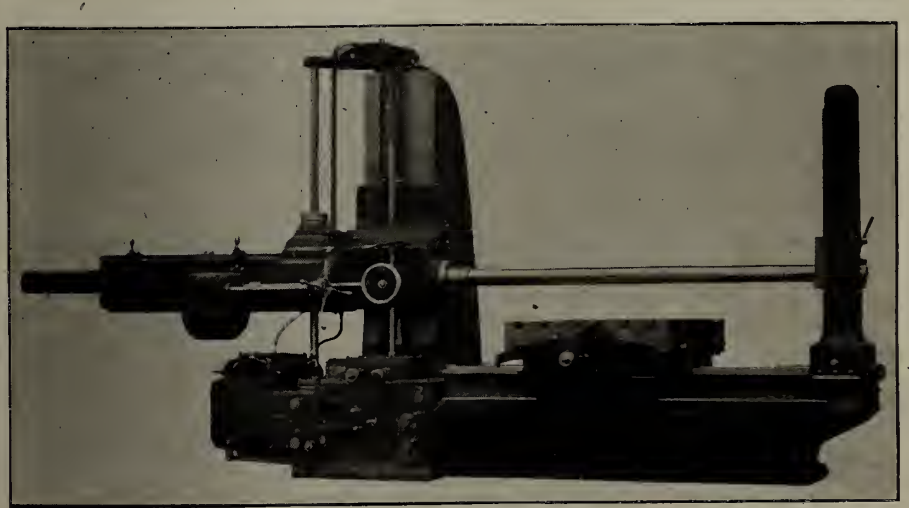
Portable Tiering Machine

A machine for piling rolls of paper, cases, bales, crated machinery, etc., in freight cars has been placed on the market by the Revolvator Co., Jersey City, N. J. The machine can also be used for piling material in the storeroom or for loading trucks. The machine is mounted on wheels and is fitted with an extension arm which operates vertically. It is claimed that bulky material can be piled to the roof in box cars.

Market Opportunities in the Philippine Islands

As a market for modern machinery of nearly every kind, according to a statement by the National Bank of Commerce, New York, the Philippine islands have been little more than touched. Primitive machinery and methods have been the rule. Only a beginning has been made in the use of modern machinery in the various lines of manufacture. The opportunities for providing manufacturing plants for the preparation of raw products for export are great. The proposed erection of a system of sugar centrals in the various producing regions of the Philippines offers a field for a vast amount of modern sugar machinery. The transformation of the copra business into an oil business now is rapidly taking place. An immense saving in freight is being made by manufacturing the oil on the ground. An extensive supply of excellent paper material is found in the Philippines that could be made into paper in the islands to advantage, and the government is doing its best to arouse interest in this direction. Such machinery as is now being used is chiefly American, British or German, with the former increasingly predominant. That which has been in use the longest is mainly British; that installed more recently, American.

Philippine reports of imports of iron and steel include not only iron and steel, but all finished products, including a great deal of machinery. Imports declined since 1913, until during 1916 they totaled but $3,763,239 as against $8,613,904 three years earlier; but in



HORIZONTAL BORING, DRILLING, MILLING AND TAPPING MACHINE

1917 they increased to $5,927,563. The United States entirely dominates the market, our imports constituting about 81 per cent, in 1916 and 84 per cent in 1915. Japans' exports to the islands have leaped from one-tenth of 1 per cent in 1913 to 6 per cent in 1916. Great Britains' exports fell from 13 per cent of the total iron and steel and manufactures imported into the islands in 1913, to 8 per cent in 1916, while Germany's fell from 8 per cent in 1913 to less than one-half of 1 per cent in 1916.

High Level Truck

The efficiency of machine operators is reduced and time lost if the workmen find it necessary to continually stoop or bend in transferring material from the shop trucks to the machines or vice versa. In order to eliminate this source of loss, the truck shown in the accompanying illustration has been designed by the Orenstein-Arthur Koppel Co., Koppel, Pa. It is so constructed that the whole load is balanced on the center axle which is of large diameter. Wide tire, roller bearing wheels are provided. The rated capacity of the truck is 1500 pounds. It is stated the truck can be moved easily when fully loaded.

Book Review

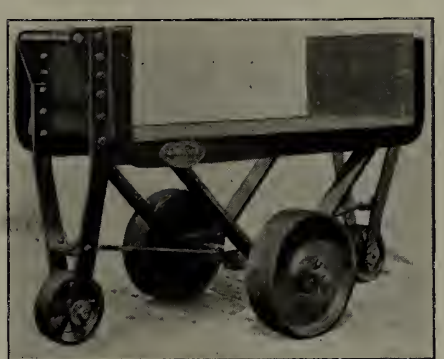
Powdered Coal as Fuel, by C. F. Herington; cloth; 211 pages, 6 x 9 inches; published by D. Van Nostrand Co. and furnished by THE IRON TRADE REVIEW for $3 net.

Fuel is a necessary adjunct to production and production, in quantity and variety, is necessary to win the war. Winning the war at present, is the most important thing on earth. Therefore any volume which gives reliable and helpful data on the use of fuel in production is timely.

The use of powdered coal is still comparatively new. The author of this book, in speaking of powdered-coal plants, says that some of them have been in service for as much as 10 or 15 years. Although this period is negligible when compared with the history of other fuels, nevertheless it is a sufficiently long time in which to demonstrate the effectiveness of this form of coal. To bear out his statement concerning the efficiency and inexpensiveness of powdered fuel, the author has compiled tables showing the initial cost of installing plants burning fuel oil, water gas and powdered coal. In the latter case both the screw conveyor and the air distributing systems are considered. First costs having been established, another set of tables follows showing various operating costs.

The first part of the book is devoted to the general subjects pertaining to the use of pulverized fuel. Coals suitable for powdering are discussed, and the results of experiments made with various kinds of coal are given. This is followed by a chapter on the preparation of the fuel, which includes excellent descriptions of the different kinds of crushers and dryers used. The general discussion ends with a chapter entitled "Feeding and Burning Powdered Coal." Descriptions of furnaces suitable to this form of fuel, particular attention being paid to burners and feeding systems, form the subject matter of this chapter.

The remainder of the book describes the uses of pulverized fuel in particular industries or branches of industries, as for instance, powdered coal in the cement industry, in metallurgical furnaces, under boilers, and for locomotives. The final chapter discusses the danger of explosions in powdered coal plants



A HIGH LEVEL TRUCK DESIGNED FOR MACHINE SHOP USE

and gives methods for preventing them. The book contains numerous illustrations.

Study Sand Problems

The members of the New England Foundrymen's association were treated to a highly interesting and instructive talk and discussion at the May dinner, held recently at the Exchange club, Boston. The principal speaker was R. F. Harrington, of the Hunt-Spiller Mfg. Co., of Boston, whose subject was "Foundry Molding and Facing Sand Problems". There also were addresses by W. S. Saunders, of Saunders & Franklin, Providence, R. I., and H. B. Hanley, of the New London Ship & Engine Co., Groton, Conn. All three speakers spoke from varying angles on the selection, separation and reclamation of foundry sands. Those who took part in the discussion which followed included F. W. Stickles, of the Capitol Iron Foundry, of Hartford, Conn.; T. D. Scott, of Brown & Sharpe, Providence, R. I., and Messrs. Kent and Thoel, of the General Fire Extinguisher Co., Providence, R. I.

Ferro Imports Heavier

Ferromanganese imports in March ran somewhat heavier than the average for the preceding nine months and were 3555 tons. This compares with 5324 tons for the corresponding month in 1917. The nine months' total is shown to be about one-third of that for a like period in the preceding year. A decided slump in manganese ore imports is represented by the March record of 19,300 tons. This compares with 56,394 tons in March, 1917.

The imports for March and for the nine months of the fiscal year compared with the previous year of ferroalloys and metals is as follows:

	March,		Nine months ending March,	
	1918	1917		
Ferromanganese, tons..	3,555	5,324	20,807	61,059
Ferrosilicon, tons.	337	977	5,173	5,624
Manganese ore, tons	19,300	56,394	431,718	485,018
Tungsten bearing ore, tons	317	269	3,703	2,952

Shipping Field Pieces

The Wisconsin Gun Co., Milwaukee, organized last fall by the heads of five leading metalworking concerns of Milwaukee at the request of the government to manufacture field pieces, has made its first shipment and production now is going on at a rate making possible regular deliveries. The company erected a shop at an estimated cost of $250,000 and equipped it for the production of the United States 1916 model field gun, a 3-inch piece similar to the French "75", and so constructed as to fire both shells and shrapnel. A production of three per day has been reached. It is said that the company's contract calls for 1000 guns. The government furnishes the rough forgings and the finished gun is shipped to the Rock Island arsenal for mounting on the gun carriages.

The Carnegie Steel Co., Pittsburgh, has issued a new edition of its booklet on steel derricks and drilling rigs for oil, gas, salt and other wells. These rigs also are used for mineral exploration. The Carnegie Steel Co. has manufactured steel oil derricks since 1903 and steel drilling rigs since 1907. The design and construction of various types of drilling rigs and derricks are fully covered in the booklet, which is profusely illustrated with reproductions of detailed drawings. Auxiliary apparatus for well drilling also is fully described and illustrated.

Making Tool Steel in War Times

Task of Selecting Raw Materials Constantly Becoming More Difficult—Ferroalloys Smelted in Electric Furnaces—How Uniformity is Obtained—Metallurgists Work Daily Growing More Important

BY FRANK B. LOUNSBERRY

IN tool steel manufacture the selection of the raw materials is very important and only the best are suitable. This is especially true of the crucible process in which little or no refining is possible. Therefore, raw materials for crucible steel are purchased on analysis, with special attention to their sulphur and phosphorus content. It is, of course, true that wider latitude in the selection of materials can be used in the electric furnace, but this should not be imposed upon. Too many have made the mistake of expecting to get a first quality product from their electric furnaces by using junk to begin with. You cannot make good bread out of bad flour, no matter what Hoover says, and making tool steel is very much a cooking proposition.

With the raw materials properly selected, the first step in the process is the melting operation. In the plant, with which the writer is connected, however, the first operation must be considered as occurring in the electric refining department, as here one of the most important raw materials, ferrotungsten, is produced. This is brought about by the reduction of tungsten bearing ores under the influence of the electric arc in small electric furnaces. The chief ores are scheelite, wolframite, hubernite and feberite coming from Boulder, Colo., Johannesburg, Cal.; Arizona, Bolivia, Peru, France and Spain. They vary from 60 to 75 per cent WO_3, or tungstic oxide. Certain of these ores as received are high in sulphur, sometimes containing as much as 2 per cent and must be roasted as the percentage of sulphur in the finished ferro must be very low. The ores, if not already fine, are ground, mixed with suitable proportions of soda ash, lime and charcoal, and charged into the furnaces where the WO_3 is reduced to ferrotungsten. This ferrotungsten usually contains around 75 to 80 per cent metallic tungsten. Two and one-half to three and one-half hours are usually required to melt the charge thoroughly and it is then killed, which requires about 30 minutes.

As the pots are pulled from the furnace they are delivered to the melter who in turn empties them. It is at this point that different manufacturers of crucible steel differ. Some pour the contents of each pot individually into molds whether casting small or large ingots, while others first teem all the individual crucibles into a ladle and then proceed to cast their ingots from this ladle. In my estimation there is little comparison between the two methods as far as obtaining uniformity of product is concerned. In the first method you are apt to have as many different annalyses as you have pots where single plot ingots are cast, and where large ingots are cast the casting must necessarily be more or less intermittant. Outside of a few improvements in construction and handling the entire process of crucible melting has changed but little since its first introduction by Huntsman in 1740.

In the electric melting process instead of weighing out the raw materials in 90 or 100-pound lots the entire furnace capacity is weighed up as a charge. This charge, be what it may, ingot crop ends, punchings, boiler plate, flashings, tubing, etc., is charged by hand into the furnace. Upon the completion of this operation a certain amount of lime and slag-making material is also charged into the furnace. The slag is the chemically active portion of the bath and upon it depends the amount of refining that is accomplished. The usual consumption of electricity per ton of liquid steel is about 600 to 650 kilowatt when starting from a cold charge. The melting down operation, that is bringing th entire charge to a molten condition, requires from 1½ to 2½ hours. At this point a test or preliminary sample of the bath is taken and sent to the laboratory for analysis. While awaiting the report from the laboratory which takes from 20 minutes to an hour, depending on the type of steel, it is usually necessary to pull a slag. During the melting down process and before the temperature of the bath becomes too high certain impurities in the charge, especially phosphorus, are taken up by the slag and held as long as the slag is basic. As the temperature increases and the old slag remains in contact with the bath it has a tendency to become acid or at least less basic, giving up some of its phosphorous back to the steel. As this is not desirable, it is advisable to remove this slag and put on a new one. A strongly reducing atmosphere is maintained throughout the remainder of the heat, to eliminate sulphur.

After annealing followed by grinding to remove pipes, seams, etc., the ingots are ready for cogging. Before being hammered they are charged into the hammer reheating furnaces. The ingots are slowly and carefully brought up to forging temperature. With each hammer is the hammer crew, consisting of hammerman and helper, heater, hammerdriver and levermen. The hammerman is in charge of the work; frequently he works on a contract tonnage and hires his own men. He must know exactly how high to heat each different grade of steel, within what limits of temperature it will forge without disaster and just how much reduction it will stand. The size of the ingots must be properly proportioned to the different-sized hammers or correct results cannot be obtained. Overheating and bursting are two of the greatest difficulties encountered in this department.

Due to the many different grades and shapes of steel, and the thousands of different sizes an accurate yet simple system of keeping track of the material from the ingot to the finished bar must be worked out. Not infrequently a billet or two of one kind of steel gets into a lot of billets of the same size of another steel and probably will not be caught until the final inspection and sometimes not then if the only difference is in the temper, both being the same grade. Consequently, the entire process requires constant vigilance and attention in order to produce quality material. By far the greatest part of the task of maintaining the quality of the product falls to the metallurgist as most everyone else is primarily interested in production and is very apt to overlook many vital matters.

The author, Frank B. Lounsberry, is metallurgist, Atlas Crucible Steel Co., Dunkirk, N. Y. This paper was presented at a recent meeting of the Pittsburgh Foundrymen's association.

Priority to Restrict Nonessentials

Industries Board Will Make no Formal Classification Between War and Nonwar Business—Preference in Raw Material Supplies for War Production Will Force Curtailment—Board Outlines Its Policies

WASHINGTON, May 28.—No formal classification of nonessential industry will be undertaken by the war industries board, but priority regulations of the distribution of necessary materials and supplies will serve to sharply draw the line of demarcation between useful and nonuseful production under war conditions. By this means, the war industries board, acting through its priorities board, promises to bring about a sweeping readjustment of industry by checking the life blood of many plants, namely the basic raw materials and products. This consequence plainly is foretold by the official statement of the war industries board that direct and indirect war work will either so exhaust and reduce the available supply of raw materials as to cause an acute shortage, to any other branch of consumption.

The war industries board is expecting non-essential industry to take a large part itself in bringing about this adjustment to conform to the new conditions. By so doing it is hoped that the process of squaring industry with war demands may be brought about in a gradual and orderly fashion and without the exercise of any drastic methods.

The purposes of the war industries board as they apply to the regulation of nonessential industry are clearly set forth in a statement of priority policies, which has been made in its behalf by Chairman Bernard M. Baruch. This classifies the forms of demand for which preferential treatment will be accorded and defines the policy with respect to new construction. The statement is as follows:

"In pursuance of the authority expressly conferred by the President in appointing the undersigned chairman of the war industries board, there has been created a priorities board consisting of (1) the chairman of the war industries board, (2) the priorities commissioner, (3) a member of the railroad administration, (4) a member of the United States shipping board and Emergency Fleet corporation, (5) a member of the war trade board, (6) a member of the food administration, (7) a member of the fuel administration, (8) a representative of the war department, (9) a representative of the navy department, and (10) a member of the allied purchasing commission.

"As this board is composed of authorized representatives of the governmental agencies principally concerned with war industries and supplies, it is not only peculiarly fitted to determine general principles and define basic rules which shall govern priorities of production and delivery of materials, equipments and supplies, but also as pointed out by the President, its composition insures 'common, consistent and concerted action' in carrying such determinations into effect.

"For the guidance of all governmental agencies in the production, supply and distribution of raw materials, finished products, electrical energy, fuel and transportation by rail, water, pipe lines and otherwise, the priorities board has adopted the accompanying general classification of purposes demanding preference treatment.

"The several governmental agencies, as well as the industries and all others affected, can without much difficulty apply this general classification of purposes, which must be accorded preference treatment, to the industries and plants with which they may be concerned. The priorities board will, however, from time to time promulgate in the form of 'preference lists' not only classes of industries but individual plants whose operations as a war measure are of exceptional importance and which shall be classified as far as practicable in the order of their relative urgency measured by the extent of their direct or indirect contribution (a) toward winning the war and (b) toward promoting the national welfare. In the meantime the foregoing general classification of purposes should prove of particular interest to the nonwar industries and of value to them in planning their future activities during the remainder of the calendar year 1918, when the basic materials entering into the manufacture of many products will be largely, if not entirely, absorbed in direct and indirect war work, and transportation both by rail and water will be acutely congested in several sections, resulting in the curtailment of production and distribution of such basic materials."

"The war industries board earnestly urges each nonwar industry to look the situation squarely in the face now and plan accordingly, curtailing where necessary operations not falling

General Classification of Priority Purposes

(*Including all necessary raw materials, partially manufactured parts and supplies for completion of product.*)

Ships

Including destroyers and submarine chasers.

Aircraft

Munitions, Military and Naval Supplies and Operations

Building construction for government needs; equipment for same.

Fuel

Domestic consumption and manufacturing necessities named herein.

Food and Collateral Industries

Foodstuffs for human consumption and plants handling the same.

Feeding stuffs for domestic fowls and animals, and plants handling the same.

All tools, utensils, implements, machinery and equipment, required for production, harvesting and distribution, milling, preparing, canning and refining foods and feeds, binder twine, etc.

Products of collateral industries, such as fertilizers, fertilizer ingredients—insecticides and fungicides, containers for foods and feeds, collateral products.

Materials and equipment for preservation of foods and feeds, such as ammonia and other refrigeration supplies including ice.

Clothing

For civilian population.

Railroad

Or other necessary transportation equipment, including water transportation.

Public Utilities

Serving war industries, army, navy and civilian population.

within the general classification of purposes demanding preference treatment, as hereinbefore defined, and at the same time, where practicable, converting existing facilities and utilizing existing organizations for purposes entitled to preference treatment, thus reducing the damage to industry to a minimum, and at the same time relieve some of the war industries that are staggering under the abnormal burdens which they are carrying.

"The following resolution was on March 21, 1918, unanimously adopted by the war industries board:

"Whereas it has come to the notice of this board that new industrial corporations are being organized in different sections of the United States, for the erection of industrial plants which cannot be utilized in the prosecution of the war, and

"Whereas plans are being considered by certain states, counties, cities and towns for the construction of public buildings and other improvements which will not contribute toward winning the war, and

"Whereas the carrying forward of these activities will involve the utilization of labor, materials and capital urgently required for war purposes: now, therefore, be it

"Resolved, By the war industries board, that in the public interest, all new undertakings not essential to and not contributing either directly or indirectly toward winning the war, which involve the utilization of labor, material and capital required in the production, supply or distribution of direct or indirect war needs, will be discouraged notwithstanding they may be of local importance and of a character which should in normal times meet with every encouragement; and be it further

"Resolved, That in fairness to those interested therein notice is hereby given that this board withhold from such projects priority assistance, without which new construction of the character mentioned will frequently be found impracticable, and that this notice shall be given wide publicity, that all parties interested in such undertakings may be fully apprised of the difficulties and delays to which they will be subjected and embark upon them at their peril."

"While this resolution is self-explanatory, it may not be improper to say here that the war industries board has not undertaken to classify any legitimate industry as 'nonessential' but only through the exercise of priority directions to insure supplying to direct and indirect war industries as nearly as possible 100 per cent of their requirements. From the surveys which the board has been able to make, and the data and information it has assembled, it seems reasonably certain that the giving to those industries engaged in direct and indirect war work 100 per cent of their requirements for such work will in some cases practically exhaust, and in others very substantially reduce, the available supply, resulting in an acute shortage of certain basic raw materials and products. This being true, duty impels the war industries board to call this situation thus pointedly to the attention of all interested parties, that they may, acting independently and with such assistance as this board may be able to extend, make their plans accordingly.

"This board needs, welcomes and confidently expects to receive the active assistance and whole-hearted co-operation of the business men of this nation, that it may to the fullest extent enjoy and have the benefit of their knowledge, judgment and experience."

Capital Odds and Ends

WASHINGTON, May 28.—Application for licenses to export those commodities now being considered for exportation to Sweden and European Holland will also be considered for exportation to Denmark, the war trade board has announced. On these shipments the importer abroad must obtain an import certificate from the Danish Merchant's Guild. Procedure is then according to the prevailing practice. The list of commodities to be considered for exportation include: pianos, spare parts or replacement parts of machinery, surgical and medical appliances except those containing rubber, toys, pen nibs, spare parts of textile and brewing machinery, sewing machines, imitation jewelry, cash registers, laundry machinery except that containing rubber or copper, phonographs, scales and balances not containing nickel or tin and sugar refining machinery.

Establishment of a rule for a deduction of two and one half per cent for moisture from the actual net weight of coal weighed within 24 hours after being washed observing as the maximum the marked capacity of cars, is asked by the Illinois Central railroad.

American imports in April reached a value of $279,000,000 an increase over March when the value was $242,000,000, according to a statement issued by the bureau of foreign and domestic commerce. Their value for the 10 months ending with April was $2,362,000,000 as compared with $2,072,000,000 for the corresponding period in 1917. April exports however, were $30,000,000, less in April than in March while in comparison of the 10 months periods a decrease of $5,167,000,000 is shown in the period ending in April 1918.

Increases of from 20 to 32 cents per barrel in the charges for gathering and transporting oil from wells to delivery points within the state of Pennsylvania or to delivery points on the South West Pennsylvania Pipe Lines in the state of Pennsylvania is sought by the South West Pennsylvania Pipe Lines.

The Utah railroad desires the following increases in switching rates on coal in carloads, including spotting of empty cars: $1.00 per car from coal tipple at Mohrland, Utah; $2.00 per car from coal tipple at Black Hawk to Hiawatha, Utah; $3.00 per car from coal tipple at East Hiawatha to Hiawatha, Utah; and $2.00 from Panther to Panther Station, Utah.

The interstate commerce commission has denied the application for cancellation of the present joint rates on carload coal from Arkansas, Oklahoma and Missouri, made by the Midland Valley, the Kansas City Southern and the Missouri, Oklahoma & Gulf railroads. This application was made primarily to prevent delay of cars, to relieve congestion and to increase the railroad's revenues through greater use of their own cars.

Petroleum, asphalt or tar products required for the construction, maintenance, or reconstruction of roads will be delivered only after approval by a committee representing the fuel administration and the office of public roads. This plan is to prevent further deterioration of roads requiring oils and tar and at the same time to conserve these products for war work. State highway departments to which notices of the restrictions have been sent, are required to pass upon all applications for highway work in their territories.

Upon request of the territorial council of defense of Alaska the fuel administration is considering the appointment of a fuel administrator for Alaska coal fields, work hitherto done by the administrator of the state of Washington. In spite of immense undeveloped coal fields Alaska imports much coal from Washington and British Columbia. The territory contains perhaps as much coal as the fields of Pennsylvania, and the opening of new mines, transportation, wharfage, loading and unloading where both boat and rail is required will furnish many problems for the administrator when he is appointed.

Jobbers Will Cut Nonwar Demands

Metal Branch of National Hardware Association Shows Members Are Intent Upon Serving Government Freely—Urge Conservation of Steel Supply—Sheet and Tin Plate Conditions Are Reviewed

STRESS was laid upon the necessity of hardware makers, jobbers and dealers conserving the supply of steel as much as possible and to eliminate all less essentials, at the seventh annual meeting of the metal branch of the National Hardware Association of the United States, held in the William Penn hotel, Pittsburgh, May 24 and 25. Reports made and expressions of members of the metal branch showed that the association is serving the government in every manner possible and has disregarded its own business interests. After-war problems also were discussed. The meeting was presided over by W. H. Donlevy, Carter, Donlevy & Co., Philadelphia, chairman of the metal committee, who was unanimously re-elected.

In the course of remarks made by Robert Garland, president of the chamber of commerce of Pittsburgh, speaking on "Opportunity for Foreign Trade After the War", he said that unless business organizations immediately take up the study of this question, as England now is doing, the industries of the United States will find themselves in an abject state of unpreparedness to meet conditions after peace has been restored. The United States, he declared, must prepare to take Germany's prewar trade. Co-operation among all kinds of civic bodies, such as chambers of commerce, was suggested so that the country will be supplied with a proper merchant marine, and marine insurance facilities, banking facilities all over the world, and a fair tariff.

More Freight Advances Coming

L. C. Bihler, traffic manager of the Carnegie Steel Co., spoke on "Traffic Conditions", and dealt with their chaotic state as the result of the war. He mentioned work that is being done by the railroad administration and the rail lines themselves to remedy the situation so far as possible. It will take time, he said, to get things to a point where they will again be running more smoothly. More revenue is needed, Mr. Bihler said, and he informed the bearers that "it is in the cards to increase all freight rates 25 per cent above advances that have been put into effect. Wider use of team, trolley and truck service was recommended as a measure of relief for the railroads. The government plan to have all freight charges prepaid, said Mr. Bihler, will mean a heavy drain of the surplus money of manufacturers, the effect of which it is too early to predict.

Demand for steel for the United States government and the allies is so great that an acute shortage was predicted by John A. Penton, Cleveland, publisher of THE IRON TRADE REVIEW.

Predicts Steel Shortage

With the government preparing to hurry an army of 5,000,000 men to France, calling for enormous tonnages of steel for ships, ordnance, railroad cars and related essentials, Mr. Penton expressed the opinion that there will be no steel available for commercial purpose for the next two years. Steel men, he asserted, are greatly concerned over the situation for fear that they will be unable to supply demands for war purposes.

"It is a question now," said Mr. Penton, "as to how we are going to make two tons of pig iron 'grow' where one ton 'grew' heretofore. The answer, I think, is to make one ton do what two tons have done before." The speaker urged the hardware men to do their utmost to eliminate less essentials altogether and in order to concentrate a plan of conservation of steel to organize a committee for the purpose of co-operating with a subcommittee of the American Iron and Steel institute recently selected by the war industries board to study this problem thoroughly.

In a paper on "Roofing Products", H. L. McKenzie, sales manager of the Canton Sheet Steel Co., Canton, O., said that it is well, in these days when sheet metal roofing has been temporarily sidetracked for the manufacturers and jobbers to awake to the realization of the dwindling use of sheet metal roofing in certain territories. Mr. McKenzie stated that from a mill standpoint, it would seem the proper method to sell roofing by the pound, as developments in recent years of practice promulgated by some interests in the way of standard converting charges, have forced roofings into the tonnage class, and the finished article, which should enjoy a class by itself, is seemingly sunk into oblivion.

"It would seem," he continued, "that in the process of manufacture, in which there are distinct stages, and in which in each stage there is more or less skill required and in which there is demanded special treatment, also to separate advertising and selling expense, would enter into a distinct fabricated class, which should carry a legitimate profit commensurate with the extra treatment and expense involved in entering said class.

"Question:—Are differentials added to flat sheets sufficient?

"From a mill standpoint, the only correct way of selling roofing is by the pound, due to the fact that this slight differential and other reasons which have a tendency in normal times to incite buyers to employ shady tactics in demanding roofing rolled light to gage.

"You will therefore see that a jobber in buying by the pound and selling roofing by the square based on the full theoretical weight, is gainer by the transaction, but at the expense of the producer and at the expense of quality, which every manufacturer and dealer should use his utmost to safeguard against.

"On the other hand the plan of selling roofing on the square basis should have the unprejudiced consideration of the mills, or, in other words in view of the jobber, dealer and ultimate consumer being necessary adjuncts, their wishes should have some consideration and they should have a voice in the matter."

Jobbers Want War Footing

In presenting the report of the metal committee chairman Mr. Donlevy said that the speeding up of war industries may be assisted through co-operation of wholesale distributors. Hope was expressed that plans may be evolved which will assist in getting "our business on a government basis so that priority may be given in the production and shipment of products to our warehouses in order to expedite work on important government contracts."

Continuing, Mr. Donlevy said, in part:

"It has been recognized and admitted on several occasions that the

war progress has been substantially speeded up through the quick supply of needed materials from the wholesalers' stocks, and if it would have been necessary to have waited for the manufacturer to produce and deliver the material, two or three months' delay could readily have been ensued. Of course, it is recognized that this applies to the local needs which it was necessary to supply and does not refer to such great quantities of material as involved in the shipbuilding and other extensive programs.

"Some comments have been heard from Washington regarding what they call the middleman and we would explain from the best evidence we can secure reference is not made to the wholesale distributor who has a properly capitalized business and who has a warehouse containing a substantial stock of the materials in which he deals, but that by middleman Washington authorities refer to a large number of brokers or manufacturers' agents who have sprung up since the war and who have harrassed, annoyed and disappointed responsible officials of the government who had reason to believe that they were dealing with well-established concerns.

"The engineering depot of the United States army has recently issued a card which they require bidders to fill out and which will guard against such irresponsible brokers and which specifically says that the government is willing to deal with either the manufacturer or the wholesale distributor."

E. Theodore Spoull, general manager of sales of the Trumbull Steel Co., Warren, O., presented a paper on "Present Situation in Manufacture and Sale of Sheets and Tin Plate." Speaking of the war, he said:

"The steel industry has offered its all, its best men, weakening its producing ability but is backing these men up, and millions of others, with steel and more steel. Every manufacturer of steel has most willingly signed the pledge offered by Judge Gary at the recent historical meeting in New York. All steel representatives present not only signed the pledge, but have gotten back of it with the force of each and every member or his corporation.

"The sheet and tin mill branches of the steel industry have established themselves firmly with the government by showing a disposition from the very beginning to co-operate and furnish any part or all of their production for war purposes. To do this naturally meant disappointment to many of their most loyal customers. Much tonnage on order was continually pushed back on the rolling schedules to make way for the more urgent war orders. Government orders were allocated in large tonnages to the various sheet mills through the subcommittee of the American Iron and Steel institute. More government orders came direct from the navy and other governmental purchasing agencies, all of which rapidly filled up the available capacity of the sheet mills and left little, if any, room for commercial business, although much of this tonnage asked for by the commercial trade was needed and could be traced step by step to a point where it actually was going to serve a part in the war program. Due, however, to its deferred classification, it had to be considered in the list of so-called nonessentials. Some months ago, seeing the present situation developing rapidly, the organization I have the pleasure to represent wrote to all their jobbing customers and asked for information as to what part of the tonnage on order could be considered in a priority class. Many replies of an interesting nature were received, and, without exception, each and every one made it clear that the jobber was doing a noble service. On the Pacific and Atlantic coasts, as well as the Great Lakes district, stocks were being utilized and depleted by consumers doing direct and urgent war work, principally building of ships, warehouses and shelter houses for soldiers and supplies. In the central west, south and southwest, stocks were being distributed to the farming and agricultural trade, which means more food for the armies and the millions of workers at home.

"Some of the principal jobbers have realized the acute conditions and have made every attempt to conserve their stocks for uses of the most essential class. One jobber has refused to accept orders unless information accompanies the order declaring the purpose of the material. The result has been gratifying and satisfactory, as the jobber has his business practically on a 100 per cent government basis.

"The sheet industry realizes the value of the jobber and offers all assistance possible to promote and develop their business so that they may continue to fill their place in the united effort to win the war. It is to be hoped that soon their place will be more appreciated and gain for them the proper classification to enable the mills to continue shipments and keep up their stocks.

"The tin plate branch of the steel industry is of the most importance, as it comes in contact directly with the big question of providing food for the armies of our country, as well as the armies of our noble allies. Food Administrator Hoover has worked untiringly to stimulate the production of foodstuffs, and it is estimated that fully 22,000,000 base boxes of tin plate will be required to properly preserve the crop production of this country, and fully 5,000,000 base boxes additional for our allies, a total of 27,000,000 base boxes against a possible production of 35,000,000 base boxes on a 100 per cent operating basis. It leaves very little tin plate for uses other than food. The mills are exerting every effort to fill their part of the program and much steel is going into the manufacture of tin plate as the sacrifice of some less essential product."

Eight Hour Day

Declared Drag on War Progress by Association of Manufacturers

That industry should, will win and is winning the war was the basis of all the papers and discussion presented at the twenty-third annual convention of the National Associaton of Manufacturers, held at New York, May 20, 21 and 22. This culminated in the passage of a resolution which in effect, recommended to congress the abolishment of the 8-hour law on government work. The resolution declared that the operation of such legislation hampers production and hinders this country's effort in the war. Another resolution was passed at the final session, urging the wider adoption of trade acceptances, and the organization likewise went on record by resolution, as indorsing the work of the American Institute of Weights and Measures in opposition to the metric system in this country.

Conservation of man power, mechanical reorganization, fuel, transportation, industrial housing, finance, export trade developments are some of the subjects which were discussed at the meeting.

Personality, publicity and patriotism were the three factors pointed out by James O. Fagan, Waverly, Mass., of the National Industrial Conservation movement, as being needed by American industry in the war. He said that the President proved that personality was needed by calling the army of over 600 business men to Washington to aid the government.

Charles S. Page of the United States shipping board, Washington, dealt at length with the shipping problem, with relation to the transportation of exports in war times.

More Scrap is Essential

Dealers in Annual Meeting Pledge Themselves to Procure All Available Supplies and Ask Government's Full Support

OFFICERS were re-elected and by-laws revised at the first annual meeting of the American Board of Scrap Iron Dealers at the Fort Pitt hotel, Pittsburgh, May 22. The officers and executive committee selected were: President, William J. Shroeder, Joseph Joseph Bros., Cincinnati; vice president, Sam Dentsch, Chicago; secretary-treasurer, C. A. Barnes, Philadelphia; executive committee, A. J. Bialosky, one year; Charles Dreifus, Charles Dreifus Co., Pittsburgh, one year; Harry S. Grant Iron & Metal Co., Detroit, one year; Ely Joseph, Joseph Joseph Bros., New York City, one year; Joseph Michaels, the Hyman-Michaels Co., Chicago, two years; W. Vernon Phillips, Philadelphia, two years; Henry P. Rees, two years.

The meeting was attended by about 60 members. Through a resolution adopted the members both as individuals and as a board pledged themselves to serve the government in every way possible to insure an adequate supply of scrap for war use. The meeting went on record as being opposed to the fixing of a price on mixed scrap.

President Shroeder in his annual report recommended that steps be taken to secure accurate information through co-operating with other bodies to show the fuel and railroad administrations the part taken in the production of iron and steel by dealers and shippers in order that the scrap trade be given proper consideration as to supplies of fuel and open-top cars.

Chairman W. Vernon Phillips, of the subcommittee on iron and steel scrap of the American Iron and Steel institute, made a stirring address. His remarks, in part, follow:

Our next big problem will be the procurement of sufficient scrap, and it is here that the American Board of Scrap Iron Dealers will have an opportunity to show whether it means what it says in its constitution, and when that time comes the government is very likely to come to you as an organization (at least if I continue in charge) and ask you to constitute yourselves into an industrial army for the purpose of bringing every last ton of scrap to the markets, not for profit, but as soldiers doing a duty, helping to save your country, to build ships, to make guns, to make shells, to make stretchers and hospital cots, yes, even to make crutches for the boys we are sending over. An order is being given this week for 750,000 cots for wounded men—think of it—750,000—and every pound of those cots is going to be made from scrap. I know, for I have been asked to see that the mill is supplied properly.

The government wants everybody to make a profit because it wants them to keep on working, working as hard as they can. Nearly one-third of the steel in the country is made from scrap, and while a lot of the scrap would reach the markets without the aid of the dealer, the portion that would not get there would be sufficient to upset the entire war program; in fact, a large portion of the mills would very quickly be shut down. This is not said for the purpose of showing how important you are, but what a great duty and privilege you have and you should all be thankful to feel that in doing your normal work, you are helping to win.

There is no great honor in buying a couple of thousand tons from some large manufacturer or railroad and selling to a consumer. It is helpful and no doubt assists both the producer and consumer, but it would get there anyhow. It is the man that actually locates material, prepares it, and delivers it to a mill that is really serving and helping the country. Every ton of material reclaimed that would not otherwise be available is a step toward victory and peace, and this carries us down to the smallest collector.

President William J. Shroeder in his annual report, said:

There is no branch of the steel and iron industry whose importance is so little understood and whose functioning is so misunderstood, as that of the dealer in scrap iron and steel. The importance of scrap iron and steel to the steel and iron industry can best be understood upon consideration of the tonnages handled, and the proportions of such tonnages to the total output of the three principal producing agencies, which are the steel mill, the rerolling and bar mill and the foundries.

Over 16,000,000 tons, or more than 33-1/3 per cent of the total output of 1917, was produced from market scrap, which excludes the output produced from the mills' own scrap production. Between 30 and 40 per cent of the entire steel mill output, more than 90 per cent of the rerolling and bar mill output, and more than 50 per cent of the foundry output was produced from market scrap.

Fuel administrations are apt to overlook the fundamental character of the scrap yard in its preparation of scrap for mill consumption. Not being familiar with the industry, persons preparing preferred lists of those to receive fuel when all cannot be served, cannot, unless we supply the information, be expected to know that without fuel for the operation of yard engines, cranes and the manufacture of power for the operation of shears, conveyors and drops, scrap material cannot be prepared for mill consumption and that without such scrap material the government's program, so far as it involves steel products, cannot be carried out.

Announce Further Revisions of Extras

A FURTHER modification of the revised method of invoicing sketch plates, announced May 21, has been put out by Chairman E. H. Gary, of the general iron and steel committee of the American Iron and Steel institute under date of May 25. This latest announcement is as follows:

In announcing revised maximum prices, differentials, and extras under date of May 21, 1918, it was stated that the revised method of invoicing sketch plates should be added to the extras for irregular sketches shown on page 34 of the institute pamphlet. It has been pointed out that this might be construed to mean that the revised basis for invoicing sketch plates would apply to irregular sketches only. It is the intention of the committee that the revised basis for invoicing sketch plates shall apply to all sketches. In order to remove any doubt as to such intention the announcement of May 21, 1918, in regard to steel plates is hereby cancelled and the following substituted therefor:

STEEL PLATES

Between the extras for irregular sketches shown on page 34 of the institute pamphlet (pages 17-18 IRON TRADE REVIEW booklet) and the extras for circles shown on the same page, insert the following to govern extras for both regular and irregular sketches:

"Sketch plates (other than those sheared to a radius) will be invoiced at actual weight of the sketch, at the base price plus standard card extras (including sketch extras), with an additional charge for waste, if any, to be determined by deducting the actual weight of each sketch from the estimated table weight of the smallest rectangular plate from which said sketch can be secured, the difference to be invoiced at the rectangular plate price, less an allowance for the value as scrap, at the price fixed by the government for No. 1 heavy melting scrap."

Cancel the first item under the sub-heading "Special" on page 34, reading as follows:

"Wasteful or difficult sketches, including hexagons, octagons, etc., are subject to special extras."

Considerable interest has been shown in the trade in the new separate extra and differential lists on hoops and bands which were announced by Chairman Gary, May 21. As previously stated, extras on these products

formerly were figured on the steel bar card. The new differentials and extras also cover hot rolled strip steel of all qualities.

Chairman Gary's complete announcement of May 21, covering steel bands, hoops and strips, which could not be published in last week's issue because of lack of space, is given below:

STEEL BANDS, HOOPS AND STRIPS

Base price and extras for steel bands, hoops and strips, recommended by the committee on steel and steel products of the American Iron and Steel institute, May 21, 1918.

(Per 100 pounds, f. o. b., Pittsburgh)

Steel bands	$3.50
Steel hoops	3.50
Hot rolled strip steel	3.50

Subject to following list of extras and differentials:

EXTRAS FOR SIZE

Thickness

Width, inches	Gage, inches	Decimal	Extra for size
3/8	3/16	0.1875	0.75c
	7	0.180	0.75c
	8	0.165	0.75c
	9	0.148	0.75c
	10	0.134	1.00c
	1/8	0.125	1.00c
	11	0.120	1.00c
	12	0.109	1.00c
	13	0.095	1.10c
	14	0.083	1.10c
	15	0.072	1.20c
	16	0.065	1.30c
	17	0.058	1.45c
	18	0.049	1.60c
7/16	3/16	0.1875	0.70c
	7	0.180	0.70c
	8	0.165	0.70c
	9	0.148	0.70c
	10	0.134	0.85c
	1/8	0.125	0.85c
	11	0.120	0.85c
	12	0.109	0.85c
	13	0.095	0.90c
	14	0.083	0.90c
	15	0.072	0.90c
	16	0.065	1.00c
	17	0.058	1.10c
	18	0.049	1.35c
	19	0.042	1.50c
1/2	3/16	0.1875	0.45c
	7	0.180	0.45c
	8	0.165	0.45c
	9	0.148	0.45c
	10	0.134	0.55c
	1/8	0.125	0.55c
	11	0.120	0.55c
	12	0.109	0.55c
	13	0.095	0.65c
	14	0.083	0.65c
	15	0.072	0.65c
	16	0.065	0.75c
	17	0.058	0.75c
	18	0.049	0.80c
	19	0.042	0.85c
	20	0.035	0.95c
	21	0.032	1.15c
	22	0.028	1.35c
9/16	3/16	0.1875	0.40c
	7	0.180	0.40c
	8	0.165	0.40c
	9	0.148	0.40c
	10	0.134	0.45c
	1/8	0.125	0.45c
	11	0.120	0.45c
	12	0.109	0.45c
	13	0.095	0.55c
	14	0.083	0.55c
	15	0.072	0.55c
	16	0.065	0.65c
	17	0.058	0.65c
	18	0.049	0.70c
	19	0.042	0.75c
	20	0.035	0.85c
	21	0.032	1.00c
	22	0.028	1.15c
	23	0.025	1.35c
5/8	3/16	0.1875	0.40c
	7	0.180	0.40c
	8	0.165	0.40c
	9	0.148	0.40c
	10	0.134	0.45c
	1/8	0.125	0.45c
	11	0.120	0.45c
	12	0.109	0.45c
	13	0.095	0.50c
	14	0.083	0.50c
	15	0.072	0.50c
	16	0.065	0.60c
	17	0.058	0.60c
	18	0.049	0.65c
	19	0.042	0.70c
	20	0.035	0.80c
	21	0.032	0.95c
	22	0.028	1.10c
	23	0.025	1.30c
11/16	3/16	0.1875	0.30c
	7	0.180	0.30c
	8	0.165	0.30c
	9	0.148	0.30c
	10	0.134	0.40c
	1/8	0.125	0.40c
	11	0.120	0.40c
	12	0.109	0.40c
	13	0.095	0.45c
	14	0.083	0.45c
	15	0.072	0.45c
	16	0.065	0.55c
	17	0.058	0.55c
	18	0.049	0.60c
	19	0.042	0.65c
	20	0.035	0.75c
	21	0.032	0.90c
	22	0.028	1.05c
	23	0.025	1.25c
3/4	3/16	0.1875	0.30c
	7	0.180	0.30c
	8	0.165	0.30c
	9	0.148	0.30c
	10	0.134	0.35c
	1/8	0.125	0.35c
	11	0.120	0.35c
	12	0.109	0.35c
	13	0.095	0.40c
	14	0.083	0.40c
	15	0.072	0.40c
	16	0.065	0.50c
	17	0.058	0.50c
	18	0.049	0.55c
	19	0.042	0.60c
	20	0.035	0.65c
	21	0.032	0.75c
	22	0.028	0.95c
	23	0.025	1.20c
13/16	3/16	0.1875	0.20c
	7	0.180	0.20c
	8	0.165	0.20c
	9	0.148	0.20c
	10	0.134	0.30c
	1/8	0.125	0.30c
	11	0.120	0.30c
	12	0.109	0.30c
	13	0.095	0.40c
	14	0.083	0.40c
	15	0.072	0.40c
	16	0.065	0.50c
	17	0.058	0.50c
	18	0.049	0.55c
	19	0.042	0.60c
	20	0.035	0.65c
	21	0.032	0.75c
	22	0.028	0.95c
	23	0.025	1.20c
7/8	3/16	0.1875	0.15c
	7	0.180	0.15c
	8	0.165	0.15c
	9	0.148	0.15c
	10	0.134	0.25c
	1/8	0.125	0.25c
	11	0.120	0.25c
	12	0.109	0.25c
	13	0.095	0.30c
	14	0.083	0.30c
	16	0.065	0.35c
	15	0.072	0.30c
	17	0.058	0.40c
	18	0.049	0.40c
	19	0.042	0.45c
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	22	0.028	0.85c
	23	0.025	1.10c
15/16	3/16	0.1875	0.10c
	7	0.180	0.10c
	8	0.165	0.10c
	9	0.148	0.10c
	10	0.134	0.15c
	1/8	0.125	0.15c
	11	0.120	0.15c
	12	0.109	0.15c
	13	0.095	0.20c
	14	0.083	0.20c
	15	0.072	0.20c
	16	0.065	0.25c
	17	0.058	0.25c
	18	0.049	0.30c
	19	0.042	0.35c
	20	0.035	0.45c
	21	0.032	0.65c
	22	0.028	0.85c
	23	0.025	1.10c
1	3/16	0.1875	0.05c
	7	0.180	0.05c
	8	0.165	0.05c
	9	0.148	0.05c
	10	0.134	0.15c
	1/8	0.125	0.15c
	11	0.120	0.15c
	12	0.109	0.15c
	13	0.095	0.20c
	14	0.083	0.20c
	15	0.072	0.20c
	16	0.065	0.25c
	17	0.058	0.25c
	18	0.049	0.30c
	19	0.042	0.35c
	20	0.035	0.45c
	21	0.032	0.65c
	22	0.028	0.85c
	23	0.025	1.10c
1 1/8 to 1 3/8	3/16	0.1875	0.05c
	7	0.180	0.05c
	8	0.165	0.05c
	9	0.148	0.05c
	10	0.134	0.10c
	1/8	0.125	0.10c
	11	0.120	0.10c
	12	0.109	0.10c
	13	0.095	0.15c
	14	0.083	0.15c
	15	0.072	0.15c
	16	0.065	0.20c
	17	0.058	0.25c
	18	0.049	0.25c
	19	0.042	0.30c
	20	0.035	0.45c
	21	0.032	0.65c
	22	0.028	0.85c
1 7/8 to 2	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c

	14	0.083	0.10c
	15	0.072	0.10c
	16	0.065	0.10c
	17	0.058	0.15c
	18	0.049	0.20c
	19	0.042	0.25c
	20	0.035	0.50c
	21	0.032	0.70c
	22	0.028	0.95c
2 1/16 to 2 1/2	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.10c
	15	0.072	0.10c
	16	0.065	0.15c
	17	0.058	0.20c
	18	0.049	0.30c
	19	0.042	0.40c
	20	0.035	0.60c
	21	0.032	0.90c
2 9/16 to 3	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.10c
	15	0.072	0.10c
	16	0.065	0.15c
	17	0.058	0.20c
	18	0.049	0.30c
	19	0.042	0.40c
	20	0.035	0.60c
	21	0.032	1.00c
3 1/16 to 3 1/2	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.15c
	15	0.072	0.20c
	16	0.065	0.30c
	17	0.058	0.40c
	18	0.049	0.55c
	19	0.042	0.75c
	20	0.035	1.00c
3 9/16 to 4	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.05c
	1/8	0.125	0.05c
	11	0.120	0.05c
	12	0.109	0.05c
	13	0.095	0.10c
	14	0.083	0.15c
	15	0.072	0.20c
	16	0.065	0.30c
	17	0.058	0.45c
	18	0.049	0.70c
	19	0.042	0.90c
	20	0.035	1.15c
4 1/16 to 5	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.10c
	1/8	0.125	0.10c
	11	0.120	0.10c
	12	0.109	0.10c
	13	0.095	0.15c
	14	0.083	0.20c
	15	0.072	0.30c
	16	0.065	0.50c
	17	0.058	0.75c
	18	0.049	1.00c
	19	0.042	1.20c
	20	0.035	1.40c
5 1/8 to 6	3/16	0.1875	Base
	7	0.180	Base
	8	0.165	Base
	9	0.148	Base
	10	0.134	0.10c
	1/8	0.125	0.10c
	11	0.120	0.10c
	12	0.109	0.10c
	13	0.095	0.20c
	14	0.083	0.30c
	15	0.072	0.40c
	16	0.065	0.70c
	17	0.058	0.90c
	18	0.049	1.00c
	19	0.042	1.20c
6 1/16 to 8	3/16	0.1875	0.10c
	7	0.180	0.10c
	8	0.165	0.10c
	9	0.148	0.10c
	10	0.134	0.20c
	1/8	0.125	0.20c
	11	0.120	0.20c
	12	0.109	0.20c
	13	0.095	0.30c
	14	0.083	0.45c
	15	0.072	0.60c
	16	0.065	0.80c
	17	0.058	1.00c
	18	0.049	1.20c
8 1/16 to 10	3/16	0.1875	0.10c
	7	0.180	0.10c
	8	0.165	0.10c
	9	0.148	0.10c
	10	0.134	0.20c
	1/8	0.125	0.20c
	11	0.120	0.20c
	12	0.109	0.20c
	13	0.095	0.40c
	14	0.083	0.55c
	15	0.072	0.80c
	16	0.065	1.05c
	17	0.058	1.25c
	18	0.049	1.45c
10 1/16 to 12 1/2	3/16	0.1875	0.20c
	7	0.180	0.20c
	8	0.165	0.20c
	9	0.148	0.20c
	10	0.134	0.30c
	1/8	0.125	0.30c
	11	0.120	0.30c
	12	0.109	0.30c
	13	0.095	0.50c
	14	0.083	0.75c
	15	0.072	0.95c
	16	0.065	1.25c
12 1/16 to 15	3/16	0.1875	0.30c
	7	0.180	0.30c
	8	0.165	0.30c
	9	0.148	0.30c
	10	0.134	0.40c
	1/8	0.125	0.40c
	11	0.120	0.40c
	12	0.109	0.40c
	13	0.095	0.60c
	14	0.083	0.90c
15 1/16 and wider	3/16	0.1875	0.40c
	7	0.180	0.40c
	8	0.165	0.40c
	9	0.148	0.40c
	10	0.134	0.60c
	1/8	0.125	0.60c
	11	0.120	0.60c
	12	0.109	0.60c
	13	0.095	0.75c
	14	0.083	1.00c

Birmingham wire gage applies on this list. Extras are given in cents per pound.

Additional Extras

(In cents per lb. to be added to the base price per lb.)

For special stamping quality steel.. 50c extra
Cutting to length 60 inches and over on Special Stamping Quality Steel, without end pieces..... 10% extra

Cutting to Specified Lengths

Cutting to lengths of 60 inches and over ..... No charge
Cutting to lengths over 48 inches to 59 inches, inclusive..... 05c extra
Cutting to lengths over 24 inches to 48 inches, inclusive..... 10c extra
Cutting to lengths over 12 inches to 24 inches, inclusive..... 20c extra
Extra for cutting to specified lengths 12 inches and less will be furnished on application, but will not be less than..... 30c extra
For rounding one end of cut hoop and bands ..... 05c extra
For rounding both ends of cut hoop and bands ..... 10c extra
For intermediate gauges the extra for the next lighter gauge will be charged.
Rolling of lighter gauges than indicated on this list and the extras to apply are subject to special arrangements.
Extras for flaring and galvanizing will be quoted on application.
Extras for packing in barrels, casks and boxes will be quoted on application.

Exemptions

Extras for cutting and rounding one end of hoops will be waived on all widths when ordered in carload lots for cooperage purposes.

Quantity Differentials

All specifications for less than 2000 lbs. of a size will be subject to the following extras, the total weight of a size ordered to determine the extra regardless of length and regardless of exact quantity actually shipped.
Quantities less than 2000 lbs. but not less than 1000 lbs..... 15c extra
Quantities less than 1000 lbs..... 35c extra
Annealing ..... 30c extra

Slitting and Pickling Extras

Gauge—Inches	Slitting	Pickling
3/16, 7, 8 and 9	25	25
10, 11 and 12	25	25
13	25	30
14	25	35
15	40	40
16	40	45
17	40	50
18	55	55
19	55	60
20	55	65

Carbon Extras

For sizes 6 inches and narrower by 12 gauge or heavier:
If specified up to 0.20 per cent.. No extra
If specified 0.21 to 0.50 per cent. 05c extra
If specified 0.51 per cent and over. 15c extra
For other sizes and gauges, or special quality, carbon extras on application.

Specifications and Inspection

Material subject to Navy Department inspection ..... 10c extra
Navy Department high tensile steel 1.00c extra
Charges for other than mill inspection, such as Lloyd's or American Bureau of Shipping, for buyer's account.

The McLain-Carter Furnace Co., Milwaukee, has been awarded a contract by the Warren Steel Casting Co., St. Louis, for the installation of a 5-ton oil-fired open-hearth furnace. The furnace is to be completed in 45 days.

Obituaries

PROF. Frederick R. Hutton, who was secretary of the American Society of Mechnical Engineers, New York, for 24 years, becoming president in 1906, died suddenly May 14, aged 65. He was graduated from Columbia college with an A. B. degree in 1873 and three years later was granted the degree of the school of mines. The following year he became an instructor in mechanical engineering and in 1891 was made a professor but it was not until 1892 that he became head of the mechanical department of the college. He resigned in 1901 and for six years was dean of the faculty of applied science. He declined re-election as secretary of the society of mechanical engineers and at the organization's annual meeting in December, 1906, was unanimously elected president. He wrote several books on engineering subjects, among them being "Mechanical Engineering of Power Plants," "Heat and Heat Engines" and "The Gas Engine." Many articles and monographs both signed and unsigned, appeared in the transactions of the society as well in the trade journals. He served as consulting engineer in 1911 for the city of New York.

William Findlay, a retired steel merchant, died at his home in Millburn, N. J., May 17.

Israel Loucks, an organizer of the York Safe & Lock Co., died at his home in York, Pa., May 15, aged 91.

Busby P. Sweeney, superintendent of the Marion Steam Shovel Co., Marion, O., died suddenly at his home May 15, as he was celebrating his sixty-first birthday.

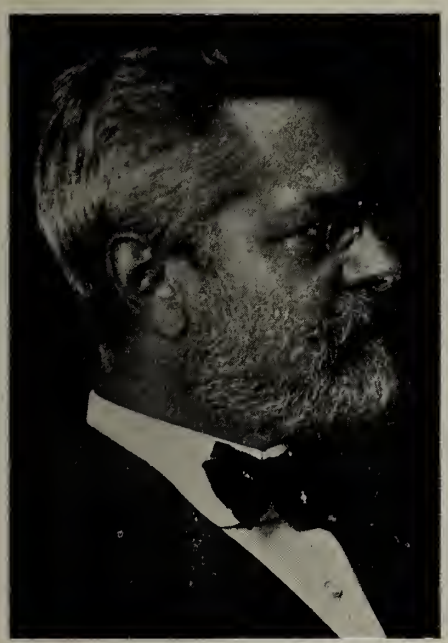
William Dewar Ellis, who was president of the Schenectady Locomotive Works when it was merged with the American Locomotive Co., some years ago, died, May 23, in New York, at the age of 63.

Claud R. Seager of the Waterworks Supply Co., San Francisco, formerly connected with the Chicago office of the American Radiator Co., was killed at Stockton, Cal., May 10, when an automobile in which he was riding struck the railing of a bridge.

Henry C. Fuller, affiliated for the past 26 years with the Crane Co., Chicago, and recently filling the office of assistant treasurer, died suddenly May 24 at Garfield Park hospital, Chicago. As assistant treasurer he succeeded R. B. Stiles, who was elected to that office upon the death of R. T. Crane early in 1912.

Leslie H. Colburn, 51 years old, general manager and one of the organizers of the Colburn Machine Tool Co., died on Sunday, May 26 at Franklin, Pa. He was one of the most widely known tool manufacturers in the United States.

Benjamin H. Richardson, who at one time was interested in an iron business with his father and uncles



PROF. FREDERICK R. HUTTON

under the firm name of Jeffrey Richardson and Bros., and later in the shipbuilding business, died at his home in Boston, May 22. He was born Aug. 17, 1835.

Ralph Waldo Wight, aged 43, treasurer of the Chapman Valve Mfg. Co., Indian Orchard, Mass., died in the New York Neurological institute, May 20. Pneumonia followed an operation. He was the owner of the Wight-Thayer Coal Co., and a director of the Hodges Fiber Carpet Co., both of Springfield, Mass.

Lieutenant Earl P. Williams, formerly vice president of J. H. Williams & Co., Brooklyn and Buffalo, N. Y., manufacturers of drop forgings, died May 8 at a hospital in Northampton, Mass. He received his commission as lieutenant after completing a course in the officers' training school, Fort Niagara, N. Y. His death was the result of an injury received at Camp Devens, Mass., May 7, when he was struck by a limb blown from a tree in a storm. He was a graduate of Yale university, in 1910.

Calvin Pardee Jr., president and general manager of Pardee Bros. & Co., Inc., died May 13 at the state hospital, Hazleton, Pa., following an operation for appendicitis. He was 46 years old, and was a director of the Hazleton National bank, the Diamond Coal Land Co., C. Pardee Works at Perth Amboy, N. J., and Blackwood Coal & Coke Co., Blackwood, W. Va.

Lieut. Mortimer Park Crane, who was the son of Theron I. Crane, president of the Northern Ore Co., Widener building, Philadelphia, died recently in an airplane accident in England. He was 24 years old and an officer of the Royal Flying Corps. Prior to enlisting he was affiliated with his father in the Northern Ore Co.

George W. Retberg, general manager of the Cansburg Steel & Iron Works, Canonsburg, Pa., died at his home in that city, May 24. When a young man, Mr. Retberg located in Canonsburg, securing employment at the plant of the Canonsburg Iron & Steel Works. Soon after, the Parkersburg Iron & Steel Co. was organized and he became largely interested in it, being made assistant manager. After remaining with that company a short time, with the late John F. Budke and others, he formed the Canonsburg company.

Albert W. Gifford, aged 82, director and vice president of the Standard Screw Co., Worcester, Mass., died at his home in that city, May 23. In 1864 he founded the Worcester Machine Screw Co., remaining in control until 1900, when he sold it to the Standard Screw Co., which operates it as a subsidiary. He likewise was the founder of the hardware manufacturing concern, A. W. Gifford & Co., Worcester. When it went out of business several years ago, Mr. Gifford retired from active business life, although he remained financially interested in a number of Worcester's important industries. He was born in Sturbridge, Mass., Feb. 28, 1836, and located in Worcester in 1861. Shortly after, he commenced to make firearms for Union soldiers.

Appoints First Committee

National War Labor Board Names Initial Permanent Body to Take Charge of Industrial Disputes in St. Louis Territory

DESIGNED to inspire, promote and maintain industrial peace in America the functions of the national war labor board, of which ex-President Taft and Frank P Walsh are the joint chairmen, include the appointment of permanent committees in industrial communities. The first of these has just been named and includes representatives of the workers and employers of St. Louis. Recommended by the central labor union of that city, Messrs. M. J. Cassidy, J. E. Woracek and David Kreyling represent the workmen upon the committee, while the following has been named for the employers, on the recommendation of the chamber of commerce and the Manufacturers' association: E. B. Pryor, president of the State National bank of St. Louis and director in many corporations in that city; Hudson S. Bemis, treasurer of the Bemis Bag Co., one of the largest manufacturers of bags and M. E. Singleton, who formerly was head of an oil corporation in East St. Louis, and who retired from active business with the exception of his position on the board of directors of the State National bank. Mr. Pryor is an authority on labor matters, having gained much experience while receiver of the Wabash railroad. Preliminary meetings have been held and active operations will commence in the near future, since approximately 15 strikes, involving 15,000 men and women are in progress.

What Committee Will Do

Vested with federal authority, this committee will act as the permanent agent of the national war labor board in endeavoring by counsel and conciliation to intercept and settle controversies threatening to arise in any St. Louis industries; to bring both sides together under the auspices of the federal government for the purposes of finding a basis of agreement when a controversy has arisen and in such other manner as may be suggested on different occasions, exert its effort for complete co-operation on the part of both labor and capital. Other committees will be named for other territories as needed.

When the permanent committee is unable to effect an agreement, it shall so report to the war labor board. A section of the board will then be named, composed of two of its members, which section shall visit the community and convene with the permanent committee. After hearings have been conducted and the case remains unadjusted, the matter shall be passed to the entire board.

Following the formation of the committee, Frank P. Walsh, who holds the chairmanship of the board jointly with former President William H. Taft, issued the following statement:

"The local committee of mediation and conciliation of the national war labor board will constitute the forums of industrial peace in the United States. On these committees capital and labor will work hand in hand with a single aim—to win the war. They know only one necessity, the maintenance of maximum production, and they know one common law—the principles established by the board as the basis for the government's mediating and conciliating action. These principles secure to the employer maximum production and guarantee to the worker his right to organization, healthy growth of the principles of democracy as applied to industry and the highest protection of his economic welfare."

Will Employ Older Men

The Bullard Machine Tool Co., Bridgeport, Conn., is about to inaugurate a campaign to fill its plant with citizens over draft age who are not now engaged in the making of war essentials. These men will be taught special branches of the machinist trade and will be paid extraordinary wages to start and will also be advanced rapidly. In a booklet entitled "Making Mechanics for the War—and After" the company states that "America has no room for idlers." S. H. Bullard, head of the company, stated recently, "the time required to become proficient in a given branch of the machinist's trade is wholly dependent on the individuals adaptability, skill and application to the work in hand."

Machinists Are Needed in Essential Plants

That nonessential manufacturers will be compelled to release large numbers of mechanics for war industries, now is believed to be a foregone conclusion if production is to be maintained or increased. It is authoritatively stated that lack of machinists and toolmakers is retarding war production work so that it now stands at but 75 per cent of maximum, by I. W. Litchfield, chief of the clearance section of the federal employment service, Washington. Calls for from 50 to 1500 machinists upon the federal employment service are numerous from many of the large war industries in different parts of the country. At least 10,000 could be employed at once to advantage. Most serious shortages exist in the east, where the manufacturing of war material is centralized. An appeal will be sent out in the near future by the federal employment service, asking machinists in all parts of the country to accept work in war plants. The enrollment of men in machinery work, including toolmakers and other skilled workers in metals by a nationwide canvas is contemplated.

Draft Creates Shortage

Co-incident with labor shortages in other sections of the country, the Youngstown and Mahoning valley districts report that the several drafts have created a more or less serious situation. It is becoming increasingly difficult to obtain skilled industrial workers to replace those who have been inducted into service, according to the statements of plant executives. Except in a few isolated cases, no exemptions on the ground of industrial necessity have been requested. One corporation which has lost approximately 1000 of its men by the operation of the draft law, has asked for less than a dozen exemptions. As far as is known, there is no contemplation of changing this policy, although heads of industry state frankly that a continuance of the draft calls will develop a situation hard to handle, since in many cases they will be called upon to maintain capacity production of essential war material, without the men to do it. Financial institutions are confronted with a similar difficulty and officials themselves discharge the routine duties while looking for men or training women to replace those who have gone into service.

Housing Work Continues

Within three months, it is hoped to have houses ready for occupancy in a model shipworkers' town to be located near Camden, N. J. Plans have been completed by the housing division of the Emergency Fleet corporation and work will shortly commence on the clearing away of the site. It will be known as Haddon township and approximately 3000 workers of the New York Shipbuilding Co., will be provided with dwelling places. The 907 houses will be mostly of brick construction, detached and in rows to cost on an average of $3070.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM G. MATHIAS, who in 1910 was made assistant general superintendent of the Tennessee Coal, Iron & Railroad Co.'s works at Ensley, Ala., and later was promoted to the position of general superintendent, has been appointed assistant to the vice president with offices in the Brown-Marx building, Birmingham. Prior to locating in Ensley, Mr. Mathias had been employed at the South Works of the Illinois Steel Co., at South Chicago, for 23 years. His first job was that of water boy. He has steadily advanced and when transferred to Alabama, was serving as superintendent of the structural and blooming mills at the South Works. As general superintendent of the Ensley works, he is succeeded by Karl Landgrebe, formerly assistant general superintendent. A. W. Allen, former superintendent of open-hearth furnaces, has been appointed assistant general superintendent to succeed Mr. Landgrebe. C. J. Barr, general superintendent of Fairfield works, has been made assistant to the vice president of the Fairfield Steel Co., Birmingham, a subsidiary of the Tennessee company. G. A. Miller succeeds Mr. Barr. He has been superintendent of mills at the Fairfield works. Mr. Barr is likewise assistant to the vice president of the Chickasaw Shipbuilding Co., Birmingham, another subsidiary.

F. P. Burgoyne, Lima, O., recently accepted a position as factory superintendent of the Modern Iron Works, Quincy, Ill.

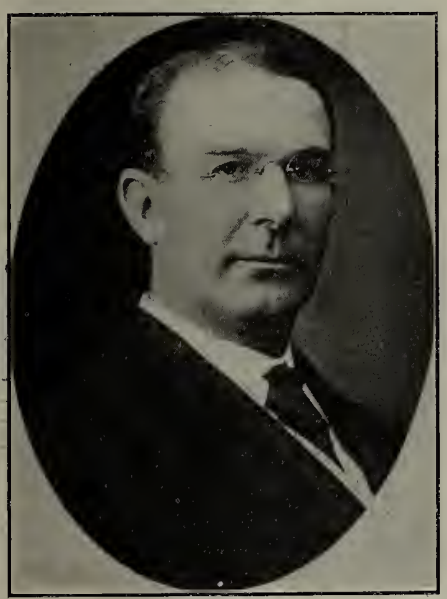
E. S. Edwards has assumed his duties as eastern manager for the Stalnaker Steel Co., with headquarters at 1407-1408 Singer building, New York.

Dr. W. Irving Clark Jr., who has served the Red Cross in Paris, for several months, has returned to take up his work as medical director of the Norton Co., Worcester, Mass.

R. W. Ellingham recently resigned from the Bilton Machine Tool Co., Bridgeport, Conn., to become works manager of the Heald Machine Co., Worcester, Mass.

A. J. Hofman, secretary of A. M. Wood & Co., Inc., Philadelphia, resigned recently to organize and become president of the Hofman-Sproul Co., Widener building, that city, to deal in iron and steel scrap, with a yard at Chester, Pa. W. A. Faison was made vice president, T. J. Sproul treasurer and James McShane is secretary.

A. W. Sidell has returned from Europe, where for several years he has represented the Gisholt Machine Co., Madison, Wis. He will be stationed at the Madison works for the present.



WILLIAM G. MATHIAS

H. Resnick, who formerly was manager of the Pittsburgh office of Luria Bros. & Co., has assumed his new duties as general manager of Bialosky Bros. & Co., Cleveland, iron and steel scrap.

Edward L. Dunn, identified for 15 years with the engineering department of the Standard Plunger Elevator Co., Worcester, Mass., has been given a position in the ordnance department at Washington.

Frank Rhodes has become factory metallurgist of the Aurora, Ill., plant of the Independent Pneumatic Tool Co. For some time he has been in the pneumatic tool engineering department.

Clarence E. Whitney, president of the Whitney Mfg. Co., Hartford, Conn., was chairman at a conference of the New England Open Shop associations, held recently at Narragansett hotel, Providence, R. I.

Edward J. Cross, president and treasurer of the E. J. Cross Co., and president of the Norcross Bros. Co., both of Worcester, Mass., was recently elected president of that city's Rotary club.

Sidney J. Williams has resigned as chief engineer of the Industrial Commission of Wisconsin, Madison, to accept the position of safety engineer of the reorganized accident prevention department of the National Safety Bureau, Chicago.

Brig. Gen. Tracy C. Dickson of the ordnance department, has been assigned to the plant of the Bethlehem Steel Co., South Bethlehem, Pa., due to the growing importance of the work being done there for the government.

Paul H. Berggreen will be in charge of the St. Louis office in the Railway Exchange building, to be opened by the Brown Instrument Co., Philadelphia, for the sale of its pyrometers in the southwestern part of the country.

J. W. Weinland resigned recently as manager of the brake beam department sales of the American Steel Foundries to become Chicago district manager in the McCormick building for the Liberty Steel Products Co., New York.

Alba B. Johnson, president of the Baldwin Locomotive Works, has been elected president of the Railway Business association, to succeed George A. Post, of New York, who had been head of the association since its formation in 1908.

Charles B. Bohn, who recently resigned as manager of the Detroit plant of the Aluminum Castings Co., has organized the Charles B. Bohn Foundry Co., Hart avenue, Detroit. Brass, aluminum and bronze castings will be manufactured.

William C. Potter recently resigned his executive position in the various companies controlled by Guggenheim Bros., New York, of which firm he a member, in order that his entire time may be devoted to work on the aircraft production board.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM C. SPROUL, Chester, Pa., who has represented his county in the Pennsylvania state senate continuously through six successive terms, or since he was 25 years old, is a striking type of the business man of prominence in the political field. Mr. Sproul has been nominated for the the governor of Pennsylvania by the Republican party, which is equivalent to election. His business career has been characterized by great initiative and success. Prior to his first election as state senator, he was a newspaper man. A few months after being graduated from Swarthmore college, he bought an interest in the *Chester Times*. The success attending the publication of that daily newspaper has marked his other ventures. In 1900, he organized the Seaboard Steel Casting Co., Chester, Pa., of which he was president. Upon its amalgamation with the Penn works of the Penn Seaboard Steel Corp., he became director and member of the executive committee. At the same time he formed the Chester Shipping Co., and has since taken a deep interest in water transportation. West Virginia served as his next field of operation and he has been connected with street railway, electric power, bridge building, coal mining, lumbering, oil and gas enterprises in that state. With others in 1909, he organized the General Refractories Co., which is now one of the largest companies of its kind in the country. It has many plants in Pennsylvania, Kentucky, Illinois and Wisconsin. Mr. Sproul is president. He also holds a similar office with the Lebanon Valley Iron & Steel Co., Lebanon, Pa. One of his latest enterprises was the purchase in 1916 of the Robert Wetherill & Co. works in Chester, manufacturers of marine equipment. A few months after acquiring this property he turned it over to the Sun Shipbuilding Co., in which he retains a large interest as a member of the board of directors.

C. J. Ramsburg, vice president of the H. Koppers Co., and the Pittsburgh By-Product Coke Co., Pittsburgh, was recently made technical expert on toluol in the United States ordnance department to assist Col. C. W. Watson in increasing the supply of toluol.

Gust B. Erickson, formerly affiliated with the Duluth Brass Works and A. A. Williams, formerly of the Duluth Gas Engine Works, Duluth, Minn., have organized the Crescent Brass Foundry Co., Superior, Wis.,



WILLIAM C. SPROUL

to manufacture brass and bronze marine castings.

L. L. Newton has resigned as secretary of the Luther Grinder Mfg. Co., Milwaukee, to become secretary, treasurer and general manager of the Stegeman Motor Truck Co., 606 Linus street, that city. He remains a director of the Luther company for the time being.

J. E. Payne, 67 East Long street, Columbus, who is a steel construction expert, was recently made acting general manager of the Concrete Steel Fire Proofing Co., Detroit, in the place of S. V. Taylor, who is a captain in the heavy field artillery section of the army.

George Brown of the purchasing department of the National Tube Co., Pittsburgh, has been named purchasing agent for the new ordnance plant to be constructed on Neville island in the Ohio river, near Pittsburgh, for the government, by the United States Steel Corp.

Benjamin H. Ball succeeds Frank E. Marvin as New England representative of the Stanley Works, New Britain, Conn. He formerly was with the John E. Bassett Co., New Haven, Conn. Mr. Marvin has reported for service at Camp Upton, Yaphank, L. I.

John C. Brown, sales manager of the Lebanon Valley Iron & Steel Co., Philadelphia, was recently elected president of the Eastern Bar Iron institute at its annual meeting. O. H. Reinhart, secretary of the Milton Mfg. Co., Milton, Pa., was made vice president, and E. T. Edwards, Columbia, Pa., treasurer.

H. S. Patterson was recently made manager of the railroad department of the Walworth Mfg. Co., with headquarters at Boston, and H. T. Goodwin was made his assistant with headquarters at New York. Both obtained their training with the National Tube Co., by taking the specialty course at its Kewanee, Ill., works.

Russel Cowles, president of the Metals Trading Corp., New York, the Sandusky Foundry & Machine Co., the International Fabricating Co., Wilkesbarre, Pa., and vice president of the Ansonia Clock Co., and the Cyclops Steel Co., was tendered a testimonial dinner at Greenwich, Conn., May 22, by 50 of his friends.

George M. Verity, president of the American Rolling Mill Co., Middletown, O., was recently elected president of the committee in charge of camp welfare houses at Camp Sherman, O. James A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown, O., is likewise on the committee.

Eugene W. Lewis resigned recently as vice president and director of the Timken-Detroit Axle Co., Canton, O., to devote his entire time to work for the government. A. R. Demory, vice president, was elected vice president and general manager; Frederick C. Gilbert, secretary, was made vice president in charge of sales and advertising and C. W. Dickerson, treasurer, was elected secretary and treasurer.

Iron and Steel Men in War Machine

Jay C. McLauchlan, Chief of Pig Iron Division, War Industries Board

JAY CHANDLER McLAUCHLAN is not known officially as pig iron director of the war industries board. That however, virtually is what his functions in the war machine make him. Upon him the war administration depends for the pig iron supply of essential industry. If ships represent the one leg the government's war effort is standing upon, pig iron represents the other. The ship program mainly is a question of steel and without pig iron there could be no steel. As assistant to Director of Steel Supply J. Leonard Replogle, Mr. McLauchlan has charge of the pig iron division of the war industries board. His entire time is devoted to production matters, the routine work being left in the hands of his assistants. Statistical data showing production, shipments and orders are furnished weekly to the war industries board by every iron and steel plant in the country. Industry's requirements of steel are filed with Mr. Replogle and when he is asked to furnish a certain tonnage of steel, he in turn requests that the requisite tonnage of pig iron is provided for by Mr. McLauchlan. He is the Washington point of contact of the American Iron and Steel institute's committee on pig iron, iron ore and lake transportation. Through the committee are made the allocations of iron requested by Mr. McLauchlan on behalf of the government for various plants engaged in manufacturing war products.

Closely allied to pig iron is the country's coke production and through Mr. McLauchlan's efforts to co-ordinate the coke and railroad administrations, the latter now work harmoniously. As a result pig iron is being produced on a larger scale because the coke is being furnished and transported to the blast furnaces.

With the increasing governmental control over pig iron supplies and distribution, Mr. McLauchlan's duties and responsibilities promise to expand greatly. The statistical canvass of the pig iron industry now being made by the committee on pig iron, iron ore and lake transportation is to equip the government with the exact knowledge for what purposes every ton of iron is being made or consumed today. This is preliminary to a close direction of distribution of iron so that plants doing direct and indirect war work will have first call on supplies. Mr. McLauchlan will be the arm of the government in carrying out this system of supplying essential industry.

Mr. McLauchlan is a representative type of the younger generation of business men upon which the government is placing great dependence for the efficient handling of the industrial side of the war. His previous experience has given him a wide familiarity with the commercial side of the three great branches of the iron and steel industry, iron ore, pig iron and steel. For some years, he was a salesman for Pickands, Mather & Co., and then for the Jones & Laughlin Steel Co. Before going to Washington last year, he had been connected for eight years with the sales staff of the Lackawanna Steel Co., and last was serving as district sales manager of the company at Detroit. At present he is a member of the firm of Pickands, Mather & Co., Cleveland.

He was born in Cleveland March 12, 1874 and was graduated from Yale college with an A.B. degree.



JAY C. McLAUCHLAN

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Business Men Want War Tax Settled

SECRETARY of Treasury McAdoo has expressed the view that immediate action on new revenue legislation is necessary and the question is before President Wilson for decision. Many members of congress had urged that pressing business now on the calendar be disposed of, that congress be adjourned and then come back for a special revenue session in the fall. However, business men generally will be better pleased to have the policy settled now so that the country will not have hanging over it the prospect of immensely increased but still undetermined levies on incomes and excess profits. The time taken in discussing the taxes for this year, and hasty decision adopted at the eleventh hour, last autumn, prevented corporation tax payers from calculating the taxes on their current profits and made for much unsettlement. This is at least one phase of the tax question which can be omitted for the coming year, it is felt, to the benefit of the business community.

Chairman Kitchin of the house ways and means committee announced that a bill practically doubling present taxes of around $4,000,000,000 would be presented, with the burden placed largely on incomes and excess profits. Representative Garner of the house committee estimates that the war expense for the next fiscal year will be $24,000,000,000, of which one-third or $8,000,000,000 will come from taxes and the remaining two-thirds from loans.

Appropriations Greatly Enlarged

The government plans to increase largely its war activities. The army alone is asking for appropriations equal to the amount actually spent this year by all departments of the government. This year the government actually expended only $7,000,000,000 in war work, aside from $5,000,000,000 loaned to the allies. Of this total expenditure, $3,500,000,000 is expected to be raised by the excess profits and income taxes, or approximately 50 per cent of the whole cost. Obviously it will be impossible to raise 50 per cent of the next fiscal year's expenditures, or $12,000,000,000, although there are some people at Washington who still believe half of war expense should be so raised.

Deny Leaseholders Right to Depletion Charge

Owners of leaseholds on iron ore properties may not be allowed any deductions for depletion of their holdings in determining taxable profits. The United States Supreme court has just approved this ruling in its decision in the Biwabik Mining Co. case.

Ore mine operators, whether leaseholders or fee owners, had not been accustomed until recently to charge depletion against shipments from their mines. Increased costs and taxes, however, have led to the wider appreciation of the importance of such charges. The Biwabik case has been followed with great interest as a test of the rights of the lease holder to make such deductions. No question has arisen over the rights of the fee-owners to make deductions for depletion of their ore properties.

Westinghouse Shows Good Year and Prospects

In the report to stockholders of the Westinghouse Electric & Mfg. Co., the board of directors states that sales billed in the fiscal year ended March 31, 1918, aggregated $95,735,406, compared with $89,539,442 the preceding year. This represents the entire business except that of the New England Westinghouse Co., and includes shipments since June 15, 1917, from the Machine Works, formerly the Westinghouse Machine Co., as well as $4,536,000 in munitions. The volume of sales billed for the regular products of the company was greatly in excess of any previous year. Unfilled orders, April 1, 1918, totaled $147,857,580 as compared with $39,776,739 at the close of the previous year, which nearly doubled the previous record. Of this total, $110,185,007 represents calls for regular products. No facilities heretofore used in the production of regular lines now are devoted to war work. Net income of $15,405,680 compares with $18,079,889 as of March 31, 1917, and the 1918 earnings are equivalent to 21.36 per cent on the common stock, against 25.13 per cent. This is after all charges are deducted including income and excess profits taxes. After the payment of $5,610,848 in dividends, the surplus, March 31, was $26,101,691, and increase of $8,239,390. The comparative income account follows:

	1918	1917
Sales billed	$95,735,406	$89,539,442
Cost of sales	80,225,936	72,077,752
Net mfg. profit	$15,509,469	$17,461,690
Other income:		
Int. and disct.	308,834	298,086
Divs. and int.	903,559	1,027,808
Misc., royalties, etc.	112,869	60,652
Gross income	$16,834,733	$18,848,237
Deduc. from income:		
Int. on bonds & deb.	303,916	89,333
Int. on notes payable	1,108,046	529,115
Misc. interest	17,089	149,900
Net income	$15,405,680	$18,079,889

The report shows the transfer of title from the Westinghouse company to a British syndicate of the stock of the British Westinghouse Electric & Mfg. Co., Ltd., in exchange for which the American company received 10-year debenture bonds, secured by the deposit of the stock transferred and other collateral. The former British subsidiary, now called Electric Holdings, Ltd., has made a trade agreement to represent the American company in England.

Notes retired during the year leave outstanding but $52,500 of the issue of 1909. Because of the heavy inventory carried, the company increased its notes payable by $12,000,000, the total outstanding now being $30,186,051. This includes $15,000,000 one-year notes and $2,433,551 on account of Liberty loan bonds subscribed for by employes.

The loss of $5,000,000 on the Rus-

sian rifle contract the previous year was written off the books by the conversion of reserves.

March Earnings Are High

Official figures recently made available show $617,000 were the net earnings of the Allis-Chalmers Mfg. Co., Milwaukee, for March, after allowing $200,000 for war taxes. This is equivalent to 21 per cent on the common stock after deducting 7 per cent preferred dividends and extras at the rate of one-fourth of 1 per cent at each quarter. The statement is made that the practice of paying off accrued dividends at three-fourths of 1 per cent will be continued and it is expected that by Dec. 31, 1919, these will have been paid off. Estimates of May shipments place the figure at $3,000,000, or at the rate of $36,000,000 worth of goods per year.

Huge Sums Stay in U. S.

With comparatively few exceptions, all monies advanced to the allies of the United States since the war began by the latter nation, have been spent in this country. The treasury simply places the money advanced in bank as the credits are called upon, but has assurance that all of it is expended here for foodstuffs and munitions. The credits advanced to the allies to date aggregate $5,766,850,000. This includes $325,000,000 advanced Russia, $191,000,000 of which still stands to her credit. Obligations of foreign governments purchased to date aggregate $5,279,750,000, which leaves the excess of loans $487,100,000 less Russia's $191,000,000, making the net $296,100,000, which represents credits advanced but as yet unexpended.

Certificates Participate

In a statement to stockholders, issued after a recent meeting of the board of directors of the Gulf States Steel Co., Birmingham, it was developed that $272,524 was the net income for April. The usual quarterly dividend of 2½ per cent on the common stock was declared, payable July 1 to stockholders of record June 15. The statement follows in part:

"This dividend will also apply to the common stock trust certificates, which will be issued to represent the 25 per cent stock distribution to be made on June 3. Authority to list such common stock trust certificates has been granted by the New York stock exchange. There was formerly $4,000,000 of second preferred stock outstanding; all but $152,100 has been converted into common stock, which will make the total outstanding common stock as of June 3, $1,097,900, in addition to the $2,000,000 first preferred stock.

Toluol Price

For Outside Use to be Fixed—Benzol Makers Reduce

New York, May 25.—The toluol division of the war industries board has become impatient with what it regards as profiteering by some of the smaller makers of toluol, and accordingly is preparing to fix a uniform price on all toluol released for commercial consumption. Although it is not yet certain what this price will be, it is intimated that it will not be far from $1.50 per gallon at producers' plants. This is the price that the government is paying for its toluol. It is expected that the price will be fixed to apply to releases at the end of May for June delivery.

A material reduction in benzol prices has developed during the past few days. One large producer came out with general offers of large quantities at 27 cents per gallon and other makers have followed suit. It is probable that even this figure now may be shaded on attractive lots. The market on pure benzol may be quoted at 27 to 30 cents per gallon depending upon quantity.

No action has been taken by the navy department on its recent inquiry for solvent naphtha. The product is moving slowly but the market continues firm at 18 to 22 cents per gallon for contract and at 18 to 25 cents for spot shipment.

Due to the larger output during the past couple of months, producers of phenol are well up on deliveries and have fairly large stocks. The market may be quoted at 48 to 52 cents per pound, depending on quantity. Practically no naphthalin is being sold, due to the urgent call for deliveries on contracts. Occasional small spot lots are being sold at 10 to 12 cents per pound.

The government now is expected to take practically the entire output of sulphate of ammonia over the next two or three months. With the exception of occasional spot carloads, which are going at $5.65 to $5.75 per 100 pounds at seaboard, no commercial business is being booked. The government has requested producers not to make at future commitments.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.27 to .30
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.48 to .52
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.65 to 5.75

Contract

Pure benzol	$0.27 to .30
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

To Hold Foreign Exhibit

An organization, of which Alfred I. du Pont of Wilmington, Del., is one of the stockholders, has purchased the lease-hold of the grand Central Palace, New York, with a floor space of more than 500,000 square feet, and will make alterations to suit the building for a colossal exhibit of the manufactured goods of foreign countries. Incidentally, the products to be exhibited may be received in this country without payment of duty, and in fact no duty must be paid on them until they are sold. Unsold goods will be returned to their point of origin. The new organization has secured this privilege by taking over the lease of the Merchants' and Manufacturers' exchange of New York. Agents have already been sent to Europe to arrange for the shipment of European products. It is believed sufficient space will be available on returning vessels to enable the organization to maintain a complete exhibit without waiting for the conclusion of the war.

Among Mr. du Pont's associates are: William du Pont of Delaware and Virginia; Charles C. Dickson, Wilmington; William P. Bonbright, New York; ex-Governor Myron T. Herrick, Ohio; Viscount Furness of Furness Withy & Co., London; General Sir John Carson, Montreal; Col. William Cantley, Nova Scotia; Judge S. G. Archibald and M. Etienne Groschlaude, Paris.

The Morgan Spring Co., Worcester, Mass., has taken over the Miller Wire Cloth Co., 72 Commercial street, in that city, and will continue to operate it as a branch. The company is a Massachusetts corporation, capitalized at $20,000, of which Morton M. Miller is the president and treasurer. It has been in business but a few years.

Shipyards and Railroads Buy Tools

Steady Activity in Machinery Market is Furnished by Munitions Manufacturers, Railroads and Shipbuilding Plants—Tool Requirements of the Ordnance Department Are Still in Suspense

NO BUYING of equipment yet has developed in connection with the new government ordnance plants. The class of equipment needed will no doubt be furnished largely from the east, with possibly some part from the Chicago district, due to the fact that these localities have previously handled the bulk of the heavier machinery business. Shipbuilding still expands and supplies a steady source of machine tool inquiries. The most recent large venture contemplated in this connection is two yards, the sites for which have not yet been chosen. They will be built by the Bethlehem Shipbuilding Corp., Bethlehem, Pa. Other new yards are under consideration, and resultant machine and crane demand is expected. Crane inquiries in general have been large. The government is a consistent purchaser, and is now in the market for a large number of cranes for interior shops. An interesting phase of new war business is furnished by a large order for gray iron grenades, which has been distributed among a number of Chicago manufacturers. Machine tools for finishing operations are now being inquired for by the shops taking these contracts. The International Harvester Co. is purchasing equipment for extensive plant additions. The railroads are following their usual custom of issuing specifications and requests for bids through their individual purchasing agents, specifying each machine by dimensions and in most cases giving the name of the manufacturer whose machine will form the first choice in alloting the contract. As was expected the lists this year are larger, and represent replacements which in most cases are long past due. Greater promptness is promised in placing contracts this year, and also in providing payment for equipment purchased as the need for promptness is appreciated. It is expected that fair deliveries can be secured on most machines needed by the railroads, as the class of tools varies widely from that needed in most war industries. The navy department will buy a large number of tools soon.

Inquiries for Cranes Strike Upward Trend

ALTHOUGH business of tremendous proportions is expected to set in shortly, trading in the eastern machine tool market during the past week has been confined chiefly to small, miscellaneous inquiry. This demand, however, due to increasing speed and additional equipment required in the operation of plants generally, has aggregated a good volume. The railroads continue to come into the market on a steadily increasing scale, picking up odd lots of tools here and there. The Delaware, Lackawanna & Western has covered recently on a number of tools in this way. The Pennsylvania Lines West and the New York, New Haven & Hartford also are now closing on equipment. The New York Central has started buying, although not as yet on a large scale. The Chicago, Burlington & Quincy has virtually covered on its recent list and the Erie railroad has closed on most of its present requirements.

The announcement that the Bethlehem Shipbuilding Corp. will erect two large yards, one in the east and the other along the Pacific coast, has been the outstanding development in the shipbuilding industry during the past week. The exact locations of these plants has not as yet been stated. Inquiries already have been put out for 225 to 250 cranes by the Bethlehem corporation. Considerable interest also is being manifested in reports that a $1,000,000 shipyard will be erected on property at Greenpoint, L. I., which has just been transferred to the Greenpoint Improvement Co. The Federal Shipbuilding Co., 54 Dey street, New York, has just added 20 acres more to its holdings in Newark meadows, N. J., for further plant expansion. Among shipbuilding companies to close on machinery equipment during the past few days are the Foundation Co., the Carolina Shipbuilding Co., both of New York City, and the New York Shipbuilding Co., Camden, N. J. The Standard Oil Co. of New York has closed on a considerable amount of equipment for the tank shop at its new plant in Providence, R. I.

The Butterworth-Judson Co., New York, will build a $7,000,000 picric acid plant at Brunswick, Ga., for the government, the contract having been just completed. The Bay Ridge Dock Co. will erect a large repair shop at its yard in Brooklyn. The Lake Torpedo Co. will be in the market shortly for equipment for its new machine shop addition at Bridgeport, Conn. Work will be started soon on a $500,000 addition to the plant of the Gillette Safety Razor Co., in South Boston. Bids are being received on a large extension by the Northway Motor Corp., Natick, Mass.

Crane Market Shows Activity

The crane market is the most active in months. The largest inquiry out is that of the Bethlehem Shipbuilding Corp., calling for 150 to 200 overhead cranes of various capacities, and 40 locomotive cranes, of which 30 are to be of 15 tons capacity each and 10 of 20 tons capacity. The New York Shipbuilding Co., Camden, N. J., has issued a new inquiry for 20 electric cranes. Specifications call for gantry and standard overhead cranes ranging from 10 to 50 tons. Another large inquiry, that of the government calling for eight 10-ton, 50-foot span; seven 10-ton, 70-foot; two 20-ton, 50 foot, and one 50-ton, 50-foot traveler. These cranes will be for distribution among interior plants. The Phelps-Dodge Corp., 99 John street, New York City, is inquiring for seven electric cranes, including three of 20 tons, two of 2 tons, one of 5 tons and one of 60 tons capacity. The



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Say you saw it in THE IRON TRADE REVIEW.

Crucible Steel Co. is in the market for a 5-ton bucket crane for its plant at Harrison, N. J. The Pennsylvania railroad is inquiring for a 3-ton bucket crane. The New Britain Machine Co., New Britain, Conn., has dropped its inquiry for a 10-ton crane, but remains in the market for a 5-ton crane. The William Cramp & Sons Ship & Engine Building Co., reported in last week's issue as having placed four cranes, has awarded this business to the Champion Engineering Co., Kenton, O. These cranes are to be of 15 tons capacity, 112-foot span. The Merchant Shipbuilding Co., Bristol, Pa., has also placed four cranes with the Champion company. Specifications call for three gantry cranes of 10 tons capacity and one gantry of 15 tons capacity, all with 85-foot span.

Grenades Cause Brisk Chicago Market

ACTIVITY continues in the machine tool market in Chicago, with business coming in small inquiries from miscellaneous sources. The inquiry for large lots, while not entirely absent, is much less than was the case earlier in the year. Some dealers find that April set a new record for the total business booked, and May promises at least to equal that month. Railroads which have been inquiring for tools have covered for as much as they intend to buy at present and they are not now in the market. Contracts for the manufacture of gray iron hand grenades are being placed and considerable inquiry for miscellaneous light tools is resulting. It is reported contracts for 100,000,000 hand grenades out of a total of 250,000,000 are about to be placed by the government. The International Harvester Co. has bought 40 lathes and 15 two-spindle drill presses, as well as some general machine shop equipment. Another interest which will undertake the manufacture of grenades has bought 38 lathes and a number of drill presses. It is expected that once manufacture is successfully under way the government will double its contracts and necessitate considerable more equipment. Advances are being made regularly and 10 per cent is the usual amount by which prices are increased. Some dealers find it increasingly difficult to get tools and attribute this to the fact that builders are not able to obtain their material as readily as formerly, as well as the fact that distribution of tools is under closer control by the government than formerly and much machinery is commandeered and sent where it appears to be of more immediate importance. The Bunting Boiler Co., Chicago, will build a boiler shop. The Riverside Iron Works, Chicago, will build a foundry. The Evansville Tool Co. will build a power house at Maryland, Ind. The De Pere Mfg. Co., De Pere, Wis., will build additions to its main shop and blacksmith department. The Universal Machinery Co., Milwaukee, will build a machine shop group.

Steady Business Holds in Cleveland District

WITH a few exceptions, buying in the Cleveland district continues to be featured by single tool and small lot contracts. The New York Central has issued a list of between 30 and 40 machines for their shops at Collinwood, O., Gibson, Kankakee and Englewood, Ill. The tools required cover milling machines, grinders, boring mills, lathes and shapers. It is understood that the list at present in the market is to be followed by another and larger number of requirements within a few weeks. The Grant Motor Car Co., Cleveland, which has been making equipment for the ordnance department in connection with an established automobile plant has purchased over $135,000 worth of shell-making machinery to handle a large shell contract. Part of the equipment goes to their plant at Findlay, O. The automobile plants in Detroit furnish a steady source of business in that locality. Dealers receive inquiries daily from these companies, and frequently plant representatives from Detroit are sent out to pick up desired equipment. Motors, some classes of drilling machines and lathes, and cutting-off machines have advanced about 10 per cent, while on some classes of equipment an even greater increase is announced. The Dann Products Co., Cleveland, is inquiring for a screw-slotting machine. The Tractor Parts Co., Cleveland, has been organized by J. O. Eaton, of the Torbenson Axle Co., and will build a plant in the near future. The Maxwell Motor Car Co., Detroit, is inquiring for heavy-duty drilling machines and a slab miller. The National Lamp Works, Cleveland, has issued a list which includes the following tools: One 10-foot vertical boring mill or a 6-foot vertical boring mill which can be extended; two No. 4 horizontal milling machines; two No. 2 Becker vertical milling machines; two No. 5 vertical milling machines; one 2¾-inch spindle Lucas horizontal boring mill; one 40-inch by 18-foot lathe; and one No. 8 Warner & Swasey turret screw machine.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

MILFORD, N. H.—The Milford Mfg. Co. will build a new weave shed, 50 x 130 feet, 3-story, of brick construction. Enlargement of the engine room also is planned.

SOMERSWORTH, N. H.—The Great Falls Woolen Co. will build a 4-story and basement, 100 x 76-foot, storehouse.

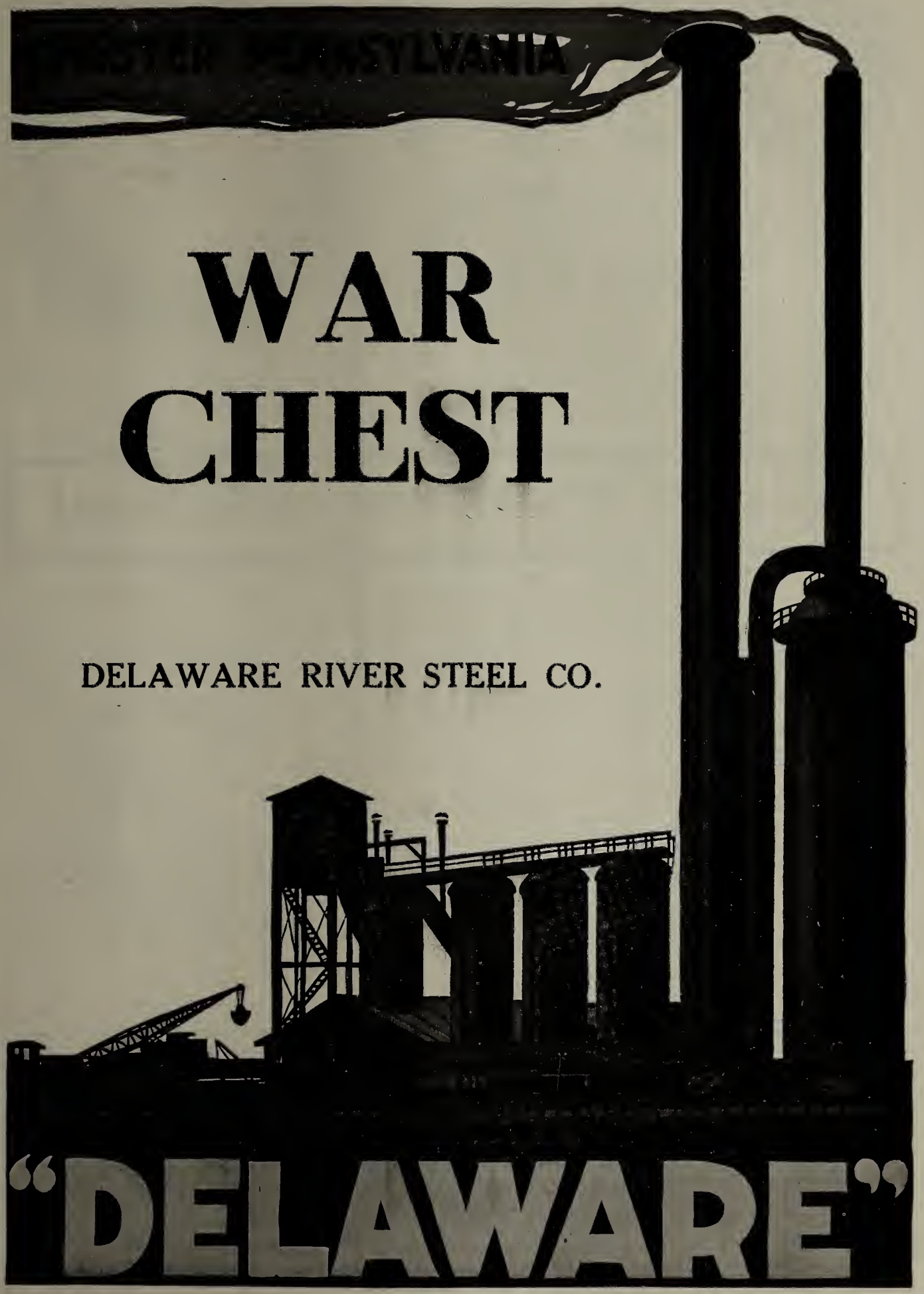
BILLERICA, MASS.—The Boston & Maine railroad is to lease its shops to the General Electric Co. and will make additions to its repair shop and roundhouse in Concord, N. H.

BOSTON.—Plans have been completed for a brick, stone and terra cotta, fireproof, 5-story and basement, 160 x 209-foot immigration station to cost $250,000 for the government on Marginal street, East Boston, Mass.

CAMBRIDGE, MASS.—The American Rubber Co. is having a factory building erected on Potter street, which will be 105 x 47 feet, of brick, steel and glass, and cost $24,000. The Cambridge Rubber Co. is constructing a 2-story brick building for factory purposes at 748 Main street to cost $10,000.

LAWRENCE, MASS.—The United States Worsted Co. is to erect a steel boiler house to cost $25,000.

MALDEN, MASS.—The Converse Rubber Co. will build a brick and concrete, 2-story


WAR
CHEST
DELAWARE RIVER STEEL CO.
"DELAWARE"

addition to its plant at 379 Pearl street, Edgeworth.

METHUEN, MASS. — The Arcadia Mills has started the foundation to a 3-story oil storage building, 19 x 40 feet, to cost $20,000. An additional story is to be added to one of the company's buildings, 50 x 300 feet, to cost $20,000.

PITTSFIELD, MASS.—J. McArthur Vance is receiving bids on a 4-story, 20 x 104-foot warehouse addition for W. G. Norton.

THORNDIKE, MASS. — The Thorndik Co. will build a reinforced concrete, steel and brick, mill construction, 4-story, 132 x 325-foot weave shed, to cost $350,000, and a 5-story, 75 x 195-foot storehouse to cost $150,000. C. W. Praray, New Bedford, Mass., is architect.

PAWTUCKET, R. I.—D. Goff & Sons have let the contract for a brick, steel and reinforced concrete, fireproof, 3-story, 350 x 120-foot building on Main, River and Elm streets, to be used as a weave shed, storage and garage.

PEACEDALE, R. I.—The Rocky Brook Mills Co., recently incorporated with $250,000 capital by South Kingston, R. I., men, has let the contract for a mill construction, 1-story, 46 x 116-foot weave shed; 1-story, 52 x 46-foot picker house; 1-story, 45 x 60-foot dyehouse; 1-story, 30 x 51-foot boiler house, and for remodeling the present 3-story, 42 x 112-foot mill.

WOONSOCKET, R. I.—Arthur L. Garland will build a 2-story, 70 x 125-foot warehouse. C. M. Godfrey is the architect.

WOONSOCKET, R. I.—The Glenark Worsted Co. will build a 1-story, 58 x 196-foot addition to its 2-story mill.

BRIDGEPORT, CONN.—Harvey Hubbell, Inc., will build a brick and steel, 1-story building on Railroad avenue.

BRIDGEPORT, CONN.—The American Can Co. will build a brick, 1-story addition to its plant on Holister avenue.

BRISTOL, CONN.—Plans are being made for a brick, mill construction, 1-story, 32 x 45-foot and two 4-story, 35 x 60-foot and 45 x 120-foot factory buildings for the Dunbar Bros. Co.

DANIELSON, CONN.—The Goodyear Cotton Mills, [illegible] brick power house to cost $150,000, which will be equipped with steam turbine engines.

DANIELSON, CONN.—The Goodyear Cotton Mills, Inc., will build a brick power house, equipped with steam turbine engines, to cost approximately $150,000.

HARTFORD, CONN.—The Allied Tobacco Co., recently incorporated for $500,000, will build a brick, 1-story, 100 x 200-foot warehouse, to cost $40,000, and a boiler house with a 50-foot stack on Windsor street.

HARTFORD, CONN.—The Jewell Belting Co. has sold its property and acquired a new factory site near Charter Oak Park where a new plant will be built.

KILLINGLY, CONN. — The Assawaga Woolen Co. is planning to build a brick addition to its plant, 94 x 194-feet, 1-story.

NEW BRITAIN, CONN.—Plans have been completed for the construction of a brick and steel, 100 x 340-foot building for the New Britain Machine Co. F. G. Platt is president of the company.

STAMFORD, CONN.—Bauer Bros. have started work on two factory buildings, one two stories, 60 x 80 feet, and the other three stories, 30 x 100 feet.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—Alterations costing $20,000 will be made to the plant of the Decorative Metals Co., 196 Degraw street. The H. D. Best Co., 52 Vanderbilt street, New York, is in charge.

BROOKLYN.—A $200,000 warehouse will be erected by the League Storage Warehouse Co., Inc. Cantor & Dorffan, 373 Fulton street, New York, are architects in charge.

BROOKLYN, N. Y.—The Long Island Railroad Co. will build a $15,000 repair shop, one story, 38 x 102 feet.

BUFFALO.—An electric power plant will be constructed by the Buffalo Cereal Co. in connection with its new elevator, to be erected here at a cost of $300,000.

BUFFALO.—The Acme Steel & Malleable Co., 120 Chandler street, contemplates erecting a 1-story steel and brick foundry to cost $25,000.

BUFFALO.—The Bossard Co., Utica, N. Y., will build a 2-story factory, 63 x 116 feet, costing $30,000.

BUFFALO.—The Spencer Lens Co., this city, will build a 2-story addition 60 x 150 feet.

BUFFALO.—The Kurtzman Plane Co., 526 Niagara street, will build a 3-story addition to its plant.

BUFFALO.—Plans are being prepared for a foundry to be built by the Demarest Heating Corp.

BUFFALO.—The Buffalo Wash Tread Co. has bought a site on Tonawanda street for a plant.

ELMIRA, N. Y.—Bids are being taken for the erection of an addition to the plant of the LaFrance Motor Truck Co.

FREEPORT, L. I., N. Y.—The Testile Piston Ring Co., Inc., is drawing plans for a $14,000 factory building. E. C. Kern is architect.

FULTON, N. Y.—The Fulton Steel Corp. has had plans prepared for the erection of an addition.

LOCKPORT, N. Y.—Architects Lewis & Mill, Buffalo, are taking bids on a 1-story factory building, to be erected in this city.

NEW YORK.—The Standard Shipbuilding Co. is contemplating erection of a 1-story boiler shop, 60 x 400 feet.

NEW YORK.—The Clark Electric & Mfg. Co. is planning the erection of a 1-story addition 35 x 45 feet.

ROCHESTER, N. Y.—The Cochran-Bly Co. is contemplating the erection of a 1-story addition to its plant, 48 x 70 feet.

SCHENECTADY, N. Y. — The General Electric Co. has awarded the general contract for an addition to its drop forge plant to the Austin Co., Cleveland.

SCHENECTADY, N. Y.—Plans are being made for the erection of a 1-story addition to the boiler shop of the American Locomotive Co.

TARRYTOWN, N. Y.—The Chevrolet Motor Co. will erect a 3-story, 60 x 150-foot plant addition.

UTICA, N. Y.—Plans have been completed for a 2-story, 111 x 130-foot storehouse for the Augusta Knitting Co.

UTICA, N. Y.—Plans are being drawn for a 3-story, 70 x 300-foot addition to the Globe Woolen Mills.

AMBRIDGE, PA. — The Parker Woolen Mills, Second National Bank building, let a contract to Kemens and Eirkheart, Eleventh and Melrose streets, for a $250,000 addition to its plant.

ASHMORE, PA.—The Lehigh Valley railroad is arranging to build shops and a round house to cost $1,200,000. G. T. Hand, 143 Liverty street, New York, is engineer.

CARNEGIE, PA.—The McClintic-Marshall Construction Co., Oliver building, Pittsburgh, has a contract for a $250,000 storage house here for Hughes-Foulkrod Co., Commonwealth building, Philadelphia.

CHESTER, PA.—John A. Worrell, 905 West Eighth street, has arranged to build a 1-story foundry at Eighth and Springwell streets.

EASTON, PA.—The Pennsylvania Utilities Co. is constructing a turbine plant here.

ERIE, PA.—The Burke Electric Co., this city, has leased 10 acres and will build additions to its plant.

ERIE, PA.—The Bay State Iron Works, this city, proposes to build a $20,000 plant near here soon.

HANOVER, PA. — The Hanover Wire

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts:

Forty-one engine lathes, 4451½, June 14, Washington.

Eleven milling machines, 6 turret lathes, 18 screw machines, 6 grinding machines, 2 engine lathes, 4 drilling machines, and 4 chucking machines, 4454½, June 11, Washington.

Twenty-five engine lathes, 4469½, June 14, Washington.

Sand blast equipment, 4470½, June 11, Norfolk.

Boring and slotting machines, planers, etc., 4477½, June 14, Washington.

Shapers, screw and milling machines, and lathes, 4478½, June 14, Washington.

One lathe, 4556½, June 3, Washington.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

OHIO STEEL CASTINGS

Quality PLUS Service

The whirring of the airplane—the roaring of the fast express—the thundering chug of the rapidly approaching motor truck, all *proclaim the victory of Ohio Steel Castings over "Power"* by proving the ability of these castings to withstand the terrific, racking, straining shocks of the mightiest engines constructed by man.

If you are in need of Tractor, Motor Truck, Automobile or other small castings—castings of a quality and strength fit for the most strenuous service specify *Ohio Steel Castings.*

Let us figure on your requirements.

The Ohio Steel Foundry Co.

Plants

Springfield, Ohio Lima, Ohio Bucyrus, Ohio



Cloth Co. is having plans prepared for a 1-story addition, 100 x 150 feet.

HYDE, PA.—The Nickel Alloys Co., this city, will build a 1-story addition, 140 x 240 feet.

MANHEIM, PA.—The Dun Foundry & Machine Co. will build a 2-story pattern shop, 25 x 150 feet, to cost $10,000.

MANHEIM, PA.—The Hershey Foundry & Machine Co. will build a 2-story foundry and pattern shop, 110 x 200 feet.

PERKASIE, PA.—The Perkasie Forge & Machine Co. will rebuild its plant here at once.

PHILADELPHIA.—Beatty & Bros., general contractors, are soon to start work on a $30,000 factory building, one story, 63 x 200 feet. Name of the owner is withheld.

PHILADELPHIA. — A $25,000 factory building will be erected by the Wiaco Screw & Machine Works. The Barclay White Co. has been awarded the general contract.

PHILADELPHIA.—A 72 x 100-foot foundry addition for the Aetna Foundry will be erected by A. Raymond Raff, general contractor.

PHILADELPHIA. — The Cresson Morris Co. has awarded the general contract for a $35,000 foundry to the Raith Construction Co.

PITTSBURGH. — The Pittsburgh Truck Wheel Corp., capitalized at $4,000,000, has been organized by A. L. Schulz, and Robert W. Barbour, chamber of commerce, Pittsburgh, and others, and proposes to build a plant here to manufacture steel truck wheels.

PITTSBURGH.—W. E. Moore & Co., Union Bank building, have plans for a plant, 60 x 200 and 40 x 120 feet, for the Gas Tank Recharging Co., Keokuk, Iowa, and have let the contract to the Worden-Allen Co., Chicago.

PITTSBURGH. — The South Pittsburgh Water Co., 238 Brownsville road, let a contract to Walker & Curley Co., East End Savings & Trust building, for a 1-story addition 48 x 118 feet to its power plant.

PITTSBURGH.—E. R. Crawford, president of the McKeesport Tin Plate Co., has announced that plans are complete for the erection of a new steam power plant, which is to be built at a cost of $1,200,000.

PITTSBURGH.—The Atlantic Refining Co., chamber of commerce building, has arranged to build a $50,000 plant at Fifty-seventh and Tulip streets.

PITTSBURGH.—The Heppenstal Forge & Knife Co. has arranged to build a $25,000 plant on Forty-sixth street.

PITTSTON, PA.—The Vulcan Iron Works, Wilkes-Barre, Pa., has let the contract for a 1-story machine shop, 75 x 200 feet, at West Pittston, to cost $500,000.

POTTSVILLE, PA. — The Atlas Powder Co., this place, will build an ammunition plant at Tamaqua, Pa.

READING, PA.—Daniel H. Hunter has received the general contract for erecting a $20,000 foundry, one story, 138 x 147 feet, for the Carpenter Steel Co. Muhlenberg Bros., architects, have drawn the plans.

WILLIAMSPORT, PA.—The Edison Electric Co., this city, will build a $75,000 addition to its plant.

WRIGHTSVILLE, PA.—The Pennsylvania Power Co. proposes to build a dam and another power plant at Turkey Hill, Pa.

YORK, PA.—The Brooks Machine Co., this city, has purchased a site at Broad and Philadelphia streets, and will erect a 1-story brick structure.

BAYONNE, N. J.—The Bergon Point Iron Works has had plans prepared for the erection of a 1-story addition to its plant. A new crane runway will be constructed. Improvements will cost about $8000.

BAYONNE, N. J.—The Standard Oil Co. of New Jersey, 26 Broadway, New York, will build a metal storage building at its plant in this city. Plans call for a structure one story, 80 x 140 feet.

HOBOKEN, N. J.—The Remington Arms & Ammunition Co. has awarded to the Austin Co., Cleveland, the general contract for erecting a $30,000 factory building here. The proposed structure will be one story, 82 x 108 feet.

JERSEY CITY, N. J.—The Federal Shipbuilding Co. recently purchased 21 acres on the west bank of the Hackensack river, and plans to erect additional buildings to its plant on it.

JERSEY CITY, N. J.—The Moran Iron Works has bought additional property adjoining its plant and contemplates an addition.

NEW BRUNSWICK, N. J.—Johnson & Johnson will build a $10,000 storage building.

NEWARK, N. J.—Maas & Waldstein will erect two factory buildings, one story, 55 x 25 feet and 55 x 128 feet, to cost $65,000. Henry M. Doremus & Co. have the contract.

NEWARK, N. J.—The general contract for an $18,000 foundry has been awarded by C. A. Goldschmidt to Joseph Christenson, Orange, New Jersey.

NEWARK, N. J.—The Central Stamping Co. will erect a 1-story, brick, enameling building, 140 x 250 feet, to cost $50,000.

NEWARK, N. J.—The Orance Mfg. Co. will build an addition and erect a garage, to cost $10,500.

NEWARK, N. J.—Bids soon will be received by the Sanders Mfg. Co. on a $12,000 plant addition.

NEWARK, N. J. — The Gray Industrial Laboratory Co. will erect a 1-story, brick building to cost $12,236.

NEWARK, N. J.—Central Stamping, 605 Ferry street, will erect a factory to cost $50,000.

Business Changes

HARPER & SON, New York, manufacturers' representatives of iron and steel products have removed their offices to the 18th floor of the Barclay building, 299 Broadway.

The Inland Steel Castings Co., Terre Haute, Ind., has changed its name to the Inland Malleable Iron & Steel Co.

The Brown Instrument Co., Philadelphia, has opened an office at 2086 Railway Exchange building, St. Louis. Paul H. Berggreen is in charge.

Crocker Bros., manufacturers and merchants of pig iron, coke, etc., have removed their offices from 30 East Forty-second street to 21 East Fortieth street, New York.

John Parker, eastern representative for the Milwaukee Electric Crane & Mfg. Co., has moved his offices from the fifth to the eighteenth floor at 50 Church street, New York City.

The Paul Wenger Co., New York, dealer in copper, aluminum, tin, lead and other metals, has removed to larger quarters and now is located at 56 to 58 Liberty street and 35 Nassau street.

Activities in the Central States

EAU CLAIRE, WIS. — The foundry of the United States Switch Co. is being enlarged. Officers state a large warehouse will be erected soon. The company is seeking milling machines, turret lathes, a bolt cutter and some forging equipment. An electric furnace is to be installed. A drop forge plant also is planned. James W. Hubbard is president and general manager.

EXCELSIOR, WIS.—Richland county is planning the erection of a bridge to cost $45,000. M. W. Torkelson, Capitol building, Madison, is state bridge engineer.

GREEN BAY, WIS.—D. G. Meyer, South Adams street, will build a 2-story fireproof addition, 20 x 60 feet, to the rear of his garage to provide larger machine shop facilities.

HARTFORD, WIS.—The Kissel Motor Car Co. is building two additions, 40 x 100 feet, and 40 x 200 feet, costing $40,000.

LODI, WIS.—Isenberg Bros., Baraboo, Wis., have taken the contract for erecting a new high school costing $50,000, for Lodi, Columbia county.

MANITOWOC, WIS.—Bids will be taken shortly by Capt. Lewis N. Stoddard, lighthouse inspector, government building, Milwaukee, for construction of steel signal and light tower on the breakwater in Manitowoc harbor. The tower will have a steel frame, and be sheathed with steel plates. The work will cost about $20,000.

MENOMONEE, WIS.—The Ampco Rolling Mill Corp. will build a wire mill costing $40,000. American Industrial Engineering Co., 53 West Jackson boulevard, Chicago, is engineer.

MENOMONEE FALLS, WIS. — The Schumann Motor Co. is preparing to build a

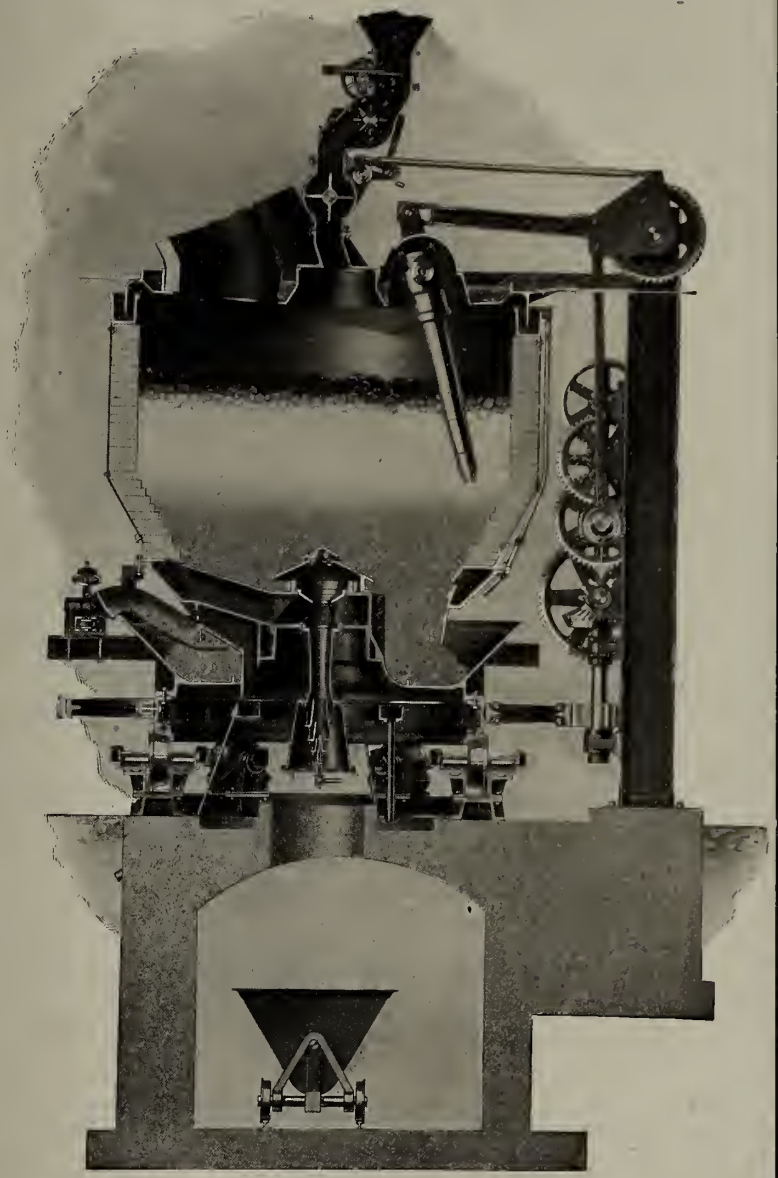
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REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron and Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

public garage and machine shop costing about $12,500.

MILWAUKEE. — The Wisconsin Motor Mfg. Co. is building a 2-story brick and concrete office, drafting room and laboratory addition costing $15,000. A. F. Milbrath is secretary and chief engineer.

MILWAUKEE.—The Wisconsin Shipbuilding & Navigation Co., care Paul E. Thomas, 831 M. & M. Bank building, is planning to build a shipbuilding plant on Kinnickinnic river costing $2,500,000.

MILWAUKEE. — The Lavinge Gear Co., care of H. A. Uihlein, Racine, Wis., is planning to build a plant costing $300,000. Kirshoff & Rose, Majestic building, Milwaukee, are architects.

MILWAUKEE. — The Allen-Bradley Co. will build a 2-story brick and steel shop addition, 50 x 90 feet. Architect A. C. Eschweiler will award contracts at once.

MILWAUKEE.—The Filer Stowell Co. will build a blacksmith shop costing $30,000. Martin Tullgren & Sons, First National Bank building, are architects.

MILWAUKEE. — The Allen Bradley Co., 485 Clinton street, will build a 2-story addition, 50 x 90 feet, at Clinton street and Greenfield avenue.

MILWAUKEE.—The E. & W. Mfg. Co. is enlarging its plant and installing considerable new machinery and equipment.

MILWAUKEE.—The Hercules Steel Castings Co. will build a 1-story foundry, 80 x 300 feet, to cost $100,000.

FOND DU LAC, WIS.—The Boggess Mfg. Co., Second and Macy streets, manufacturer of mop wringers and specialties, will install a galvanizing plant. J. J. Carberry is secretary.

RACINE, WIS.—A 1 and 2-story brick factory addition, 62 x 190 feet, will be erected by the Racine Auto Top Co., at a cost of $15,000, including equipment. Architects Chandler & Park, Racine, are awarding contracts.

RACINE, WIS.—J. I. Case Tractor Co. will build a 1-story machine shop, 144 x 213 feet, to cost $125,000.

STEVENS POINT, WIS. — The Jackson Milling Co., Grand Rapids, Wis., is planning to build a steel and concrete hydroelectric plant to cost $500,000. L. A. Geers, Grand Rapids, is engineers.
architect.

SUPERIOR. — The Enterprise Foundry Co. is contemplating remodeling a building here. An addition will also be built.

TWO RIVERS, WIS.—The Two Rivers Plating Works is building a 1-story steel addition, 60 x 75 feet, to cost $18,000.

WEST ALLIS, WIS.—The Rosenthal Corn Husker Co. is building a foundry and shop addition 30 x 100 feet to replace a recent fire loss.

DETROIT.—The Dodge Bros. Motor Car Co. has bought the plant of the Wilt Engineering Co., which it will dismantle to provide a site for an addition to its plant.

DETROIT.—The Packard Motor Car Co. will erect an 8-story truck and passenger service station in Chicago, at a cost of $800,000.

DETROIT.—The American Twist Drill Co., is equipping its plant for quantity production of forged twist drills.

DETROIT.—The Buhl Malleable Co. is making extensions to its foundry which will cost about $35,000.

DETROIT.—The National Twist Drill Co. plans the erection of a 4-story addition to its factory.

DETROIT.—The Detroit Heater Corp. contemplates erection of a 1-story factory building.

DETROIT.—The J. E. Bolles Iron & Wire Works plans an addition to its factory.

GRAND RAPIDS, MICH.—The Accounting Machine Co. has bought a site here and plans a factory. Contract for the building has been let to the Owen-Ames-Kimball Co. The building is to be 50 x 175 feet.

JACKSON, MICH. — The Walcott Lathe Co. will erect a large addition to its plant. Dean G. Kimball is vice president.

CHICAGO. — The Sanitary District, of Chicago, care John McGillen, 900 South Michigan avenue, will receive bids until June 6 on the Calumet sewage pumping station, 1-story, 80 x 185 feet to cost $400,000, including building, pumping machinery and electrical equipment.

CHICAGO. — The Independent Button & Mfg. Co., 3940 Ravenswood avenue, will build a 3-story factory. A. L. Moon, 1819 Irving Park boulevard, is president.

CHICAGO.—The Riverside Iron Works is contemplating erection of a 1-story foundry, 60 x 75 feet, to cost $20,000. Plans have been completed.

HAMMOND, IND.—The Standard Steel Car Co. has taken out a permit to erect a new shop at a cost of $100,000.

INDIANAPOLIS. — An addition to the plant of the Nordyke & Marmon Co. will be 1-story, 120 x 176 feet, and cost $42,000. The Austin Co., Cleveland, has the contract.

AKRON, O.—The Wellman-Seaver-Morgan Co., Cleveland, has awarded the George A. Fuller Co., Cleveland, the contract for the construction of its $30,000 power house here. The building will be 1-story, 46 x 97 feet.

AKRON, O.—The T. E. McShaffery Co. has been awarded the contract for the storage building to be erected at a cost of $40,000 for the Akron Scrap Iron Co.

CINCINNATI.—Plans for the construction of several additions and improvements are being drawn for the Peerless Foundry Co. by F. D. Chase, 122 South Michigan street, Chicago. The improvements include the construction of a new foundry.

CINCINNATI.—The John B. Morris Foundry Co. has applied for permits to construct two additions to the foundry, at a cost of $6600.

CLEVELAND.—Plans have been completed for the construction of an addition to the plant of the Cleveland Pneumatic Tool Co., to be erected at a cost of $35,000. The addition will be a 1-story basement, 182 x 52 feet, and will be used for a machine shop.

HAMILTON, O.—Plans have been completed for the erection of an office and factory building for the Niles Tool Works. The cost will be about $15,000.

MANSFIELD, O.—Plans are now being drawn for a building for the Hartman & Spreny Co. It will be 3-stories, 20 x 50 feet.

TOLEDO, O.—Bids are to be opened about May 31, for the construction of a municipal powerhouse at Minster, O., at a cost of $50,000. Vance I. Gray, 518 Nashby building, is engineer.

CLARKSBURG, W. VA.—Swift & Co., Chicago, will build a cold storage plant here, to cost $35,000.

FAIRMONT, W. VA.—The Midwest Box Co., this city, let a contract to D. Eshleman & Son, Anderson, Ind., for a box factory, 66 x 409 feet, to cost $25,000.

FAIRMONT, W. VA.—The Fairmont By-Products Corp. proposes to build a plant here in the near future to include 110 by-product coke ovens and cost $5,500,000.

LOGAN, W. VA.—The Guyan Machine Shops will purchase considerable new equipment at once.

PARKERSBURG, W. VA.—The Parkersburg Iron & Steel Co. has arranged to build an addition, 30 x 25 feet, to its power plant, to cost $12,000.

SUTTON, W. VA.—The Sutton Chemical Co. plans the erection of another factory.

Western and Intermountain Territory

BURLINGTON, IOWA. — The Murray Iron Works, C. H. Schroeder, secretary, will build a 3-story addition, 32 x 40 feet, to cost $5000.

ST. JOSEPH, MO.—The Berry Iron & Steel Co. will proceed at once to rebuild its plant, recently burned, and will erect five buildings in place of the two foundries. The main foundry is 50 x 260 feet, with two cranes.

FORT SMITH, ARK. — The Creekmore Motor Co. is contemplating erection of a machine shop and repair plant. It recently added $40,000 to its capitalization.

LITTLE ROCK, ARK. — The Arkansas Battery Co. is contemplating equipping a plant with more than $10,000 worth of machinery. W. P. Galloway is president.

GEARY, OKLA.—The city of Geary plans new waterworks pumping machinery equipment, of 800,000 gallons daily capacity. L. E. Troxel is mayor.

McALESTER, OKLA.—Burns & McDonnell, engineers, Kansas City, Mo., are preparing plans for a waterworks system and sewage treating plant to cost $500,000 to $600,000.

OKLAHOMA CITY, OKLA. — The Federal Steam Specialties Co. has been organized by W. E. Price and F. X. Loeffler and will equip a plant with about $25,000 worth of machinery.

OMAHA, NEBR. — The Omaha Crockery Co. soon will begin the construction of a 5-story addition to its present building. The addition will cost about $75,000.

CLAYTON, N. MEX.—Bonds for $75,000 will be sold shortly to provide funds for building a waterworks system. A. J. Mahon is city clerk.

100

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5 in Canada	1 in France
5 in England	1 in Belgium
4 in Germany	1 in Austria
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New Trade Publications

PENDANT SWITCHES.—A small colored envelope folder, illustrating and describing both single and 2-circuit brass shell and porcelain pendant switches, is being circulated by the Cutler-Hammer Mfg. Co., Milwaukee.

GENERATORS.—Alternating current generators and direct current lighting and power generators, manufactured by the Crocker-Wheeler Co., Ampere, N. J., are described and illustrated in two bulletins just issued. Construction, material and cost of maintenance are fully discussed.

CIRCUIT BREAKERS.—An 8-page booklet on these devices is being circulated by the Roller-Smith Co., New York. The booklet explains the use of the circuit breaker as a protection for an ordinary motor, in the event of overloading. The breaker, the booklet points out, tends to trip instantaneously when the load for which it is adjusted, is applied.

POWER HAMMERS.—The United Hammer Co., Boston, is circulating a bulletin recently printed, containing several illustrations of its types of power hammers. The pamphlet also describes hammers adapted for the manufacture of edge tools, spindles, files, shovels, plows, agricultural implements and other thin work where dies are brought close together.

STOKER.—The Laclede-Christy Clay Products Co., St. Louis, is distributing a 12-page booklet describing a chain grate stoker for high volatile coals, which it manufactures. The booklet thoroughly describes the stoker, telling of its construction, etc. The pamphlet is well illustrated and contains several diagrams showing actual installations of the stoker.

TRUCKS. — Methods of handling factory trucking are described in a catalog on automatic lift trucks issued by the Stuebing Truck Co., Cincinnati. The truck is designed for service in handling loads which have been placed on raised platforms, thus economizing loading and unloading time. The truck is made of steel and is equipped with roller bearings, making it possible for heavy loads to be moved by one man.

INDUSTRIAL HAULAGE. — The Lakewood Engineering Co., Cleveland, has just published a bulletin containing information regarding its equipment for use in handling freight at warehouses and docks, moving machinery about in machine shops and for other haulage purposes in factories. A number of factory electric trucks and tractors, as well as hand trucks are described and illustrated in the booklet.

FIRE BRICK CEMENT.—A circular was recently issued by the Quigley Furnace Specialties Co., New York, containing information on fire brick cement which it manufactures. This is a refractory plastic material and, the circular claims, will retain its strength up to a heat of 3100 degrees Fahr. It is especially designed for use in laying fire brick and tile, for furnace repair work, and other mill and foundry work.

CONVEYOR.—John F. Godfrey, Elkhart, Ind., recently published a circular illustrating and describing a coal conveyor. The conveyor, which is small, can be operated by one man, and is designed to load auto trucks and wagons quickly, as well as to unload cars and stock coal in a short time. The circular contains a number of illustrations, including several diagrams, showing how the conveyor works.

OXYGEN AND HYDROGEN GENERATOR.—The Levin oxygen and hydrogen generator is illustrated and described in a circular recently issued by Electrolabs, 15 William street, New York. This generator is of the unit type and consists of three parts. The oxygen is generated in the two outer and the hydrogen in the center compartment. One of these generators will produce 38.4 cubic feet of oxygen and 76.8 cubic feet of hydrogen in 24 hours.

TOOLS.—A quick reference catalog recently was issued by the Ready Tool Co., Bridgeport, Conn., illustrating and describing tools manufactured by this company. Chrome nickel lathe tools; shaper and planer tools; tool holder for bench and watch lathes; boring tool holders; boring bars and internal threading tools; cutting off tools; side tools; shaper or milling machine vise hold-downs; belt sticks; high speed steel cutters and many other tools are all fully described.

COLD SAWS.—A bulletin has been recently issued by the Earle Gear & Machine Co., Philadelphia, describing and illustrating the use of its cold cutting-off saws. A brief summary of the points of design and operation of the cold saw is given in the forepart of the booklet. The company's cold saws are manufactured in four sizes, a description and illustration of each being given. Several illustrations show the saws in actual service on a wide variety of work.

ADVERTISING. — After three years of preparation, "Advertising", bound in limp leather, by E. H. Kastor of H. W. Kastor & Sons, has just been published by the La Salle Extension university, Chicago. Ideas gained in 20 years experience in the advertising business are set forth in this volume's pages to make it a practical and comprehensive work. Effective copy is effectively handled and illustrations of successful advertisements with explanations as to what makes them successful are given.

HYDRAULIC VALVES AND FITTINGS. —A 60-page booklet containing illustrations and descriptions of hydraulic valves and fittings is being circulated by the Hydrauiic Press Mfg. Co., Mt. Gilead, O. Each device is illustrated and briefly described. All standard types of hydraulic fittings are listed as well as accumulator controls, pressure gages, hydraulic pipes, etc. The four general classes of hydraulic valves, operating, check, knockout and safety, are also illustrated and described at length.

TOOL STEEL.—The manufacture and use of tool steel is fully described in a booklet recently published by the Ludlum Steel Co., Watervliet, N. Y. The booklet is original in that the metallurgy of steel is treated in simple language, all technical terms having been eliminated as far as possible. A complete chapter is devoted to nickel, chromium, manganese and tungsten respectively. The effect of heat on alloys of these metals is described. The catalog contains 156 pages and the information given on the manufacture of tool steel is of interest and value.

CHAIN DRIVE.—The Link-Belt Co., Chicago, recently published a catalog on chain drives for machine tools. The chain consists of a series of leaves or plates, the joints of which consist of case-hardened liners or bushings and case-hardened steel pins. The catalog, which is elaborate, contains a number of illustrations showing the chain used in driving a number of different types of machine tools, including gear hobbers, pipe threaders, lathes, automatic machines, gear cutters, roll lathes, grinders, and various other types.

ELEVATORS.—A leaflet has just been issued by the Warner Elevator Mfg. Co., Cincinnati, describing and illustrating the company's line of elevators. The motor used in these elevators has a heavy driving sheave with four grooves for lifting cables. The motor is so designed that it can be changed at any time from alternating to direct current. The elevator is equipped with an electric brake, which is applied by means of a spring. The elevators are designed for freight service and have a capacity of from 2500 to 6000 pounds and a speed of 50 feet per minute.

ELEVATING TRUCKS. — An attractive catalog is being circulated by the Lewis-Shepard Co., Boston, illustrating and describing its trucks for use in industrial plants. The catalog contains many illustrations showing the various uses to which the trucks can be put, and thoroughly describes each type. The trucks range in size from 17 to 27 inches in width. Their maximum capacities range from 2500 pounds with a lift of 2½ inches to 8000 pounds with a lift of 3 inches and one of 3000 pounds capacity with a lift of 6 inches.

FOUNDRY CONSTRUCTION. — A treatise on the construction and the working system of the modern foundry is being circulated by Frank D. Chase, Inc., industrial engineers, Chicago. The treatise is from a paper read by Mr. Chase recently before the Philadelphia Foundrymen's association. Plant location, site railroad facilities, labor, power facilities, plant construction, the laying out of the different parts of the plant and other important points of modern foundry construction and operation are thoroughly discussed. The treatise is well illustrated.

INVOLUTE GEARS.—A booklet containing a concise treatise on the application of the involute curve to gearing, is being distributed by the Fellows Gear Shaper Co., Springfield, Vt. The subject is discussed in as simple language as possible, making the action of involute gearing plain without the use of higher mathematics.

The booklet points out that with involute gear teeth, the center distance of the gears can be varied without affecting the theoretical tooth action of the gears in mesh. This booklet is in its third edition and has been fully revised.

HAND MAGNET.—A circular is being distributed by the Cutler-Hammer Mfg. Co., Milwaukee, describing a hand magnet, for use in machine shops, foundries, and numerous departments of manufacturing plants. The magnet is made for operation on 110 or 220-volt direct-current circuits. The circuit to the magnetic coils is opened and closed by means of a trigger under the handle. The magnet can be used for clearing chips and borings out of machinery. It can be used to separate brass chips from iron. In foundries the magnet is handy in picking up warm and awkwardly shaped castings. The magnet complete weighs but 8 pounds.

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Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports
Old range Bessemer, 55 iron..... $5.95
Mesabi Bessemer, 55 iron..... 5.70
Old range non-Bess., 51½ iron..... 5.20
Mesabi non-Bess., 51½ iron..... 5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	27.50 to 28.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melt'g steel, Birming.	22.50 to 24.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. quar. & east. Pa.	36.50
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.50 to 21.00
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	22.50 to 23.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.50 to 30.50
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Bushcling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	28.75 to 29.25
Busheling, No. 2, Chgo.	19.00 to 20.00
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cleveland	18.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	17.50 to 18.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	36.00 to 36.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	18.00 to 18.25
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 17.50
Machine turnings, Chicago	17.50 to 18.00
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wrgt., No. 2, Chgo.	30.50 to 31.00
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	31.25 to 31.75
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	36.50 to 37.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 27.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.50
Cast, No. 1, Cincinnati	31.50 to 32.00
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	26.50 to 29.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	33.00
Maleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.00 to 31.50
Malleable railroad, St. Louis	28.50 to 29.00
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	36.00 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	40.00 to 41.00
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, June 6, 1918 *No. 23*

Nonwar Demands Remain in Doubt

Molding of Plan to License Iron and Steel Distribution to Commercial Demands Indicates Belief Surplus Will Be Available in Time—May Production Establishes High Records—Manganese Ore Prices Fixed

HOW consumption of iron and steel not related to direct and indirect war requirements is to fare with regard to supplies still is an unsettled problem. The latest development along this line to come out of Washington is the understanding that a licensing system modeled after the English plan and covering business not concerned with war has been agreed upon by the joint committee of iron and steel producers and of representatives of the war industries board. This proposal soon will come before the war industries board for adoption. Consideration given to such a plan suggests that the belief is entertained there will be eventually some steel over and above essential needs. The quoted statement this week attributed to a prominent member of the war industries board that 20 per cent of capacity will be left for nonwar demands accents the fact that such a view is entertained in authoritative circles. This estimate would mean probably 7,000,000 tons of finished product annually. This statement grew out of the announcement of the steel director at New York last week that the present orders for the government and allies now on hand total 16,800,000 tons.

Survey Will Be Helpful

It now generally is admitted that the survey of demands undertaken by the joint committee representing the industry and the war industries board will fall short of its objects because of its inability to develop definite information regarding the government's steel requirements. At the same time the information accumulated from the canvass will serve to draw a closer discrimination between essential and nonessential demands. Relief is expressed that the government this week has begun the belated allocation of the material for the 100,000 cars recently awarded. A total of 922,110 tons is being placed with the mills.

No more licenses are to be issued by the war trade board against the imports of 12,000 tons of English ferromanganese which it recently was decided to permit. Import licenses will be issued only when the imports of manganese ore fall below a certain point. The war industries board has issued a fixed schedule of manganese ore prices based upon the recent market.

May Breaks All Records

Production statistics continue highly encouraging in view of the tremendous demands for iron and steel. May established many new high records. In pig iron the output of 3,448,207 tons was the largest of any May ever known and the second largest month in history, being exceeded only by October, 1916, with 3,508,180 tons. The gain over April was 174,852 tons. The number of active furnaces increased from 351 to 361. The lake ore movement of the past month also was the red letter period for any May. The movement of 8,792,231 tons was 2,508,619 tons greater than May, 1917. The season's movement to date is 2,532,957 tons ahead of last year. May plate output by the Carnegie Steel Co. set a new high record with 126,264 tons.

Speeding Up Iron Data

The tardiness of many pig iron consumers in making returns to the questionnaires which are to fix their status as producers of essentials has caused speeding up methods to be adopted. The furnaces have been formally advised by the pig iron committee that all users of iron, not reporting by June 6, will be considered in the nonessential class and their supplies will be regulated accordingly. Returns from consumers so far received show that a considerable amount of iron has been shipped and is obligated to go into nonessential channels. This condition makes it probable that a considerable tonnage of iron may be shifted into war consumption. Statistics on hand in the Pittsburgh district bring forth an estimate of 85 per cent of steelmaking iron and 65 per cent of foundry iron is being used for essential purposes.

JUNE 6, 1918

THE IRON TRADE REVIEW

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Where the Responsibility Rests

BRIGADIER GENERAL C. C. WILLIAMS, acting chief of ordnance, in addressing a recent meeting of ordnance officers at Washington, stated that production is now the most important factor in the departments share of winning the war. Matters of engineering design have been established, administration and control are in full swing, and the success of the ordnance program rests on the ability of the manufacturers to insure a steady flow of supplies to the camps and to the front.

These statements are no doubt true in some measure, but is the entire burden upon the manufacturer? Has the machinery of the ordnance department been so adjusted that there will be no hitch, nor wasteful friction at the many points of contact with the manufacturers? Consider the inspection division.

Expanded suddenly to many times in its original size, it is obvious that there was not time for minute examination of the personnel of the inspection division. The greater number of executive heads are men of wide industrial and engineering experience, and their work has been a credit to the department. However, the bullet-proof character of the inspector's job, and the fact that many were called for and many chosen, left the door open for some incompetents. W. H. Morgan, of the Morgan Engineering Co., Alliance, O., recently testified before the senate committee on military affairs. The fact that this manufacturer has filled a $15,000,000 contract for heavy ordnance ahead of the time limit specified, and at a saving to the government of over $800,000 on an improved wheel for gun carriages alone, removes any insinuation that a complaint is prompted by selfish considerations. Mr. Morgan complained that the inspectors employed by the department lacked technical training to make them competent. Foundries producing castings for ordnance work have had a similar experience. Through ignorance of modern methods, much time and material has been lost through the rejection of castings which could have been made satisfactory by the use of welding processes.

Another case of the hypercritical frame of mind, which sometimes marks incompetence and in other instances arises from hampered authority due to red tape, is given by a middle western firm. This manufacturer was constructing railway carriages for heavy ordnance. The drawings supplied were based on the French system, with all dimensions in metric measure. As no deviation was tolerated, a complete revision of production equipment was necessary.

The entire responsibility of ordnance production is by no means on the manufacturer. The structure of the department itself needs strengthening, as it is the steel framework upon which the production is built up. To continue this comparison, a revision of design is necessary in tension members, which constitute the inspection division. In some cases these members are obviously under weight and should be replaced by heavier shapes. In others the factor of safety allowed is entirely too great and a redesign is necessary. In any event the inspection division should be able to carry its full share of the burden.

Meeting the Call of War

A TRUE manifestation of the grim spirit of war that has gripped the important business interests of the country, was displayed at the annual general meeting of the American Iron and Steel institute at New York the past week. War and the things that count for victory occupied the thoughts and discussions of the meeting and crowded the private conversations. Consideration of ordinary business and matters of personal advantage were relegated to the level of secondary importance. The strong and virile patriotism of Mr. Schwab and the measured and far-sighted wisdom of Judge Gary together formed a background against which individual views were projected and joined in a swell of set and militant determination to carry the great cause through to a successful conclusion, no matter what the cost.

Judge Gary fitly summarized the present status of the iron and steel industry from a broad viewpoint of the future. He pointed out how war has changed the tendency toward criticism at Washington to a

desire for earnest co-operation with business. And business is meeting the new and friendly spirit with its best. Then he said: "We are being better prepared for the future and the iron and steel business will be on a better basis and a better footing than ever before; well prepared to succeed in the contest and the competition for international trade. If we win the war that will be worth something to us, if we do not have much in cash. If we lose the war, then it is not so important whether we have anything or not."

The sober tone of the meeting displayed no evidence of a light-hearted attitude toward the great burden and task that lies ahead. Rather it was the appraisal of a big job by business minds, neither too optimistic or unduly pessimistic but full of faith and Americanism.

The New York meeting showed clearly and why the iron and steel industry is giving the government 100 per cent co-operation as so generously acknowledged by Steel Director Replogle. The spirit of the meeting was the spirit of the industry. It reflected the present-day consecration of the effort of every manufacturer and the capacity of every plant to the higher cause of national necessity. It indicated that along with the country at large, the iron and steel industry gradually has grasped what the war means and will require and has settled down to meet every demand that may be made upon it.

Second Labor Problem of Industry

WHEN employes have enlisted or have been called into training by the operations of the draft, it has been the usual and proper thing for employers to extend their best wishes and the promise of their old jobs back again when they return from the war. If that has not been possible, they have been given to understand that places would be made for them in their old organizations. Their going presented one problem. Since such large numbers of industrial workers have been called to the colors, labor shortages have existed. In a way this problem has been met by enrolling of public service reserves, a proper allocation of workmen and the employment of women. Further drains upon the man power of the nation, however, will increase that problem and cause the adoption of other expediences to meet fresh labor shortages.

A greater problem perhaps will confront industry when these soldiers return. The problem of reclaiming them for and replacing them in industry will be particularly difficult, since large numbers of them will return, as they have to Canada, maimed, wounded, gassed and shell-shocked. No two will have precisely the same injury.

Several weeks ago, a transport docked at an Atlantic port and 50 American soldiers saw their homeland after more or less lengthy absences. During those absences they had fought the enemy and that fighting had left them in a more or less battered condition. During a recent week 148 sick and wounded soldiers of the American expeditionary force arrived at ports in this country. These variable demonstrations of war's ravages have served perhaps even more than reading the casualty lists in the newspapers to make America realize what war with Germany means. It did more than has anything else to remove the look of smug complacency from the faces of the stay-at-homes. Chief in importances, however, has been the result that industry has awakened to the realization that preparation must be made to receive such wounded and maimed soldiers. Consideration must be given to the restoration of their missing members, their shattered nervous systems, the use of paralyzed or semiparalyzed muscles.

While for a long time in the Creusot works of the Schneider brothers in France, such reconstruction work has been in operation and the equipment of that department of its welfare work is most complete, the eyes of industry have turned to a nation nearer home. Canada, from whom has gone forth approximately 500,000 volunteer soldiers, is already receiving droves of them back as casualties, and is leading the world in reclamation work. Committees of business men from the United States recently have visited Toronto which is the center of such work and have given intensive study to this problem. This means that tentative plans will soon be laid in this country, particularly by the iron and steel industry, to inaugurate as a part of its welfare work, some such reconstruction, reclamation and re-education methods as are followed and have proved so successful in the neighboring nation.

Already, much good work is being done by the Red Cross Institute for Crippled and Disabled Men in New York city. A letter it sent out recently reads in part as follows:

With thoughtful placement effort, many men can be employed on the basis of past experience. With disabled soldiers who have profited by training, the task should be even easier. The patriotic duty of employers is to study the jobs to determine what ones might be satisfactorily held by cripples; to give the cripples preference for these jobs; to consider thoughtfully the applications of disabled men for employment, bearing in mind the importance of utilizing labor which would otherwise be unproductive; to do the returned soldier the honor of offering him real employment, rather than proffering him the ignominy of a charity job.

If the employer will do this, it will be a great factor in making the complete elimination of the dependent cripple a real and inspiring possibility.

Returning soldiers must not be made to feel that they are subjects of charity, but in them must be inspired the feeling as it has been in Canada, that since they have done so much for the country, the country is back of them and is doing and will do all it can for them to help them find their useful place.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1464

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.30
Basic, Pittsburgh	33.10
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.60
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	34.10
No. 2 foundry, Cleveland	34.10
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	45.50
Silveries, 8 per cent, Chicago	48.50
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon, furnace	50.00 to 52.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	37.50
Charcoal, southern to 2 per cent silicon	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$290.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot.	75.00 to 77.00
Spiegel, contracts, furnace.	75.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	150.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00 to 155.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh.	3.95
Polished staples, Pittsburgh.	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base, Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	63.35
Six-inch and over, Chicago	60.35
Four-inch, New York	64.35
Six-inch and over, N. Y.	61.35
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Hot rolled strip steel, Pitts.	3.50c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets ⅞ in. & small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation, on leading products June 5, average for May, 1918, average for March, 1918, and average for June, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices June 5, 1918	Average prices May, 1918	March, 1918	June, 1917
Bessemer pig iron, Pittsburgh..	$36.30	$36.15	$37.25	$55.20
Basic pig iron, Pittsburgh.....	33.10	32.95	33.95	50.20
*No. 2 Foundry pig iron, Pitts.	34.10	33.95	33.95	51.02
*No. 2, Foundry pig iron, Chi.	33.00	32.00	33.00	51.00
Lake Superior charcoal, Chicago	37.50	37.50	37.50	51.80
Malleable, valley	33.50	33.50	33.50	50.07
Malleable, Chicago	33.50	33.50	33.50	50.50
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	32.00	33.00	46.37
**No. 2X Virginia, furnace....	33.50	33.50	33.50	46.50
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	47.50
Ferromanganese, 70%, delivered	250.00	250.00	250.00	431.25
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	93.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	101.25
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	101.25
Open-hearth billets, Pitts.....	47.50	47.50	47.50	93.75
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.62
Steel bars, Chicago.....	2.90	2.90	2.90	4.50
Iron bars, Philadelphia.....	3.50	3.50	3.50	4.26

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices June 5, 1918	Average prices May, 1918	March, 1918	June, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.50
Iron bars, Chicago mill.....	3.50	3.50	3.50	4.00
Beams, Chicago	3.00	3.00	3.00	4.63
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.18	3.18	4.66
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	7.92
Tank plates, Philadelphia.....	3.435	3.43	3.43	9.66
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	8.13
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	7.57
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	9.95
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.62
Connellsville furnace coke.....	6.00	6.00	6.00	11.12
Connellsville foundry coke.....	7.00	7.00	7.00	11.18
Heavy melting steel, Pitts.....	29.00	29.00	30.00	40.00
Heavy melting steel, eastern Pa.	28.50	28.50	29.50	36.62
Heavy melting steel, Chicago..	29.00	28.90	30.00	37.00
No. 1 wrought, eastern Pa....	34.00	34.00	35.00	47.87
No. 1 wrought, Chicago.....	33.50	33.50	35.00	46.75
Rerolling rails, Chicago.....	34.00	34.00	35.00	46.00

(For Additional Prices See Page 1464)

Insist Users Make Quick Returns

Pig Iron Committee Advises Furnaces to Consider Consumers Not Reporting by June 6 in Nonessential Class—Reports Show Much Iron Going Into Non-war Work—Government Favors Covered Consumers

Cleveland, June 4.—More vigorous methods to get in the returns from consumers of pig iron to the questionnaire showing the extent to which they are occupied by essential work have been adopted by the committee on pig iron, iron ore and lake transportation. In a new letter by Chairman H. G. Dalton to the furnaces, it is declared that consumers who have not made a return by June 6, will be considered the nonessential class and will be entitled to receive pig iron only in accordance with that class until they establish their status otherwise. The letter to the furnaces dated May 28 follows:

Gentlemen:—

While we appreciate in asking that the blanks sent you requesting certain data in regard to pig iron matters entails considerable work and will take some time to complete, still we are hopeful that we might get the reports in within two weeks. This time has elapsed and very few of the reports have been received so far.

I write to urge you to give special attention to sending them in with as little further delay as is possible. It is very important to the department of steel supply that we furnish this information to them at the earliest date we can. I have no doubt that you are being delayed in your reports awaiting the figures you have requested from your customers; possibly they do not appreciate the importance of prompt reply.

Might I ask if you would again communicate with such of your customers, who have not yet made their reports to you, requesting prompt compliance and I should think you might suggest in the letter that not hearing from them by a certain date, say June 6th, you will consider that they are on nongovernmental work and that you will make your report to the government and this committee on such basis.

I believe if there is further delay in hearing from them that the department of steel supply will support us in our contention that their work must be nonessential; otherwise they would be more interested in making their reports promptly.

Trusting that you will realize the importance of hurrying these reports along and, therefore, will give it your first attention, I remain,

Sincerely yours,
Chairman, Pig Iron, Iron Ore and Lake Transportation Committee.

Allocation requests to the committee continue to increase. The largest of the week calls for 17,500 tons of basic and 8400 tons of bessemer for June-December delivery to the Crucible Steel Co. for general steel requirements. Other ordnance requirements include 1500 tons of June-August bessemer for a Braddock, Pa., user; 2400 tons of June-December foundry for one Wilmington, Del., consumer, and 1860 tons of foundry for the same delivery to another Wilmington interest; and 500 tons of prompt foundry for a Pittsburgh plant. For the Fleet corporation 2500 tons of foundry for June-November will go to a Plattsburg, N. Y., consumer and 500 tons of early No. 2 to a Baltimore shop. The railroads now are considered a government department for the allocation of material and the American Railway association will distribute such supplies. A lot of 900 tons of bessemer was allocated to the association this week.

Unfilled Demands Accumulate

Boston, June 3.—There is still a large demand for pig iron that cannot be satisfied. In all local offices there

is a big accumulation of orders that are to be filled when and if the iron becomes available. Inquiries for lots of from 100 to 1000 tons are frequent and some for large amounts, but no matter how large or small the inquiry, it finds no response on the part of the furnaces and merely takes its place in the files. Meanwhile, the delivery of iron on old contracts leaves little to be desired. Alabama furnaces, thanks to the free deliveries during the past few weeks, are practically all caught up with their arrearages and while it may not be the general condition among Buffalo furnaces, there is at least one big merchant furnace in that region that is now right up with its orders. Virginia furnaces continue far behind, but transportation conditions have improved in that section and there is a better movement than a fortnight ago.

Stocks Better Than Expected

New York, June 3.—The pig iron questionnaires which have been filled in and returned by the consumers, show the latter to be much better provided with iron than was thought. They show that many consumers who in recent months have urgently been requesting deliveries, have large stocks on hand. This favorable showing is due in part to the fact that many consumers, although using iron on a hand to mouth basis, have maintained stocks of varying size to fall back upon in case of emergency. About 75 per cent of the consumers in this district have returned their questionnaires. Several tonnages of foundry iron have been shipped by eastern furnaces to consumers in this district recently, as a result of requests by the government. These ported involve small spot lots of high manganese, gray forge and off-foundry iron. A canvass of the trade shows that of all eastern blast furnaces, only two, which have a comparatively small production of foundry, have not yet sold their second half output. One of these furnaces, however, has made reservations for its regular customers, and will book formal orders as soon as the price has been established July 1. Most makers still have large tonnages to deliver on contracts at $40 and higher. Many makers have not yet completed deliveries on second half of 1917 contracts. Some makers have just begun to make deliveries at the $33 price.

Covered Consumers Favored

Philadelphia, June 4.—Government contracts for castings hereafter will be awarded as far as possible to foundries which have covered their pig iron requirements. This position has been taken by the pig iron division of the war industries board. Several eastern foundries have been rebuked for taking government casting contracts without being covered on iron. One melter took a contract and then notified the government he had not covered, expecting the latter to furnish the metal. The pig iron division, as a result, requisitioned for this contract, all the stock of iron which the consumer had on hand and will supply additional tonnage to finish the contract. This procedure has deprived the consumer of any iron for commercial work. Eastern furnaces which have not sold their output for the second half have been assured they will not be called upon to furnish more than their pro rata share for government work. Thus they will have an opportunity equal to that of other furnaces to care for their regular customers. Considerable basic and foundry iron has been allocated the past week to eastern consumers. Leonard Peckitt, president of the Empire Steel & Iron Co., eastern member of the subcommittee on pig iron, has been given charge of the low phosphorus iron situation. The Midvale Steel & Ordnance Co. blew in this week its Coatesville furnace to make about 12,500 tons of standard low phosphorus from Cuban ore. The Eastern Steel Co., Pottstown, Pa., expects to resume on this grade later with Spanish ore provided the government arranges for the latter.

Survey About Completed

Pittsburgh, June 4.—Survey of the pig iron situation, which is nearing completion, discloses the fact that there will be large tonnages of both steelmaking and foundry iron now being used in the manufacture of so-called less essentials diverted to the production of military necessities. The survey has required a great amount of work on the part of consumers in filling out questionnaires and for this reason has progressed more slowly than had been expected. The committee on pig iron, iron ore and lake transportation, is dealing with a total of 20,000 tons represented by requisitions of the war industries board, but is deferring action till the survey is more nearly completed. These requisitions involve 7000 tons of basic and 13,000 to 14,000 tons of bessemer. Reports received prove to be extremely illuminating to furnace interests. The latter have discovered in numerous instances that a sizable amount of iron which they have been shipping and for which they have committed themselves, is for the production of material not related to war work. One producing interest has found that approximately 2000 tons of steelmaking iron, can be shifted each month to the manufacture of war requirements. It is roughly estimated that 85 per cent of steelmaking iron and 65 per cent of foundry iron is being used for war work. Some blast furnace operators now are of the opinion that government demands can be met and still leave a fair tonnage of iron, especially foundry grades, for commercial users. This view, however, is not shared by all producers. Demand for all grades of iron continues, but is less insistent because consumers appreciate no tonnage is available except occasional off lots. Some consumers have asked furnaces to supply them with any off grade tonnage that may be produced at any time. One furnace interest has promised to supply 1000 tons of foundry iron high in sulphur whenever such tonnage is made.

The war industries board is watching closely to see that production of neither pig iron nor steel is cut down where, in its estimation, this is not necessary. Several operators who were preparing to blow out for relining were asked by the board not to do so. As a result, these furnaces are being kept going and will be until it is imperative that they be blown out. Averages of W. P. Snyder & Co. for May showed that selling prices of basic and bessemer iron were at the fixed levels.

Scarcity Still Grows

Buffalo, June 4.—The scarcity of iron grows with the further mobilization of the nation's steelmaking program and producers are beginning to believe that these conditions will prevail for the duration of the war. No iron can be bought except on government's priority orders and then only in an urgent case, so long as the government's scheme to systematize is pending. Producers are awaiting with no little interest the report of the war industries board, as to whether there will be any iron tonnage of consequence available for the nonwar industries. Little, if any, surplus is looked for in basic and low phosphorus iron as there is a real shortage of these grades now.

No Market in Chicago

Chicago, June 4.—Except that melters are ready to take up any iron offered them no market for pig iron exists in Chicago. Makers are producing all they can drain from blast furnaces and are seeking to distribute it most equitably for the best interest of all. They are not selling because they have none to sell for

delivery this side of 1919. Melters are not inquiring for iron because they have canvassed the market and found it bare. There is demand, but it is quiescent, ready to take anything offered, but not asserting itself. Much attention is being given to the questionnaire of the American Iron and Steel institute. Returns from western foundries are coming in well and give much information. Southern makers are not yet offering anything except off iron, usually low silicon and high sulphur, though some lots carry good silicon content with the high sulphur. This is being absorbed readily.

Consider Freight Changes

Cincinnati, June 3.—The proposed change in pig iron freight classifications has not yet been fully digested by many sellers and producers. It is thought that the recommendations of the Central Freight association to abolish the commodity rate and use only a class rate will in the long run be a good thing for the furnaces, and it will undoubtedly lighten the load of their traffic departments. The advance of 25 per cent that is scheduled to take place June 25 has brought out an insistent call for shipments on contracts. The car supply in the south is easing up and the movement of iron from the Birmingham district is very heavy. Inquiries have lately been receiving only perfunctory notice because the furnaces have no iron to offer.

Rushing Shipments Through

St. Louis, June 1.—Strenuous efforts have been made by southern manufacturers of pig iron to rush tonnages through to this district and other Middle Western points before the new increased railroad rates take effect. The result has been a notable increase in receipts during the past two weeks. Embargoes against territory east of the Mississippi river have also served to stimulate the movement in this direction. Accordmates of the quantity of pig iron going into war work in this district is variously estimated from 60 to 75 per cent with one authority placing it as high as 80 per cent.

Shipments Are Improving

Birmingham, Ala., June 3.—Furnace company officials in the south are carefully watching production and delivery and leaving selling practically to its own accord. Despite the fact that there is some improvement in railroad car situation, delays in deliveries on old contracts still are to be heard. The production is improving steadily and stocks are going down.

Coke Supply Still Easier

Car Supply Now Adequate and Quality of Fuel Improves—Labor Lack Remains Factor—Production Favorable

Pittsburgh, June 4.—Supplies of coke constantly are becoming easier and all furnaces are reported to be in a comfortable position. The quality of the fuel still is below standard, due to irregular charging and drawing of ovens, a condition brought about by shortage and irregularity of placing cars which prevailed some time ago. In some instances, lack of labor also is a factor in this situation. The car supply now is adequate and placements are more regular so that there is a decided betterment in quality of fuel moving to furnaces. The improvement in this respect promises to continue in view of the fact that oven operators are enabled to produce on a more uniform schedule. The car supply on the Monongahela and Pennsylvania railroads in the Connellsville region during the past week averaged 100 and 98.7 per cent, respectively. For May the respective averages were 95 and 96 per cent, as compared with 63 and 78 per cent for April. Fuel is being diverted from idle to active stacks at the direction of the federal fuel administration. No offerings in the open market are being made as yet. Production during the week ended May 25 totaled 340,100 tons as compared with 343,270 tons for the preceding week, according to *The Connellsville Courier*.

Improvement Signs Are Near

St. Louis, June 1.—For the first time in several weeks the feeling in the coke situation locally and to the west and southwest shows slight signs of improving. During the past week fair tonnages have passed through this gateway on their way to hard pressed consumers in western states. The intensive efforts of federal and state administrations to relieve the stringency are beginning to bear fruit. There is still, however, an urgent and heavy demand for both furnace and foundry grades. Production by gas and by-product ovens shows a decided broadening tendency.

Government assistance has been tentatively promised established plants and several large enterprises in process of organization. These interests have been requested to outline definitely just what they can do in the matter of production, with estimates of time and cost of proposed enlargements. These negotiations have been confidential, and publicity at this time other than in general terms, is being avoided both by government agents and the companies involved.

Production is Increased

Cincinnati, June 3.—A late report from the Wise County field shows an increase in production of both furnace and foundry coke. But this increase is more marked in foundry coke and the report is borne out by foundry coke consumers here who obtain some fuel from that district. Shipments from the Connellsville field are improving, and according to statements made by different selling agencies the only trouble lies in an increase in production, which is somewhat curtailed by the scarcity of labor.

No Coke Being Offered

Birmingham, Ala., June 3.—Coal and coke production show slight improvement in Alabama but as far as can be learned no coke is being offered on the open market. Either the manufacturers have promised their coke ahead and are saying very little about it or contracts made some time ago are not expiring as soon as was expected.

Higher Prices

For Tin Concern the Mills—Production Practically Full

Pittsburgh, June 4.—The price of tin continues to increase and it is said that some makers of tin plate in the United States have had to pay as high as $1 a pound for this metal. The levels paid by consumers in this country are said to exceed by 15 to 20 cents a pound those paid by British users. These high costs are one factor which leads some makers of tin plate to feel that the government should grant an increase in price beginning July 1. Other makers apparently do not take this view but think that the price situation was covered sufficiently for the present when the committee on steel and steel products of the American Iron and Steel institute announced advances in the prices of charcoal and terne. The industry is producing at the rate of about 95 per cent of capacity, representing approximately 800,000 base boxes a week.

Fear Yard Scrap Shortage

Authorities Take Measures to Anticipate Lack of Supplies—Unfavorably Located Buyers Permitted to Pay Higher Prices

FOR COMPLETE SCRAP PRICES SEE PAGE 1464

Philadelphia, June 4.—An ominous scrap shortage next fall and winter is foreseen in the present scarcity of yard scrap. Instead of bulging with scrap as usual at this time of the year, the yards are not receiving enough scrap to keep busy. Anticipating future conditions, the subcommittee on scrap is working out a plan to bring to the market scrap from old plants, mines, construction jobs, etc. Large quantities of such scrap, it is believed, can be located and moved with the government's assistance. Much scrap of this character is located in the south. It is contemplated if necessary to withhold material from all consumers who do not need it for essential purposes. In the meantime, wrought scrap is very scarce. The American Board of Scrap Dealers has been asked to locate 10,000 tons of pipe of a new specification for one consumer. Many scrap dealers are asking advice on how to charge freight advances. The authorities say there is no room for question. Since maximum prices are on a delivered basis, the entire freight comes out of the shipper. The scrap rate from New England to eastern Pennsylvania was advanced 38 cents to $2.80, May 25. This rate now is in line with the present rates from New England and New-York to Pittsburgh and from New-York to eastern Pennsylvania, which were advanced several months ago. The general 25 per cent increase will apply on this as well as all other rates. Due to increasing requests from the Pacific coast for information, the subcommittee has decided to appoint a member there who will act same as Chairman Phillips does in the east and middle west. The scrap committee is allowing applications where justified, from unfavorably-located consumers for the privilege to pay higher than maximum prices to equalize freight disparity. This disparity ranges from several cents to $2 and $3 per ton. The report that lower scrap prices can be expected July 1, is declared to be without foundation by the institute authorities.

Shortage Appears Probable

Boston, June 3.—There continues to be an excellent demand for scrap in the local market, with the turnover restricted only by the scantiness of supplies. It would be some exaggeration to say that a shortage exists now, but there is no surplus supply and the indications are in the direction of a marked scarcity later on. Any recent accumulations have been pretty well wiped out and fresh supplies are not becoming available in normal quantity. Prices are strong, with government maximums plus commissions being freely paid. The prices that dealers can charge being restricted, the price they can pay are likewise restricted; it is therefore, impossible to change local quotations.

Dealers Feel Rate Increase

Pittsburgh, June 4.—Dealers in iron and steel scrap will be affected greatly by the increase of 25 per cent in freight rates, effective June 25. Scrap prices are fixed f.o.b. consuming points and in consequence the burden of the rate increase will fall upon dealers. In addition to this many dealers have bought supplies which have not been shipped and in many cases the tonnages were bought f.o.b. shipping points, so that dealers will face the payment of rate increases on both incoming and outgoing material. Some railroads have not yet put into effect the recent general advance of 15 per cent in freight rates and these are expected to make an increase of 40 per cent at one time. One effect of the higher rates probably will be to further intensify shipments to nearest consuming points. There is a freer movement of all of the standard grades, the supplies of which are said to be insufficient to meet the demand. It is less difficult to move material because of the greater readiness with which railroads issue permits. The principal demand is for open-hearth scrap. A consumer in this district bought 1000 tons of heavy cast for open-hearth use at $29, delivered, plus commission.

Pittsburgh Absorbing Freight

Buffalo, June 4.—Inquiries are being received from the Pittsburgh district for certain grades of steel scrap urgently needed and inquiries state that purchasers are empowered to pay the difference in freight to nearest consuming point in addition to the government price. This has been possible hitherto by means of government permits but advantage has not been taken of it in such volume before. The Pittsburgh inquiries are not being well satisfied due to the fact that practically every ton of heavy melting steel or its equivalent is being required here. The largest production of scrap at present is shell steel turnings. The output is constantly increasing in volume. This scrap is being used by mills which have never used it before, though the point has not been reached where it is of any benefit to low phosohorus users. The demand is strong for every grade and the dealer can dispose of almost any tonnage he has on hand. Several large railroad lists will close this week. The Pennsylvania list will run 10,000 tons; the others are blank. A local consumer has been offered heavy steel shearings which were in reality first cut shell turnings and for which the heavy melting steel price was asked. This is in direct violation of government rulings and indicates that some dealers are selling this grade of scrap at a price higher than that of $24, delivered, fixed by the government.

Wait for New Prices

Cleveland, June 4.—Scrap iron and steel dealers here agree with producers and consumers of scrap that increased activity cannot be looked for until after prices for the third quarter are made known late this month. Meanwhile, only enough scrap to tide over immediate requirements seems to be changing hands. Heavy melting steel is most difficult to buy, and were no maximum price fixed, $29 would not command a ton. Both dealers and consumers are hit hard by the increased freight rates, but less adverse comment is heard than ordinarily could be expected. Six months ago the trade would have felt aroused.

Chicago Quiet and Firm

Chicago, June 4.—Although no marked change has taken place in the scrap market here, added firmness is noticeable and some quotations are slightly higher than has been the case recently. Heavier steel grades are in considerable demand, but bar iron rolling mills are not yet coming into the market. Continued scarcity is noticeable in rails, car wheels and some other grades. Railroad offerings are small, the Northwestern just closing a list of 5000 tons, which included 750 tons of steel rails, 500 tons of No. 1 wrought and 300 tons of iron angle bars.

Foundry Consumers Buy

Cincinnati, June 3.—Following a spirited buying movement on the part of foundry melters a lull is reported by nearly all dealers. Last week a number of contracts were con-

summated that covered quite a large tonnage of both No. 1 machine cast and No. 1 railroad wrought. Dealers report some activity in stove plate and they are also receiving calls for heavy melting scrap.

Freight Advance Confusing

New York, June 3.—While many brokers will be hard hit by the recently announced advance of 25 per cent in freight rates on June 25, the trade generally in this city is making every effort to adjust itself to the new ruling. All contracts now being entered into carry clauses dealing with this increase. The burden of this increase will eventually rest chiefly upon the dealers. At present there is some confusion in the trade as to the scope of the new ruling, as it is pointed out in some quarters that the increase of 15 per cent in freight rates late last fall affected only shipments to certain points. During the past week several of the mills in the Pittsburgh district have come into this market for steel scrap, offering to pay the freight differential between western and eastern Pennsylvania points, in addition to the government maximum and the 3½ per cent commission allowed to brokers.

Market Is Softer

St. Louis, June 1.—There is a softer tendency in the scrap market. The feature of the trade this week has been lively effort of dealers to sell their material, most of them believing it the best policy to unload before the new railroad rates take effect. The result has been quite heavy purchases of reserve stocks for shipment to other points, the spread in prices permitting of a fair margin of profit in these transactions. There exists an excellent local demand for iron rails, the price of which has advanced approximately $1. Otherwise, however, little interest has been displayed. Steel is more plentiful than heretofore, and consumers are evidently well supplied by contract, as their purchases have been unusually light, even for this season. No railroad offerings were before the market.

Market at Standstill

Birmingham, Ala., June 4.—Scrap iron and steel dealers in the Birmingham district continue to take a pessimistic view of the situation. In addition to asserting that the market is at a standstill they say that every indication points to a downward revision this month when the government fixes prices again. Railroad cars are plentiful and there is plenty of stock in sight.

Weather Adds to Shortage

Hot Period Cuts Down Output and Makes Semifinished Situation More Acute—Discards in Demand—Electric Steel Sold

Pittsburgh, June 4.—No relief is forthcoming from the scarcity of semifinished steel, and none is in sight. On the contrary, the hot weather is slowing up production somewhat, so that the situation is increasingly acute. The point has been reached where it is not possible to secure enough discard steel to meet demands, despite the large output of shell material. Sheet mills are especially short of bars and some tin plate mills also are in need of greater quantities, both of which are rolling freely from bessemer steel. Inquiries for slabs still come to makers and middlemen from plate producers, but the market in this district has been scoured in vain for additional tonnages. Wire rods are in strong demand, and except for small lots which are supplied occasionally to regular buyers no tonnages are to be found. Makers say that the price of $75, Pittsburgh, for soft rods, is not attractive and are using their steel to make other products required by the United States government or the allies. Inquiry for billets also is active but no offerings are being made except that infrequently small tonnages are found for consumers engaged in government work. One sale made during the past week by a middleman involved 1500 tons of 4 x 4 billets.

Discards Are Offered

Philadelphia, June 4.—Numerous small lots of semifinished steel are being offered in the eastern market. These largely are of discard and offheats steel. The only important sale involved 1500 tons of soft billets to an eastern consumer who is engaged in government work.

Sell Small Discard Billets

New York, June 3.—Numerous large sales of 4-inch and smaller billets rolled from shell steel discards have been made in this district during the past week, and the mills having capacity for rolling the smaller sized billets have taken so much business that they are practically out of the market for months ahead. In many cases, consumers who have been relying upon this steel, and fearing that the government shortly may specify its use for much essential work, have closed contracts for the remainder of the year. In many cases, consumers have been desirous of placing orders also for next year, but the mills have been unwilling to go so far ahead. One of the mills now refuses to book any more business excepting when the orders are accompanied by priority certificates. Demand for large shell discard billets, however, while improved, still has not caught up with the supply.

Electric Steel in Demand

Cleveland, June 4.—A new lot of 3500 tons of electric steel forging ingots and blooms has been placed by a consumer in this district with a large producer. This steel is to go into the building of 3 and 4-inch naval guns for which a new contract recently has been awarded to the buyer. An inquiry for 10,000 to 11,000 tons of electric steel blooms to be delivered 1500 tons monthly has been put out by a northern Ohio buyer. Some of the larger makers of electric steel have been unable to accept this business because of heavy demand for this material. Sheet and tin plate makers continue keenly to seek sheet bars of either standard or off-grade character but they are meeting with their usual experiences of refusal by the mills.

Strip Output is Cut

Pittsburgh, June 4.—Shortage of steel has curtailed the output of cold rolled strip steel and production is estimated at about 75 per cent of capacity. Direct and indirect business for the government represents a great bulk of the bookings made. Demand from private consumers is relatively light and in view of the reduced output of pleasure automobiles inquiry from this source involves small tonnages.

Shenango Elects Officers

After serving for some time as assistant to his father, William P. Snyder Jr., has been elected to succeed him in the presidency of the Shenango Furnace Co., Pittsburgh. W. P. Snyder, who has been head of the company since 1889, becomes chairman of the board. Other officers were elected at the same time as follows: Vice president, C. D. Dyer; vice president and general manager, George L. Collord; treasurer, Henry Irwin Jr., and secretary H. M. Wilson.

Discard Bar Demand Strong

Consumers Fearing Government May Preempt This Material Buy Vigorously—Implement Manufacturers Seek Fall Requirements

New York, June 3.—The buying movement in bars rolled from shell steel discards reached fairly large proportions during the past week. Numerous consumers, fearing that this class of steel shortly may be specified by the government as suitable for certain kinds of essential work, came into the market and called for large tonnages for future delivery. In many cases, consumers bought for delivery through the remainder of the year. Some of them desired to buy even further ahead, but the mills refused. One mill which has a large amount of shell discard bars on its books, has gone so far as to refuse all orders which are not accompanied by priority certificates.

Mills Heavily Booked

Pittsburgh, June 4. Iron and steel bar mills are heavily booked, present schedules calling for probably four months' production. They are taking business which is connected with war work. The 100,000 cars placed recently with builders by the railroad administration will call for large tonnages and these requirements will be given preferred positions on the books of makers. The implement trade also is being supplied with steel bars.

Seek Fall Requirements

Cleveland June 4. — Implement manufacturers in this district have inquired from the mills for authority to place specifications covering their fall requirements. These cases are receiving individual consideration and the tonnages which the producers will ship will be determined by the quantity previously delivered to the customer this year and by that which remains unshipped on old contracts. No new contracts are being made. A local tractor builder has placed an order for 2000 tons of bars and small shapes, covering his construction program for the next year. An inquiry of 1000 tons of soft steel hexagons for spark plugs is current.

Turn to Wrought Iron

Chicago, June 4.—Inability to place orders for soft steel bars except in cases where priorities are given for war purposes is causing many manufacturers to seek bar iron for use in place of steel. This substitution has been going on for some time but recently it has taken on new form and there are signs that it will increase rapidly from now on. Bar iron mills are not rushed and have comparatively small tonnage on their books, most of which will be delivered during the present month with only a small tonnage remaining over for third quarter. In spite of nearness of the middle of the year, practically nothing has been booked for last half delivery except a few small tonnages which will lap over. Demand for hard steel bars rerolled from rails continues strongly in excess of the ability of mills to furnish it. Scarcity of old rails prevents full production and most mills are operating single turn, although they could book sufficient business for full operation were raw material available.

Car Builders Benefitted

Pittsburgh, June 4.—Makers of nuts, bolts and rivets are receiving orders regularly, which are for the government, either directly or indirectly. While it is understood that some large requirements are about to be placed, in addition to those for cars, new business during the past week represented the usual sizes of lots that are being taken regularly. Car builders are to receive rivets from makers at the recently reduced price, amounting to $5 a ton. Makers of nuts, bolts and rivets are operating their plants at capacity.

Demand for Hoop Steel

Pittsburgh, June 4.—Demand is coming from makers of oil, rosin and turpentine barrels for hoop steel. The importance of supplying these users is great inasmuch as they are furnishing their products to the government and consequently mills are taking this business. Producers find it difficult to supply hoop steel to purely domestic consumers. The principal demand for bands comes from jobbers and manufacturing concerns.

Shafting Demand Good

Pittsburgh, June 4.—Demand for cold rolled shafting is active and comes from consumers engaged either directly or indirectly on government business. Large sizes are involved chiefly. Deliveries are being made in 60 to 90 days. Inquiry from commercial consumers is light.

Heavy Bolt Demand

Chicago, June 4.—General demand for bolts and nuts continues strong in all lines and manufacturers are placing orders which are filling mill books rapidly. Nothing has been done recently on the government's heavy inquiry and this matter appears to be held up indefinitely, although quick delivery was asked when the inquiry was put out. Car builders have made reservations for bolts in some cases, but have not been able to file their definite specifications until further information is available.

Cancel Orders

For Wire Nails and Replace Them Abroad—Steel Shortage Felt

Pittsburgh, June 4.—Heavy demand is being made by domestic users for wire and nails. Mills are declining all new business of this character, but are supplying comparatively small lots on specifications. Orders from the United States government and the allies are large and take up all available capacity. Output is considerably restricted owing to the shortage of steel. Some producers are using all the discards they can obtain to make wire and large nails. Because of the annealing process necessary to reduce this steel to the proper state of softness, this kind of production is unusually expensive. Overhead costs also are high and some mills complain that they are unable to make profits at prevailing prices. The quartermaster's depot of the war department has canceled an order it placed recently with a local mill for 12,500 kegs of nails for shipment during the latter part of June and early in July. It is understood that this action was taken because arrangements have been made to get the nails abroad, in order to conserve ship space. A Pittsburgh mill has taken 3000 tons of a large lot of uncoated barbed wire for the British government.

No More Ferro

Likely to Come from England—Regulated by Ore Imports

New York, June 3.—It is unlikely that any more English ferromanganese will be brought to this country due to the long ocean haul involved, according to a statement by a member of the ferroalloys division of the war industries board. There is no objection to selling English ferromanganese, provided English export and American import licenses may be obtained, according to this statement. American import licenses, however, will be issued only when imports of manganese ore into this country fall

below 35,000 tons per month, which tonnage now may be brought in in steamships by consent of the United States shipping board. The arrangement which was made about two weeks ago by the war trade board, permitting the importation of 12,000 tons of English ferromanganese, resulted from the fact that the ore program had fallen behind.

Spiegeleisen has continued to strengthen and now is held at $75, furnace, for 16 per cent for all deliv-tries.

The Midvale Steel & Ordnance Co. has close to 1500 tons of bessemer ferrosilicon.

Market is Quiet

Pittsburgh, June 4.—The market for ferroalloys is quiet. A consumer south of the Ohio river has taken 500 tons of 70 per cent ferromanganese for the last half at $250, delivered. A consumer in Cleveland has closed for 500 tons of 16 per cent spiegeleisen for last half shipment. The price paid is said to have been between $70 and $75, furnace. A nearby consumer has put out an inquiry for 1000 tons of 16 per cent spiegeleisen. Small lots of this grade for prompt shipments are being sold at $71, furnace. Demand for 50 per cent ferrosilicon is light.

Essential Orders

Filled By Warehouses—Business Is Rejected

Cleveland, June 4.—Local warehouses now uniformly are limiting the acceptance of orders to construction work in connection with war orders or to government manufacturing necessities. Some business not of this kind has been rejected. Stocks are greatly depleted, some leading warehouses now carrying only about one-fifth of normal while more than half the usual sizes are missing. Large rounds and squares especially are scarce.

Shipments Exceed Receipts

Boston, June 3.—Local jobbers in steel and iron products report a much larger outward than inward movement and express the fear that the supply situation is going to be worse before it is better, for the reason that production usually declines in July and August. Those lines that plants working on government contracts require continue to monopolize the business, with structural lines in steadily diminishing request.

Plate Records Are Broken

Carnegie Steel Co. Produces 126,264 Tons in May—Allocating 922,110 Tons For Government Cars—Ship Steel Leads

Pittsburgh, June 4.—Producing 126,264 tons of plates in May, the Carnegie Steel Co. broke all previous records. The 110-inch Liberty mill at the Homestead works turned out 20,973 tons during that month just passed, as compared with its previous highest tonnage of 18,025, rolled in April. This new mill, which began operations early in October, 1917, has consistently shown an increase each month since it was started. Like other plate mills, it is engaged in turning out government work. Plate mills are operating at the greatest capacity possible, but some of them have been unable to reach the maximum on account of a shortage of slabs. All of the output is for the government and no offerings of any kind, so far as can be learned, are available for purely domestic consumption. Car builders are waiting for the railroad administration to allocate tonnages among mills.

Allocating Car Tonnage

Philadelphia, June 4.—Allocation of the rolled steel required for the 100,000 government cars recently awarded now is being made. The tonnage under distribution totals 922,110 tons, the main portion of which is plates with a considerable tonnage of structural shapes and bars included. Bessemer steel is being taken wherever possible. The government car business has been the principal development of the week in the plate market. Some further fair tonnages of plates for government purposes have been placed with eastern mills and large Emergency Fleet and other tonnages are in sight.

Ship Tonnage Leads

Chicago, June 4.—Mills continue to give their heaviest efforts toward the production of ship plates and the larger proportion of new tonnage allocated by the government consists of material of this sort. Tonnage of plates is accumulating on mill books faster than the product can be turned out and in many cases builders are in need of material which cannot be furnished promptly. Since the placing of the heavy tonnage mentioned last week for the construction of 50 ships on the Pacific coast, orders have been for small tonnages, running up to 2500 tons each, but the aggregate has been heavy. Steelmakers are much interested in the distribution of material for railroad cars which has been awaited for several weeks, but which seems no nearer. Just how this tonnage can be produced without reducing the quantity of plates for ships is one of the present puzzles. Some car builders have already filed specifications for material, but these have been returned by mills and will not be entertained until the allocation has been made through the usual channels.

Considerable Pipe

Required for Government Car Orders—Foundries Still Seek Recognition

Pittsburgh, June 4.—Approximately 6000 tons of 1½-inch butt weld pipe will be required for the 100,000 cars recently distributed to builders by the railroad administration. Tonnages of pipe will be taken direct from mills by builders and this class of business will be given a good rating of priority. Development of oil fields for the government is calling for large tonnages of iron and steel pipe, 4 to 8 inches in diameter, and makers are booking this business freely. Active demand also is being made for 4-inch lap weld iron and steel pipe. Better inquiry is out for butt weld sizes, and producers have become rather heavily committed on this grade and some of them have taken lap weld business which insures capacity production for more than one year.

Government Action Withheld

New York, June 3.—Inquiry from the government for miscellaneous tonnages still comprises the bulk of current demand in the eastern cast iron pipe market. Municipal work continues at a virtual standstill and inquiry from private consumers is light. While manufacturers still are endeavoring to obtain a preferred classification for cast iron pipe, no move in this direction has yet been taken by the government.

Demand at Minimum

Chicago, June 4.—With the government frowning on expenditures for purposes not absolutely essential and the recent advance in the price of cast iron pipe, cities are retrenching more and more in this respect. The only tonnage in the west recently under consideration is 260 tons, on which bids were taken May 29 at Hammond, Ind., but no award has yet been made.

Classify Users of Sheets

Official Survey of Industry to be Made to Determine Rank of Priority of Various War Demands—Production at 85 Per Cent

Pittsburgh, June 4.—For the purpose of learning the relative importance of each of the numerous sources of consumption, it is understood that complete official classification of the sheet industry will be made. While virtually all of the output of sheets is entering into the manufacture of war essentials, there is not an entirely clear understanding as to the rank of priority that should be given to users. In order to clear up the situation, it is said to be proposed to work out an official classification. Production in the sheet industry is being maintained at approximately 85 per cent of capacity. Some makers are rolling altogether from bessemer sheet bars. The scarcity of steel makes it improbable that improvement in production will develop. In fact, this shortage, together with the hot weather, may be expected to curtail production further. Government orders for sheets during the past week have not been heavy. Jobbers who supply lots for government work are having this material replaced wherever possible. Reports are in circulation that some jobbers are naming quotations in excess of fixed prices. If this proves true, it has been indicated by information from Washington, that the war industries board will call for the invoices and will take action looking to the cutting off of supplies for such jobbers and to the taking over of current stocks.

Must Get Priority

Philadelphia, June 4.—Consumers of sheets have been informed by the leading eastern maker that they will receive no deliveries on contracts unless they get priority permits. New business in sheets has been light but large allocations are in sight.

Commercial Buyers Disappointed

Youngstown, O., June 5.—Buyers of sheets are inquiring exceedingly heavy among valley makers for all grades but more particularly black and galvanized. Few contracts have been closed lately with domestic buyers on account of the mills being in such a sold-up condition for months to come. All mills are rolling governmental tonnages and the latter are so heavy that few sheets other than overage and wasters are available for the domestic buyers until the beginning of the last quarter. A few makers are of the opinion that few sheets will reach the domestic trade before the first of the coming year. Many cantonments are to be enlarged and this will require further tonnages of galvanized. Jobbers are finding it hard to replenish their stocks although mills are furnishing tonnages to them whenever permits are presented showing that the material is to be used for war purposes. The jobber does not necessarily have to obtain a permit direct from the government. If he sells a tonnage of sheets out of stock to a buyer who presents a permit, the mills when tendered the latter will deliver a like tonnage to the jobber.

Yard Plans Need Shapes

Proposed Enlargements of Atlantic Ship Plans Call for Big Tonnage—Little Commercial Material For This Year

Philadelphia, June 4.—A large tonnage of structural material will be required for the proposed extensions to various Atlantic shipyards. The Sun Shipbuilding Co. will add four ways, the New York Shipbuilding Co. will double its plant, the Newport News Shipbuilding & Dry Dock Co. will add ways, erect a boiler shop at Richmond and other additions are proposed by various plants. The American International Shipbuilding Corp. has begun the award of fabricated material estimated at 150,000 tons for 60 additional vessels. Structural shapes for the government cars are being allocated. Bessemer steel to considerable extent is being used.

Business at Minimum

New York, June 3.—Demand for structural steel is at a minimum in this district. Jobs placed total less than 5000 tons, and the largest of the bookings involve 3700 tons for the Culver Rapid Transit extension, Brooklyn, which formally has been placed under contract with the Bethlehem Steel Bridge Corp. Only two new jobs are up. These call for 800 tons. Priority orders for plain shapes during the past week have been of almost negligible proportions.

Building at Low Ebb

Chicago, June 4.—Aside from structural material furnished to fabricating shops for ship work, practically nothing is being turned out in a structural way. The Northwestern Bridge & Iron Co., Milwaukee, has taken 450 tons for a girder shop at the plant of the Pawling & Harnischfeger Co. at Milwaukee. Another small tonnage has been placed in the west involving 158 tons.

Good Deliveries Given

Pittsburgh, June 4.—Despite heavy demands being made upon them fabricators are giving good deliveries of government requirements. Large tonnages are being placed by the Emergency Fleet corporation, and the navy department. Business also is being taken from machine tool manufacturers engaged in war work who are extending their plants.

CONTRACTS AWARDED

Girder shop for the Pawling & Harnischfeger Co., at Milwaukee, Wis., 450 tons, to Northwestern Bridge & Iron Co.

Steel tipple for the Valier Coal Co., Valier, Ill., 158 tons.

Bridge for Lehigh Valley railroad, 100 tons to American Bridge Co., and 100 tons to an independent fabricator.

Extension to Vulcan Iron Works' plant at Wilkes Barre, Pa., 900 tons to Hedden Iron Construction Co.

Culver Rapid Transit line extension, Brooklyn, 3700 tons, formerly awarded to Bethlehem Steel Bridge Corp.

Addition to plant of Studebaker Corp., South Bend, Ind., 1600 tons to Wisconsin Bridge & Iron Co.

Building at Branford, Conn., for Eastern Malleable Iron Co., 300 tons to Bogert-Carlough Co.

CONTRACTS PENDING

Building for Vermont Milk Chocolate Co., Burlington, Vt., 200 tons, bids being taken.

Buildings for Gulf Sulphur Co., 600 tons, bids being taken by J. G. White Engineering Company.

Extensions to plant of Westinghouse Electric & Mfg. Co., Essington, Pa., 5000 tons to be awarded by Westinghouse, Church, Kerr & Co.

Made Ore Manager

Lewis D. Newman has been made manager of the Great Northern Iron Ore Properties. For some time he was private secretary to R. A. Jackson, general counsel of the Great Northern railroad. Later he was assistant to Carmi Thompson, general manager of the ore properties. He has been filling that post since Mr. Thompson resigned.

Pig Iron Output Near High Record

Production in May Exceeds All But One Month in Country's History—Number of Stacks Now in Blast Sets New Mark for Recent Years

PIG IRON production is approaching the highest level in the history of the country. May's output has been exceeded only once, that being in October, 1916. The pronounced decline in output which began just 12 months ago and continued until January, has now been more than overcome. The blast furnaces produced in May 3,448,207 tons, compared with 3,273,355 tons in April, a gain of 174,852 tons. Production in May, 1917, was 3,413,677 tons, and in October, 1916, the banner month, 3,508,180 tons.

AVERAGE DAILY PRODUCTION

	1918	1917	1916	1915	1914
Jan.	77,523	101,930	102,319	51,323	60,624
Feb.	82,794	94,641	106,157	59,521	67,450
Mar.	103,548	105,026	107,343	66,009	75,534
Apr.	109,112	110,936	107,517	70,484	75,383
May	111,232	110,119	108,535	72,747	67,646
June	.....	108,675	107,127	78,998	63,486
July	.....	107,659	103,907	82,687	63,075
Aug.	.....	104,483	103,156	89,510	64,403
Sept.	.....	104,691	106,935	94,478	62,757
Oct.	.....	106,332	113,167	100,656	57,007
Nov.	.....	106,620	110,593	101,174	50,042
Dec.	.....	93,077	102,715	103,278	48,236
Av'ge	97,039	104,562	106,610	81,022	62,934

The average daily output last month was 111,232 tons, against 109,112 tons in April, a gain of 2120 tons. Steelworks or nonmerchant furnaces made the bulk of the gain, their average daily output jumping to 81,513 tons in May, from 80,182 tons in April, an increase of 1331 tons. The daily production of merchant iron in May was 27,915 tons, against 27,597 tons in April, a gain of 318 tons. The total output of nonmerchant iron last month was 2,526,895 tons, against 2,405,467 tons in April, a gain of 121,428 tons. Merchant iron production last month was 865,374 tons, compared with 827,921 tons in April, a gain of 37,453 tons.

More stacks are now in blast than at any time in recent years. On May 31, 361 furnaces were active against 351 on April 30. A year ago 340 furnaces were in blast, this number increased to 357 on August 31 and dropping off after that date. The October, 1916, record was made with 328 furnaces.

Ferro production in May was 36,898 tons against 29,536 tons in April, an increase of 7362 tons. Spiegel output last month was 19,040 tons against 10,431 tons in April, a gain of 8609 tons.

The Stewart Iron Co., Ltd., Sharon, Pa., blew out its blast furnace on May 12 for relining and general repairs.

The Mattie furnace of the A. M. Byers Co. of Ohio, Girard, O., was blown out on May 29. This stack will be relined.

MONTHLY PRODUCTION

	1918	1917	1916
January ...	2,403,227	3,159,839	3,171,878
February ...	2,318,242	2,649,935	3,078,548
March	3,209,996	3,255,813	3,327,630
April	3,273,355	3,328,061	3,225,496
May	3,448,207	3,413,677	3,364,584
Total 5 mos.	14,653,027	15,807,325	16,168,136
June	.....	3,260,234	3,213,818
Total 1st half.	.....	19,067,559	19,381,954
July	.....	3,337,442	3,221,127
August	.....	3,238,970	3,197,838
September .	.....	3,140,742	3,208,041
October	.....	3,296,286	3,508,180
November ..	.....	3,198,597	3,317,805
December ..	.....	2,885,380	3,184,178
Total 2d half	.....	19,097,417	19,637,169
Grand total.	14,653,027	38,164,976	39,019,123

Increased Rates

On Iron Ore Will Go to Upper Lake Railroads

Cleveland, June 4.—Increased freight rates on iron ore continue to hold the interest of the ore trade. Plans of the railroad administration at this time are understood to call for an advance of 33.6 cents per gross ton on iron ore shipped from the mines to upper lake ports. Railroads handling either direct or dock ore from lower lake docks to furnaces, under this plan, would receive no increase. The fractional rule will be observed, bringing the Mesabi rate, for instance, from 63.5 cents to $1. The original announcement of 30 cents a ton has been decided as applying to net tons.

Mining companies under the present plan would pay all of the increase as ore, of course, is sold lower lake docks. Before the rate becomes effective on June 25, these companies and lower lake railroads hope to secure some modification of the plan.

Efforts are now being made by lower lake railroads to secure the increased freight on ore handled by upper lake railroads just prior to June 25 and which is carried to the various furnaces after that date. Under present arrangements, such ore would not pay any increased freight rate.

Iron ore shipments up to June 1 are 39 per cent heavier that last year. Shipments in May total 8,792,231 tons against 6,283,612 tons shipped in May, 1917. Shipments up to June 1 are 9,028,101 tons against 6,495,144 tons in 1917, and 10,107,991 tons in 1916. Boats are receiving good dispatch and the movement continues heavy. Last month's total was the highest of any May in the history of the ore trade. Detailed shipments by ports follow:

Port	Gross tons
Escanaba	655,495
Marquette	495,043
Ashland	898,147
Superior	2,088,029
Duluth	3,055,083
Two Harbors	1,600,434
	8,792,231

MAY PIG IRON

States.	No. of stacks.	No. in blast last day of month. May	Apr.	Total tonnage made Merchant.	Non-Merchant.	—Totals— May	Apr.
Pennsylvania	160	136	134	227,023	1,082,455	1,309,478	1,275,389
Ohio	79	74	70	170,823	622,721	793,544	734,284
Alabama	47	32	31	120,320	91,962	212,282	207,245
Virginia	21	14	13	40,754	.....	40,754	39,510
New York	28	24	22	94,854	142,162	237,016	201,872
New Jersey	5	5	5	23,424	.....	23,424	21,558
Illinois	25	23	23	69,805	235,542	305,347	302,292
Colorado	6	4	4				
Indiana	15	15	15	31,194	298,920	330,114	315,034
Maryland	4	3	3				
Wisconsin	6	4	4				
Kentucky	7	5	5				
West Virginia	4	3	3	54,390	26,892	81,282	77,107
Tennessee	17	11	11				
Washington	1	1	1				
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	3	3	3	32,787	26,241	59,028	59,097
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						19,040	10,431
Ferro—All states....						36,898	29,536
Total	437	361	351	865,374	2,526,895	3,448,207	3,273,355

Propose to License Nonwar Needs

Joint Committee of Producers and War Industries Board Understood to Have Accepted This Plan to Distribute Any Surplus Iron and Steel—Baruch Credited With Estimate of 20 Per Cent For Open Market

WASHINGTON, June 4.—A license system to regulate the use of pig iron and steel not going into direct or indirect war consumption probably will be adopted by the war industries board as the solution of the problem arising in the board's contention of an acute shortage of both materials and of the steel manufacturers' claim there will be sufficient steel, if properly allocated, for all essential consumers. It is understood the joint committee representing the board and the industry have agreed upon this plan which will be submitted to the board for its consideration and ultimate adoption.

At the office of J. Leonard Replogle, director of steel supply and at the Washington headquarters of the American Iron and Steel institute attempts to confirm this information met with no success although at neither place was it denied that the license system may be adopted. The committeemen representing the institute met with Mr. Replogle in New York last Saturday following the fourteenth general session of the institute, but what transpired is withheld. Neither Mr. Replogle nor H. P. Ingels, secretary of the board, would say when the board would hear the committee's report, although this may be expected soon, because Chairman Baruch of the board urged immediate action when the joint committee was named May 17.

The license system, if adopted, would be somewhat similar to that employed in England. It would be adjusted to the war industries board's present plan of priority rating by which all war or semiwar orders of pig iron, steel and other important materials automatically are licensed when priority certificates are issued. If the licensing plan is inaugurated, it means that every pound of steel leaving American mills will be under priority or license authority.

Mr. Replogle, who has been director of steel since early last autumn, in all probabilty will be placed at the head of the license system, or, in other words, the license system will be made part of the steel division. Mr. Replogle's staff already has grown from two or three assistants to more than a dozen and adoption of the proposed plan will see the number increased to hundreds. It will be one of the largest sections of the war industries board, with every mill and furnace in the country receiving its orders from Mr. Replogle or assistants empowered to countersign allocations for him.

Baruch Changes Views

The unfolding of this information today leaves a puzzling situation which developed last Saturday in statements carried in several newspapers which quoted "a high official of the war industries board" as saying that war orders of the United States and allied governments will require 80 per cent of mill capacity. It could not be learned authoritatively who this high official is but it is understood the statement was made by Chairman Baruch to several newspapermen when his attention was called to accounts carried in other papers of Mr. Replogle's address.

If Mr. Baruch made the statement, it is contrary to his declaration to THE IRON TRADE REVIEW following the meeting with steel manufacturers here May 17. At that time he declared he fully believed there would be little if any surplus after war orders were filled. This has been the contention of Mr. Replogle.

One explanation forthcoming today was that Mr. Baruch, undoubtedly besieged by many manufacturers of fabricated steel articles to take no step detrimental to their interests, and desiring not to be openly in the position of debating Mr. Replogle, told the newspapermen that there will be a surplus in order to pacify the so-called less-essential industries.

In THE IRON TRADE REVIEW last week it was stated that the survey being undertaken by the committee would in all probability fail because of the lack of knowledge of the government's steel requirements. This now is generally admitted, but it is pointed out that the information being accumulated from various sources will give the industry and the board a fairly clear idea of the nonwar needs and more clearly define the task of culling the essential from the nonessential. Mr. Replogle frankly admits the situation is due to pig iron production problems as previously outlined in this paper.

Government Adopts the Cleveland Plan

WASHINGTON, June 4.—Appreciating the need for a decentralized organization, which through its various branches can furnish a point of direct contact between the government and the manufacturers, the war industries board has created the resources and conversion section under C. A. Otis of Cleveland. Full authority is given Mr. Otis to proceed with the organization of such agencies as he deems best suited to supply the needs of the army, the navy and other government departments.

The plan of organization as proposed by Mr. Otis divides the entire United States in 20 regions with regional headquarters in each case at a designated site within the territory covered. Each of these industrial areas, or regions, will be under individual directors who were today appointed by the resources and conversion section of the war industries board. These local chiefs are local men who have the personal knowledge of and acquaintance with manufacturers in their regions. The directors appointed in each of the 20 districts designated are as follows:

Henry I. Harriman, Boston; George E. Crawford, Bridgeport, Conn.; William F. Morgan, New York; Ernest R. Trigg, Philadelphia; George S. Oliver, Pittsburgh; Harper Sibley, Rochester, N. Y.; Myron T. Herrick, Cleveland; Allan A. Templeton, Detroit; Lucius Teetter, Chicago; A. Clifford Shinkle, Cincinnati; Frank N. Hoen, Baltimore; W. H. White Jr., Atlanta, Ga.; M. W. Bush, Birmingham, Ala.; Frank D. Crabbs, Kansas City, Mo.; Jackson Johnson, St. Louis; D. R. Cotton, St. Paul; August H. Bogel,

Milwaukee; Louis Lipsitz, Dallas, Tex.; Frederick J. Koster, San Francisco; A. J. Rhodes, Seattle.

The intention is to organize each region along the lines already developed by the Cleveland district war industries commission. The plan of this organization was explained in full in the May 16 issue of THE IRON TRADE REVIEW. Local chambers of commerce and other business associations have been requested to form the division industrial units.

The various classes of industry under the regional organizations will be thoroughly familiar with the resources of the manufacturers, and are expected to be able to furnish the resources and conversion section with accurate information. The division in turn will act as a clearing house between the government departments requiring supplies and the manufacturers. Accurate knowledge regarding materials and supplies to be purchased will be transmitted to the regional offices and thus directly to the manufacturers who will be able to handle the work to be allotted. Each regional division eventually may maintain a Washington representative who through the resources and conversion section of the war industries board may keep in direct contact with his division and at the same time will be immediately available to the government procurement departments or the war industries board for prompt action in giving data on manufacturing.

The organization being set up by Mr. Otis is a governmental agency, deriving authority under the war industries board, and responsible to the government directly. The regional organizations which will come into existence through this plan will originate with the manufacturers themselves, will be organized and subdivided under the various classes of industry, and will function in gathering information from first-hand knowledge of production facilities. Further, the regional organizations will serve to disseminate information gathered and furnished by the resources and conversion section of the war industries board. The new section will assemble and distribute information as quickly as possible, and the intention is to interfere in no way with the work now being carried on by such agencies as the American Iron and Steel institute.

Fighting to Wipe Out Commodity Rates

WASHINGTON, June 4.—The railroads are expected to continue their fight to shift iron and steel articles from the commodity rate basis to that of class rates. Three days intervened between the time they filed their applications and the time Director General McAdoo ordered a general increase of 25 per cent in all freight rates. Whether the interstate commerce commission will allow the railroads' own plea in the face of the McAdoo order is altogether another question. On this point opinions differ and at the commission's offices here it is impossible now to get an inkling of its attitude.

Through their agents in the Central Freight association, the Western Trunk Line association, the Mississippi Valley association and the St. Louis-Cincinnati-Louisville committee, the railroads filed their applications May 22. This was three days before Director General McAdoo issued his order, although it was not publicly announced in full detail until May 27.

The exact words of the interstate commerce commission, expressed in another case, were used by the railroads to indicate their firm intention of endeavoring to remove the iron and steel articles from commodity bases and place them in the class rate schedules.

Reference to the accompanying table, made up from examples taken from the exhibits supplied by the railroads in their application, will show what the present commodity rates are, the rates of the class basis if allowed, and each as will be altered by the McAdoo 25 per cent increase which becomes effective June 25. The table also shows the increases in each instance.

Examination of petitions filed by the railroads reveal the fact that they propose to take bessemer ferrosilicon and silvery iron out of the pig iron class and to place these products in the sixth class with the proposed billet rate. Ferromanganese, spiegeleisen and manganese ore also would be given the sixth class rating. The advances proposed on bessemer ferrosilicon, silvery iron, spiegeleisen, ferromanganese and manganese ore would be exceptionally heavy and would be probably 60 cents a ton on ferrosilicon and silvery iron from southern Ohio furnaces to Pittsburgh. Protests already are being made by the consuming interests dependent upon furnaces at Jackson, New Straitsville and Wellston, O., for supplies.

PIG IRON

Haul	A	B	C	D	E	F	G
Pittsburgh to Chicago	$2.70	$2.70	$0.00	$3.38½	$0.68½	$3.38½	$0.68½
Cleveland to Middletown	2.20	2.30	.10	2.75	.55	2.87½	.67½
Youngstown to Detroit	2.20	2.40	.20	2.75	.55	3.00	.80
Buffalo to Toledo	2.10	2.60	.50	2.62½	.52½	3.25	1.15
Pittsburgh to Kalamazoo	3.30	2.90	.40*	4.12½	.82½	3.62½	.32½
Chicago to Lima	2.00	2.30	.30	2.50	.50	2.87½	.87½

BILLETS

Haul	A	B	C	D	E	F	G
Pittsburgh to Chicago	$3.60	$3.50	$0.10*	$4.50	$0.90	$4.37½	$0.77½
Cleveland to Middletown	2.30	2.60	.30	2.87½	.57½	3.25	.95
Youngstown to Detroit	2.30	2.70	.40	2.87½	.57½	3.37½	1.07½
Buffalo to Toledo	2.30	2.90	.60	2.87½	.57½	3.62½	1.32½
Pittsburgh to Kalamazoo	3.50	3.20	.30*	4.37½	.87½	4.00	.50
Chicago to Lima	2.40	2.60	.20	3.00	.60	3.25	.85

Explanatory:
*Decrease.
A, present commodity rate per ton; B, proposed class rate per ton; C, increase class over commodity; D, rate under McAdoo 25 per cent increase; E, increase McAdoo over present commodity; F, rate if railroad application is approved plus McAdoo increase; G, increase combined McAdoo and class rate over present commodity.

Greater Capacity

Scheduled for Shipyards, Schwab Announces—Turbines Produced

Great increases to shipyard capacity are in contemplation according to an announcement made by Charles M. Schwab, director general of shipping of the Emergency Fleet corporation, following a banquet tendered him by W. H. Donner, president of the Donner Steel Co., at the Bellevue-Stratford, Philadelphia, May 29.

Turbine producing plants as well as two or more large fabricating plants are likewise to be built. Mr. Schwab said: "I expect to increase the Westinghouse Electric & Mfg. Co. plant at Essington at least 40 per cent. Either these works or those of the General Electric Co. must be increased to meet the demands of shipbuilding for engines and other accessories, or we will build plants to produce the turbines for Hog Island, the Merchant Shipbuilding Corp. at Bristol, and the Submarine Boat Corp. at Newark."

Further Concession

Made by Ordnance Department in Steel Casting Specifications

Washington, June 3.—Further concessions in the specifications for steel castings have been granted by the United States bureau of army ordnance which provide for a reduction of the elastic limit for cast steel No. 2 from 32,500 to 31,500 pounds per square inch and for cast steel No. 3 from 42,000 to 36,000 pounds per square inch. Before the recent change in the physical requirements for No. 3 cast steel the elastic limit was 40,000 pounds per square inch and this downward revision will enable steel casting manufacturers generally to meet this physical property.

However, cast steel No. 2 may be used in place of cast steel No. 1 in all cases where the latter is called for and cast steel No. 3 may be substituted for cast steels Nos. 1 and 2. This concession will greatly expedite steel foundry operations since it permits the substitution of the higher grades of steel for the lower grades and this will enable foundrymen to pour the higher grades of steel into other molds when desired. It always is difficult to gage exactly the weight of a heat and if a heat of No. 3 steel is being made and in the event of a surplus amount of this metal after pouring molds in which No. 3 steel is specified, this surplus metal may be poured into molds in which either steels Nos. 1 or 2 are required.

The revised specifications also provide that in cases where the carbon content does not exceed 0.35 per cent, the phosphorus may run as high as 0.06 per cent with the sulphur 0.08 per cent. In announcing these reductions of physical qualities the bureau of army ordnance stated that these will be granted until further notification only, since they are made for the purpose of facilitating the immediate production of steel castings. As finally revised the physical requirements for steels Nos. 1, 2 and 3 are as follows:

Cast steel	No. 1	No. 2	No. 3
Elastic limit, pounds per square inch	27,000	31,500	36,000
Tensile strength, pounds per square inch	60,000	70,000	80,000
Elongation, after rupture, per cent	22.0	18.0	15.0
Contraction of area, per cent	30.0	25.0	20.0

Holding Largest Meeting

Worcester, Mass., June 5.—The largest spring meeting in the history of the American Society of Mechanical Engineer is indicated by the early registration for the sessions now being held in this city. Over 600 had registered up to Wednesday morning. A feature of the meeting will be discussions of munition making at a special New England session.

J. R. Freeman of Providence has been appointed to represent the society on the national engineering research council. Special committees on the readjustment of industries for war work have been authorized and will be appointed later. The next spring meeting will be held at Detroit.

The address of welcome Tuesday evening was by R. Sanford Riley, president of the Worcester chamber of commerce. Other speakers were Charles T. Main, president of the society and Hon. Charles G. Washburn.

Shape Plans for Midvale Ordnance Works

Philadelphia, June 4.—Preliminary details are being shaped providing for the erection of a large government ordnance plant by the Midvale Steel & Ordnance Co. The Midvale company has formally agreed to undertake this work and now is drafting plans for the new plant.

The location of the works will be at Nicetown, this city, adjacent to the present plant of the Midvale Steel Co. Considerable additional land will be required for the new plant.

Plan By-Product Plant

Buffalo, June 4.—The Donner Union Coke Corp. will build near the plant of the Donner Steel Co. a $7,000,000 coke plant for the use of the government. The project is being financed by the government and its product will be used during the war for war purposes. After the war the Donner Steel Co. and the Buffalo Union Furnace Co. will take over the plant. Work on the ovens, one of the principal by-products of which will be bases used in the making of high explosives, will start without delay, and it is hoped to complete the final unit within fourteen months. Some units will be available before then. It is estimated that the plant will cover 40 acres and will use 2000 tons of coal per day. A large quantity of gas will also be made.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	§Aluminum	Spot antimony
May 29	23.50	.....	7.05	7.20	32.00	12.00
May 31	23.50	.....	7.07½	7.20	32.00	12.00
June 3	23.50	.....	7.15	7.25	33.00	12.00
June 4	23.50	.....	7.20	7.30	33.00	12.25

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
§Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 33.10c; one to 15 tons, 33.20c.

New York, June 4.—The war industries board last week announced the revision of the maximum price for ingot aluminum up 1c to 33c for 98 to 99 per cent metal, in lots of 50 tons and more, with differentials for other grades and smaller quantities the same as those existing previously. Differentials on sheets, wire and rods were increased 12½ per cent. The maximum price for No. 18 gage sheets, 3 to 60 inches wide, is thus now 42c, in 50-ton lots, 42.10c in lots 15 to 49 ton and 42.20c, lots 1 to 14 tons. The new prices will be effective on deliveries made between June 1 and Sept. 1.

The tin market has eased off further the past week, largely due to the partial letting down of the bars on Banca tin, which grade of metal now is finding its way into our markets again. Chinese tin for May shipment from China is now offered at 84c, as compared with about 99c a few weeks ago; May shipment, 81c. Spot 99 per cent tin is offered at about 95c. It remains difficult to obtain Banca tin because of the still unsatisfactory shipping situation.

There is little to be said about copper, which continues to be distributed at the government fixed maximum of 23.50c, which remains effective until August, 15c for carloads, and 24.67½c for less than carload lots.

The government is taking bids on 250 tons of antimony June 5. This is the only reported business of consequence at present pending in antimony.

June supplies of lead seem to have grown scarce and outside sellers are holding firmer views. Outside quotations are ranging from 15c to 30c, above the leading interest's price, which is 7c, New York.

The spelter market is steady and apparently a trifle firmer than earlier in the week. Sellers are asking around 7.25c to 7.35c, St. Louis, for prompt June and July shipment, and are showing reluctance to commit themselves beyond July, owing to the uncertainty of the ore situation.

Heat Treating Sub-Chaser Parts

The Engines of the Little U-Boat Hunters Are Subjected to Constant Racking Strains—Their Parts Must Stand Up—This Article Tells How Stamina is Secured

BY L. A. DANSE

ONE of the interesting appurtenances of peace developed by the allies under war's necessity to a high state of efficiency is the speed boat, or, in common parlance, the sub-chaser.

Of its mechanism the motors are pre-eminent. Usually built in twin sets, one a starboard unit and the other a port unit, to drive twin screws; they are the last word in heavy duty, slow rotative speed engines.

The exigencies of their use in pursuing the lurking German U-boat puts the hardest kind of strain on these boats and their motive equipment. They must be what sailors call handy; that is, quickly respond to a change in course, turn almost within their length and maintain full speed while executing these and other maneuvers.

The motors are stationed at port and starboard in order to facilitate this quick handling. They must stand the racking strain of being suddenly thrown into full speed astern while going full speed ahead.

Such boats could be made either with a reverse gear to drive the propeller astern, or the motors may be designed to run with equal speed ahead or astern, either in unison or in opposite directions. The latter is the course pursued.

Method of Reversing

The reversing is accomplished by slowing the motors down and throwing the reverse lever over on the quadrant, which shifts the camshaft longitudinally in the bearings. There are two sets of cams on the shaft and when a shift is made the disengaged set comes into position, timing the valves for running in the opposite direction. As the motors are started by air, if the shifted shaft does not catch the cams in the right position to start backwards, the air starter lever is tipped and the motor spins and starts.

It is the necessity of strength to withstand the severe stresses incident to quick handling, quite as much as the necessity for stamina to undergo the grilling of long runs at high speed, which calls for the best heat-treatment of the motor parts and care in selecting and handling the material.

The cylinders are gray iron cast individually. As the motors are of the open base, marine type, the crankcase familiar to automobile or aeroplane practice is noticeable by its absence. In its place, to support the cylinders on the bed plate, is a series of steel posts fastened in the bed plate and to lugs on the cylinders.

The camshaft mechanism, with the rocker levers, etc., is mounted on these posts.

The exhaust valve is in a port at the side of the combustion chamber, forming an L-head cylinder. The valve is water-cooled and is operated through push rod and rocker levers. The air starter valve is also in the port. The intake valve is mounted in a cage in the head. Ignition is by make-and-break igniter plugs and magneto. The carburetor is of the constant level multi-jet type. Cylinder water-jackets are cast in the cylinders. Crankshafts are of the seven-bearing type, the motor being six cylinder, as is illustrated.

The author of this article, L. A. Danse, is chief of the heat treating department, Lincoln Motor Co., Detroit, manufacturer of airplane engines. This material was published originally in Houghton's Herald.



A FLEET OF SUB-CHASERS WAITING THEIR TURN TO POUNCE ON THE U-BOATS

These little boats are performing a tremendously valuable service for our cause in the war. For their machine parts the best is none too good and in their construction high grade alloy steels scientifically heat treated play a prominent part.

From the foreging very brief summary. the magnitude of the task facing the metallurgist and engineer can be grasped.

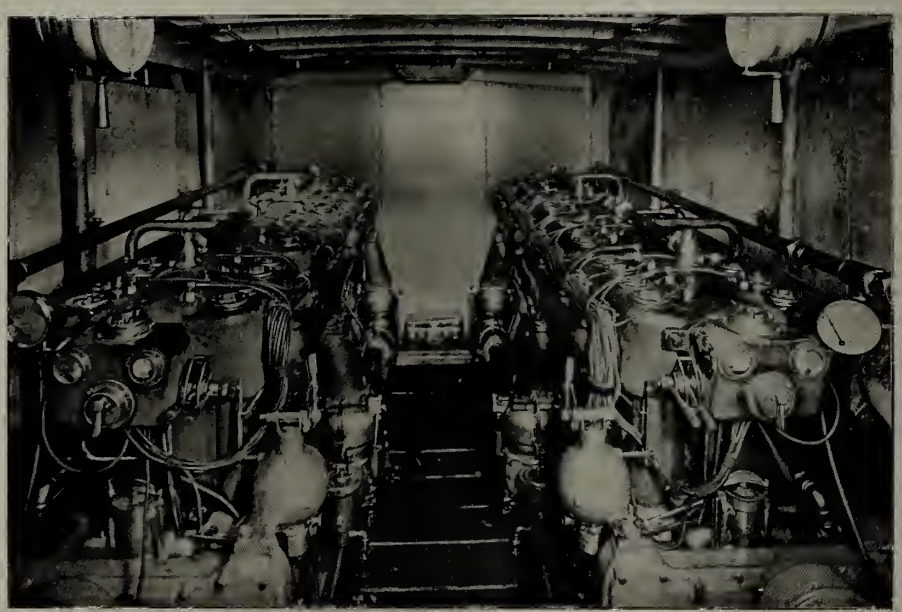
The cylinder castings are roughed out, and then annealed by being heated in a large semi-muffled furnace, oil-fired, to about 800 degrees Fahr.

They are cooled in the furnace, slowly, to relieve all casting and machining stresses. As the bore is 10 inches and stroke 11 inches and the cylinders are treated eight to the charge, care is needed to see that so large a furnace as that required is evenly heated. Operations are carefully checked and controlled by pyrometers and heat record numbers.

The pistons are also of gray iron and are annealed in much the same manner as the cylinders. After this annealing, very little trouble need be anticipated from warpage in the pistons under service. Crankshafts are forced up from 0.40 per cent carbon open-hearth steel billets, roughed out and heat-treated by heating to 1500 degrees Fahr., and after quenching in soluble quenching oil; are then tempered at 900 degrees Fahr. This is a heavy job and requires big equipment for handling. Connecting rods are drop-forged from 0.35 per cent carbon open-hearth steel and treated in the rough as follows: Heated to 1520 degrees Fahr., quenched in soluble quenching oil in a vertical position, to prevent warping and the necessity of straightening; tempered by heating to 750 degrees Fahr., and cooled in air. The minimum tensile strength specified is 70,000 pounds, and actual strength as tested should range from 85,000 to 90,000 pounds per square inch.

Connecting rod bolts are of 0.30 per cent carbon open-hearth cold-drawn steel. They are untreated, but are required to pass physical tests and, if not up to standard, are treated to increase their strength.

Piston wrist pins are of 0.20 per cent carbon open-hearth steel, bored and turned from solid bars, carburized hard and then ground. Due to their large size and the fact that the specifications call for ⅛-inch case and 65 scleroscopic hardness after grinding, they are packed four in a box with quick light carburizer. The holes are plugged with fireclay. The carburizing heat is 1600 degrees Fahr., and the carburizing time in the furnace is 12 hours. They are quenched directly from the carburizing box into soluble quenching oil; reheated to 1550 degrees Fahr. and again quenched in soluble quenching oil. They are then rough ground and returned to the heat-treating shop to be heated to 1440 degrees Fahr. and quenched in brine. Tempering is in the same oil at 400 degrees Fahr. These pins when completed are very fine and can be flattened out in a steam hammer until the walls meet without shattering or chipping under the repeated heavy blows.



THE MOTOR IS THE HEART OF THE SUB-CHASER

These engines are operated continuously for many hours at a stretch in a service where failure may mean loss of life. Practically every part is individually heat-treated including even the cylinders and pistons

The eccentric for operating the air pump is a disc of 0.20 per cent carbon open-hearth steel, 9 inches in diameter by 1 inch thick, with a ⅛ inch wide rib ⅛ inch high around the center of the rim. The center is cut away in holes for the crankshaft and to lighten the eccentric on the high side. This is carburized and hardened after finishing. It is also a difficult operation, as the piece must be kept perfectly smooth, must have a 60 scleroscopic hardness and must run true.

The eccentrics are packed in a round box, flatwise, six high, all laid on each other, the holes plugged with fireclay and 2 inches of quick light carburizer between the rim and the inside of the box. The carburizing heat is 1500 degrees Fahr., and the time in furnace is 10 hours. The pieces are quenched directly from box into a bath of cold water on the surface of which is ½-inch of soluble quenching oil. Very good results from every standpoint are obtained by this method.

The propeller thrust bearing plates are discs of open-hearth 0.20 per cent carbon steel mounted on the crankshaft and held by yokes bolted to the bed plate. They are about 9 inches in diameter and 1 inch thick. They are carburized in the same round boxes as the eccentrics, but only four high, leaving 1 inch of quick light carburizer between them. The carburizing heat is 1600 degrees Fahr. and the time in furnace is 14 hours. They are quenched from the carburizing box into soluble quenching oil. They are then reheated, ground and tempered in the same manner as are the wrist pins. The water circulating pump is of the double-acting reciprocating type and is driven through reduction gears from the crankshaft. These are spur gears and all but the crankshaft pinions are heat-treated. They are of 0.30 per cent carbon, 3½ per cent nickel steel and are heated in lead pots to 1500 degrees Fahr., quenched in a soluble quenching oil; then tempered for 30 minutes at 400 to 450 degrees Fahr., in tempering oil. The small water pump crank is of 0.35 per cent carbon open-hearth steel, drop-forged and heat-treated in the rough. The quenching heat is 1520 degrees Fahr. and tempering 700 degrees in an open furnace for one hour.

The water pump crosshead pin is of 0.20 per cent carbon open-hearth steel. The threads are copper-plated, then the pins are carburized in hydro-carbonated bone black at 1600 degrees Fahr. for 10 hours, quenched from the box into soluble quenching oil, reheated to 1420 degrees Fahr. and quenched in brine. A light tempering of 350 degrees Fahr. for 20 minutes is then given in tempering oil.

The water pump connecting rod is similar in material and treatment to the large connecting rods.

The stanchions upon which the cylinders are mounted are of 0.30 per cent carbon open-hearth steel, drop-forged

and heat-treated in the rough. They are heated to 1575 degrees Fahr. in an open furnace and rolled into the oil bath to cut down quenching warpage, then tempered to 900 degrees Fahr. for 1½ hours in an open furnace. The specified minimum tensile strength on these is 65,000 pounds per square inch, and they must stand being bent double on themselves, cold, under a steam hammer. Their actual strength as treated is about 70,000 pounds per square inch.

A number of stanchion braces, brackets, levers, etc., of 0.20 per cent carbon open-hearth steel have a typical heat-treatment of 1500 degrees Fahr. in an open furnace, are quenched in soluble quenching oil and tempered at 900 degrees Fahr. in an open furnace for from 1 to 1½ hours.

The camshaft drive is through a bevel gear train; the vertical shaft and pinion is a drop forging of 0.30 per cent carbon 3½ per cent nickel steel. It is heat-treated in the rough by heating to 1650 degrees Fahr., in soluble quenching oil, drawing back at 1350 degrees Fahr. in the furnace, and cooling in the furnace. After machining, it is carburized in quick light carburizer at 1600 degrees Fahr. for 12 hours, in large boxes, quenched from the box in soluble quenching oil; reheated to 1500 degrees Fahr. in a lead pot, quenched in soluble quenching oil, reheated to 1360 degrees Fahr. in a lead pot and quenched in soluble quenching oil. The tempering treatment is 375 degrees Fahr. in tempering oil for 45 minutes.

The camshaft bevel gear is a 0.20 per cent carbon open-hearth steel forging. It is heat-treated in the rough by heating to 1650 degrees Fahr., quenching and tempering at 1350 degrees Fahr., the same as the vertical shaft and pinion. After machining, the center recessed part of the shaft hole, also the keyway are plugged with fireclay and the gears packed two-high in tall round boxes, teeth down. They are carburized in carburizer at 1600 degrees Fahr. for eight hours, quenched from the box into soluble quenching oil, reheated to 1550 degrees Fahr., quenched from the box into soluble quenching oil; reheated to 1550 degrees Fahr., quenched down in soluble quenching oil, reheated to 1440 degrees Fahr., then quenched teeth down in water and tempered 375 degrees Fahr. in tempering oil for 45 minutes.

This gear and the vertical shaft pinion must give a scleroscope reading of 65 to 75, finished.

Cams a Hard Proposition

The cams, of 0.20 per cent carbon open-hearth steel, are a very difficult proposition on account of several having a recess in one end which leaves a wall ⅛-inch thick. This thin section is on the hub, where the roller rides and adjoins a section ⅝-inch thick. To overcome breakage, the holes, in the process employed at first, were plugged with fireclay and bent wires stuck into the plug to hold a cap of fireclay on the ends. This was not altogether successful, so the cams are now strung on closefitting bolts, four or five to a bolt. The heads of the bolts are fitted to the cams, as is also a washer at the threaded end. The ends of the cams are covered with a mixture of kaolin and sodium silicate to form a paste; they are then strung on and the bolt and nut are tightened. This keeps the action of carburizing gas out of the holes entirely.

The bolted cams are carburized for 12 hours at 1600 degrees Fahr. and quenched from the box into soluble quenching oil. They are left on the bolts, reheated to 1440 degrees Fahr., and quenched in brine. They are then removed from the bolts and tempered for 30 minutes at 350 degrees Fahr. in tempering oil. The cams are finished before hardening, which means that they must not go out of shape in heat-treating, nor be roughened up. This treatment brings them out in fine shape and meets the requirements of 70 to 80 scleroscopic hardness.

Cam rocker lever rollers are of 0.20 per cent carbon open-hearth steel. They are carburized for 10 hours at 1600 degrees Fahr. in quick light carburizer, quenched from the box into oil, reheated 1420 degrees Fahr. and quenched in brine. After grinding they must show a scleroscopic hardness of 70 or over.

The roller pins are of screw stock. They are copper-plated on the ends and carburized in hydro-carbonated bone-black carburizer for eight hours at 1600 degrees Fahr., and quenched from the box into water. They must be file hard on the body and be soft enough to rivet over on the ends.

The cam rocker levers are cast vanadium steel. After annealing and machining they are heated for 40 minutes in cyanide at 1450 degrees Fahr. and quenched in water.

Besides these parts there are a number of others which have typical treatments. The only one of interest is the igniter plug finger. This is a drop forging of 1½ per cent nickel, 0.80 per cent chromium, 0.20 per cent carbon steel. It is heat-treated in the rough by heating to 1650 degrees Fahr., quenching in soluble quenching oil and tempering to 1350 degrees Fahr. After machining, the threaded and squared end is copper-plated. The carbonizing is done in hydro-carbonated bone black carburizer at 1600 degrees Fahr. for seven hours. They are quenched in soluble quenching oil from the box; then very slowly reheated to 1520 degrees Fahr. and quenched in soluble quenching oil; again very slowly reheated to 1360 degrees Fahr. and quenched in oil; tempered in tempering oil at 360 degrees Fahr. for 20 minutes.

These quenches are all in a tank of soluble quenching oil kept at from 80 to 90 degrees Fahr.

The igniter finger is a delicate part and caused no end of trouble for several weeks at the plant where the foregoing practice is followed. The material was changed and treatments of all sorts were tried out. Finally the method here given was hit upon and it met all the requirements under the most severe tests.

How to Select Steel for Small Tools

PROPER selection of steel entering into the manufacture of small tools and its heat treatment is of vital importance at the present time when millions of small tools are used in producing many of the necessities of modern warfare. That manufacturers realize this fact was evidenced by the large attendance at a recent meeting of the Cleveland Engineering society, Cleveland, where the subject for discussion was "Practical Methods of Heat Treatment of Small Tools". Discussion was general.

J. V. Emmons, metallurgical engineer, the Cleveland Twist Drill Co., Cleveland, presided over the meeting. In his opening remarks he laid stress on the fact that the manufacturer must learn first to select the proper grade of steel for a given product or heat treatment will prove of little value. Mr. Emmons, in discussing the composition and uses of carbon steels, emphasized that while a steel containing 1.5 per cent carbon was excellent for making such tools as reamers, it was not suitable for tools such as drills which require a slightly tougher steel—1.25 to 1 per cent carbon. It was further explained that other tools such as hammers and chisels, required a steel having a still lower percentage of carbon. For delicate tools, oil hardening steels were strongly recommended owing to the fact that the cost of labor involved in making many intricate tools practically prohibits the use of a water-hardening

steel where the loss from fire cracking is heavy.

Owing to the fact that labor is exceedingly scarce at the present time, care should be exercised in the selection and heat treatment of steel because the kind of labor now available is not as efficient as formerly. In other words, the human element leads to a higher percentage of blunders than it did before the war.

The first inspection of steel, Mr. Emmons said, should consist of a preliminary examination of the external appearance. By this method cracks, laminations, laps and seams can often be detected. It was stated that external tests alone should not be relied upon as this method is often deceptive.

A good means of testing, it was said, was by the hardened fracture method. By this means such defects as overheating at the mills, or too deep a scale or bark may be readily detected. In the latter case the decarbonization of the outer shell is easily detected when it is necessary to have the outer portion of the finished product hard, enough stock for finishing should be allowed to remove the decarbonized portion. Inspectors were urged to be on the lookout for too much graphite in annealed steel.

Another factor that often caused trouble, it was explained, was mixed shipments from the steel mill. A consumer buying a hundred bars of tool steel might find a few bars of a low carbon or machine steel or, in rare instances, a bar of high speed steel. Mixed shipments should be tested by the spark method. The inspector should study the sparks thrown off by different steels when brought in contact with the grinding wheel until he can readily recognize any kind of steel by its sparks. Thus, machinery steel gives off plain yellow sparks with but few stars while the sparks from high carbon steel contain many stars. High speed steel, or any steel containing tungsten, throws a dark-red spark with no stars.

By far the most efficient means of testing steel, Mr. Emmons stated, is with the microscope. With its aid, once the inspector has mastered the subject, more can be ascertained concerning different specimens of steels than by any other method. To illustrate this point, numerous stereopticon views made from various steels were shown.

W. S. Bidle, metallurgist and president of the W. S. Bidle Co., Cleveland, next gave a short talk on tool design. He laid great stress on the fact that the manufacturer of tools should leave fillets wherever possible on work that had to be hardened. He further stated that neglect to look after this small detail caused the manufacturers of this country an enormous loss annually from the ruining of tools that were fire cracked in hardening. Mr. Bidle was asked what a man should do when fillets on hardened work were necessary, as in making blanking dies. Mr. Bidle thought that the best practice would be to use a nonshrinkable, oil-hardening steel. In making expensive tools, Mr. Bidle stated it was of the utmost importance to find from the maker of the steel the proportion of carbon contained and in subsequent heat-treating processes to be governed accordingly. The manufacturer should not take snap judgment on steel.

W. C. Whyte, president of the Steel Improvement Co., Cleveland, stated that many small manufacturers know but little concerning the heat treatment of steels. This lack of knowledge of fundamental principles often led to serious difficulties in trying to make machine parts conform to certain specifications. He said that the small manufacturer must be thoroughly educated to the importance of heat treatment, owing to the fact that the war has brought about exacting conditions.



HEAVY-DUTY TRACTOR STEERED BY ALL FOUR WHEELS

Builds Heavy-Duty Tractor

A tractor for intermill service has recently been placed on the market by the Industrial Truck Co., Holyoke, Mass. The tractor is made in two types with end control and center control respectively. The frame is built of channels. The bumpers are heavy boiler plates which are bent on the corners and riveted to the frame. The couplers are of the 3-step type to accommodate the different heights of trailers.

The battery boxes are provided with side doors which are easily removed when changing batteries. The boxes are also provided with hinged top plates which may be lifted whenever it is necessary to flush or inspect the batteries. By removing four nuts, the frame and battery boxes may be lifted from the chassis leaving the driving mechanism exposed for inspection or repairs.

Power is transmitted from the motor through a single reduction worm and gear to a differential. The latter transmits the power to the wheels through a universal joint which operates at a minimum angle of 43 degrees. The universal joint is enclosed in a dust-tight case formed by the pivoting-wheel knuckle and its supporting yoke. Two separate brakes are provided. The one operated by the left foot is the emergency and the other, operated by the right foot, is the service brake. All brake rods are adjustable.

The design of the tractor embodies many safety features. To operate the machine the driver must be sitting in his seat with his left foot pressing down on the emergency brake pedal. Each time his left foot is lifted from this pedal, the brake is applied and by means of a clutch on the controller shaft, the control lever is thrown into a neutral position. The steering wheel is of the tilting type. This arrangement is interlocked with the controller-shaft clutch and under no circumstances can the current be applied except when the wheel is in correct operating position.

Ordnance Tools Present Problem

Present Facilities Are Inadequate to Supply Machine Tools Needed Unless Non-essentials Are Eliminated—Engineering Advice to Ordnance Contractors is Urgently Requested

BY COL. H. W. REED

WHEN problems of such magnitude as are arising today come up for action, it is impossible to handle them through the recognized channels of peace times; and so the ordnance department has, in the the past, frequently called upon machine tool manufacturers for assistance not only in expediting the delivery of machine tools so urgently required, but also in determining the requirements of the machines necessary to build certain types of ordnance.

Frequently, it has been necessary to send out hurry-up calls to machine tool manufacturers for the loan of certain of their engineers to assist the ordnance officers in analyzing some new type of ordnance so as to determine the kind and number of tools required in each instance.

Recognizing the attitude of co-operation, that the machine tool builders have always shown, each of the several calls made was sent without regard to the inconvenience that it may have caused in giving up the services of important engineers for this work. It was felt by the department that the best results could be accomplished if a tentative schedule was made of machine tool requirements for some of the most important types of ordnance.

Engineering Assistance Valuable

By preliminary time-study work, it is safe to say that several million dollars worth of unnecessary machine tools was saved. This relieved to a some extent, the tense machine tool situation that existed last Fall.

Although comparatively few builders were called upon for this work, the prompt response made by those few reflects the spirit of the industry. The department takes this opportunity to extend appreciation for the assistance given during those trying days when the production sections were being organized.

Before giving the machine tool requirements of the ordnance department for its large gun program, there are a few general conditions that I have been instructed to bring to attention. The question often has been asked: How best can the machine tool builders serve the government? This may be answered broadly by stating that builders can best serve by turning out machine tools in the quickest possible time. There are, however, so many phases of the problems to be considerd that I will enumerate, in their order of importance, the specific ways in which manufacturers can best serve the ordnance department. In frankly stating what the department expects, these statements should not be considered as criticisms of present work. The ordnance department recognizes the wonderful work which has been performed and the request for a greater effort is based on the knolwedge of past work. I may add that if all branches of industrial manufacturing had come through as the National Machine Tool Builders association, we would be further on our way today.

The ordnance department asks a greatly increased production of large machine tools. The reply will be that manufacturers have reached their limit; if such is the case, then they must remove that limit, because the success of the program for large guns depends upon the output of heavy machines for the balance of the year. In other words, the success or failure of the 1919 drive, as far as the use of large caliber guns is concerned, rests squarely upon the manufacturer's shoulders, and they are expected to carry that load. The machines available are insufficient, and based upon reliable information, it is understood that unless the present rate of output for large machine tools is considerably increased, the program for large guns will be jeopardized.

Therefore, the first requirement expected is an increased output of large tools of a type that will produce large ordnance, and steps must be taken to insure an increase over the present output.

The procedure to be followed to secure this increased output is part of the burden of the war. The members of the National Machine Tool Builders association are in the best position to work out a successful plan to produce the required machines, and to that end are asked to co-operate with the machine tool section of the war industries board to determine how the results can best be obtained.

Find the Government's Needs

Thus closer contact should be maintained between the machine tool association and the machine tool section of the war industries board, so that the members of the association can, at all times, be fully informed as to the requirements of all branches of the national government.

Certain machine tool builders have in the past, strictly adhered to certain types and sizes of machine tools, and have enjoyed a national reputation as the manufacturers of these tools. The time has arrived for some of these manufacturers to change their commercial commodity. The time has arrived when it is not a question of maintaining past standards, but of manufacturing types of machinery that will do the most good.

A manufacturer who is equipped for

The Narrowing Road

BUSINESS-AS-USUAL fell by the wayside early in the advance of American industry toward war-production. The will to win has brought about this sacrifice to serve the ultimate aim of victory. In the ever-growing power of that determination which is to demonstrate the unfailing success of force to the utmost, private commercial interests gladly are meeting every sacrifice asked. In that narrowing defile through which all industry is driving forward, there is no room for the nonessential. Steel and iron took the first decisive action in the pledge of 100 per cent output for government needs. The machine tool interests are facing a similar decision. Col. H. W. Reed in the accompanying article states in plain words that the time has arrived when the builder must concentrate on tools needed solely for war purposes. Failing in the ability to meet the ordnance tool requirements, the manufacturers are requested to engage in munitions production. The nonessential machine tool will be an early casualty.

Abstract of an address by Col. H. W. Reed, ordnance department, delivered at the meeting of the National Machine Tool Builders association, Atlantic City, N. J., May 16, 1918.

making certain machine tools for which there is no urgent demand by the government, should immediately take steps to devote his energies to some type of machine for which there is a demand. If his equipment is such that he cannot change to some other type of machine tool, then it is his duty to inquire into the needs of the ordnance department to determine the material for which he is equipped and for which there is an urgent demand.

The machine tool section of the war industries board should be able to advise as to the advisability of changing from machine tools to straight ordnance manufacturing, provided equipment is such that it would be impossible to produce machine tools which the government really requires. It is felt that with the machine tool section of the war industries board acting as the intermediary between the ordnance department and the machine tool builders, an alliance can be formed between these two bodies that will be extremely beneficial to both. It should be remembered, however, that builders should be in the frame of mind to accept the board's decision as to what can best be built to suit the government's needs, and not what would suit the convenience of the manufacturer.

Engineering Judgment Needed

It is suggested that far too little time is devoted by the machine tool manufacturers in assisting to secure the equipment that would best suit their requirements. During peace times, every progressive machine tool manufacturer would check up the requirements of his customers so as to be assured that each tool sold was the one best fitted for the customers' needs. This service has probably been discontinued to a certain extent, for two main reasons:

Due to the enormous demand for machine tools during the war period, it was not necessary for machine tool builders to solicit business; and therefore, they unconsciously discontinued their engineering services, which heretofore had been given to the operating departments of customer's plants.

Due to the general unfamiliarity of the country at large on the machine tool requirements for ordnance work, the machine tool builders have been loath to offer any suggestions as to what tools would be best fitted for the manufacturing of ordnance material.

Eliminate Wasteful Buying

The result has been, that all too frequently, equipment has been sold to manufacturers holding contracts for ordnance material which was not suited in any way for their needs. The vast amount of new material to be manufactured, and the difficulty in securing the proper personnel for the ordnance department, has made it practically impossible to check in detail, the machines required for all classes of ordnance material. Due to these difficulties, together with the lack of advice from machine tool builders, quite a large amount of machine tools have been delivered which are absolutely unsatisfactory.

Upon checking the machine tool list submitted by a contractor of the ordnance department recently, it was discovered that he proposed to buy 180 12-inch lathes. Had these lathes been purchased, it would have been impossible to use any of them on his contract. While this is an extreme case, it might frankly be stated that every government contractor would have been benefitted had the machine tool builders



ELECTRICALLY DRIVEN BENCH DRILL

in each case, co-operated to the fullest extent in advising the types and sizes of machines to be purchased.

Machine tool builders should realize that it was necessary to let contracts for ordnance material to manufacturers who have had little or no experience in the past on up-to-date machine shop practice. Therefore, manufacturers should increase the service heretofore rendered prospective customers in advising them as to what they should and should not buy.

Another important service in which the machine tool builders can assist the ordnance department is in driving the machine tool gypsies out of business. It should be remembered that the ordnance department must defend the prices paid for the machine tools purchased by the government for their contractors. This may be difficult in a few cases, as the prices on certain machine tools, especially second-hand ones, have been run up to an amount out of all reason, due to one or more wash sales. Transactions of this kind reflect discredit upon the tool industry as a whole, even though those who are well informed realize that actions of this kind would not be tolerated by the association. Manufacturers and legitimate sales agents must use their influence toward the elimination of the perincious activities followed by this class of men.

Ordnance Requirements

Quoting from a letter from G. E. Merriweather, chairman the machine tool section of the war industries board, the present requirements of the ordnance department for machine tools may be stated as follows:

Briefly stated, the American machine tool industry is apparently well able to cope with all the demands that may be made on it for small and medium size tools up to approximately 24-inch lathes; 24-inch planers; 36-inch vertical boring mills; radial drills up to 4 foot swing; all small drill presses, turret lathes; automatic screw machines, surface grinders, etc. There is, however, much evidence of a dangerous shortage of planers, lathes, slotters, vertical and horizontal boring mills, radial drills, milling machines, of sizes larger than those specified above. The reasons for this statement are sufficiently obvious.

Sensitive Bench Drill

The electrically driven, sensitive bench drill shown in the accompanying illustration, was recently developed by the Wisconsin Electric Co., Racine, Wis. The motor is directly connected to the spindle. The motor is of the variable speed type and affords six speeds ranging from 500 to 10,000 revolutions per minute. The controller is mounted on the floor and is operated by a foot pedal.

The platen is adjustable and affords a stroke of ½ inch through the medium of the hand lever at the right of the machine. The drill is said to be adapted for drilling steel, cast iron, aluminum, brass, fiber, hard rubber, etc. It has a capacity up to 1/16 inch in steel and ⅛ inch in soft alloys. Holes can be drilled in the center of a 5-inch circle. The motor and chuck are balanced dynamically to insure smooth running.

The United Electric Light & Power Co., New York City, has recently placed an order with the Westinghouse Electric & Mfg. Co. for a 22,000 kilowatt turbo-generator set. The generator will be rated at 25,900 kilovolt-ampere, at 85 per cent power factor, 8000 volts, 3-phase 62½ cycles. It will be direct-connected to a Westinghouse 22,000 kilowatt turbine. The order includes a 40,000 square foot surface condenser and auxiliaries.

Builds Massive Tools For War Work

Electric Drives and Centralized Control Are Features of a Massive Boring Mill and a Set of Heavy Duty Bending Rolls Recently Built to Expedite the Government's War Program

TO manufacture the necessities of modern warfare in the shortest possible time, calls in many cases for heavy machine-tool equipment in sizes which were unheard of a few years ago. Under the spur of war needs, machine-tool manufacturers all over the country have bent their efforts toward producing more efficient tools and as a result many machines involving interesting features have been developed.

A good example of modern, heavy machine-tool construction is shown at the right of the accompanying illustration. This is a 28 to 42-foot extention boring and turning mill recently built by the Niles-Bement-Pond Co., New York, for arsenal work.

The housings of this machine slide on ways which permit the maximum swing when occasion requires. A separate 15-horsepower motor is used to traverse the housings. With the housings in their forward position, the machine will swing 28 feet 2 inches and when the housings are set as far back as possible, a swing of 42 feet 4 inches can be obtained.

The table is designed safely to carry a load of 300,000 pounds in addition to its own weight. A 60-horsepower motor rotates the table through the medium of a diametrically opposed, double-pinion drive.

The crossrail is of heavy section, 48 inches wide and 54 inches deep, built to withstand severe strains. The maximum height under the tool holders is 10 feet while the tool bars have a travel of 84 inches. The crossrail is elevated and lowered by means of a 25-horsepower motor and is equipped with two heads carrying octagon-shaped bars which measure 10 inches across the flats. The crossrail heads are provided with platforms for the operator. The adjustment of feeds and the rapid traversing of the bars and saddles by means of a 15-horsepower motor, is controlled from these platforms. The operator on these platforms also has control of the main driving motor, although this motor can also be operated from stations at each side of the machine. All motors are controlled by push buttons.

Plate Bending Rolls

Another example of modern, heavy machine-tool construction was recently developed by the Niles Co. at its Hamilton, O., works. This machine, which is shown at the left of the accompanying illustration, is a set of bending rolls of the strong-back type having the capacity to roll mild steel plates 1 inch thick and 36 feet long, or 1¼ inches thick and 30 feet long.

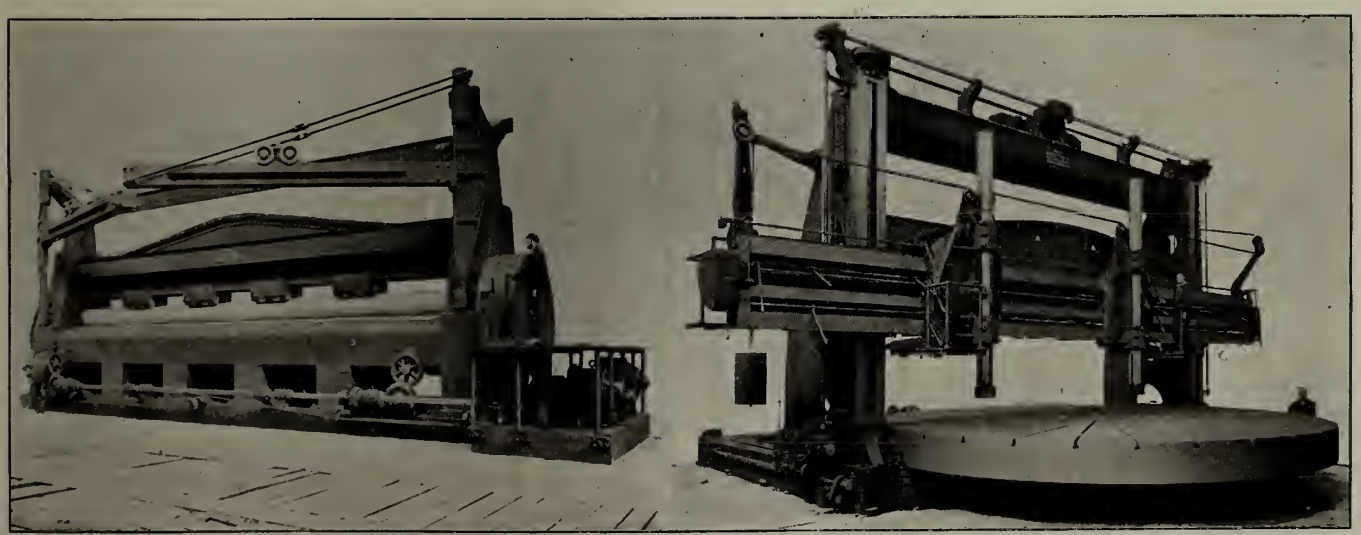
The machine consists of two massive cast iron housings which are joined at the top by two 20-inch I-beams and below by two heavy cast iron side frames. Rolling is accomplished by three forged steel rolls, one upper roll and two lower rolls. The lower rolls are 36 feet 9 inches long and 16 inches in diameter. They are supported by eight pairs of supplementary rolls, arranged four pairs on each side.

The upper roll is 36 feet 9 inches long and 19 inches in diameter. It is reinforced by a heavy, built-up steel girder, carrying on its under side four supporting roller bearings which are directly over those supporting the lower rolls. The rolls are driven by a 100-horsepower motor.

The girder and upper roll are raised and lowered by means of steel elevating screws which are placed one at each end of the machine. These screws are operated by a 75-horsepower motor and the arrangement is such that both screws can be turned simultaneously or independently.

The motors are placed at one end of the machine and over them is built the operating platform. The whole set of controlling levers are grouped together at this station so that the motor controllers, reversing and clutch levers, can be operated by one man from one position on the platform.

To facilitate the handling of heavy material, the machine is equipped with four, top-braced jib cranes, self-contained with the machine. The posts for these cranes are set at the four corners of the machine and the lower thrust of each crane is fully equipped with ball bearings.



AT THE RIGHT IS A MASSIVE BORING MILL BUILT FOR ONE OF UNCLE SAM'S ARSENALS. THE MACHINE AT THE LEFT IS A SET OF HEAVY BENDING ROLLS FOR SHAPING HEAVY STEEL PLATES

High Velocity Air and Gas Washer

New Apparatus Based Upon Both Spray and Centrifugal Action—Washer is Designed to Handle a Large Volume Through the Application of High Velocity—Machine is Small in Size

BY JOHN L. ALDEN

A NEW type of air and gas washer has been developed within the past 18 months, which offers a number of advantages over the existing types. With the new apparatus the washing can be continued to any desired degree of cleanliness, and the washer will handle unusually large quantites of dust or long fiber without clogging, owing to its large passages and the absence of eliminators. Due to the high washing efficiency, the water consumption is low, from 1 to 2 gallons per 1000 cubic feet of air being needed. The washer is extremely small and compact, and of light weight. A 10,000-cubic-foot washer is about 5 feet long, 5 feet in diameter, and weighs less than 400 pounds. The term "air" is used in the discussion preceding and following to include any gaseous fluid or vapor for which cleaning apparatus may be found necessary.

Gas scrubbers normally operate at a velocity of about 90 feet per minute and air washers at from 400 to 500 feet per minute, while with these devices the limiting velocity for good washing and a reasonable frictional resistance is about 1000 feet per minute. The washer about to be described operates habitually at from 2000 to 5000 feet per minute. As the efficiency of air cleaning in this type increases rapidly with the velocity, the only limit to the latter is the resistance imposed. Fig. 1 represents a longitudinal section of the air washer which meets the conditions previously stated. A helical passage is constructed within a horizontal drum, provided at one end with a tangential inlet for the dirty air, and at the opposite end with an outlet for the purified air. That portion of the helical passage nearest the inlet constitutes the washing chamber, while the remainder comprises the eliminating element. On the inner wall of the helical duct are suitable spray nozzles which spray across the column of air. Depending upon the amount of dust to be removed and the completeness of washing desired, the air makes from 1¼ to 5 screwlike revolutions in passing through the helix from inlet to outlet. For fairly dusty air or for the ordinary dust-collecting system, two turns are sufficient. The whole or a portion of the first turn is used for washing while the last turn is employed for the elimination of the free moisture.

The washer described in this article makes use of both spray and centrifugal washing, with the greater dependence placed upon the latter. As the dust-laden air enters through the tangential inlet pipe it is thoroughly wetted by the mist of the spray chamber. Much of the coarser dirt is removed by the direct action of the spray. As the air is whirled through the helical conduit a large proportion of the remaining dust is thrown against the wet curved side of the washer, flowing off to the drain with the spent wash water. The extremely fine dust still remaining cannot be caught by ordinary means, for it is too light to be separated by centrifugal force. However, a considerable amount has been exposed to the mist to such an extent that, although not actually wet, its specific gravity has been increased by the moisture to a degree which will permit its removal by centrifugal force. Thus, an unusually high proportion of the dust content is removed.

After the washing operation the air passes through the eliminating portion of the washer, where it is freed of the suspended moisture. The elimination of water drops is accomplished by centrifugal action, exactly as the dust itself was removed. It is unnecessary to introduce into the washer any form of eliminator plates.

The high washing efficiency gained presents two possibilities, either of which is advantageous. Extreme dust conditions may be met, or, street air may be washed for ventilating purposes with an unusually small amount of water. One of the smaller sizes of these washers handles 4000 cubic feet per minute of dusty air from a dust-collecting system, and from 50 to 100 pounds of mud is removed daily from the strainer basket. From four to six gallons of water per minute wash this dirty air to a sufficient degree of cleanliness to permit it to be returned to the room. While no measurements have been made of the dust content, this air seems fresh and pleasant and has no dusty odor. These results, obtained from a practical commercial washer show that air sufficiently dirty to show a decidedly smoky dust cloud can be washed with from 1 to 1½ gallons of water per 1000 cubic feet. The standard washer requires from 4 to 5 gallons per 1000 cubic feet to successfully wash air which is initially much cleaner than that on which the centrifugal washer was tested. Where it is impossible to re-circulate the wash water, the economy in water alone is an appreciable item. For a machine to handle 10,000 cubic feet of air per minute, this amounts to 20,000 gallons per day of 10 hours. Greater thoroughness in removing dust is accomplished by increasing the number of turns of the helical washing space. Thus,

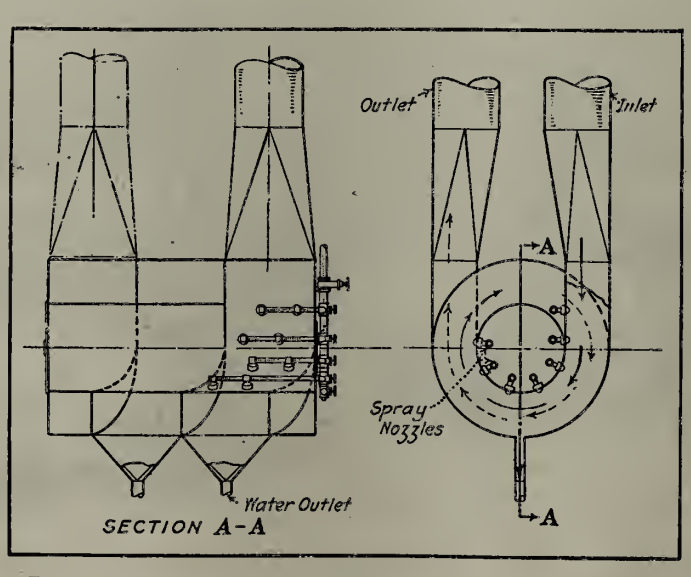


FIG. 1—CENTRIFUGAL AIR WASHER SHOWN IN SECTION

From a paper to be presented at the June meeting of the American Society of Mechanical Engineers. The author, Lieut. John L. Alden, is in the ordnance department at Washington at the present time.

for ordinary ventilating purposes, one to two turns are sufficient; for dust collecting, 1½ to three turns; while for extremely fine dust, from three to five or more turns must be used. The economical limit is probably about five or six turns, or convolutions. The overall length, as determined by the number of turns of the screw-shaped conduit, depends, therefore, upon the degree of purity of air desired, and to a much less extent upon the relative arrangement of inlet and outlet. The outside diameter, on the other hand, depends upon the air volume. Since centrifugal force plays an important part, the size of the washer is greatly reduced because the efficiency increases as the diameter decreases. In addition, the efficiency increases rapidly with the higher air velocities. Both factors tend toward the production of a small, compact washer. The reason is evident from the expression for centrifugal force:

$F = mv^2/r$,
v = air velocity, feet per second,
r = radius, feet,
and m = mass.

Thus, if satisfactory cleaning is done with a washer of 2 feet mean radius of the washing chamber at 3000 feet per minute, velocity, an 8-foot washer would require a velocity of 6000 feet per minute to give equally good cleaning. It is therefore desirable to make the diameter of the washing drum as small as possible and at the same time use as high a velocity as is consistent with a reasonable friction loss. Owing to the fact that with increased diameters higher air speeds must be used to give the same cleanliness, it is probable that the practical limit of size for ordinary air washing is between 15,000 and 25,000 cubic feet per minute. High-speed air washers may be built in sizes as small as 100 cubic feet per minute, but both the upper and lower limits of size may be extended to meet unusual requirements.

Washer is Self-Cleaning

It is difficult to clog the centrifugal air washer with dirt and refuse, owing to the large passages and to the absence of eliminator plates or other obstructions. It is unnecessary to interpose between the washer and the source of dust any form of dust collector or rough washer. Since the dirt and water are removed at each convolution of the helix, there is no accumulation of water and material to be re-entrained by the air current. This is an essential feature where the centrifugal removal of free moisture from a high velocity current is attempted.

With the air flowing through a rectangular passage, it is desirable to throw a flat spray of water across the channel. After considerable experiment with a variety of forms, the nozzle shown in Fig. 2 was designed to fulfill these requirements. The spraying tip is part of a removable plug containing two holes designed to throw opposing streams. The impact of the jets forms a flat sheet of spray at right angles to the plane of the holes. Although this spray is quite fine, much of it is further broken into mist upon striking upon the opposite wall of the washer. Locating the spray nozzles upon the inner wall of the chamber makes it necessary for all of the dirty air to pass through this fog-filled passage.

The pressure loss through the washer is from ⅛ to 1 inch of water, depending upon the conditions governing the design. The variables to

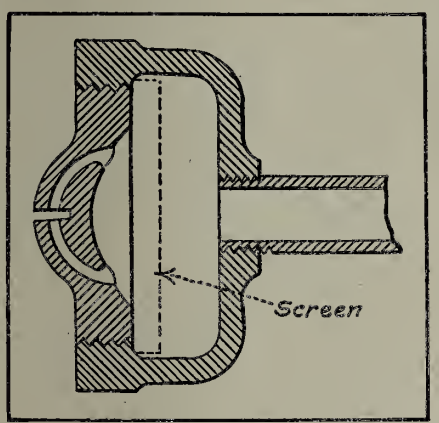


FIG. 2—SPARY NOZZLE FOR USE IN AIR WASHERS

be considered are the diameter, the cross-sectional area and proportions of the washing space, the velocity, the number of turns of the helix, and the volume of water per square inch of the sectional area of the washing chamber. Ordinarily, this washer can be designed for ventilating work with a resistance of about ¼ inch of water. Where the dust requirements are more severe, demanding higher velocities, more wash water and a greater number of convolutions of the helix, the loss will be somewhat greater.

Two washers of this design in operation are reported by the owner to be in successful operation. Each of them has a capacity of 15,000 cubic feet per minute, and was designed to hang from the ceiling with 7 feet of headroom beneath. This type of washer was designed and developed for a specific job, that of washing the clouds of dust from the fan blast of dust-collecting system, leaving the air fit for breathing. Owing to the similarity of refined dust washing and blast-furnace-gas scrubbing, an investigation of the adaptability of this washer to gas cleaning would be valuable and interesting at this time.

Book Review

Principles, Operation and Products of the Blast Furnace, by J. E. Johnson, Jr.; cloth; 551 pages, 6 x 9 inches; first edition, published by McGraw-Hill Book Co., and furnished by THE IRON TRADE REVIEW for $5 net.

This book is divided into four parts, the first of which deals with chemical, thermal and mechanical principles. The author has developed these principles in such a way that they not only agree with present-day practice, but each one merges into the other with only an arbitrary dividing line between. The reactions between carbon, oxygen, and iron and its oxides and the reactions which lead to the formation of slag are fully discussed. The heat production and consumption in the hearth and shaft are calculated from operating data. Twenty-two pages are devoted to Gruner's "ideal working" theory, and many calculations are found in the discussion. The subject of the cause and function of blast pressure in the chapter which deals with mechanical principles, is thoroughly analyzed.

Part II is subdivided into 10 chapters. It deals with the sequence of raw materials as they descend and of gas as it ascends; fuels in the order of their importance; slags; burden calculations from the standpoint of the raw materials charged and the production of the kind of iron to be made; the distribution of the charge column and of the ascending gas column; the rate of driving; casting and flushing the furnace, blowing in, blowing out and banking; furnace irregularities and treatment; and the combustion of furnace gas together with a description of the various types of burners which are now operating with good results.

The products of the blast furnace which depend solely on the chemical composition are discussed in Part III. This section of the book is subdivided into four broad classes which in the order of their importance and tonnage produced, are steel-making, foundry and puddling irons, and ferroalloys. The last chapter in the book deals with the commercial consideration and future possibilities and is not only of interest to the owner and the investor, but to the higher employes as well. This volume is useful to the furnace builder, the student, or anybody who is interested in the efficient operation of blast furnaces.

Heavier Loading of Cars Advocated

Many Millions of Dollars Saved Annually by Utilizing Railroad Cars to Fullest Capacity—Improvement in Car Supply is Thereby Effected—100-Ton Units for Bulk Loads Promised

BY J. F. TOWNSEND

A MARKED improvement has been noticed in transportation, at all the steel producing points, located in the Pittsburgh, Cleveland, Youngstown, Buffalo and Chicago districts, with the more favorable weather conditions, but with the opening of navigation on the lakes, the demand for equipment to supply coal mines with cars for lake coal has been increased. The demand for a greater number of cars required to move the largest shipments of iron ore that the country has ever had, makes it plain to those in touch with the situation that there will be little improvement in the car supply, unless the shipping public can be aroused to a full appreciation of this serious problem and give their co-operation toward the utilization to the fullest capacity of all cars.

While there have been great strides made in the adoption of modern railroad cars of large capacity and improved methods for heavier loading of cars, the increased volume of traffic that the railroads are confronted with today has far exceeded the most advanced plans of the railroads to provide adequate facilities for the natural increase in the general business.

The railroads have grappled with the situation in a heroic manner. They attempted to handle the traffic which was sufficient to support nearly twice the number of railroads that we have today, or, at all events, twice the facilities and rolling stock in the section of the country east of the Mississippi river. If shippers will do their part toward utilizing equipment to the fullest extent and consignes unload all cars promptly at the destination, they will do much toward clearing up this situation.

Building Larger Cars

Last year a new 85-ton hopper car was constructed by the Pennsylvania railroad at its Altoona shops; with the 10 per cent allowed above capacity, this car will carry 93½ tons. This means that the 100-ton car will soon appear. The compiled records show that the average carload throughout the United States is but 22½ tons, or substantially one-fifth the capacity of this monster freight car. The car is constructed with five drop doors, suitable for handling coarse material, such as iron ore, coal, coke and limestone, all of which should be loaded to the full carrying capacity.

The Norfolk & Western has over 1700 200,000-pound steel gondola cars equipped with 6-wheel trucks. These cars are in regular service and are giving satisfactory results. The Virginian railway has four 120-ton steel gondola cars which were built during the last year for experimental purposes. These changes show that the adoption of a car of 200,000-pounds capacity for coarse bulk freight is not only practical but its general adoption would make for efficiency.

The 13 shipping companies of the U. S. Steel Corp. have conducted a vigorous campaign for the heavier loading of cars and during 1917 the average weight of material loaded by these companies was 88,300 pounds per car. This is a remarkable showing, when it is considered that the average capacity per freight car in this country is only 80,000 pounds, according to the statistics compiled by the bureau of railway economics. It is hard to realize this record of heavy loading when the average carload of material of all railroads throughout the country on all traffic, including the steel traffic referred to, was only 44,800 pounds. This is an average of 43,500 pounds per car less than the record made by the 13 shipping companies of the U. S. Steel Corp.

While the 13 shipping companies referred to, increased the average carload on outbound shipments during 1917 only 2900 pounds per car, there was effected an actual saving of 73,010 cars, as compared with the loading for 1916, when the average was 85,400 pounds per loaded car. This does not include the cars which were loaded to 50 tons and shipped by the Oliver Iron Mining Co. during that year; to include these would have tended to increase the average load but might have been considered misleading.

The saving, according to the basis used by the American Railway association in its compilation of Feb. 6, 1917, places the average earnings of a freight car at $2.50 a day, and using that method of calculation, i.e., multiplying 26,648,650, the number of idle car days, by these average earnings per day, it shows that during the year 1917 the railroads gained $66,621,625 in gross earnings on account of the heavier loading of cars. This also effected a saving of 73,010 cars, which were in other service.

The records also show that the 13 shipping companies actually forwarded 3,223,391 more tons of freight than if the practice of loading one year ago had been followed. This increased traffic was enjoyed by the railroads without any additional operating expenses.

According to the interstate commerce reports compiled for 1916, the average haul per ton of revenue freight of the individual railway throughout the country was 166 miles, and the loaded freight cars per train was 25 cars. On this basis, the railroads throughout the United States were saved 12,119,660 car miles, or an equivalent of 484,786 train miles; the 73,010 cars saved means that these cars were in other service and at the average freight revenue of 16.13 cents, the actual saving of the 73,010 less cars used, resulted in increased railroad earnings of $1,954,901.15 without any increased operating expenses.

During the last six years, the 13 shipping companies of the U. S. Steel Corp. have effected a saving of 275,908 cars through the heavier loading of equipment, a record probably unmatched in this country for the period referred to.

Shippers and consignes as well as the railroads have been greatly benefitted in the fewer number of cars switched and weighed, to say nothing of the relief of terminals and the great saving in operating expenses that would have been created had it been necessary to handle this additional number of both empty and loaded cars through the various classification and interchange yards of the railroads from point of shipment to destination.

The author, J. F. Townsend, is traffic manager for the National Tube Co., Pittsburgh.

Foundry Methods

Frank D. Chase, industrial engineer, 122 South Michigan avenue, Chicago, has issued a booklet containing the material and illustrations prepared for a lecture on "The Modern Foundry" before the Philadelphia Foundrymen's association and the Chicago Foundrymen's club. In it he treats of modern layouts for efficient handling of material and products, lighting, ventilation and ecenomical foundry materials.

Wide Range Covered in Institute's Program by Authorities in Their Respective Lines



T. W. ROBINSON,
Vice President, Illinois Steel Co., Chicago

KEEN interest was aroused by T. W. Robinson's paper which contains the first description ever made of the triplex steel-making process inaugurated at the South Chicago plant of the Illinois Steel Co. This plant embraces the largest electric furnace installation in the world. As first vice president in charge of operation, Mr. Robinson has devoted practically his entire time to the development of steel manufacture and during his affiliation with the Illinois Steel Co., for many years, he has become widely known. Undoubtedly he is one of the best informed men on steel plant operation in this country if not in the world. His literary contributions on this and kindred subjects are always enthusiastically received.

* * *

THAT chemistry is daily entering more and more into metallurgy is conclusive. Each succeeding discovery seems to demonstrate a wider latitude for further chemical research. On previous occasions, J. S. Unger has shown the monetary value of knowledge of the action of chemicals in iron and steel, and his technical papers on this subject are always preserved for guidance. His latest contribution is entitled, "The Effect of Phosphorus in Soft Acid and Basic Open-Hearth Steels." Mr. Unger is manager of the Carnegie Steel Co.'s central research bureau at Pittsburgh.

* * *

SINCE the beginning of the war, particularly since this nation's entry into it, the value of the by-product coke oven and its products has been appreciated and realized as never before. Great impetus has been given to this industry, which has taken what were at one time waste products and made them sources of revenue. W. H. Blauvelt, consulting engineer of the Semet-Solvay Co., Syracuse, N. Y., delivered an address on "The Modern By-Product Coke Oven and Its By-Products," which showed to what extent this branch of the iron and steel industry is depended upon for aid in winning the war.

* * *

ANOTHER conservation measure confronts the iron and steel industry. Upon the importation of manganese ores and alloys has depended in large part, the country's steel production. Curtailment of such imports makes necessary rigid conservation of manganese materials. C. R. Ellicott, who is superintendent of furnaces and mills at the Lehigh plant of the Bethlehem Steel Co., South Bethlehem, Pa., presented a paper which dealt with every phase of the subject. It is published in this issue.

* * *

TRADE journals at one time, were considered almost a necessary evil. Times change and trade journals change as well. Bertram S. Stephenson, who at one time was associate editor of

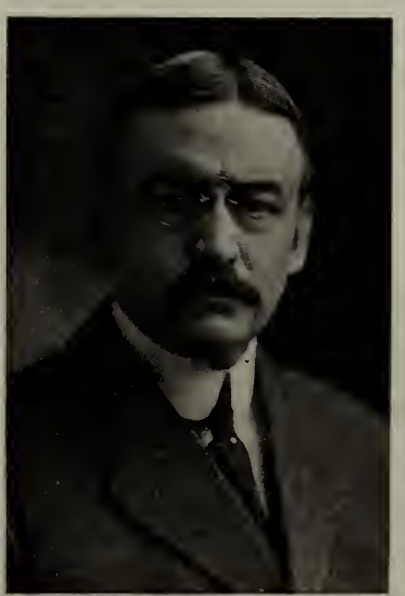


B. S. STEPHENSON,
Resident Manager, M. A. Hanna & Co., Pittsburgh

THE IRON TRADE REVIEW in Cleveland and later in New York, spoke on the subject of the "Relation of the Trade Papers to the Iron and Steel Industry." Because in 1910 he became affiliated with M. A. Hanna & Co., at Detroit and latterly has been their resident manager at Pittsburgh, Mr. Stephenson is competent to deal with the subject of trade journals as they apply to industry



J. S. UNGER,
Manager, Central Research Bureau, Carnegie Steel Co., Pittsburgh



W. H. BLAUVELT,
Consulting Engineer, Semet-Solvay Co., Syracuse, N. Y.

The South Chicago Triplex Process

Bessemer Converters, Open-Hearth and Electric Furnaces Combined to Make High Grade Steel on a Quantity Basis—A Description of the New Plant at South Works

BY T. W. ROBINSON
First Vice President, Illinois Steel Co.

IT is a far cry from Benjamin Franklin expounding American democracy in the court of France to the maintenance of American ideals on the battlefields of Europe—yet the enlightening power of Franklin's statesmanship promises to pale into insignificance before the compelling force of the guns that are being produced through his genius in electrical discovery. Electric steel has played no unimportant part in the paths of peace. It is about to play a more important part in the theater of war.

This paper has to do with the triplex process of producing electric steel as carried out at the South Chicago works of the Illinois Steel Co., Chicago, a subsidiary of the United States Steel Corp. In the following survey, it has been the aim to leave the description of physical features of plant largely to illustrations and drawings, and to confine process reference to its most salient points. The technicalities of general plant design and the operation of the electric furnace have been ably presented before the American Iron and Steel institute by W. R. Walker, John A. Mathews, and others. The object of this paper will have been achieved if with a minimum of repetition, it supplements existing records with later developments, especially in connection with the manufacture of electric steel in relatively large quantities.

The development of electric steel at South Chicago was based upon the fundamental conception that the electric furnace was pre-eminently adapted to the manufacture of carbon and alloy steel of the highest quality; that it would be possible to produce electric steel in sufficiently large units to permit its use in heavy products; and that the increasing demand for high-grade steel would provide a sufficiently extensive market to make its manufacture commercially possible.

Under these promises, the Illinois Steel Co. in May, 1909, installed its first electric steel furnace at the South Chicago works. At that time there were only two other electric furnaces in this country concerned with the manufacture of electric steel—one at the Halcomb Steel Co., Syracuse, N. Y., and the other at the Firth Sterling Steel Co., McKeesport, Pa. The furnaces here and abroad were all small, running from a ton or less to five tons in capacity. Our installation consisted of a 15-ton basic-lined Heroult furnace with an electric equipment for 3-phase, 25-cycle, and 110-volt current. The manufacture of electric steel was a new art, and ours was a new adaptation of a new art. As to the troubles we encountered, I may say their name was legion. Perseverance conquered, however, and we soon had the satisfaction of producing a metal of unquestionably superior quality.

As the fundamental object was to demonstrate the opportunities of the new process in connection with heavy products, attention was early turned to the experimental manufacture of electric steel rails. Under the limitation of equipment, it was necessary to depart from standard rail practice to the extent of accumulating cold ingots and reheating them. The electric steel used was made from bessemer blown metal. We advisedly felt our way in chemistry. Ir-

A paper presented at the annual meeting of the American Iron and Steel institute, New York, May 31, 1918.

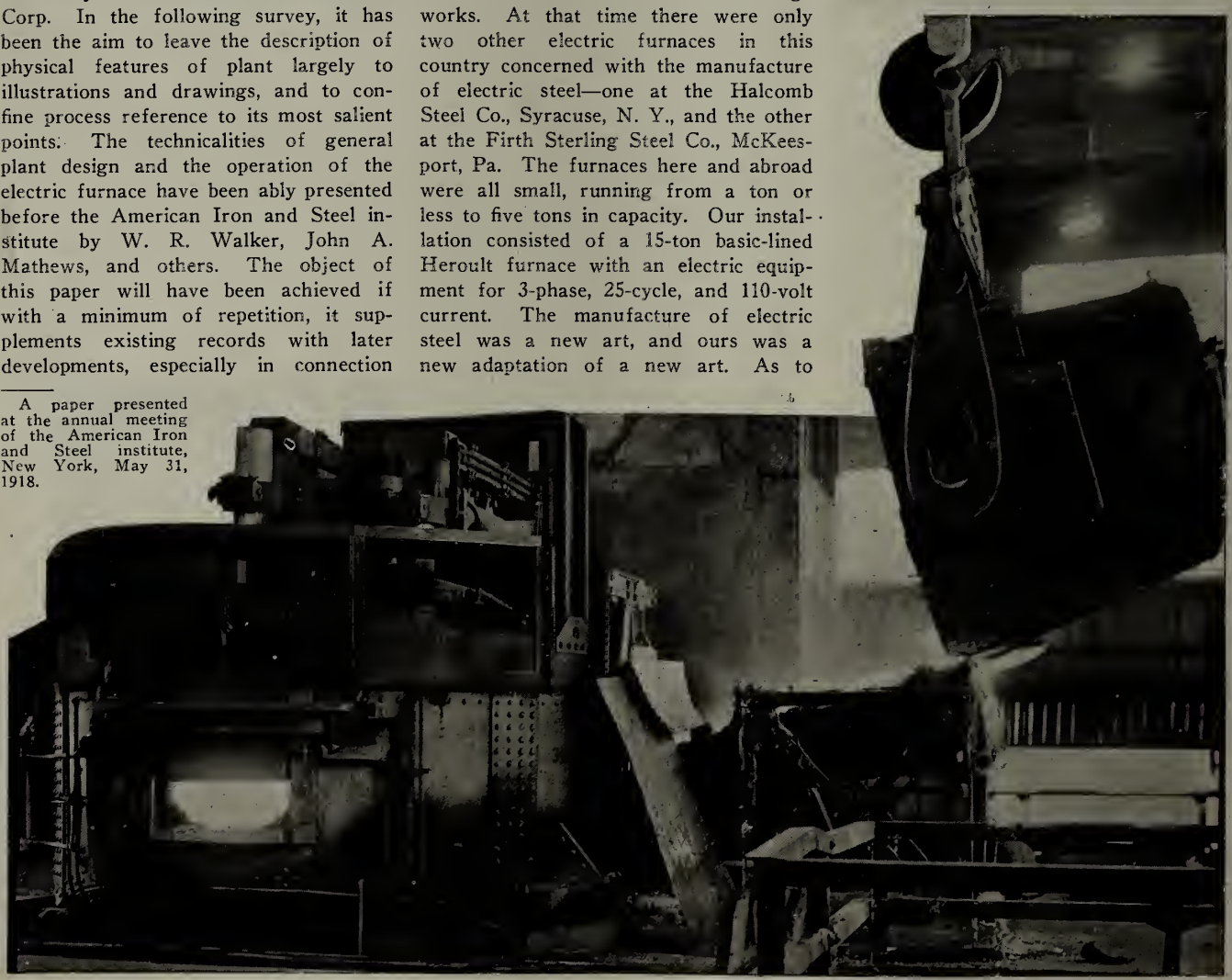


FIG. 1—REFINED METAL FROM THE OPEN HEARTHS IS POURED INTO THE ELECTRIC FURNACES FOR THE FINISHING OPERATION

regularities incident to incomplete equipment were unavoidable. In spite of pioneering difficulties, about 10,500 tons of electric steel rails were laid on 14 railroads throughout the country. The results of these rails in track indicated that electric and open-hearth rails of like chemical composition had practically the same resistance to wear when the former were made under the conditions that existed at the time of their manufacture. The failure from breakage was almost negligible, there were no interior defects, and the test showed that the electric steel was considerably more ductile at low temperature than either the open-hearth or the bessemer steel.

In order to further determine the facts, a series of experiments was undertaken with a view of testing the ductility of rail steel at low temperatures. A refrigerating plant was erected adjacent to our regular drop testing machine. About 900 pieces of electric, open-hearth, and bessemer rails of various sections were tested at temperatures ranging from 70 degrees above to 50 degrees below zero, Fahr. These tests emphasized that in the case of all the steel there was a marked decrease in resistance to shock as the temperature lowered. Relatively speaking, however, the electric steel was distinctly more ductile than either the bessemer or open-hearth.

During and after the period in which we were manufacturing electric steel rails, we were experimenting with such other heavy products as forgings, plates, axles, and structural shapes. Not only had carbon steel been made in relatively large quantities in connection with these productions, but the field of alloy steel had been comprehensively entered. Expanding demand led to the introduction in July, 1916, of a second furnace similar to the original one in electrical equipment and capacity. This gave a combined capacity of about 4500 tons of electric steel ingots per month.

By this time our experience had verified in a large measure the soundness of the views upon which our original electric-furnace installation was predicated. We had demonstrated that it was possible to produce electric steel in relatively large units without the sacrifice of quality. The physical characteristics of the steel had proved to be admirably adapted for heavy products. There was a growing demand for a superior steel for general purposes, and the call for alloy steels was rapidly increasing in connection with the automobile and other industries. Extent of market was largely a question of price, and price logically was largely a matter of cost.

Quality Safeguarded

In the meantime an addition to our open-hearth at South Works had become desirable, and in connection therewith the matter of increasing our electric steel capacity was taken under consideration. In studying this subject, we were naturally guided by our past experience. We had made electric steel by the melting of cold stock. We had refined in the electric furnace both molten blown bessemer metal and molten open-hearth metal. We also had made steel by the initial refining of bessemer blown metal in the open hearth, supplemented by final refining in the electric furnace. Part of this work was experimental in character. None of it was done under ideal economic conditions. The cost of producing steel in the electric furnace was vitally influenced of course by the amount of power used, and this and other conversion items were in turn largely influenced by the tonnage produced. Manifestly nothing could be considered that would sacrifice quality for output without destroying the very essence and reason for the electric process.

As electricity is an expensive metallurgical fuel, the melting of cold stock or the preliminary refining of metal in the electric furnace could be accomplished only at the expense of a comparatively high fuel cost. Our original practice was to make electric steel by refining bessemer blown metal. This process necessitated two distinct operations in the electric furnace, namely, dephosphorization by the use of an oxidizing slag, and deoxidization by means of a reducing slag. Steel of the highest quality can be produced by this practice, but there is obviously greater liability to irregularity in this method than when open-hearth metal is used from which the phosphorus previously has been eliminated. It is well to remember that the electric furnace while a highly efficient instrument, is far from foolproof. Several years' experience with the use of bessemer blown metal in the stationary open-hearth furnaces under the local conditions that existed had helped to demonstrate the advan-

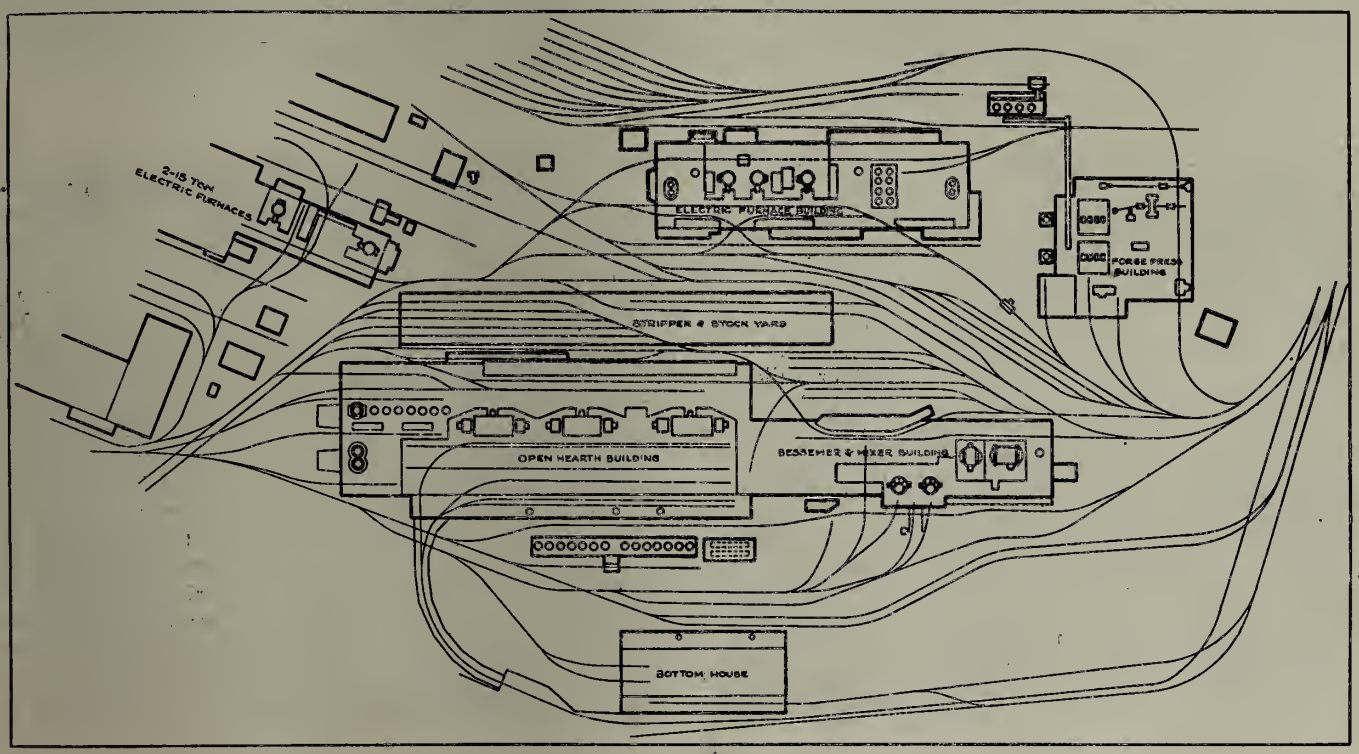


FIG. 2—GENERAL PLAN OF DUPLEX AND ELECTRIC FURNACE PLANT AT SOUTH WORKS

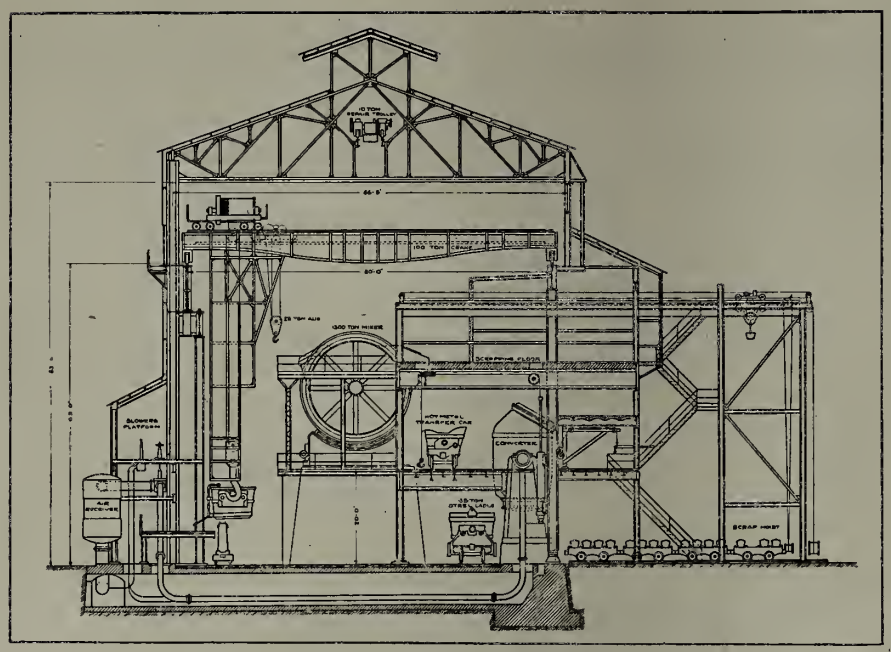


FIG. 3—SECTION OF BESSEMER CONVERTER AND MIXER BUILDING

tages of the duplex process for producing open-hearth steel. It likewise had been shown that electric steel could be most advantageously produced at South Chicago by the use of open-hearth metal.

Elasticity of Operation Sought

It was essential that the proposed plant should be so designed as to provide not only bessemer metal for open-hearth refining and open-hearth metal for electric refining, but bessemer ingots and open-hearth ingots as well. Many new problems were involved. It was clear that for the simultaneous production of bessemer, open-hearth and electric steel, extreme elasticity of operation was fundamental if efficiency was to be attained. Close assembly of the various units was essential for rapid and economical practice. The sequence of operation had to be unobstructed. A supply of hot pig metal and preliminarily refined molten steel must be provided. The plant as finally designed, both in respect to its general plant location and its general details of construction, is shown in Figs. 2, 3, 4, 12, 13 and 14..

Inasmuch as this paper deals specifically with electric steel, no attempt will be made to give a detailed description of the bessemer and open-hearth refining as carried out in the new plant at South Chicago. The metallurgy and physical manipulation present little that is novel, and the principles of the duplex process as such are well understood.

In respect to the plant, it will be noted that there are two main buildings: one comprising the duplex plant proper, and the other, parallel thereto, containing the electric furnaces. As an adjunct to the latter, there was installed a 1500-ton forge press. In its essential features, the duplex plant consists of two mixers, one of 1300 tons and one of 306 tons capacity; two 25-ton acid-lined converters, and three 250-ton tilting open-hearth furnaces. The mixers are commanded by two cranes, one of 100-tons and one of 75 tons capacity, and the mixer metal is transferred on an elevated platform to the converters by a 25-ton transfer ladle operated by cable and winch mechanism.

When used in the open-hearth furnaces, two heats of bessemer blown metal are poured into a 65-ton ladle commanded by a narrow-gage locomotive. Elimination of slag is accomplished by nozzle pouring into a second ladle. When bessemer ingots are to be produced, the metal from one vessel is poured into a smaller ladle and transferred to the bessemer pouring platform. The three tilting open-hearth furnaces, each of which has a hearth area of 892 square feet, are electrically operated, and are so constructed as to be heated either with producer gas or with tar. Air chambers having 10,472 cubic feet of checker volume and gas chambers having 6734 cubic feet of checker volume provide liberal regenerative capacity. Two low-type 7½-ton charging machines and three 100-ton overhead cranes assure the rapid handling of material. The pit side of the open hearth department, which is generous in its dimensions, is served by two 175-ton cranes, and is provided with a 330-foot pouring platform capable of handling two sets of molds.

Capacity is Large

The bessemer plant is designed for the ultimate addition of a third vessel. Its present capacity may be conservatively placed at 75,000 tons per month of blown metal, bessemer ingots, or any desired combination of the two. The three tilting open-hearth furnaces when operating on blown metal are rated at 65,000 to 75,000 tons per month. The elasticity of their operation is self-evident, and it is obvious that their actual tonnage is dependent upon the character of the charge used. At the present time two of these furnaces are running on open-hearth material, with bessemer blown metal as a base. The other furnace is operating on a nickel steel scrap charge with molten pig iron additions for further refining in the electric furnace in additional operations.

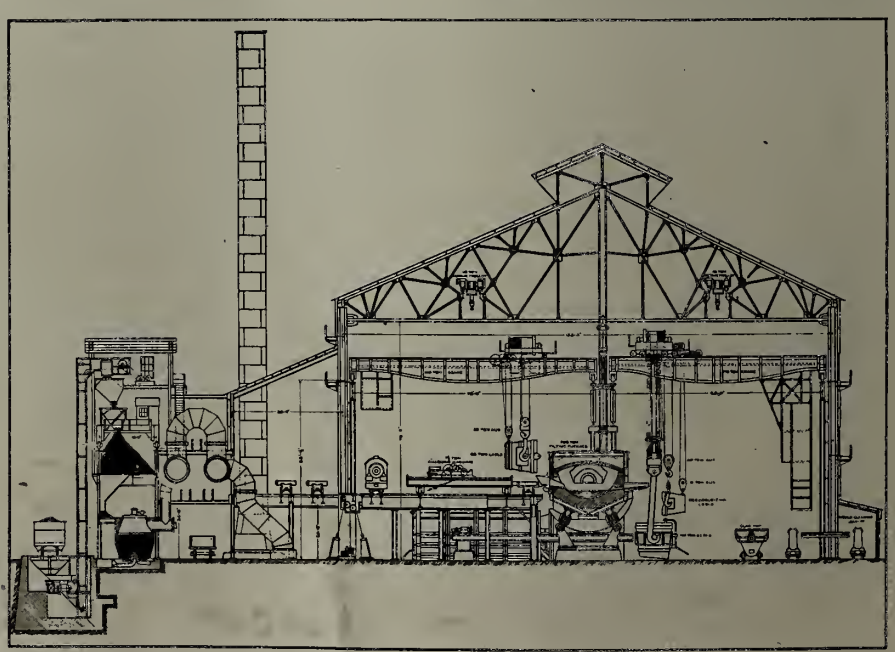


FIG. 4—SECTION OF OPEN-HEARTH BUILDING IN DUPLEXING PLANT



FIG. 5—TWENTY-FIVE TON ELECTRIC FURNACES IN ELECTRIC FURNACE PLANT



FIG. 6—POURING PIG IRON INTO 1300-TON MIXER.



FIG. 7—BLOWING METAL IN BESSEMER CONVERTER



FIG. 8—FIFTEEN-HUNDRED TON HYDRAULIC FORGING PRESS



FIG. 9—THREE-TON MANIPULATOR IN FORGE PLANT



FIG. 10—GENERAL ARRANGEMENT OF BESSEMER CONVERTERS IN THE DUPLEX PLANT

In transferring the open-hearth metal to the electric furnaces, it is the aim to have the metal slightly lower in carbon and manganese than the specifications under which the electric steel is to be made. There is of course often a wide range in the specifications under which the electric furnaces are operating, involving high and low carbon, and various alloy steels.

The new electric plant contains three 25-ton Heroult furnaces, each with an adjacent transformer building. The general design and dimensions are shown by the plan and cross sectional views. The capacity of the plant naturally is somewhat dependent upon the character of the steel made, but may be placed approximately at 12,000 tons per month. This with the output of the two old furnaces gives a total electric steel capacity of 16,000 to 17,000 tons per month, and makes the South Chicago works the world's largest electric steel producing plant.

The advancement in the design and operation of electric furnaces has not necessitated any radical change in the original electrical scheme as a whole. Such improvements as have been made have been rather in the nature of refinement than essential change. In the case of the large electric furnace, it is more necessary than in the small furnace to consider the losses due to reactance in the electrical current. When we consider the relatively little power required by the original furnaces, it is evident that in the case of our larger furnaces which are equipped with transformers of 3750 kilowatt-ampere capacity, the question of power losses is an important one. In respect to the electric furnace load from the central station standpoint, it is interesting to note that with four furnaces operating on the triplex process, 24-hour load factors of 75 or 80 per cent are not unusual. This compares favorably with other forms of industrial load.

A Reducing Slag Employed

In our practice, the furnaces ordinarily are operated with only a reducing slag, and care is taken at all times to see that such conditions obtain as will most thoroughly and quickly effect complete deoxidation. After the steel is thoroughly dead-melted and the reactions are complete as determined by the careful testing of the slag and metal, the current is reduced until a proper pouring temperature is obtained.

The pouring of steel from the electric furnace is subject at all times to the careful control of pyrometric observation. For the production of a satisfactory steel, a proper casting temperature is an important element in all processes, but with the electric furnace special care is needed, partially because of the high heats obtainable with the electric arc. Electric steel on account of its freedom from gases is specifically a dense steel, and in metal of this character the pipe tends to be exaggerated. It is our custom to teem all electric steel in inverted molds with refractory hot tops. As a result, little difficulty is encountered with the piping as usually found in the ordinary ingot.

In connection with alloy steels, it is very necessary to guard against any condition that will unduly tend to unequal ingot strains, and special precautions are taken to avoid undue surface tension in the molds. We are now casting ingots weighing from 3400 pounds to 38,000 pounds, the uniform solidification of which is made the subject of the greatest care. Top pouring, box pouring, and bottom pouring are resorted to, as the individual character of the steel best appears to warrant, and the entraining and inclusion of slag or other foreign matter is carefully guarded against.

To one familiar merely with the casting methods in vogue with ordinary open-hearth or bessemer steel, the pit practice incident to the proper manufacture of electric steel is something of a revelation. In the subsequent work to which the ingot is subjected, whether

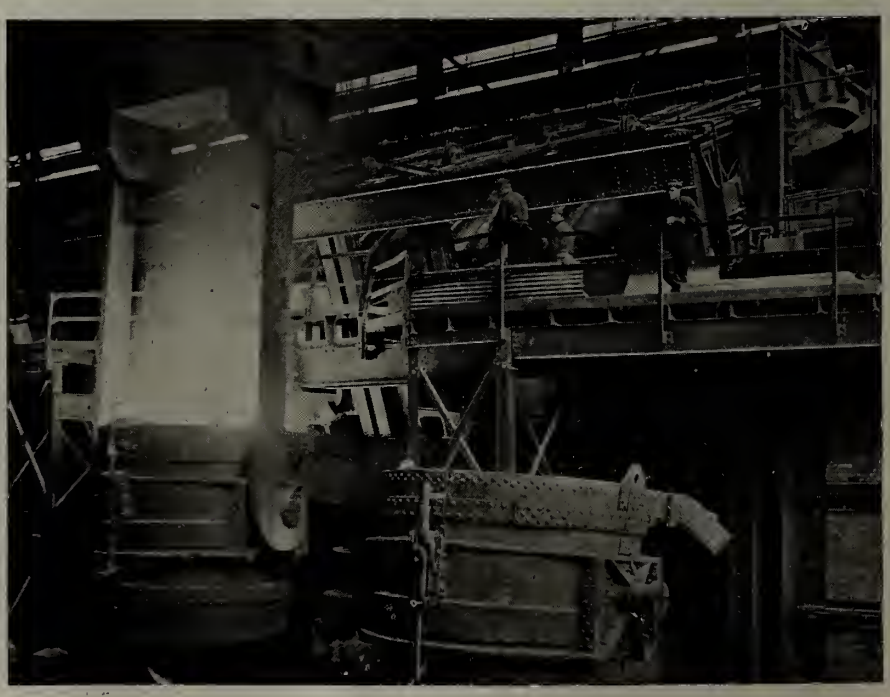


FIG. 11—TAPPING TILTING OPEN-HEARTH FURNACE IN DUPLEX PLANT

in the forge or in the rolling mill, special precautions are taken in the heating, in the reduction of the metal, and in the cooling of the product. Ordinary mill practice will by no means suffice if proper results are to be obtained, especially when alloy steels are concerned. Steel which may be innately of the highest quality when tapped in the ladle may readily retrograde or become unfit unless there is exercised extreme care in its later manipulation. Quality is peculiarly the *sine qua non* of electric steel, and the price of success is eternal vigilance.

There is of course nothing occult nor mysterious in the electric method, although there is more or less misconception concerning the production of electric steel. The electric furnace when used for the manufacture of steel may be likened to a large crucible heated from within instead of from without by the electric arc. It is capable of performing not only the functions of the open-hearth, but very largely those of the crucible as well. Its superiority lies in the rare purity of the heat derived from the electric current and in the peculiar slag control that can be commanded in a neutral atmosphere. Both the bessemer and the open-hearth processes are distinct in their physical and metallurgical character. The electric process may likewise be considered as distinct when concerned with the manufacture of steel directly from cold metal. When, however, it is used to finish metal which previously has been made in the bessemer or open-hearth, it may be considered as supplementary to standard methods rather than as an independent process. Other than as manufactured in the smaller and perhaps more ephemeral installations, electric steel is today, and probably will be in the future, largely produced by a duplex or triplex process whereby, strictly speaking, steel is electrically refined rather than electrically made.

Service the Ultimate Test

The manufacture of steel is far from being an exact science. It is an art founded upon scientific principles and to a degree subject to scientific control —but there is much in the metallurgy of steel that bespeaks ignorance instead of knowledge, uncertainty instead of definite determination. It logically follows that one should not be dogmatic in passing upon the respective qualities of steel made by different processes. As measured by customary chemical and physical standards, it is possible to show that steel made by the bessemer process is at times equal in quality to that made by the open-hearth, and steel made by the open-hearth is equivalent to that made in the crucible. By the same token, it may not be difficult to show that steel made by the open-hearth process is as good as that made in the electric furnace. Certainly some of our laboratory results, upon which we ordinarily depend for metallurgical guidance and control, warrant such an assertion. But just here science, paradoxically speaking, proves unscientific, and the laboratory oft-times does not square with the results in the field. We all know that irrespective of laboratory tests, the final verdict of result in service has already clearly established the superiority of open-hearth steel as compared with bessemer, and the superiority of crucible in its own particular field as compared with open hearth. In the last analysis, the characteristics of any metal must be determined by the composite testimony of practical experience.

And now a word as to the future: I am not unmindful that "A prophet is not without honor save in his own country." Moreover, human limitation and the kaleidoscopic changes of the past make one hesitate to forecast the metallurgy of steel. While ours is the age of steel, it has been given to men here present to see the passing of the age of iron. The crucible is hoary in its antiquity. The converter a short generation ago was but a conception in the mind of a man whom many of us knew personally, and the open-hearth as an essential factor is even more striking in its adolescence.

It behooves one, therefore, to be conservative in his prognostication. Forty years ago this country produced but little over 500,000 tons of steel, 90 per cent of which was made by the bessemer process. Last year we made 43,000,000 tons of steel, and to the open-hearth 75 per cent is to be accredited. While our production of bessemer steel has remained nearly stationary since 1906, when it reached its zenith with an output of 12,250,000 tons, the open-hearth has rapidly forged ahead, and last year it accomplished over 32,000,000 tons.

The marvelous development in bessemer steel was due both to its superiority for general purposes as compared with wrought iron and to its

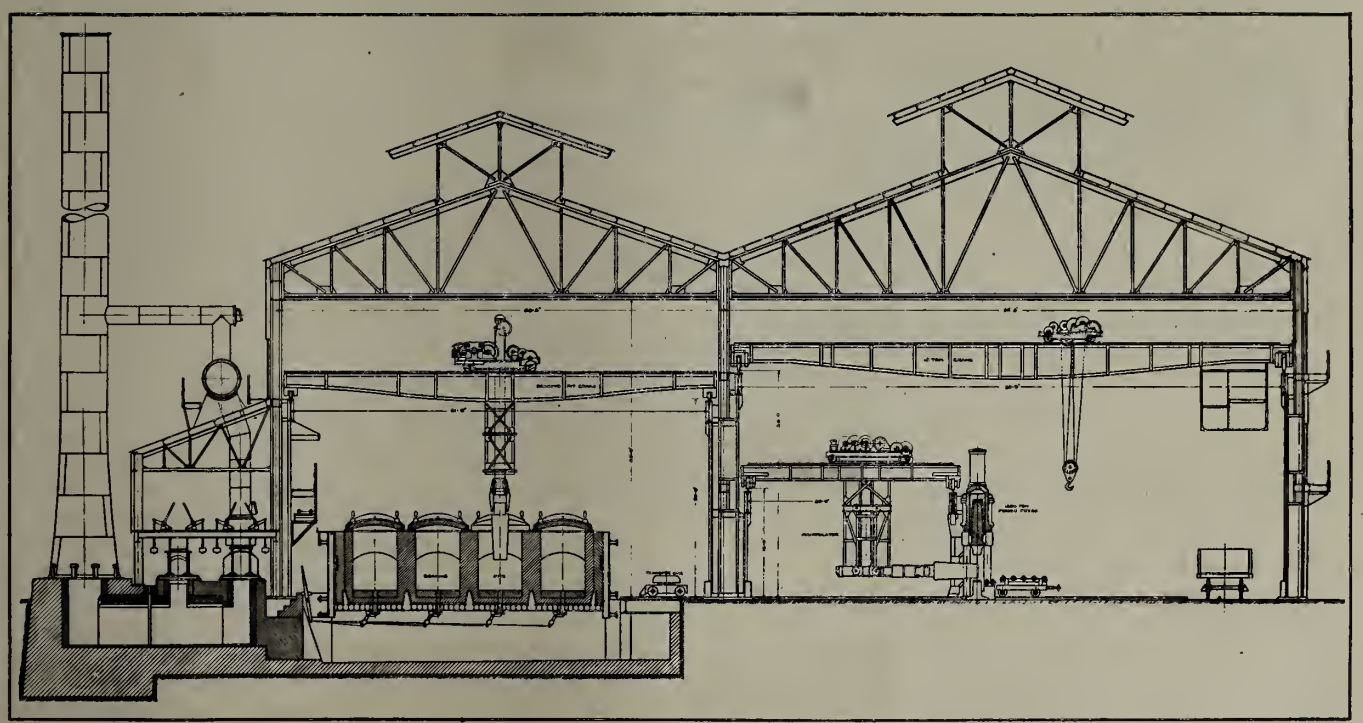


FIG. 12—SECTION OF FORGE PRESS PLANT SHOWING ARRANGEMENT OF SOAKING PITS AND FORGE PRESSES

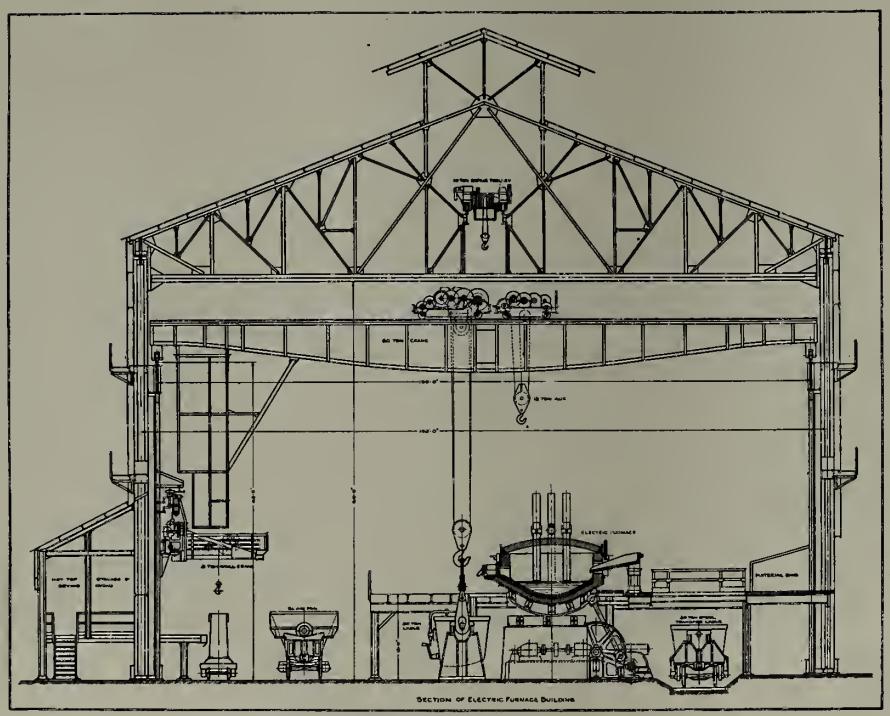


FIG. 13—SECTION OF ELECTRIC FURNACE BUILDING SHOWING ARRANGEMENT OF CRANES, TRACKS AND FURNACES

relative cheapness of production. The more recent expansion of open-hearth is attributable not alone to changing ore additions and to the lower cost incident to modern construction, but to the increasing demand for a higher quality of steel. The passing of the bessemer plate and the bessemer beam and channel was only a prelude to the replacement of the bessemer rail by its open-hearth rival. It is true that steel made by the bessemer process is admirably adapted to certain products, and for many years to come will play an important part in the metallurgical economies of our nation, but the glory of the converter has definitely paled before the more enduring reliability of the open-hearth. In the earlier stages of our steel manufacture, tonnage as an essential element of cost was a dominant consideration. Neither the mill nor the consumer attempted more than a general differentiation as to the character of the product. It was largely a matter of quantity and price. Now quality stands first, and while tonnage has gone on apace, volume has become more and more subordinate to character of production.

What does this increasing demand for higher quality portend for electric steel. How much is history to repeat itself in connection with the new process? It is clear that the lower the cost of production, the greater will be the field presented, and much will depend upon the ironmaster's ability to reduce the cost of electric refining to a minimum. When we realize the economies that have been commanded with the open-hearth furnace during the last 20 years, it perhaps is not unreasonable to anticipate that much may be accomplished along similar lines with the electric furnace. There appears to be no reason why electric furnaces larger than those already installed cannot be built. Cost should be inverse to tonnage, and high quality is not incompatible with large production.

A Striking Growth

If one is intelligently to read the future, he must take into consideration both statistics and psychology. The annual statistical report of the American Iron and Steel institute first separately classified electric steel in 1909, with a production of 13,762 tons. Last year this country produced 234,000 tons, which is more steel than was made annually in all our open-hearth furnaces 30 years ago. The output of electric steel this year undoubtedly will be much greater. We are now producing at the South Chicago plant at the rate of 140,000 tons per year, and we shall shortly be producing at the rate of 200,000 tons per year. Our country is growing rapidly, and the per capita consumption of steel is growing even more rapidly in comparison.

As for psychology, we should not forget that the luxury of today is the necessity of tomorrow, and that emulation is a powerful creative force. Bessemer steel was eminently satisfactory until the superior quality of open-hearth metal relegated it to a subordinate class. And now comes elecrtic steel with a still higher standard. Safety cannot be measured by price, and public opinion will more and more insistently call for the highest excellence in the automobile, the airplane, and other forms of fabricated material.

Forty year ago Sir William Siemens dreamed of making electricity the handmaiden of the metallurgical art, and through his efforts his dream was realized in the birth of electro metallurgy. Twenty years later, Heroult visualized the dominance of electro metallurgy in the realm of steel. Whatever the future may have in store, let us remember that progress waits upon vision, and vision even though it resolves for the moment into a mirage of shattered hope, often is finally translated into accomplishment.

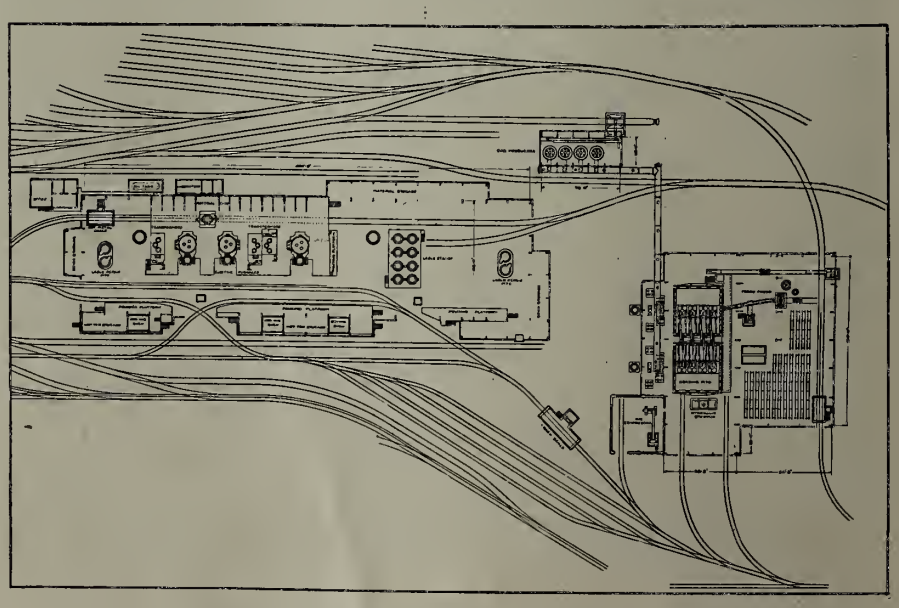


FIG. 14—GENERAL PLAN OF ELECTRIC FURNACE AND FORGE PRESS PLANTS AT SOUTH WORKS

Manganese Conservation Necessary

Curtailment of Importations by War Has Given Impetus to Domestic Mining —Limited Supply Calls for Rigid Economy Followed by the Elimination of Unnecessary Use of This Material

BY C. R. ELLICOTT

WAR'S effect on the manganese supply for the steel production of America has taught us that our greatest industry is dependent largely upon the importation of manganese ores or manganese alloys.

In the past two years, material efforts have been made to increase the domestic output of manganese ores and alloys spurred on, perhaps, by the high price per unit of manganese in the ores. The effect of this effort has been felt, but the situation is still serious. Now and in the immediate future it is not only desirable and profitable to prospect for, and develop manganese and manganiferous iron ores, but it is our patriotic duty from an economical standpoint to do all in our power to increase the domestic production of manganese alloys, and to conserve our available supply. Doubtless sufficient manganese ores and manganiferous material exist within our boundaries to meet our own requirements until normal conditions return. Meanwhile, it will be necessary for a broad-minded spirit looking toward the national welfare to exist, first among the steel manufacturers, and second, between the manufacturers and the steel consumers.

The Effect of Manganese

The influence of manganese must be appreciated to its fullest extent in steel manufacturing, and equally important, its effects upon the finished product must not be overrated if any economical departure from our present standards is to be made. Manganese is used in steelmaking for three distinct purposes: First, in the melting operation it is of great advantage up to a certain percentage of the charge, as a deoxidizing agent for making ingots which can readily be rolled or forged with the minimum amount of scrap and defective material; second, it is used in specified percentages to give desired physical results in the finished product, acting as an alloy; and third, it is added to obtain a specified percentage in the finished material, but not for the hot working qualities of the steel nor for desired physical properties which would necessarily be a function of manganese. It is added as a matter of accepted practice subscribed to by both producer and consumer without considering manganese conservation.

These three purposes are considered in detail as follows:

As a Deoxidizing Agent:

In the average open-hearth practice 0.60 to 0.80 manganese is in the charge from the pig iron and scrap. All furnace reactions including decarbonizing, dephosphorizing and desiliconizing are oxidation processes. Some oxides are soluble in molten steel, and these, when the steel is near the point of solidification, will usually generate gas, thereby forming blowholes, which appear as surface or internal defects in the finished product. In addition, oxides contribute to what is commonly known as "red shortness" or brittleness when hot. Manganese material in any form in the initial charge prevents the formation of soluble oxides in the steel, or reduces what might be formed during the period the steel is molten. In other words, if an appreciable percentage of residual manganese can be maintained in the open-hearth furnace from the time the charge is melted, until it is tapped, further additions of manganese can be eliminated in high carbon steels, and greatly reduced in lower carbon steels to produce the same ductility in rolling which would be expected from heats which were low in residual manganese and finished with high manganese recarburizing additions.

This practice will not reduce the total pounds of manganese added to a given ton of steel, but it will permit the use of a lower grade of manganiferous material available in this country to replace the higher grade material which in normal times has been imported.

Physical Properties:

The second use of manganese is to give special physical properties to the finished product, subdivided as follows:

(a) Steel used in the rolled, forged, cast or annealed conditions.
(b) Steels heat-treated.
(c) Special manganese steel containing 11 to 14 per cent manganese.

Subdivision (a) contains by far the greatest tonnage of steel produced. The effect of manganese on the physical properties of these steels is to increase the elastic limit and tensile strength. In cases where this is the sole purpose of manganese additions, we suggest the use of other strengthening elements, preferably carbon.

Subdivision (b) consists of heat-treated steels of normal manganese content. The effect of manganese is similar to nickel, except that its influence is not so marked. Its effect is to retard the transformation of austenite in cooling. The use of manganese for improving the physical properties of heat-treated steels is not essential, as this improvement can be obtained by other available elements. We would, therefore, suggest that where nickel can be substituted, the use of manganese be restricted, and in other cases, where it plays no part in heat-treated results, it be reduced to a point where its function is of forging or rolling importance alone.

Subdivision (c) Hadfields manganese steel containing 11 to 14 per cent manganese is a special product with special physical properties due to the manganese content. No change in present practice for this steel can be made.

Specifications:

The other function of manganese is to fill specifications. There is no question but that many consumers specify a manganese content for no reason within their knowledge and for no special purpose. A large tonnage of the steel produced is made to both physical and chemical specifications. If only the physical qualities in forged, rolled, cast or heat-treated products were specified, the manufacturer would be free to economize in manganese.

Manganese Requirements for Steel

The statistical record of steel production for 1917 has been delayed, but since the total 1917 production was close to that of 1916, the 1916 figures are used as a basis. We have classed the various grades of steel roughly according to manganese content usually specified. These classes are arranged in the order of their tonnage importance.

Class 1.—Low carbon steels below 0.25 carbon, such as structural steel shapes and plates for bridges, buildings, etc., boiler and fire box steel, plates, shapes and bars for railway cars; low carbon splice bars, forging steels, rivets, pipe, tubes, tin plate, bolts, sheets, spikes, tie plates, wire rods, merchant bars, etc.

Class 2.—Medium carbon steels 0.25 to 0.80 and high manganese steels, including bessemer and open-hearth carbon steel rails, quenched high car-

This paper by C. R. Ellicott, superintendent of furnaces and mills at the Lehigh plant of the Bethlehem Steel Co., South Bethlehem, Pa., was presented at the fourteenth general meeting of the American Iron and Steel institute, held at New York City, May 31.

bon splice bars, nickel, structural, rivet, silicomanganese spring steel, chromevanadium automobile and railway spring steels, machinery, ship and structural forgings, alloy, machinery and commercial forgings, heat-treated axles and shafts, steel wheels and tires, carbon shell steel, rifle barrels, small arm parts and low-carbon open-hearth and bessemer cold-drawn screw stock.

Class 3.—High tensile carbon and alloy steels containing 0.60 to 0.70 manganese. In this class is included gun forgings and castings, marine and heavy machinery forgings and castings, structural ship steels, automobile bar stock, forgings, etc.

Class 4.—High carbon low manganese steels, high carbon and other steels, involving comparatively small tonnage. This would include file steel, armor plate, armor piercing shells, carbon and alloy tool steels, carbon spring steel, nickel chrome commercial bar stock, punches and dies, etc.

The tonnage of ingots of these classes for the year 1916 was approximately as follows:

Class	Tons	Percent of Production
1	21,350,000	49.89
2	11,998,187	28.06
3	9,008,186	21.07
4	417,307	0.98

The steels of Class 1 are considered as low tensile, or soft steel, having as a rule an ultimate strength below 70,000 pounds per square inch. The method of manufacture for the same grades varies between manufacturers. Some prefer to make what is known as "dead" steel, which contains on an average 0.60 per cent manganese; others "churned" or "rimmed" steel, analyzing on an average 0.35 per cent manganese. We will assume that the average of all steels in class 1 is 0.50 per cent manganese. The residual manganese in the steel bath in the furnace would be less than 0.10 per cent, so that with 30 per cent less of manganese added, this steel would require an addition of 0.60 per cent of metallic manganese, or a total of 128,100 tons.

In Class 2 the manganese varies from 0.40 per cent to 1.40 per cent manganese, the average being about 0.70 per cent. The method of adding manganese to these steels varies considerably, depending upon plant construction, and the individual opinions of the operators. At present there are five methods in common use for adding manganese as follows:

(a) Adding cold crushed ferromanganese in the ladle or furnace.

(b) Melting ferromanganese in electric or oil furnace, or in special cupolas, and adding molten in the ladle.

(c) Melting spiegel in a cupola and adding direct or diluted into the ladle.

(d) Adding about 5 per cent manganiferous pig iron from mixer or cupola to furnace or ladle.

(e) Recarburizing with 1.00 to 2.00 per cent manganese iron in the furnace or ladle and adding the balance of the manganese in alloy form.

In this class of steels probably the greatest proportional conservation of manganese could be accomplished. Assuming a residual manganese of 0.10 per cent before tapping, and a normal manganese loss of 20 per cent, this class would require an addition of 0.75 per cent manganese, or a total of 89,986 tons of manganese.

In Class 3 a considerable percentage of the product today is forgings for guns and ships and castings made from both acid and basic steels. These steels we will consider as high-grade products, low in sulphur and phosphorus. It is a common practice to add in the nighborhood of 0.20 to 0.30 per cent manganese to the charge in the form of ferromanganese or low phosphorus spiegel in order to increase the manganese content of the charge to about 1.00 per cent. These steels will average 0.65 per cent manganese in the finished product, and will have a normal manganese loss of 20 per cent. With a residual manganese of 0.15 per cent before tapping the final additions would be 0.63 per per cent. With 0.20 per cent manganese charged, the total tonnage requirements of manganese would be 74,767 or 18,016 tons in charge and 56,751 tons in final additions.

In Class 4 the manganese additions are small, for (to use a mill term) the heats are "caught coming down" as carburization is started when the desired percentage of carbon is reached, and the manganese, as a rule, is within specifications. We will say that this grade requires an addition of 0.10 per cent on an average, or 417 tons of manganese.

The total manganese requirements from 1916 figures are therefore:

	Tons Manganese
Class 1	128,100
Class 2	89,986
Class 3	74,767
Class 4	417

or the equivalent of 366,600 tons of 80 per cent ferromanganese.

The manganese alloy production and imports of the United States for 1917 were:

	Tons
Ferromanganese produced	286,000
Ferromanganese imported	45,381
Spiegel produced	193,291
Total contained manganese produced and imported	304,000
Manganese ore imported	629,971
Ferromanganese from imported ores	300,000
Contained manganese in alloy produced from imported ores	240,000

The domestic production of high grade manganese ore for 1917, is estimated by the United States Geological Survey at 122,275 tons, and this is expected to reach 172,900 tons in 1918. Using the 1918 figure, this will net us but 70,000 tons of 80 per cent ferromanganese or 56,000 tons of contained manganese. The low grade ores are being produced at an estimated rate of 800,000 tons for 1918. This will yield about 340,000 tons of an alloy containing an average of 35 per cent manganese, or 119,000 tons of contained manganese.

The situation is, therefore, briefly this: We require, at our present rate of steel production, present specifications and methods, 293,270 tons of contained manganese per year, and we are producing in 1918 at the rate of 175,000 tons from our own raw materials.

There is no question that the importation of manganese ores or ferroalloys is undesirable at the present time. We have the manganese in our country in sufficient quantity to be independent for some years. We can produce it and certainly can devise means to make it applicable to our steel production in the immediate future. We have been accustomed to the use of 80 per cent ferromanganese in the manufacture of open-hearth and soft bessemer steels, but we can substitute lower percentage manganese alloys for this work, which can be produced in our own country, particularly if the steel specifications have their manganese limits reduced.

The majority of the steels in Class 1 could be "churned" or "rimmed" steel with 0.20 to 0.40 per cent manganese, and be of as good quality and, at the same time, eliminate the use of high grade ferromanganese. In Class 2 recarburizing could be done with 5 to 6 per cent manganiferous iron, or spiegel and iron below 0.15 per cent phosphorus mixed in the proper proportions and added molten. In Class 3 the highest grade ferromanganese could be used for probably half of the product. With comparatively low carbon and high manganese, the low grade manganese alloys would not be suitable because of the proportion of manganese to carbon. In acid steels of low phosphorus, the use of the lower grade alloys would be prohibitive due to the impossibility of producing a low phosphorus low manganese alloy. In Class 4 spiegel or alloys containing less than 20 per cent manganese could be used entirely.

By using pig iron containing 2.00 to 2.50 per cent manganese in open-hearth charges, the residual manganese

in the steel before tapping will vary between 0.20 and 0.40 per cent, so that in many cases further additions of manganese for deoxidizing purposes are not required, and the final manganese additions are for physical properties only. With basic steel at 0.40 per cent, 10 points of manganese would add 2,500 pounds per square inch to the tensile strength. The same effect could be accomplished with three to four points of carbon. As an example, all the standard specifications for open-hearth rails today, call for manganese limits from 0.60 to 0.90 per cent. No reason exists why this specification should not be changed, to read, manganese 0.40 to 0.70 per cent, with a higher carbon adjustment to give the same physical qualities. It would appear therefore, that at least an average of 15 points of manganese could be reduced in the specifications for steels in Class 2.

Without the use of high manganese pig iron in the charge, assuming our previous conclusions are possible, the requirements of ferromanganese and spiegel and lower manganese alloys are shown in the accompanying table.

Tonnage Requirements

Class	Metallic manganese required Tons	Ferromanganese, per cent— 80 Tons	60 Tons	40 Tons	20 Tons	6 Tons
1	100,345	0	25,085	40,138	346,200	0
2	71,990	0	0	0	179,975	598,715
3—Charge	18,016	.....	35,470	0	0	141,880	300,300
Final	56,751	74,767				
4	417	0	0	0	2,085	0
Totals	247,519	35,470	25,085	40,138	670,140	899,015

By changing or standardizing our method of recarburizing adopting a standard process for the manufacture of soft steels, and lowering our specified manganese requirements where possible, we can reduce the total tonnage of manganese from 293,270 tons to 247,519 tons or 15.6 per cent. Further, the requirements of 80 per cent low phosporus ferromanganese is reduced to 35,470 tons.

The estimated production of 80 per cent ferromanganese from domestic ores will net us 70,000 tons for 1918, which is sufficient for the country's needs. The manufacture of 60 per cent ferromanganese will require high grade ores so that 25,085 tons of 60 per cent ferromanganese will lower the possible production of 80 per cent from 70,000 tons to about 51,200 tons and 40,135 tons of 40 per cent ferromanganese should be made from the lower grade ores. This will require approximately 100,000 tons of ore. This leaves about 700,000 tons which will produce 520,000 tons of alloy averaging 20 per cent manganese. This would leave a shortage of 150,140 tons of spiegel.

In the last 12 years the spiegel production has varied from 83,000 to 348,000 tons per year. What proportion of the ore available for the manufacture of 35 per cent manganese has been used heretofore for spiegel manufacture is impossible to estimate without a detailed canvass of the various producers. The fact remains, however, that there are great quantities of low grade manganiferous iron ores in this country. The use of 1.50 to 2.50 per cent manganese pig iron in the open-hearth charge would reduce the quantity of manganese required for additions, approximately 15 per cent for basic open-hearth steels, or a further reduction of 10.6 per cent manganese in the total steel produced.

There is ample reserve of ores to produce sufficient 5.00 to 6.00 per cent manganese recarburizing iron for a considerable period. The annual requirements of this grade would be approximately 900,000 tons, which could probably be increased to produce a further saving of 20 per cent spiegel.

It has been customary for us to specify a phosphorus content in ferromanganese of not over 0.250 per cent. This is probably not so vital as we have always considered it. For example, an addition of 0.60 per cent manganese using 80 per cent ferromanganese of 0.25 per cent phosphorus, would cause a phosphorus addition to the steel of less than 0.002 per cent. In most cases this limit of 25 per cent could be appreciably increased without affecting the quality of the product. The addition of 0.50 per cent manganese through the use of spiegel would add to the steel 12 points of carbon, and assuming we could afford to 0.015 points of phosphorus, the spiegel could contain 0.600 per cent phosphorus, which is well above the content which spiegel produced from our own ores, would contain. For basic steels this would be no hardship; for sheets and tin plate it would be an advantage, but for high grade acid steel, the 80 per cent ferromanganese would necessarily be used on account of the phosphorus.

The phosphorus content of our high grade domestic ores 40 per cent and above is roughly estimated in the following table. The estimated production for 1918 is from the United States Geological Survey.

High Grade Manganese Ores, 40 Per Cent and Above:

State	1918 Production Tons	Probable Phosphorus Content Per Cent
Alabama	200	0.200
Arizona	22,000	0.050
Arkansas	10,000	0.200
California	12,000	0.100
Colorado	500	0.200
Georgia	5,000	0.100
Montana	81,600	0.050
Nevada	2,500	0.100
New Mexico	1,500	0.100
North Carolina	100	0.150
South Carolina	2,000	0.150
Tennessee	5,000	0.150
Texas	2,000	0.050
Utah	4,000	0.150
Virginia	20,000	0.200
Washington	1,000	0.100
Wyoming	500	0.100
Total	169,900	

Low Grade Ores for Manufacture of 35 Per Cent Ferromanganese:

Appalachian Region	40,000	0.200
Arizona	25,000	0.100
Colorado	100,000	0.200
Lake Superior	150,000	0.200
Lake Superior	150,000	0.090
Montana	25,000	0.080
New Mexico	36,000	0.100
Zinc Residuum	175,000	0.040
Miscellaneous	15,000	0.200
Total	716,000	

A serious difficulty which becomes apparent from the above tabulation is the selection of furnaces for the manufacture of the various alloys, the economic transportation of raw materials and the distribution of the product to the best advantage.

With our present methods of recarburizing, if imports were suddenly cut off, we would find our production of steel greatly impaired. Our country is actually short less than 160,000 tons of 20 per cent spiegel or 11 per cent of our manganese requirements, if we use to the best advantage possible the ores that we are producing at our present rate, but with our present methods we are short approximately 40 per cent. The ores are available for spiegel production, but they must be mined and converted.

It cannot continue to be a question of costs, nor can the usual routine of specifying and buying ferromanganese remain. This situation demands the guidance of a strong, able, impartial committee of the American Iron and Steel institute, which knows, and can tell, or show how our materials are to be used.

With such a body of men and the hearty co-operation of every steel plant in the country, we can make our greatest manufacturing industry as independent as it is great.

Steel Industry Meets the Mark

Call of Country Has Been Answered in Patriotic, Aggressive and Fair-Minded Spirit Says Gary—Criticism at Washington Gives Way to Active Co-operation—Time to Fight With All Power

IT IS a pleasure to greet so many members of the iron and steel industry at this meeting, nearly eight years after the first meeting was held. Those who were present will remember that the first meeting was held in a rather small room adjacent to this one, and that room was not filled. It gave promise of great results, and our expectations, have been more than fulfilled.

There are incidents connected with that first meeting which now seem to us rather sad. There were representatives from the iron and steel industry of all the steel-producing countries. There were men from Germany and Austria, men of high type, fine character, men who were a credit to civilization, men for whom we had very great respect, and men who, if in the control of the affairs of their affairs of their respective countries, would prevent the continuance of present conditions.

Following that meeting, in 1911, at Brussels, another international meeting was held, attended by many who are present here today, and by quite a large number of representatives of the iron and steel industry of the various steel-producing countries of the world. It was a most harmonious meeting and promised great results. They have not been fulfilled. But I may say, again, that if the men who were at that meeting were in control of international affairs in my judgment, there would be no wars.

War Conditions Desperate

The war conditions in Europe are not only deplorable, but today they are desperate. We hardly know what to think, and we are not inclined to consider what may be the possibilities. We have for some time realized and we see now more clearly than ever before that the commencement of the war was deliberate and was influenced by a desire on the part of a few individuals, comparatively speaking, to rule the world by might.

We may carry our minds back to the conditions of Europe and Asia and consider for a moment the desperate, despotic, arbitrary and cruel methods of conquest and lust, and we can think of nothing worse than the things which are being done today.

It would be impossible for anyone, much less myself, to attempt to picture the misery, the agony, the suffering of mind and body, that is going on in France today. The conquering hosts are cruel to the limit in their methods and in their treatment; and even though we hope to be happily disappointed we must not expect, gentlemen, that in the near future there will be any great successes on the part of the valiant hosts who are fighting in defense of humanity.

In all history there has never been any picture of battle scenes and battle results which were so terrible as those now existing and which we fear may be continued for some time.

It would be useless to discuss what ought to have been done to prevent these conditions. We are not at this time particularly concerned with the past. Many of us, probably most of us, perhaps all of us who are present on this occasion, would have done things some years ago that were not done. Some of us at our regular steel meeting in October, 1914, as forcibly as we could, presented our views as to what should be done. But that is a thing of the past. There were reasons for nonaction. Whether they were good or valid we need not talk about it at the present.

It would not be useful now to refer in the tone which I have adopted, to the awful things that from our viewpoint are being done in Europe, except for the purpose of emphasizing in the strongest words and in the best possible manner, the fact that we personally are not without courage, we are not without vision, we are not without appreciation of our responsibilities. The people of this country, represented by such as you, will never give up this fight until (what we believe is not possible) Germany comes to this country and actually conquers and subdues the people who are here.

I was pleased to hear Mr. Schwab say night before last that of all the different lines of industry the steel and iron people are doing better, more loyally and more effectively their duty than any others. And, gentlemen, we may have to do much more than we have done; we may have to devote more time and expend more money in assisting to carry on this war. Taxes are liable to be much higher than they have been. There is talk of doubling the income tax and the excess profits tax and of taxing many other lines of industry or activity. And we may expect very much greater hardships.

Measure Up to Mark

The individual who possesses little or nothing to be taxed, who represents little or nothing which can be taxed, is often quite prompt in saying it is immaterial to him how large the taxes are and he is surprised that people generally seem to be so indifferent and so selfish; but the men who are here this morning have and represent a great deal, and in dollars and cents we know that this war will be more costly to us as it proceeds. We know that our property, for most of us have some property, and the large interests which we represent, will be more and more heavily taxed. But in defense of the rights, the liberties of the men of this country, in defense of civilization itself, we do not care what the

The Will to Fight

WE have reason to be hopeful. The man who recognizes the dangers and the difficulties which are in sight is not necessarily a pessimist. I prefer the man who takes a broad vision, which covers disasters and possibilities of destruction, but puts his back up against the wall, and with his teeth shut, proposes to fight it out until success is achieved. I do not care for the man who is so optimistic that he never sees anything but sunshine and prosperity and happiness, for he never accomplishes anything worth while. Gentlemen, this is a time for judgment, for patience, for level heads, for patriotism, and above everything else the grit that stands and fights and never gives up. For the long future I am an optimist. I believe we will win this war. Why will we win it? Because first of all we are right. We know our rights and we seek our rights and we have the brains and the ability and the courage to stand for them until they are secured.

Opening address by President E. H. Gary before American Iron and Steel institute at New York, May 31.

expense is or will be, provided it is equitably distributed, and provided, to the best of the ability of honest and faithful men, the money is well expended.

Steel men have marched up to the point of obligation at every opportunity with the most patriotic, the most loyal, the fairest disposition, having in mind the one idea of trying to serve the country faithfully, in total disregard of personal gain or success. Whatever may happen in the future to us, to our business, or to our country, we shall have the satisfaction of knowing that we did our best, and we did it patriotically, with pure motives and with a desire to render service that our friends and our children may always know was well rendered.

Washington Seeks Co-Operation

Now, this disposition and action on the part of the steel people has had its effect in Washington. There have been times when our whole business was by some criticized unfavorably. Even since the war, your general committee has met officials in Washington, who at first seemed disinclined to render fair judgment or to grant what, under all the circumstances, we believed we were entitled to.

You have read in newspapers that it was disposition and the intention of the governmental officials to take possession of the iron and steel industry and manage it, and you have read that it was proposed to do or not to do a good many things which seemed to you unfair. I cannot speak for the future. I do not know what may happen. I do know that it frequently turns out that there are government officials as well as others, who prove to be incompetent to fill the positions which they occupy; and there is always danger of a mistake being made, and, of course, we may have reason for apprehension; but we can speak of the present and the past—that we know, and I believe my associates on the committee will confirm what I say—that after we have met the officials in Washington and have had full opportunity to discuss with them the questions raised or the action proposed, the final result has been, though not entirely satisfactory to us, yet in the main proper, all things considered.

There have been times when we have been more or less discouraged. Claims have been put forth that were not justified by the facts and the figures, and at times it has seemed to us temporarily there was great danger of our lines of business being injured and perhaps jeopardized, but by patience and perserverance and discussion we have been able to avert disaster, at least, and have generally secured what was appropriate, certainly from the standpoint of the government officials.

Today you will hear very little of anything in Washington against the iron and steel industry. You have demonstrated that the professions which you have been making during the last 10 or 11 years were sincere. You said in your speeches at your meetings time after time that you had no improper intention relating to your management, that you were not disposed to do anything which would be injurious to the public interests, that it was a cardinal doctrine of the iron and steel men that they hoped to be of real benefit to the public, and that their management so far as it could be controlled by those in authority, would finally be proven to be above reproach; and I believe all Washington is of that opinion at the present time.

We find today government officials in high places coming to the steel men with the statement that they want to co-operate with us, that they want our assistance; that they depend upon our loyalty and our ability to assist the government in this time of great distress. It is to my mind a source of gratification that we may look forward to the future with hope and expectation that the government of the United States is going to assist, to foster prosperity and business enterprise, instead of attacking it.

We must remember always that we cannot expect to get more than our just deserts, and we must be loyal to the government and loyal to the law of the land, and we must be reasonable and just, and expect that when we deserve punishment or censure we will get it from the government. Carrying our minds back to the dark business days of 1907 and some that followed, and to the words spoken by many of the gentlemen now here concerning their intentions—we know all meant what they said; you have proven this. We know that in the future your acts will correspond with your heretofore expressed intentions and therefore that we may not only hope but we may expect there will be co-operation between the government and the business people, and that consequently this country, if we succeed in this war, will have reason to occupy the highest and best position of all the nations of the earth.

Putting Affairs In Shape

We are doing another thing, gentlemen; and the government is permitting us, assisting us, urging us to do it. We are day by day putting our affairs in better shape . We may not be making so much money, or if we do make it we may be paying it out in taxes and in extensions to our works for the benefit of the government at such cost that we are absorbing our profits, but nevertheless we are putting our works in better condition; we are being better prepared for the future, the iron and steel industry will be on a better basis and a better footing than ever before; well prepared to succeed in the contest and the competition for international trade. If we win the war that will be worth something to us, if we do not have much in cash. If we lose the war then it is not so important whether we have anything or not.

On the whole, gentlemen, our business is good. We at least have a steady customer, and one able to pay. Our prospects at the present time, notwithstanding the horrors and the costs of the war, are good.

After the war is over, when history is written up, the fair minded man who writes the account will say that in the ranks of the hosts of really fighting men, with fighting disposition, were the members of the iron and steel industry of America.

The Spirit of Sacrifice

I REMEMBER in 1914, on the third and fourth and fifth days of August, I took pains to go around the street of Paris to see the mobilization of troops. I saw French soldiers by the thousands marching along the streets going to the stations to take trains for the front; and along with these boys and men were their wives and their sisters and their old fathers and their children, allowed by the gendarme to proceed without interruption, and, while everyone knew that every soldier so soon as he got to the front would probably be in the midst of battle, and that many, many of them would lose their lives, there was not a tear or a sigh to be seen or heard. Every woman, every child, every old man was encouraging the boys as they marched along the streets. And such is the spirit of this country. Why is it so? Because we know as they knew that we have the right on our side, and that the other side has nothing but might.

Acclaim Grim Resolve of Victory

Iron and Steel Institute in Largest Meeting of History Gives Demonstration of Determined Patriotism—Schwab Inspires Producers to Utmost Efforts—Replogle Praises Co-operation of Industry But Sounds Shortage Danger

A SHADOW cast upon it by the German drive to the Marne served only to intensify the sober determination and the will to make the iron and steel industry a great instrument of victory at arms, which were displayed on every side at the fourteenth general meeting of the American Iron and Steel institute at New York May 31.

The iron and steel producers gathered in such numbers as to far outrank the meetings of previous years, heard their leaders and government representatives declare the industry had fully measured up to every call of the country and government upon their patriotism and power. They responded with their enthusiasm and cheers to the declarations of Judge Gary that whatever more was demanded of the industry both in tonnage and treasure would be cheerfully forthcoming. The slogan "Everything for war and victory" was everywhere and supreme. Private business considerations were wholly set aside.

The meeting had its memorable moments. Charles M. Schwab, director of shipbuilding, received a wonderful ovation when he rose to speak at the evening's banquet. He fired his fellow manufacturers with a resolve to do their utmost to co-operate with him in his great task. His address was sober, yet inspiring, and was colored by characteristic optimism. J. L. Replogle, steel director, also was accorded an enthusiastic greeting. He praised the 100 per cent service which the iron and steel industry was rendering the government but emphasized the great demands of the war which would take up, he said, the whole output of the works for the balance of the year at least. He placed the present bookings for the government and its allies at 16,800,000 tons.

The formal program of the meeting was featured by various papers of exceptional excellence and significance. The first description to be publicly presented of the triplex process of steelmaking as perfected by the Illinois Steel Co., attracted much interest and was looked upon as a far-reaching development. Motion pictures were used to clearly display the various steps of the process from the blast furnace, through the converter, open-hearth and electric furnace, to the forging press or rolls. Conservation of ferromanganese was another timely and important subject given extensive treatment. The registration of the meeting was record-breaking, totalling between 1100 and 1200.

"I FACE you with a heart so filled with responsibility and a heart so filled with the thought that my friends in the iron and steel industry have placed on me a trust which I cannot fail. I must speak as the heart dictates in a tone of deep responsibility of the situation in which the United States and all its people find themselves tonight," said Mr. Schwab. In reminiscent vein he carried the banqueters back to the formation of the institute in a small way more than a decade ago. He paid a tribute to Judge Gary, "as a true friend to myself and every single man in the American Iron and Steel institute." He congratulated the iron and steel industry in having at Washington as a director of the iron and steel business a man of the caliber of Mr. Replogle.

Mr. Schwab expressed his appreciation of the enthusiastic reception given him by his fellow iron and steel makers and said that such encouragement and good will would be a tremendous help in his undertaking. He said he was not so vain as to think that he individually could be responsible for the success of the great enterprise. The united effort of everyone is needed. "No man or group of men can be successful in this undertaking without the approval and encouragement of every man, woman and child in the United States," he said. He spoke of the natural tendency to criticize things in Washington. "I am sure I would not be fair to myself or to my associates if I did not say that the work of Messrs. Hurley, Piez and others has been magnificent. I have examined 65 to 70 per cent of the ship-producing capacity of the United States, and I must say that the work has been magnificently accomplished. I do not believe that we in Washington cut a figure in this great undertaking after all. The men in direct charge of the shipyards and accessory plants are those who had the real responsibility. This responsibility rests not only upon the managers, but on the superintendents, foremen, subforemen, yes, on the workmen themselves. We have started on a ship program with a wave of enthusiasm and confidence and at a pace that cannot be stopped. In May, the United States produced and placed in commission and in service, 250,000 tons of deadweight capacity. I am sure May will be the least productive month we will have. We may be confident that if we maintain the same spirit as now is prevailing, we will not be disappointed.

"What is the necessity? I have enlisted in this work every plant that can do ship or accessory work. We have authorized or contracted for within the week new works aggregating in cost between $200,000,000 and $250,000,000, which will increase our ship capacity by 3,000,000 tons per year. The Great Lakes this year will produce between 400,000 and 500,000 deadweight capacity. Extensions have been provided whereby 1,000,000 tons will be produced next year. In January, 60,000 workmen were employed in the shipyards. Today there are 350,000. In addition, 350,000 are employed in the manufacture of engines and accessories.

"I am so proud of the people in the steel industry. Replogle is afraid

that we are not going to get enough steel. I am more optimistic and am not worrying much about that. Ships, you know, are first on the list. I know Replogle will give us the steel; I know the industry will produce the steel; and I feel sure there will be given us all the steel this year and next required to carry out our program. I know of no industry which has done more nobly by its country than the steel industry. I want you with me and I want to succeed. If I succeed, you succeed; if you succeed, the industry succeeds. In the end we will have the sense of patriotic satisfaction of having done our duty not because we are asked to do it but that we did it with love for our country, love for our fellowmen and love for each other."

At the conclusion of Mr. Schwab's address, Judge Gary declared if there should not be sufficient capacity to satisfy the ship program and other war demands, he pledged that the works will be extended and the capacity increased.

Replogle Enthusiastically Received

Mr. Replogle was given a great ovation when he arose to speak at the banquet.

"The last time I was privileged and honored to address you was about three years ago at the Chicago meeting, when I appealed to you for the establishing and maintenance of proper extras and differentials on various lines of steel products, he said:

"So far as proper prices, extras and differentials are concerned, you do not, at present, need any help from me, as this is now looked after in a more capable way by the official committee you have appointed, and my plea during the past 10 months is of a different kind. Extra tonnage of the important lines of steel products necessary to win the war! If there is one thing in the world of which I am positive, it is this fact that the direct and indirect war necessities of the United States and allied governments in this great emergency are such as to require the entire output of steel which you can make, at least for the balance of this year. 'War necessities' is rather a flexible term—and it has been given much thought and consideration of those in authority at Washington.

"I had a conference Wednesday with the representative of the corset industry. It developed that their profits last year from this great industry aggregated $40,000,000, and that they require 15,000 to 20,000 tons of high carbon spring steel annually.

"There have been many lists of so-called nonessential industries prepared at Washington, but they have never been officially issued, as there has never been complete agreements on this subject.

"All industries are essential from one standpoint or another—if no other, from the standpoint of the owner, and we have preferred to reverse the procedure and prepare a list of the more essential industries, giving them such preference in steel supply, fuel, transportation and labor as are necessary to get the results for which we are all striving.

Unfilled Orders Tremendous

"It may be surprising to many of you to learn that we now have unfilled orders on the books of the steel manufacturers and on our desks at Washington, for 16,800,000 tons of steel for the United States and allied governments and the orders are coming in at a greater rate than they are being executed, although I believe we are near the peak of production. Difficulties of some of our gallant allies are very great. Coal in Italy is $140 per ton, and their steel industries are working under great disadvantages. A very large percentage, probably 75 to 80 per cent of the steel and coal of France are now either in the hands of our enemy or within the range of his guns. The requirements of our allies will be enormous and the least we should do is all that we can do to give them steel when and as needed.

"The railroads of our country are more rails for safety and efficiency of operation, and it is difficult to give them any increase without restricting the production of projectile steel, which is largely rolled on rail mills. The forging plants are now getting under way and have just reached the point where their consumption of projectile steel will be an extremely heavy factor. The shipyards have their ways built and many keels laid, and under the direction of Mr. Schwab, will require vast tonnages of steel. His program for next year is at least double that of this year and we must furnish him the steel to complete the great work he has to do and for which he is so well qualified. The appointment of Charles M. Schwab was an epoch in this war—a great allied victory and one which caused great consternation in Germany. The expressions of approval of the representatives of the allied governments dealing with us, were of such a nature as to leave no possible doubt as to how it was received by them.

Praises Baruch Highly

"There has been another appointment in Washington which properly met with great approval—Bernard M. Baruch, chairman of the war industries board. He is a man of great ability, determination and quick decision and is doing wonderful work in this great fight to keep the world a decent place in which to live. My association with him has been such that I can say positively that every move he has made has been directed by fairness and he has done everything possible to promote and foster prosperity of industries, consistent with the one big object of winning the war. He has a most difficult position and is filling it with great efficiency. No important steps have been made by him without full consultation with the industries affected, and where possible, the ideas of the leaders of these industries have prevailed. Some of you gentlemen have felt that we on the war industries board have been, at times, critical and severe. There have been times before the acute necessities of war became known, that a few—a very few—manufacturers, we felt, had been governed a little too much by commercialism and did not devote sufficient of their product to the lines we felt most necessary, and we have not been slow in calling their attention to this fact.

"At the meeting some weeks ago in Judge Gary's office, when the 100 per cent pledge was adopted, I think there was a clearer understanding of the necessities of the situation and it is incumbent upon me to say, and I do say, with the greatest of pleasure, that today 100 per cent of the steel manufacturers of the country are do-

Pays Gary Tribute

AN impressive scene marked the point in Mr. Schwab's address where he paid a high personal tribute to Judge Gary. Laying his hand on the shoulder of the toastmaster, Mr. Schwab said, "You have been a true friend. I hope you always will be. You no more desire to be my friend than I hope always to be yours." The banqueters received this demonstration of affection and regard with great applause. Judge Gary in introducing the ship director said Mr. Schwab "could do more than anyone else to assist in putting into practical effect the sentiment of Lloyd George that we need ships, ships and more ships."

ing their utmost and that there is not a single exception to this rule. You are all doing wonderful work and with the history of this great cruel war, the work of the steel manufacturers will stand out in the most glowing chapters.

"I have often felt that one of the great achievements of history was accomplished at the meeting of the steel manufacturers and the war industries board in September of last year. The manufacturers realize fully that due to the abnormal conditions created by the war, that prices had risen entirely too high, and that the burdens of our gallant allies were already so heavy that the law of supply and demand must temporarily be abandoned. I do not think our wonderful President has made many more important or proper decisions than that our allies in this fight were entitled to the same prices on the materials necessary to win this war, as our own government. The steel manufacturers and the war industries board mutually agreed upon prices, which were officially approved by the President, and which, while involving reduction, in some cases as much as 75 per cent from the standards then prevailing, and which were constantly increasing, I think today are considered by all of you fair and reasonable. The differences in a year's output meant a saving of between two thousand and three thousand million dollars. There was no statute of law for this action and the war industries board was not vested with legal authority to compel such an action and it was, therefore, entirely a voluntary one on the part of the steel manufacturers, and is, I believe, one of the most glorious chapters of the war."

Other banquet speakers were Ex-Congressman J. J. Fitzgerald, of Brooklyn, Major General Glenn of Camp Sherman, Ohio, and Dr. Thomas Darlington of the welfare committee of the institute. Mr. Fitzgerald emphasized the great things that had been accomplished in the management of the war and bespoke a fair appreciation from the general public of what is being done. General Glenn pointed out the great danger to American economic progress of the future if Germany retains and utilizes the cheap labor and mineral resources of Russia. Dr. Darlington urged the necessity of the business man to carefully guard his health particularly under war conditions. He set forth what he termed "The Ten Commandments of Health".

The discussions of the various papers at the day's session were unusually good and were filled with original thought and information. "Conservation of Ferromanganese," presented by C. R. Endicott of the Bethlehem Steel Co., was discussed by A. W. Diehl of the Carnegie Steel Co., by G. B. Waterhouse, metallurgical engineer of the Lackawanna Steel Co., and by Dr. Richards of Lehigh University. Those who discussed the paper on "The Design of the Modern Blast Furnace Stack," by J. G. West Jr., general superintendent of the Jones & Laughlin Steel Co., were Geo. L. Collard of the Shenango Furnace Co., J. S. Fraser of the Pittsburgh Steel Co., and Walther Mathesius of the Illinois Steel Co. "The Relation of the Trade Papers to the Iron and Steel Industry," by B. S. Stephenson, resident agent of M. A. Hanna & Co., Pittsburgh, received attention from A. O. Backert, vice president of the Penton Publishing Co., Cleveland. J. R. Mills, district manager of the sales of the Carnegie Steel Co., Cleveland, and John A. Penton. The paper on "The Modern By-Product Coke Oven and Its By-Products," was presented by title as was also the discussion by Wm. A. Forbes, New York, chairman of the benzol committee of the United States Steel Corp. There was no discussion of the "Effect of Phosphorus in Soft Acid and Basic Open-Hearth Steel," by J. S. Unger, manager of the central research laboratory of the Carnegie Steel Co., Pittsburgh, but it was announced Bradley S. Stoughton would contribute something on this subject for the proceedings.

Prof. H. M. Howe, in discussing Mr. Robinson's paper, stated that there had never been a clear and satisfactory reason why crucible steel is better than bessemer or open-hearth. He believed, however, that the better control of conditions in the crucible method probably was the explanation. He could not see why electric steel is better than open hearth, unless similarly the conditions of this process were under better control. The electric steel method reproduces very closely the conditions of the crucible process. "In the open hearth you have such atmospheric and slag conditions as you can get, while in the crucible, you have such atmosphere and you might say such slag conditions as you wish," he said. Dr. Howe stated that electric steel promised to have a great part in the production of alloy steel, but its greatest part, it seemed to be, would be in finishing steel already made in the open hearth or bessemer. He said cheap freight rates of the future depended on rail life. It is necessary that rails have greater resistance which was to come from the electric furnace method. He thought the time was not far distant when standard practice in rail manufacture would be to make open-hearth steel and refine it in the electric furnace. Dr. John H. Mathews, president of the Holcomb Steel Co., Syracuse, N. Y., also discussed Mr. Robinson's paper.

At the meeting of the directors of the institute, Friday noon, the retiring officers were re-elected for the ensuing year.

Obituaries

William Bell Ullman, who formerly was actively identified with the iron and steel industry in Illinois, died recently at his



WILLIAM B. ULLMAN

home in Chicago. Had he lived until Oct. 7, he would have been 68 years of age. He was born in Racine, Wis., and after being graduated from Racine college, he located in Chicago in 1870. Eight years later, he became a partner of Davis Kelly in the wholesale iron business, under the firm name of Kelly, Ullman & Co. In 1884, Mr. Ullman moved to Moline, Ill., in order to accept the position of manager of the Moline Malleable Iron Co., and a few years later, he purchased the plant. Destroyed by fire in January, 1903, Mr. Ullman had it rebuilt at St. Charles, Ill., and in 1905, he sold out and returned to Chicago. Ill health has made him practically an invalid for the past 10 years.

James Sargeant, superintendent of the D. & W. Fuse Co., Providence, R. I., died at his home in that city, May 21.

War Board Receives Full Powers

Executive Order of President Under Overman Bill Makes Industries Body a Distinct Administrative Agency—Steel Director Replogle Now in Position to Employ Laws to Procure Production if Necessary

WASHINGTON, June 4.—The war industries board, and through its division of steel supply, which has long functioned as a subsidiary of the council of national defense and an auxiliary of the war and navy departments and the shipping board, now is a definite and powerful branch of the government. Formerly it derived by agreement with other authoritative bureaus only such meager powers as it exercised, but now, through an executive order of the President last week, it is "a separate administrative agency" functioning through such regular statutes as it may require.

The President acted under authority given him by the Overman bill. The executive order was brief and without detail. It had been expected the President would sum up, at least generally if not minutely, just what sections of existing laws he actually would transfer to the war industries board. This, however, may come later, possibly from Bernard M. Baruch, chairman of the board, whose status now is on a par with Fuel Administrator Garfield, Chairman McCormick of the war trade board, Food Administrator Hoover and Director General McAdoo of the railroad administration.

Baruch Has Much Power

In nearly every law affecting the military establishments, there are sections which more or less definitely have some bearing on the iron and steel industry but which formerly have been exclusively the administrative powers of the secretary of war, of the navy or of the chairman of the shipping board, as the case may be. While the President has not specified whether these powers have been or will be given to Mr. Baruch, it may be regarded as a fact that if Mr. Baruch should convince the President he needs the authority under certain clauses, the President, by authority of the Overman bill, and through Mr. Baruch, can transfer that legal power.

This means that J. Leonard Replogle, Mr. Baruch's director of steel supply, is to be the one who may administer any laws necessary in the regulation of the iron and steel industry for the production of war materials. Mr. Replogle cannot arbitrarily wield the power thus conferred upon him, but he may do so with the approval of Mr. Baruch, possibly of the President. However, all the laws now on the books are really at the disposal of the director of steel supply and if 100 per cent production cannot be obtained through voluntary response of the industry, Mr. Replogle may feel called upon to put some of the laws to use.

The war industries board occupies what is known as the council of national defense building. The President's order divorced the board from the council and now the council is to take up headquarters in the building just vacated by the fuel administration. The fuel administration has moved to Twentieth street and Virginia avenue N. W. Its former headquarters, the new home of the council, is at Eighteenth and C streets N. W. The war industries board remains at Eighteenth and D streets N. W.

The council of national defense now is to devote itself mainly to research work, looking to conditions after the war, at the same time cooperating in every way with all government work in the determination to carry the war through to victory. For the work contemplated, more room is required and the old fuel headquarters provides ample space for the task, another point of which is the general supervision of the work of state and subsidiary councils. The war industries board also is expanding, which is another reason for the council seeking a new home. One of the newest divisions under the board, and one which likely will play an important role in the distribution of war orders. This is the "resources and conversion section," for a time known as the "zoning of industries division", of which Charles A. Otis of Cleveland is chief. Under him is being developed the plan of establishing 20 zones throughout the country, each of which will know its own possibilities and be at the service of the various contracting departments of the federal government.

Another division of the board is the textile section, under John W Scott of Carson, Pirie, Scott & Co., Chicago. Both this and Mr. Otis' department are under the general supervision of George N. Peek, who came to the board as "industrial representative" with the general task in hand now undertaken by Mr. Otis. These divisions have been added since publication in THE IRON TRADE REVIEW on May 23 of the full list of the personnel of the board.

The long list has been revised again, this time tentatively as before. It is pointed out that the personnel is constantly changing because of army and navy orders, operation of the draft law, assignment of committeemen to other tasks, and the creation or elimination of other committees or branches.

One of the changes noted in the revised list is the appointment of W. W. Phelps as acting secretary of the price-fixing committee. Mr. Phelps is assistant secretary of the war industries board. H. P. Ingels, the board's secretary, has been acting secretary of the price committee but has been relieved of all duties except those directly affecting the board itself.

Priorities Commission Created

Another change is the creation of a priorities committee under the priorities division. This is really the old priorities division, but the new division is the link between the new committee and the priorities board, still a third priorities body. Judge E. B. Parker, chairman of the priorities committee, is commissioner of the priorities division and a member and vice chairman of the priorities board. His assistant, Charles K. Foster, is the only other member of the division as indicated in the revised list. To the board have been added Maj. Gen. Geo. W. Goethals, succeeding Brig. Gen. Palmer E. Pierce as the army's representative, and T. F. Whitmarsh for the food administration.

Under the building materials section, Maj. F. W. Leadbetter, representing the army, Charles V. York representing the navy, and F. K. Paxton the Emergency Fleet corporation, have been added and S. I. Marks of the navy and Capt. J. J. Mills of the army have been relieved. In the chain section Samuel Porcher of the railroad administration and E. C. Gillette of the department of commerce have been given assignments.

H. Ray Paige of the Nitrate Co., New York, for nitrates, and J. W.

Paxton, for salt, have been added to the chemicals and explosives section. Here also C. K. McDonalds has been transferred from mica, etc., to acids, sulphur, pyrites, caustic soda, etc., and C. G. Grimes has been made the mica representative. Mr. Blair has been placed in charge of dyestuffs. The last three represent the navy.

To the emergency construction committee have been added W. F. Long as assistant section chief and Lieut. J. B. Talmage. In the legal section the name of Adrian Ettinger has disappeared. Under the lumber section a new addition is M. E. Philpriet. Another new section has been added for platinum, iridium and palladium, and is in charge of C. H. Conner, who also represents wood distillation products, and G. E. DeNike.

Government Fixes Manganese Ore Prices

WASHINGTON, June 3.—Manganese ore prices as recommended by the American Iron and Steel institute have been approved by the war industries board on the basis of the market values which have prevailed during the past month. The fixed schedule of prices became effective May 28. No announcement has been made as to the length of time it will be in force. In announcing the new schedules and the collateral conditions, the war industries board declared:

"A schedule of prices on manganese ores produced in the United States has been agreed to by the American Iron and Steel institute and has been approved by the war industries board. The prices are fixed at a figure higher than the prices on this ore that have prevailed in past months. The new price schedule is to be used on transactions taking place after midnight on May 28. No announcement is made as to the length of time that this schedule of prices is to remain effective.

"The following schedule gives domestic metallurgical manganese ore prices per unit of metallic manganese per ton of 2240 pounds for manganese ore produced and shipped from all points in the United States west of South Chicago, Ill. This schedule does not include chemical ores for dry batteries, etc. The prices are on the basis of delivery f.o.b. cars South Chicago, and are on the basis of all-rail shipments. When shipped to other destinations than Chicago, the freight rate per gross ton from shipping point to South Chicago, Ill., is to be deducted to give the price f.o.b. shipping point.

"For ore containing when dried at 212 degrees Fahr., metallic manganese:

Per cent	Per unit
35 to 35.99, inclusive	$0.86
36 to 36.99, inclusive	.90
37 to 37.99, inclusive	.94
38 to 38.99, inclusive	.98
39 to 39.99, inclusive	1.00
40 to 40.99, inclusive	1.02
41 to 41.99, inclusive	1.04
42 to 42.99, inclusive	1.06
43 to 43.99, inclusive	1.08
44 to 44.99, inclusive	1.10
45 to 45.99, inclusive	1.12
46 to 46.99, inclusive	1.14
47 to 47.99, inclusive	1.16
48 to 48 99, inclusive	1.18
49 to 49.99, inclusive	1.20
50 to 50.99, inclusive	1.22
51 to 51.99, inclusive	1.24
52 to 52 99, inclusive	1.26
53 to 53.99, inclusive	1.28
54 and over	1.30

"For manganese ore produced in the United States and shipped from points in the United States east of South Chicago 15 cents per unit of metallic manganese per ton shall be added to above unit price.

"Above prices are based on ore containing not more than 8 per cent silica and not more than 0.25 per cent phosphorus and are subject to

Silica Premium and Penalties

"For each 1 per cent of silica under 8 per cent down to and including 5 per cent premium at rate of 50 cents per ton. Below 5 per cent silica, premium at rate of $1 per ton for each 1 per cent.

"For each 1 per cent in excess of 8 per cent and up to and including 15 per cent silica there shall be a penalty of 50 cents per ton; for each 1 per cent in excess of 15 per cent and up to and including 20 silica there shall be a penalty of 75 cents per ton.

"For ore containing in excess of 20 per cent silica, a limited tonnage can be used; but for each 1 per cent of silica in excess of 20 per cent and up to and including 25 per cent silica, there shall be a penalty of $1 per ton.

"Ore containing over 25 per cent silica subject to acceptance or refusal at buyer's option, but if accepted shall be paid for at the above schedule with the penalty of $1 per ton for each extra unit of silica. All premiums and penalties figured to fractions.

Phosphorus Penalty

"For each 0.01 per cent in excess of 0.25 per cent phosphorus there shall be a penalty against unit price paid for manganese of ½ per cent per unit figured to fractions.

"In view of existing conditions, and for the purpose of stimulating production of domestic manganese ores, there will be no penalty for phosphorus so long as the ore shipped can be used to advantage by the buyer. The buyer reserves the right to penalize excess phosphorus as above by giving 60 days notice to the shipper.

"The above prices to be net to the producer; any expenses such as salary or commission to buyer's agent to be paid by the buyer.

"Settlements to be based on analysis of ore sample dried at 212 degrees Fahr. The percentage of moisture in ore sample as taken to be deducted from the weight.

Payments

Eighty per cent of the estimated value of the ore (less moisture and freight from shipping point), based on actual railroad scale weights to be payable against railroad bill of lading with attached certificates of sampling and analysis of an approved independent sampling chemist. Balance on receipt of ore by buyer. Actual railroad scale weights to govern in final settlement. Cost of sampling and analysis to be equally divided between buyer and seller."

Proper Form for Invoices of Navy Outlined

Washington, June 4.—A circular letter relative to rendering of certified invoices, forwarding of inquiries in connection with payments, differences, shortages, etc., has been sent out to contractors by Rear Admiral Samuel McGowan, paymaster general of the navy. The letter says:

"1. Contracts specifying delivery f.o.b. contractor's works, which show on their face the ultimate destination of the material—send invoices and inquires to the supply officers of the navy yards or stations at destinations.

"2. Contracts specifying delivery at some navy ward or station—send invoices and inquiries to the supply officer of that yard or station.

"3. Contracts specifying delivery at a navy yard for reshipment to another yard—send invoices and inquiries to the supply officer of the yard making the reshipment.

"4. Contracts specifying delivery f.o.b. works of contractors, which do not show on their face the ultimate destination of the material—send invoices and inquiries to the bureau of supplies and accounts.

"5. Contracts specifically providing for preparation of public bills in the bureau of supplies and accounts, regardless of conditions of delivery—send invoices and inquiries to the bureau of supplies and accounts.

"Public bills are prepared by the supply officers at the navy yards where the material is received in all cases except as noted in sections 4 and 5 above. Payments cannot be made by the purchasing office until after receipt of certified public bills either from the navy yards in cases of sections 1, 2 and 3, or from the bureau of supplies and accounts in cases coming under sections 4 and 5.

"Payments may always be expedited by sending invoices and inquiries to the office responsible for preparation of public bills, regardless of the office from which the order is received or from which payment is expected."

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

W. P. PRESSINGER, formerly manager of the compressor and engine departments of the Chicago Pneumatic Tool Co., Chicago, has been appointed manager of sales. In 1887, he began his business career, with the Clayton Air Compressor Works, New York, remaining three years, rising to the position of manager of sales. In 1900, he organized the New York Air Compressor Co., of which he was secretary and general manager. One year later, it was absorbed by the Chicago Pneumatic and Mr. Pressinger has been manager of the air compressor department until his latest promotion. Other recent changes in the latter company's organization include the promotion of W. R. Callan, formerly Franklin, Pa., plant manager, to the position of general manager of plants with headquarters at Chicago; G. A. Rees, general purchasing agent, has been promoted to be manager of purchases and stores; H. D. Megart, formerly with the Bethlehem Steel Co., South Bethlehem, Pa., has been made assistant to the president.

C. G. Tarkington is in charge of the Mechanical Appliance Co. office at Washington.

W. B. Greenleaf, formerly located in Plymouth, Mich., was recently appointed superintendent of the Kohler Die & Specialty Co., DeKalb, Ill.

Palmer D. Weeks has resigned from the Dale-Brewster Machinery Co. and has organized the D. Weeks Machine Tool Co., 1270 Broadway, New York.

John Parker, formerly with the Cincinnati-Bickford Tool Co., has been made factory manager of the Spencer-Smith Machine Co., Howell, Mich.

Frank C. Lord, formerly superintendent of the Hobbs Mfg. Co., Worcester, Mass., has accepted the position of superintendent of A. Hankey & Co., Inc., Rochdale, Mass., maker of machine knives.

Eric V. Carlson, formerly with the Brown Hoisting Machine Co., Cleveland, who left the United States in April, 1914, to go into business in Nerka, Sweden, has returned to his former home in Worcester, Mass. He declares that the great majority of the Swedes today are against the Hun and that Sweden is not pro-German.

Carl M. Nelson recently became affiliated with the Dale-Brewster Machinery Co., Chicago, in its sales department, having resigned his position with the E. L. Essley Machinery Co., that city.

C. B. Pritchard was recently appointed superintendent of the Marion Machine, Foundry & Supply Co., Scottdale, Pa. He formerly was machine shop foreman of the Scottdale Machine Mfg. Co., that city.

William A. Viall, secretary of the Brown & Sharpe Mfg. Co., Providence, R. I., had the honorary degree of A. M. conferred upon him at the 150th annual commencement excercises of Brown University in that city, May 29.

Frederick F. Fuessenich, president and treasurer of the Hendey Machine Co., Torrington, Conn., celebrated his 70th birthday anniversary, May 7, by presenting to the town the property known as League Park, valued at more than $25,000.

John G. Zummach was recently made chief engineer and assistant factory manager of the Perfex Radiator Co., Racine, Wis. He until recently, was chief of the tool-designing department of the Mitchell Motors Co., Racine, Wis.

R. G. Stutsman has been made sales representative at Milwaukee for Manning, Maxwell & Moore, resigning as master mechanic of the Four Lakes Ordnance Co., Madison, Wis. He formerly was president of the frog and switch shop of the Chicago, Milwaukee & St. Paul railroad.

A. B. Hall, formerly Chicago sales manager and latterly vice president at Akron of the Whitman & Barnes Mfg. Co., affiliated with it for 21 years, now has supervision of all sales. R. S. Carter, formerly Pittsburgh representative of the company, has been promoted to be twist drill and reamer sales manager at Akron. H. E. Fisher, formerly with the Pittsburgh Model Engine Co., Pittsburgh, succeeds R. S. Carter as mechanical engineer and Pittsburgh sales manager. Paul E. Thomas, formerly affiliated with the Seaboard Air Line, Chicago, has been made wrench and spring cotter sales manager at Akron.

C. L. Campbell and C. B. Leeds were recently added to the machinery sales force of the Cadillac Tool Co., Detroit, Mich. Mr. Campbell was formerly with the C. A. Strelinger Co., of that city and Mr. Leeds was formerly with the National Automatic Tool, Co., Richmond, Ind.

Uldric Thompson, formerly chief engineer for the International Steel and Ordnance Co., and who supervised the equipping of the artillery ammunition assembly plant of the Rock Island arsenal has opened an office as consulting engineer under the firm name of Uldric Thompson Jr., Inc., at 120 Broadway, New York.

Cyrus N. Cowan, factory manager for several years for the Heald Machine Co., Worcester, Mass., has been obliged to relinquish his duties on account of sickness which confines him to his home. He was succeeded June 3 by R. W. Ellingham, works manager of the Bilton Machine Tool Co., Bridgeport, Conn.

Maj. John F. Tinsley, general manager of the Crompton & Knowles Loom Works; George N. Jeppson, works manager of the Norton Co., and Frank H. Willard, assistant general manager of the Graton & Knight Mfg. Co., all of Worcester, Mass., have been appointed by the fuel committee of that city to have charge of the conservation of coal and prevent waste in heat in the factories of Worcester.

Ralph A. Walters, an assistant superintendent for the American Bridge Co., Pittsburgh, has been requisitioned by the United States Steel Corp. as superintendent of steel construction and installation of machinery of the new ordnance plant at Neville island, O., for the United States government. Mr. Walters, who is 33 years old, has been with the American Bridge Co. since graduating from the Worcester Polytechnic Institute, Worcester, Mass., in 1906.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ALFRED O. SONNE, who was recently appointed resident manager of the Chicago office of Rogers, Brown & Co., succeeding the late E. L. Billingslea is typically a Chicago man. He was born in that city and has never lived in any other, though he has traveled widely through the industrial portions of the United States. He obtained his education in the Chicago public schools, being a graduate of Englewood high school, and entered the office of Rogers, Brown & Co. eighteen years ago as office boy. In the years since he rose through various positions of increasing importance in the organization until he became assistaant to Mr. Billingslea, who was resident partner. Through his long service he is in close touch with the foundry industry in the west and has a wide acquaintance. He is a member of the Chicago Foundrymen's club and has been active in the work of the various meetings of the American Foundrymen's association held in the west.

Thomas Finigan was recently elected vice president of the American Brake Shoe & Foundry Co. His headquarters are at Chicago.

J. L. Gillespie has been made advertising manager of the Aspromet Co., First National bank Building, Pittsburgh.

W. H. Williams, formerly of Racine, Wis., has moved to Minneapolis to become superintendent of the Flour City Iron Works there. His address is 2105 Twenty-sixth avenue, South.

Patrick T. Kilgarriff has been made vice president of the Certes Supply Co., St. Louis. He has been chief clerk to T. C. Powell, vice president of the Southern railroad, Cincinnati.

L. E. Thomas, formerly chief draftsman for the National Tube Co., Lorain, O., is chief engineer of the government ordnance plant on Neville island, near Pittsburgh, being built by the United States Steel Corp.

Bert M. Pettit, who at one time was advertising manager of the J. I. Case Threshing Machine Co., Kenosha, Wis., but who lately has been advertising manager for the J. I. Case Plow Works, Racine, Wis., was recently made secretary of the Wallis Tractor Co., Racine. This interest is closely identified with the Case works..

William F. Cutler was recently elected president, and Frank C. Turner was elected vice president in charge of sales of the Southern Wheel Co.



ALFRED O. SONNE

Both are located in the company's St. Louis office.

George W. Agerter will have charge of tool steel sales in the Pittsburgh district for the Ludlum Steel Co., Watervliet, N. Y. He formerly was with the Hunter Saw & Machine Co., and later with the Pittsburgh Saw & Mfg. Co., Pittsburgh.

H. G. Spilsbury, metallurgical engineer for the Metal & Thermit Corp., who has had charge of the alloy sales in the Pittsburgh district, moved to New York recently and his headquarters will be in the home office of the corporation in the Equitable building.

Holmes Forsyth has been elected president of the Curtain Supply Co., Chicago, to succeed the late Edward T. Burrowes. He has been second vice president, secretary and general manager for some time, and as secretary he is succeeded by Randolph S. Reynolds, formerly assistant to the general manager.

Charles A. McCune became sales engineer for the Page Steel & Wire Co., 30 Church street, New York, upon his resignation as chief engineer of the Commercial Acetylene Co., that city. He will devote his effort to the sale of and service in connection with "Armco" welding rods.

Walker C. Conner Jr., New York, was recently appointed assistant manager for the New York district of the United States shipping board, transportation division by Frank C. Joubert, manager. Mr. Conner will look after the supplies and materials, through the various terminals, which are going into the construction of ships.

George N. Jeppson has declined the position of trustee for the Grafton, Mass., state hospital, tendered him by Governor Samuel W. McCall. He is works manager for the Norton Co., Worcester, Mass., and is serving on the army selective board. These duties and others public and private do not permit his accepting the appointment.

John R. Caldwell, who until recently was in the Washington sales office of the General Fireproofing Co., Youngstown, O., has been granted a captain's commission in the ordnance department. He has been placed in charge of hand grenade production. He formerly was central district sales manager of the General Fireproofing Co., with headquarters in Youngstown.

George B. Malone, who has served as superintendent of the welding and turbine blade department of the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., has received a captain's commission in the engineer reserve corps. He has reported in Washington and will be assigned the duty of organizing welding schools there as well as in the various cantonments.

J. J. Tynan; general manager of the Union Iron Works, San Francisco, accompanied Joseph W. Powell, vice president of the Bethlehem Shipbuilding Corp., Ltd., on an inspection tour of the Fore River and Squantum, Mass., plants, May 27. He said that preparations were being made to launch nine ships at the Union yard when Charles M. Schwab visits San Francisco, July 4.

Iron and Steel Men in War Machine

C. E. Hoyt, Secretary, American Foundrymen's War Service Committee

CHARLES E. HOYT has been bringing the foundries of the United States into touch with the government. As secretary of the American foundrymen's war service committee, he has made a survey of the gray and malleable and steel foundry industry of the country. The government itself is not a heavy buyer of castings. It confines its purchases to hand and rifle grenades, trench mortars and a certain type of shell. This survey however, furnished contractors and subcontractors with a direct source of information for the placement of tonnages with plants best equipped to handle them. These tonnages include every conceivable casting entering into ordnance work. Both direct and indirect war work are affected. Data thus collected includes plant capacity, extent of government and railroad work on books, etc.

Mr. Hoyt has handled this work in his customary efficient and energetic manner. His committee has been called into frequent consultation with ordnance officers with reference to plant equipment as well as the preparation of specifications for gray iron and semisteel shells. Largely through this effort, a number of foundries now are conducting a a series of experiments with semisteel shells. As a result, a vast tonnage for more efficient and expeditious shell production will be opened up.

It was this committee which pointed out to authorities in Washington the threatened shortage of foundry iron due to the allocation of tonnages of steel-making grades to furnaces making foundry iron and also the fact that many furnaces operating on foundry iron, intend to make only steel-making grades after July 1.

When the American Foundrymen's Association Inc., decided by resolution last September to operate a war service committee in Washington at its own expense, to aid the government in its casting purchases, Mr. Hoyt was the natural selection for committee secretary, serving that body as exhibition manager since 1909.

Not many years ago, since he is still a young man and not over 45, he pounded sand and poured iron in his father's foundry in Wayland, Mich., where plows were produced. Upon being graduated from Michigan Agricultural college, he served for a while as instructor. He returned to Wayland to take charge of the foundry upon his father's death, but later was called to the Lewis Institute, Chicago, to serve as foundry instructor. He remained affiliated there for about 20 years, becoming head of the foundry department. While in that capacity, he commenced his exhibition activity. The Chicago Foundrymen's club decided to exhibit some of the work of the institute's students. This attracted considerable attention. When the Foundry & Machine Exhibition Co., which conducted the exhibitions held in conjunction with the annual meetings of the American Foundrymen's association needed the services of an exhibition manager, they employed Mr. Hoyt until 1909.



CHARLES E. HOYT

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Drive and Taxes Puzzling Business

GERMANY'S present offensive takes first place, above all other factors, in the financial markets. In the stock market, as among business men generally, the war news has been read with considerable perplexity. So many questions, relating to the military situation, remain obscure, that it has been difficult to draw any conclusions. Nevertheless, no matter what untoward developments may arise, the feeling has been one of optimism for the "long pull". Judge Elbert H. Gary expressed this sentiment clearly at last week's meeting of the American Iron and Steel institute, when he said: "For the long future I am an optimist. I believe we will win the war. Why will we win it? Because we are right; we ask for nothing that is of pecuniary benefit to us, and which belongs to anyone else." Judge Gary made some other interesting statements that put heart into the stock market when things were looking rather blue. He pointed out that the steel trade is putting its affairs in better shape; that while the industry may not be making much money, it is putting its works in better condition; and that after the war the trade will be better prepared than ever before in the competition for international trade. The statement by J. Leonard Replogle, steel representative on the war industries board that direct and indirect needs of the allies were sufficient to keep all mills of the country busy for a year at least also indicated the present stable character of the trade and gave heart to the holders of the steel shares.

Taxation Affects Stock Values

The stock market has moved off slightly the past week, steel shares generally losing from one to three points, in the face of the most critical military situation since the first battle of the Marne. And this decline appears to have been more the result of taxation proposals than of anxiety on the score of military reverses. President Wilson's speech before congress, showing that a new tax bill would be necessary during the summer, was followed by a sharp break in prices. In some quarters it was feared the excess profits and income taxes would be so large as to affect dividends adversely. However, the general feeling is that the administration will not countenance a revenue measure that would jeopardize the business of the country. The government is spending an increasing amount of money each month. The treasury department estimates present expenditures at about $1,500,000,000 and predicts that $2,000,000,000 will be the rate before the close of the present year, as deliveries of ships, guns, airplanes and other goods contracted for increase. Congress has already appropriated $12,000,000,000 for the army, for the coming year, or as much as the total amount spent by the government the last year. At any rate, one point in the tax question of importance is that the new bill be framed and disposed of early enough in the next fiscal year to afford business men an opportunity to prepare for it, instead of being forced to muddle along for a half year in the dark, as was the case in the present legislation.

Toluol Price

For Commercial Requirements Fixed —Aimed at Excessive Quotations

New York, June 1.—The toluol committee of the war industries board, after investigating the situation surrounding charges of $5 and $6 per gallon by some producers, on toluol released for essential commercial requirements, has extended the price for government needs to quantities thus released. This price is $1.50 per gallon at producers' plants for tank cars. On drums released for commercial consumption, the price will be $1.55 per gallon. These prices apply to all toluol to be released for June delivery. It is possible that they may be revised later. It is understood that any attempts to secure higher prices will result in commandeering.

The government's inquiry for future solvent naphtha is exerting a bad effect on the market. Not having any assurance as to when they can expect deliveries, consumers are averse to closing. Prices continue unchanged at 18 to 22 cents per gallon for contract, and 18 to 25 cents for spot shipment.

Prices on pure benzol have settled down to 25 to 30 cents per gallon both spot and contract. The lower prices are attracting some inquiry. Producers now have the largest stocks in months.

A fair amount of spot phenol which has accumulated mainly as a result of the refusal of the government to license exports other than for deliveries on contracts with allied governments, is being offered at 48 to 52 cents per pound. Practically no naphthalin is being sold. Producers estimate they are about 6,000,000 pounds behind in deliveries. The price is nominal at 10 to 12 cents per pound.

Practically all the sulphate of ammonia now being produced is going to the government. The market is nominal at $5.65 to $5.75 per 100 pounds at tidewater, for spot lots.

Coke Oven By-Products

Spot	
Per Gallon at Producers Plant	
Pure benzol	$0.25 to .30
Toluol (on sales sanctioned by governm't) (tank cars)	1.50
Toluol (drums)	1.55
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.48 to .52
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.65 to 5.75
Contract	
Pure benzol	$0.25 to .30
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

War Needs Dominate Tool Market

May Marks Definite Stride Towards Elimination of the Nonessential Machine Tool—Railroads and Shipyards Furnish Steady Demand for Equipment—Inquiries Still Are Increasing in Volume

EACH recurrent phase of the great war creates a definite reaction on the machine tool market. Increasing pressure on the west front, the active drive, the consequent consumption of great quantities of munitions, and the steadily increasing momentum of America's great war machine are all marked by reflex conditions in the machine tool industry. Slowly but surely the full strength of production of every class of metalworking machinery is being directed into war channels. Eventually machines not actively needed for the production of some item essential either directly or indirectly will no longer be produced. The past month has pointed this fact sharply and decisively. Indefinite promises of delayed deliveries are not forthcoming in response to inquiries for machines for nonessential use. Unless the essential character of the work for which the machine is intended is evident, many builders are refusing to quote to dealers. Available plant facilities are needed for the manufacture of machines which will produce ordnance, munitions, army transport equipment, ships and locomotives and cars.

Lull is Evident in Early May

THE first week of May represented a low point in the demand for new equipment. The buying incident to speeding up to compensate for the munitions consumption in the March drive had fallen away, and the new contracts had not yet appeared. Great quantities of munitions of what is known as the inert, or nonproductive class had been used in stopping the German drive. This class of munitions, includes projectiles, grenades, etc. Speeding up on existing contracts ensued to supply the deficit. The result was a steady demand for supplementary machines. The ordnance program was still under consideration, shell steel was going through the mills in great quantities, but no new contracts had been allotted. Confirmation of the reports that the United States Steel Corp. was to construct a huge ordnance plant, followed by the announcement that the Midvale Steel and Ordnance Co. was to enter into a similar undertaking introduced the prospect of large equipment demand. It was announced that practically $15,000,000 worth of machines would be required for these two plants. Col. H. W. Reed in addressing the machine tool builders in convention at Atlantic City, put the situation squarely before the industry when he announced that only about $1,500,000 of the needed equipment for these two plants was in sight. He stated that the builders faced the condition which necessitated the abandonment of the nonessential machine.

Shipbuilding Inquiries Gather Volume

EXISTING shipyards have in many cases taken steps to double their capacity during the past few months. These in addition to the new ventures in ship construction have furnished a cumulative demand for equipment which has made great progress throughout May. The Bethlehem Steel Co. recently announced the erection of two yards which will be commenced in the near future. The Federal Shipbuilding Co., New York; the New York Shipbuilding Co., Camden, N. J.; the American International Shipbuilding Co., Philadelphia; the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., and the American Shipbuilding Co., Cleveland, have all figured as active buyers of machine tools. These companies and others in shipbuilding lines have also contributed to develop the most active crane market which has been noted for some months. Additional inquiries have appeared from a wide range of sources. Ship Director Schwab within the week has announced that $200,000,000 to $250,000,000 is to be spent quickly for shipyard extensions. The navy has been a steady inquirer for cranes during the past month, and has also taken bids on a large number of miscellaneous machine tools.

The Railroads Enter the Market in Force

VAST machine tool requirements are involved in the domestic transportation phase of the war. The railroads, obviously, must maintain their equipment in the best possible condition to stand the severe strain of war time burdens. For the past few years there has been an apparent laxness in keeping up the equipment in railway shops throughout the country. Extensive machine tool lists prepared with care from the recommendations of master mechanics and motive power engineers have furnished a convenient outlet for economical instincts of purchasing agents and railway executives who have wielded the power of veto. The result of this policy has been evident in the past and became acute during last winter. Existing shop equipment in many cases was entirely inadequate to handle needed repairs. During the past month a great volume of requirements has developed from this source. Railroads throughout the east and middle west have come into the market with specifications covering every class of equipment for their shops from cranes to pipe-threading machines. The Chicago, Burlington & Quincy, the Pennsylvania lines, the New York Central lines have all entered the market, and in most cases lists are extant at the present time. Some difficulty is anticipated in meeting the requirements for heavy machinery contained in these lists. No change in method of specifying equipment, nor in the routine of receiving quotations has developed due to the government control of the railroads.

Interesting Market Angles Have Appeared

WITH the appearance of varied war constracts, interesting phases of the machinery market have developed. In the Chicago district contracts for the manufacture of gray iron hand grenades have produced considerable inquiry for miscellaneous light tools. It is reported that contracts for about 100,000,000 hand grenades out of about 250,000,000 to be let have been placed. In the same locality a number of contracts for a new type of knuckle knife for trench use require light machinery. The Japanese navy has been inquiring in both the eastern and middle western markets for a large list of machinery for navy and shipyard purposes. Private interests from both Japan and China have further demonstrated the appreciation of American tools in the Orient by appearing in the various machine tool centers. The shortage in many lines has prevented the sale of equipment to these sources, and in one or two cases, the agents have sought to fill their requirements in Canada.

Railroad Tool Inquiries Increase

Transportation Agencies Furnish the Greater Bulk of Machine Tool Requirements—Railroad Lists Are Large in the Central and Western States—Crane Market is Active

TRANSPORTATION occupies the most important position in public attention at the present time. Getting the army across to France is speeding up the effort of every agency involved. Reflecting this situation, the machine tool industry is directing its energies toward supplying the needs of the railroads and the shipyards. In the central and western states extensive lists of equipment needs have been furnished by the railway shops, while new shipyard construction is providing an immense volume of inquiry. The railroad lists which have appeared during the past week will be open until the middle or latter part of June in most cases. Munitions and ordnance work has for the present been eclipsed, though there is a steady inquiry coming from those plants already engaged in war work. Some pointed comment has been indulged in by the trade relative to the apparent delay in issuing a comprehensive list of requirements for the two new ordnance plants to be constructed by the Midvale Steel & Ordnance Co., and by the Steel corporation. Some opinion is critical to a marked degree, but in other cases the point is suggested that the tools required may be purchased from time to time by the department, without designating that they are part of the equipment needed for these enterprises. An increase in the number of small plants which are extending their plant facilities is an evidence of the wider distribution of munitions work. The opinion is expressed that this distribution will be even more evident in the near future, owing to the tremendous tonnage of finishing work to be handled. Shipbuilding interests are providing the bulk of the inquiry for cranes, although various government departments and a large number of inland industrial plants contribute their portion. The crane market is continuing active, although the bulk of the inquiries extant for the past week still are open. New shipyards in contemplation will provide future demand.

Shipbuilding Plants Provide Equipment Demand

ADDITIONAL heavy demands are expected to be made shortly upon the eastern machine tool trade as a result of further huge expansion in the shipbuilding industry. According to authoritative reports, the New York Shipbuilding Co., Camden, N. J., and the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., will be in the market soon for more than $1,600,000 worth of machine tool equipment. This equipment, it is understood, will be required for the proposed extension at the yard of the New York Shipbuilding Co. A large turbine plant is to be erected by the Newport News Shipbuilding Co. at Richmond, Va. Although final specifications have not as yet been issued, it is understood that the requirements will involve principally heavy tools. Both the Newport News Shipbuilding Co. and the New York Shipbuilding Co., are in the market at the present time for a number of electric cranes, in addition to those recently purchased by the latter. The bureau of yards, navy department, Washington, will receive bids until June 17 under specification 3036 for about $25,000 worth of core ovens for brass foundry work.

The vast machine tool requirements of the two yards to be erected by the Bethlehem Steel Shipbuilding Corp. have yet to be announced. It is expected, however, that action may be taken before the end of this week. An allotment of the cranes needed for these yards, numbering almost 250, is being looked for from day to day. No announcement has yet been made as to where the yards will be located. Other shipbuilders now in the market include the Standard Shipbuilding Co., Shooters Island, N. J., and the Groton Iron Works, Groton, Conn., both companies having lists out for a fair-sized number of miscellaneous tools. The Foundation Co., 233 Broadway, New York City, has lately closed on a large number of used machine tools for its new yard at New Orleans, and at present is inquiring for nine 2-ton hand cranes. The government has recently closed bids on about 60 tools, including a number of lathes, milling machines and grinders, for the Brooklyn and Philadelphia navy yards. Action by the Wright-Martin Aircraft Corp., New Brunswick, N. J., on its latest list of tools has been temporarily postponed, pending revision in specifications. The huge requirements of the two ordnance plants to be erected by the Midvale Steel & Ordnance Co. and the United States Steel Corp. are not yet announced officially. Despite the large volume of business now up, however, actual trading during the past week has been relatively small.

Crane Inquiries are Large

This situation also applies to the crane market, for although the greatest amount of business in months is now before sellers, the number of orders placed have been few. The largest inquiry to come out during the past week is that of the Newport News Shipbuilding & Dry Dock Co., which is asking prices on 29 overhead cranes, ranging in capacity from five to 70 tons. The Vulcan Iron Co., Wilkesbarre, Pa., is inquiring for one 30, one 20, and three 10-ton electric cranes. The Groton Iron Works Co. is in the market for five or six overhead cranes of five to 10 tons capacity. The J. G. Brill Co., Philadelphia, will buy one 20-ton crane and one 5-ton. The Hay Foundry & Iron Co., Newark, N. J., is inquiring for four 10-ton electric cranes. The Champion Engineering Co., Kenton, O., has been awarded a contract for five 10-ton electric cranes for installation in the boiler shop



LIKE yelling, mud-bespattered Poilus who are first to go "over the top" when the signal is given to charge across the waste of "No Man's Land," Agathon Alloy Steels have been tested by the touchstone of actual service—long service.

The brave boys of France are high-spirited, for they see beyond that hour of carnage the holiday of respite in the rest billets, and still further beyond, that glorious day when France will be cleared forever of the menacing bands of autocracy.

But for Agathon Alloys there is no rest from the gruelling, grinding, strength-testing bombardment which actual service imposes. But there are no cowards among Agathon Steels.

Agathon Alloys will serve your purpose best because they have been made and tested for the word

The Central Steel Company

Massillon, Ohio

Agathon City

SALES OFFICES:

Detroit Office: 326-27-28 Ford Bldg. F. Walter Guibert, District Representative.

Cleveland Office: Hickox Bldg. The Hamill-Hickox Company, District Representative.

Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd. C. H. Beach, District Sales Manager.

Philadelphia Office: 603 Widener Bldg. Frank Wallace, District Sales Manager.

Syracuse Office: 621 University Blk. T. B. Davies, District Sales Mgr.

J. E. Dockendorff & Co., 20 Broad St., New York. General Export Agents.

now being erected by the Standard Shipbuilding Co. at Shooters Island, N. J. The General Electric Co. is inquiring for a 30-ton overhead crane for its plant at West Lynn, Mass. The bureau of yards and docks, navy department, is inquiring for cranes for aero storehouses under specification 3028. These will be let on June 10.

Railroad Demand is Extensive

CHICAGO dealers in machine tools base their expectation of continued strong demand for equipment on renewed activity among railroads and the fact that increased demand for war materials is coming to this district. The Rock Island railroad has put out a number of small inquiries which aggregate considerable equipment and the New York Central railroad has asked for bids on 30 tools, mostly of large size. The Chicago, Indianapolis & Louisville railroad is asking bids on 18 tools, including lathes, planers, boring mills and air compressors. Manufacturers appear to be falling behind on their deliveries in many cases, and while 30 days delay is usually considered almost unavoidable, tools now are running three to four months behind promises. The Henry Lindahl Machine Co., Chicago, is building a machine shop. The Jenkins Machine Shop, Sheboygan, Wis., will build a 3-story machine shop. Fairbanks-Morse & Co. are having plans made for a foundry at their Beloit, Wis., plant. The Globe Shipbuilding Co., Superior, Wis., will build a machine and molding shop. The Burrougs Adding Machine Co., Detroit, will build a 5-story plant addition. The Wilson Foundry & Machine Co., Pontiac, Mich., will build a machine shop addition.

Railway Requirements Predominate

INTEREST in the Cleveland district centers about railroad tool requirements, although some new munitions contracts are serving to divide attention. The Grant Motor Car Corp., Cleveland, still is in the market for a number of miscellaneous tools for use in connection with a new contract for 6-inch shells. The Templars Motor Corp., Cleveland, which has been engaged for some time in shell manufacture will purchase some new equipment for this class of work. The Eclipse Stove Co., Mansfield, O., will build a plant addition in the near future. The Roderick Lean Co., Mansfield, O., will build a plant for the manufacture of farm implements. The Lake Erie and Western have issued the following list of machine tools needed for replacement purposes: One 6-inch American radial drill; one Racine No. 5 power hack saw; one Ding's metal separator; one No. 2 Cincinnati universal grinder; one Niles double-headed car axle lathe; one Gould & Eberhart heavy duty 23-inch shaper; one 1½ Acme double-headed bolt cutter; two standard bench drill presses; one 3¼ Underwood cylinder boring machine with head to bore 25 inches. The New York Central list of about 30 tools which was issued last week has been supplement, as was announced in the May 30 issue of THE IRON TRADE REVIEW. The complete list to date is given on this page. The American Shipbuilding Co. is in the market for the following machines and tools: Three 48-inch plate punches, 1¼ x 1¼ inches; one 48-inch plate shear, 1¼ inches; one 54-inch combination head punch and shear; seven 54-inch punches, 1¼ x 1¼ inches; two 54-inch plate shears; one angle shear for light sheets; two 36-inch punches, 1¼ x 1¼ inches; one horizontal punch, 1¼ x 1¼ inches; two 18-inch x 6-foot engine lathes; one 18-inch x 10-inch [illegible] lathe; one 24-inch x 8-foot engine lathe; one 12-inch monitor lathe; one 48-inch x 20-foot engine lathe; one 30-inch x 12-foot engine lathe; four 20-inch x 10-foot engine lathes; one 24-inch x 12-foot engine lathe; one 16-inch x 12-foot engine lathe; one 52-inch x 27-foot engine lathe; one 18-inch x 5-foot engine lathe; one 34-inch x 16-foot engine lathe; one 30-inch planer; one 24-inch shaper; one 16-inch slotter; one 3-foot radial drill; four 25-inch drill presses; two wall radial drills, 15-foot arm; two wall radial drills, 18-foot arm; one 36-inch drill press; one 30-inch drill press; one No. 3 universal milling machine; one No. 4 plain milling machine; three No. 5 universal milling machines.

The National Roll & Foundry Co., Avonmore, Pa., recently has taken an order for two hydraulic flanging presses and an unusually large set of bending rolls from the Southwark Foundry & Machine Co., Philadelphia. The bending rolls are to be used for bending ship plates.

New York Central Issues Extensive Tool List

SUPPLEMENTARY to a list of about 30 machines for which an inquiry was in the market last week, the purchasing office of the New York Central lines at Cleveland has submitted specifications for about 55 additional tools. The complete list of equipment desired at the present time is given herewith. In addition the railroad will purchase a 10-ton traveling crane of about 46-foot span.

One 102-inch turning and boring mill for tires; two 24-inch high-duty shapers; one 36 x 36-inch by 12-foot Cincinnati planer; one 4-inch turret lathe; one 18-inch x 8-foot lathe with Fox attachment; one 24-inch x 7-foot engine lathe; one 1½-inch Landis bolt cutter; one 30-inch power cold saw; one 24-inch slotter; one 30-inch engine lathe; one 24-inch engine lathe; one 24-inch high-duty shaper; one 18-inch engine lathe; one 96-inch, 600-ton hydraulic driving wheel press; one 42-inch heavy-duty planer; one 6000-pound steam hammer; one 3½-foot Cincinnati-Bickford radial drill; one 102-inch boring and turning mill; one punch with 12-inch throat; one 42-inch Bullard boring mill; one No. 4 universal milling machine; one Universal tool room grinder; one 2-inch double head bolt cutter; one 18-inch x 8-foot engine lathe; one 32-inch table drill press; one 24-inch x 8-foot engine lathe; one 26-inch x 10-foot Pond back geared engine lathe; one No. 13 Brown & Sharpe universal grinder; one No. 4 universal milling machine; one No. 20 Gardner combination grinder; one 3-inch x 36-inch J. & L. turret lathe; one No. 3 Lennox rotary bevel shears; one 24-inch high-duty shaper; one 1¼ to 2-inch pipe cutting machine; one 90-inch driving wheel lathe; one drill press for ⅞ inch; one 60-inch heavy-duty horizontal boring mill; one 24-inch high-duty shaper; one high-duty double end axle lathe; one power bending brake; one ¼ to 4-inch pipe threading and cutting machine; one automatic buffing machine for head light reflectors; one 42-inch car wheel turning lathe; one heavy duty bulldozer; one emery grinder; one single end bulldozer furnace and blower; one double chamber single end bulldozer furnace and blower; one 2B universal milling machine; one 42-inch Bullard vertical milling machine; one 30-inch x 10-foot extra heavy engine lathe; one combination tool and drill grinder; one mortising and boring machine; one 24-inch universal rip saw; one 4-inch pipe threading machine; one 4-spindle stay-bolt threading machine; one tinners squaring shears; one 16-inch x 8-foot lathe; one 2¼ x 24-inch turret lathe; one 24-inch x 7-foot engine lathe; one bolt forging machine; one high speed drill press; one 30-inch power cold saw; one No. 3B Kearney & Trecker milling machine; one 60-inch heavy-duty drill press; one 24-inch x 8-foot engine lathe; one portable threading and cutting machine; one 48-inch throat combination punch and shear; one 36-inch cut-off saw, one 18-inch x 10-foot engine lathe; one pipe cutting and threading machine; one steel power bending machine; two 4-spindle angle-cock grinding machines; one 48-inch throat combination punch and shear; two 3 x 18-inch emery grinder; one 30-inch x 8-foot engine lathe; one 36-inch self-feed power rip saw; one 20-inch jointer; one universal woodworking machine; one No. 31 Fay & Eagan heavy planer and smoother.

SPEEDING with ROLLING MILL JIM





Say Fellows! you remember the first of March I told you the "Hubbard" broke ground for a new foundry? Well here's a picture of her, she started with a BANG, June 3rd. Just 93 days! She has ***some*** up-to-date equipment in her, installed by ***some speed artists,*** I'll say: electric furnace, open hearth furnace and all that swell stuff. Pike her off for yourself!

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

New Construction and Equipment

Concise and Timely Business Building Opportunities
from the Field of Industry

Among New England Factories

WATERVILLE, ME.—The Lockwood Co. plans to erect a hydro electric power plant, one story high, 28 x 175 feet. Bids will be received shortly by Engineer I. W. Jones, Milton, N. H., on the two units of 1200 horsepower each which are to be installed.

BOSTON.—Plans are being drawn for a steel and concrete 7-story, 300 x 375-foot addition, to cost $500,000, for the Gillette Safety Razor Co., South Boston. Charles T. Main is the engineer in charge.

BOSTON.—The B. L. Sawyer estate has let the contract for a reinforced concrete, fireproof, 6-story, 78 x 92 x 141-foot public garage, to cost $150,000.

BOSTON.—The Mason Regulator Co. is receiving bids through engineers Desmore & McClear for a 3-story, 80 x 160-foot factory building.

EAST BOSTON, MASS.—Plans have been figured for a boiler tube storage building for the Hodge Boiler works. Charles T. Main, Boston, is the engineer.

FALL RIVER, MASS.—The Osborne Mills will build a brick, 2-story, 81 x 107-foot building, to cost $30,000.

HYDE PARK, MASS.—Bids have closed for a fireproof, 3-story, 80 x 160-foot factory for the Mason Regulator Co., 1605 Hyde Park avenue. Densmore & LeClear, Boston, are engineers.

IPSWICH, MASS.—The Ipswich Mills will build a brick, 2-story, 100 x 100-foot storehouse.

NATICK, MASS.—The Northway Motor Corp. is receiving bids on a 1-story, 200 x 600-foot building.

WINCHESTER, MASS.—The Whitney Machine Co. will erect an addition to its shop.

PROVIDENCE, R. I. — The Taft-Pierce Mfg. Co. will enlarge its Woonsocket plant by the erection of a brick addition to cost about $60,000.

PROVIDENCE, R. I.—For relieving freight congestion on the main line to Boston, a new section of track is to be built by the New Haven railroad from Hebronville to Foxboro, a distance of about 18 miles.

PROVIDENCE, R. I.—The New Haven railroad is building a coaling station at East Junction. The station is to be fitted with modern mechanical appliances and cost will be $35,000.

BRIDGEPORT, CONN.—A permit has been issued to the Bilton Machine Tool Co. to erect a concrete and steel, 1-story building.

BRIDGEPORT, CONN.—The Lake Torpedo Boat Co. is contemplating erection of two machine shop additions.

BRISTOL, CONN.—Bids are being received by Architects Unkelbach & Perry for three buildings for the Dunbar Bros. Co. Two of the buildings will be four stories, 35 x 60 feet and 25 x 120 feet, respectively, while the third structure will be one story, 32 x 45 feet.

HARTFORD, CONN.—The Terry Steam Turbine Co. will build a brick and steel fireproof, 1-story, 235 x 40-foot and 255 x 20-foot addition to its plant.

NEW BRITAIN, CONN.—Barney Miller will build a brick, mill construction, 1-story, 89 x 64-foot storage warehouse to cost $20,000 on Stanley street.

NORWICH, CONN.—Plans are being drawn for a 6-story, 40 x 60-foot addition to the mill of the Norwich Woolen Co.

STAMFORD, CONN.—The Waterside Mills will build a two-story addition for storage purposes.

WATERBURY, CONN.—The Clark Bolt & Nut Co. will soon start work on an addition to its plant. The proposed extension will be one story, 46 x 57 feet.

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts:

One grinding machine, 4586½, June 10, Washington.

Sensitive drills, 4587½, June 10, Washington.

One plate cutting machine, 4595½, June 10, Washington.

Four drills, 4596½, June 10, Washington.

Six engine lathes, 4604½, June 10, Washington.

Six sensitive drills, 4606½, June 10, Washington.

Two vertical tapping machines, 4607½, June 10, Washington.

One crank shaper machine, 4611½, June 10, Washington.

One vertical shaping machine, 4615½, June 11, Washington.

Three bench milling machines, 4617½, June 11, Washington.

One power press, 4618½, June 11, Washington.

Two drilling machines, 4620½, June 11, Washington.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Bay Ridge Dock Co. has filed plans for a $375,000 plant. According to plans by Architect William Hagginson, 21 Park Row, New York, the structure will be four stories high, 149 x 307 feet.

BROOKLYN, N. Y.—It is reported that a large shipbuilding plant will be erected on property known as the Palmer Docks and recently purchased by the Greenpoint Improvement Co.

NEW YORK.—The Randsberg Iron Works has purchased the 9-acre tract on the East river, and plans to erect a $1,000,000 dry dock.

ALTOONA, PA.—The Pennsylvania railroad is considering a big addition to its shops here.

CONNELLSVILLE, PA. — The Capstan Glass Co., this city, has bought the plant of Ripley & Co. will make extensive improvements.

CONNEAUTVILLE, PA. — The Burke Electric Co., Erie, Pa., has bought 25 acres here and will build a branch plant.

FORT WASHINGTON, PA. — Columbia Chemical Co. will build an addition to its plant this summer.

PITTSBURGH.—W. E. Moore & Co., Union Bank building have plans for a plant 60 x 200 and 125 x 145 feet, for the Gas Tank Recharging Co., Keokuk, Iowa, and have let contract to the Worden-Allen Co., Chicago.

POTTSVILLE, PA.—The Industrial Foundry Co. has broken ground for a 1-story foundry, 90 x 120 feet, to cost $30,000.

SHARON, PA.—It is believed that the



A defective casting can make hours of the finest sort of machine work look sick.

Good, reliable and dependable steel castings means fewer shutdowns for repairs—and greatly reduced upkeep.

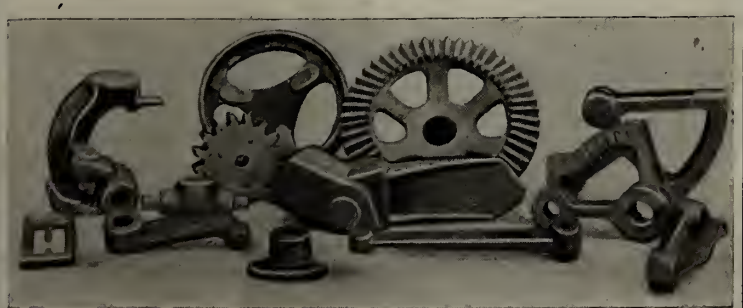
Many motor car and truck manufacturers—and in fact all concerns that have ever used "Farrell-Cheek" Steel Castings, strongly recommend them as being absolutely reliable in every respect. They are quality castings through and through.

Just a line from you on your requirements will bring a quotation and dependable delivery date —send us the line.

We specialize on Small Steel Castings; Blank Gears; Carbonizing and Case Hardening Boxes.

Farrell-Cheek Steel Foundry Co.

Sandusky, Ohio



Say you saw it in THE IRON TRADE REVIEW

Savage Arms Corp. is planning extensive additions to its plant.

BOUND BROOK, N. J.—The Calco Chemical Co., 233 Broadway, New York, will make additions to its plant here, costing $280,000.

HARRISON, N. J.—The General Electric Co. will erect a producer house, one and three stories, 50 x 100 feet, at its works in this city. Edward M. Waldon, 665 Broad street, Newark, N. J., will be in charge of construction.

NEWARK, N. J.—The Pierce, Butler & Pierce Mfg. Corp., manufacturer of boilers, radiators and plumbing supplies, has purchased a 50 x 200-foot plot which will be improved by a 1-story factory building.

NEWARK, N. J.—The National Oil & Supply Co. has bought additional property here and plans the erection of an addition.

NEWARK, N. J.—The Essex Foundry Co. has had plans prepared for the erection of a 1-story brick addition, 41 x 75 feet.

POMPTON LAKES, N. J. — A $45,000 hydro electric plant will be erected by this borough. S. Firestone, Rochester, N. Y., is drawing plans.

TRENTON, N. J.—The Trenton Malleable Iron Co. will start work shortly on the construction of a $10,000 foundry addition, 44 x 117 feet.

Activities in the Central States

AURORA, ILL.—The Lyon Metallic Mfg. Co., Chicago, will build an addition to its Aurora plant, 1-story, 100 x 140 feet, to cost $50,000.

BLACK RIVER FALLS, WIS.—The Jackson county board of supervisors has accepted plans and specifications by W. C. Neatow, LaCrosse, Wis., for two 75-foot reinforced concrete and steel bridges, subject to the approval of the government.

CHETEK, WIS.—The board of education has authorized employment of an architect to prepare plans for a new high school building, containing gymnasium, auditorium, manual training and domestic science rooms and shops, steam heating system, costing $75,000.

CHICAGO.—The Bunting Boiler Co., John T. Bunting president, 4341 Lowell avenue, will build a boiler shop, 70 x 200 feet, to cost $30,000. L. M. Mitchessl, 19 South La Salle street, is architect.

CLINTONVILLE, WIS.—J. A. Perkins, clerk of the board of education, is taking bids for the erection of a new high school, planned by Architects Parkinson & Dockendorff, LaCrosse, Wis. It will cost about $100,000.

GREEN BAY, WIS.—The Morley-Murphy Hardware Co. sustained a loss of $75,000 by fire in its warehouses. Plans are being prepared by Architects Foeller & Schober for reconstruction of the group and erection of additions.

MANITOWOC, WIS. — Architect Stanley F. Kadow, 988 Kinnickinnic avenue, Milwaukee, is preparing plans for a $100,000 hotel building to be erected in Manitowoc by John M. Kadow. It will be 4-story and basement, 40 x 125 feet.

MANITOWOC, WIS.—Albert C. Tomcheck, contractor, Manitowoc, has taken the contract for building a new county jail and sheriff's residence at Manistique, Mich., at $45,000.

MENASHA, WIS.—Plans are being prepared by city engineer for proposed new $50,000 bridge over the Fox river, to be built this year. The bridge will be of reinforced concrete and steel, with stationary spans.

MILWAUKEE.—Architect Frank E. Gray, 86 Michigan street, has awarded contracts for erection of a foundry, cupola and core room building, costing $65,000, for the Universal Machinery Co., Milwaukee. The building will be 90 x 160 feet, one story, and 35 x 166 feet, two stories. Steel work has been let to Lakeside Bridge & Steel Co., North Milwaukee.

MILWAUKEE.—Albert C. Downing, 787 Shepard avenue, formerly of the Hummel & Downing Co., paper box and boxboard manufacturer, Milwaukee, is organizing a new company to engage in a similar line of business. An initial investment of $100,000 in plant and equipment is contemplated.

MILWAUKEE.—Klug & Smith, consulting engineers, have completed plans for a new bridge over the Sheboygan river, Sheboygan, Wis., to cost $60,000. It will contain one lift and one stationary span, with steel and concrete superstructures, respectively. C. U. Boley is city engineer.

MILWAUKEE.—The Universal Machinery Co., 784 Thirtieth street, manufacturer of machine tools, will build and furnish a machine shop group on Sixty-fourth avenue, to cost $250,000, including a 10-ton crane and several smaller cranes. E. C. Devlin is president.

MILWAUKEE.—Paul Riesen & Sons, Milwaukee, are low bidders at $147,373 for the general contract for erection of superstructure of the first unit of the new Central Continuation school. For the steel and iron work. A. F. Wagner is low bidder at $6094.

MILWAUKEE.—F. Ramstack and Harry Herz have organized the J. E. F. Spark Plug Co., Ltd., with a capital stock of $6500 to manufacture spark plugs and other automobile and tractor accessories.

MILWAUKEE.—The Allen-Bradley Co., 495 Clinton street, manufacturer of electric control apparatus, will build a 2-story addition, 50 x 100 feet. A. C. Eschweiler, Goldsmith building, is architect.

MILWAUKEE.—The Milwaukee Stamping Co. has awarded contracts for construction of a reinforced concrete and steel sash factory and warehouse addition, 100 x 126 feet, 3-story and basement.

MILWAUKEE.—The National Steel Foundries will start construction shortly on an addition, 80 x 140 feet. Richard P. Tell is president and general manager.

MILWAUKEE.—The Standard Crucible Steel Co. will build a foundry, 123 x 422 feet at Thirtieth and Lloyd streets.

MODENA, WIS.—Casper Schmidlin has engaged the Power Engineering Co., Corn Exchange, Minneapolis, to prepare plans for extensive improvements in his hydroelectric and milling plant.

OSHKOSH, WIS.—Sealed bids will be advertised for by the board of public works for furnishing and installing a 4,500,000-gallon pumping engine, motor-driven, with automatic control, for the city waterworks system.

PLAINFIELD, WIS.—Spees & Reed have taken the general contract for erecting a public garage and machine shop, 80 x 53 feet, for J. F. Walter & Fields.

QUINCY, ILL.—The Moorman Mfg. Co., E. W. Moorman president, will build a 2-story addition, 50 x 146 feet, to cost $30,000.

RACINE, WIS.—The Perfex Radiator Co. has reorganized and increased its capital stock from $15,000 to $1,000,000. Plans are being made for building extensions to the new plant erected a short time ago. Fred Opits is president and general manager.

RIB LAKE, WIS.—The Rib Lake Lumber Co. is building a machine and repair shop costing $15,000.

STEVENS POINT, WIS.—The First National bank, this city, will erect a modern bank building.

SUPERIOR, WIS.—The Douglas county board of supervisors has taken bids for the construction of the proposed new $400,000 courthouse, county jail and sheriff's residence, subject to the wishes of the government.

SUPERIOR, WIS.—The Continental Motor Truck Co. is installing equipment in its new plant and will begin production of trucks in a short time. J. G. Barnesdale is chief engineer.

SUPERIOR, WIS.—The Enterprise Foundry Co. has been organized by S. A. Riches and associates and is establishing a gray iron and malleable works.

WATERTOWN, WIS. — The Monarch Tractor Co. is making additions to its machine shop and assembling room and will also build an addition to its foundry. F. L. Thomas is secretary and treasurer.

WEST BEND, WIS.—The West Bend Woolen Mills and the Barton Roller Mills will rebuild their power dams on the Milwaukee river. John Geib is owner of the woolen mills and W. F. Gadow of the flour mills.

WHITEFISH BAY, WIS. — The village board of trustees has engaged Architects Martin Tullgren & Sons to design a new public school building, with eight classrooms, auditorium, gymnasium and manual training shops. The building is estimated to cost $75,000. W. J. Eisenring is secretary.

DETROIT.—Machinery and equipment of the Detroit-Wyandotte Motor Co. has been sold by the Security Trust Co., trustee, to Samuel L. Winternitz, of Chicago, and the New Jersey Machine Co., of Newark. The equipment probably will be offered for sale.

DETROIT.—The A. Colton Co., 782 Jefferson avenue, manufacturer of machinery, will build a 1-story machine shop addition, 60 x 153 feet. Mildner & Eisen, 924 Hammond building, are architects.

DETROIT.—The Kelsey Wheel Co., Military road, is building a 1-story addition, 80 x 140 feet, to cost $20,000.

DETROIT.—The Aluminum Castings Co is building a 1-story acetylene gas plant.

ALTON, ILL.—The Consolidated Chemical Products Co., care I. W. Brandels, will build



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Economy in cost and certainty of completion in time specified are assured by Arnold Methods. The wide clientele which we have served for more than 20 years, includes such well-known concerns as:

Aermotor Company	Amer. Brake Shoe & Foundry
Bucyrus Company	W. B. Conkey Company
Diesel Engine Company	Hurley Machine Company
International Harvester Co.	Otis Elevator Co.
The Pullman Company	Quaker Oats Company
Walker Manufacturing Co.	Cleveland-Cliffs Iron Co.

Among Arnold Clients there is a uniformity of satisfaction that bears witness to prompt efficient service they have received. Such results were made possible through centralizing the entire responsibility in one organization, broad enough to handle properly every detail from the making of the plans to the final installation of machinery and equipment.

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This new plant of a large manufacturing company was put up in the face of the most unfavorable material and labor conditions. It is under conditions such as these that through centralizing responsibility in The Arnold Company, seemingly impossible problems are solved.

a 2-story factory, 90 x 150 feet, to cost $100,000.

BRADLEY, ILL. — The David Bradley Mfg. Co., owned by Sears, Roebuck & Co., Chicago, will build a malleable foundry. J. C. Bohrer is manager.

CHICAGO.—The Electric Steel Co., Thirty-first and Wood streets, has under construction a foundry building, 130 x 300 feet, a materials yard with a craneway, 48 x 360 feet, and a reclamation mixing and distributing system for handling molding sand. Design and construction are by Frank D. Chase, Inc., Peoples Gas building, Chicago.

CHICAGO.—The Haggard & Marcussen Co., manufacturer of spring beds, 1109 West Thirty-seventh street, is building a 1-story addition, 49 x 70 feet. J. C. Llewellyn, 38 South Dearborn street, is architect.

CHICAGO.—The Groen Mfg. Co., 2113 North Kenneth avenue, coppersmiths, will build a 1-story factory, 50 x 100 feet. T. J. Reynertson, 1937 North Crawford avenue, is architect.

CHICAGO. — A. F. Dagling, 6327 St. Lawrence avenue, is building a 1-story machine shop, 96 x 100 feet, at 995 West Nineteenth street.

MATTOON, ILL.—The Chuse Engine & Mfg. Co., 1320 Prairie avenue, has increased its capital and bought a site adjoining its plant on which it will build a foundry and machine shop. H. A. Chuse is general manager.

ANDERSON, IND.—The Hill Pump Co. is building a foundry, 100 x 200 feet, to cost $45,000.

ATTICA, IND.—The Attica Electric Power Co., B. H. Freeland superintendent, will build a waterworks and electric light plant, to cost $100,000.

FRANKFORT, IND.—Bids will be asked within the next few weeks for the construction of new shops for the Toledo, St. Louis & Western railroad, to cost $200,000. Plans now are being prepared.

MARYLAND, IND.—The Evansville Tool Co., Frank Loloff president, Ninth avenue and Maryland street, Evansville, will build a 1-story power house, 45 x 65 feet at Maryland.

SOUTH BEND, IND. — The Malleable Steel Range Co. is building an addition, 34 x 88 feet, to cost $10,000.

VALPARAISO, IND.—The Indian Steel Products Co. is building an addition.

CINCINNATI. — The Cincinnati-Bickford Tool Co. is installing machinery in an addition to its plant in Oakley that will increase its present capacity nearly 50 per cent.

CINCINNATI.—The Cincinnati Pulley Machinery Co. is building an addition to its plant in Covington, Ky.

WEST UNION, O.—W. E. Caldwell, of the Hillsboro Overall Co., is arranging for improving and enlarging the plant here.

YOUNGSTOWN, O.—The Truscon Steel Co., is erecting a shop addition of 12,000 square feet.

COVINGTON, KY. — The United States Motor Truck Co. is building a 3-story plant, 75 x 175 feet, to cost $75,000.

LOUISVILLE, KY.—J. B. Speed & Co. will erect a potash plant at Lockland, Ky., at a cost of $100,000.

OWENSBORO, KY. — The Owensboro Forging Co., Henry S. Barry, president, will proceed at once to rebuild its shop, recently burned.

Western and Intermountain Territory

ROCHESTER, MINN.—J. O. Thompson, 118 Broadway, will build a 2-story machine shop, 66 x 140 feet, to cost $35,000. F. H. Morse & Co., Leland block, is architect.

ST. PAUL.—The American Hoist & Derrick Co., Water and Roberts streets, is building a 1-story machine shop, 40 x 74 feet, to cost $20,000.

DAVENPORT, IOWA.—The Scott County Savings bank has let the contract for a new bank building to cost $250,000.

FORT MADISON, IOWA.—The Karamoid Mfg. Co. is building a 3-story addition, 50 x 250 feet, to cost $20,000, part of which will be used as a machine shop.

WINTERSET, IOWA.—The Citizens National bank has let the contract for a new bank building.

ST. JOSEPH, MO.—The Berry Steel & Iron Co., G. D. Berry, president, Fifth and Oak streets, will build a plant, 270 x 360 feet.

LITTLE ROCK, ARK.—The C. J. Snyder Co., 114 Arch street, is inquiring for equipment for its machine and repair shop.

BAXTER SPRINGS, KANS. — Citizens have voted a bond issue of $85,000 for waterworks plant construction.

EL DORADO, KANS.—Citizens have voted a bond issue of $60,000 for waterworks extensions.

OMAHA, NEBR. — The Auto Pump & Mfg. Co., 729 First National Bank building, is building two additions, 80 x 240 feet and 40 x 80 feet.

LIBBY, MONT. — The Great Northern railroad will begin construction of 10 new passing sidetracks between Troy and Whitefish.

MISSOULA, MONT.—The Northern Pacific railroad is to start at once construction of a double track in Missoula to eliminate a delay in switching and handling freight. This and other work will cost $19,000.

COPPERFIELD, NEV.—A forge shop, engine shop and compressor works will be erected by the Washoe Copper Co. at its plant near here.

RENO, NEV.—The Lang Iron Reduction Co., capitalized at $30,000, has been chartered to operate a small plant, by Herbert Lang, J. H. Scales and Irving Peterson.

Up and Down the Pacific Coast

EVERETT, WASH.—The United Steel Co. is to start at once on the erection of its buildings here, and bids are being received from Everett contractors. The main building is to be 70 x 200 feet, 32 feet high. J. Johnson, general manager, states that all necessary machinery has been provided for.

SEATTLE.—The Western Drop Forge Co., 301 Horton street, Seattle, will erect an addition, 180 x 165 feet. Four additional hammers and presses are being installed. A die sinking room also is being constructed.

SEATTLE.—The city has asked the capital issues commission, Washington, to grant permission to issue bonds for $5,000,000, proceeds to be used for a power plant for the city, probably on the Skagit river.

SEATTLE.—Contracts are to be awarded shortly by the Centenial Mill Co. for an 8-story flour mill, warehouse and office building. Plans are practically completed. Cost will be $400,000.

SEATTLE. — The Gulowsen-Grei Engine Co. will build a plant, 174 x 300 feet, costing $400,000, on Salmon Bay. S. E. Sonnichsen, Downs block, is architect.

SEATTLE.—The Heffernan Engine Works will erect a 175 x 50-foot machine shop, to cost $25,000. Hull Building Co., 1510 Jefferson street, has the contract.

SEATTLE.—An ordinance has been passed by the city council authorizing appropriation of $100,000 for municipal railroad construction from the bond fund.

SEATTLE.—The American Foundry Co., 408 Occidental avenue, has obtained a site and will build a foundry of 20 tons a day capacity.

SEATTLE.—The Hefferman Engine Works is building a 2-story machine shop, 50 x 174 feet, to cost $25,000.

TACOMA, WASH.—Pacific Coast Managers of the Foundation Co., L. C. Smith building, Seattle, announce plans for constructing a new unit to the local yards for steel ship construction and numerous other buildings are under consideration.

ASTORIA, OREG.—The Hammond Lumber Co. will install electric power equipment, including a turbine and generator, of 2000 horsepower capacity, and four 600-horsepower water-tube boilers.

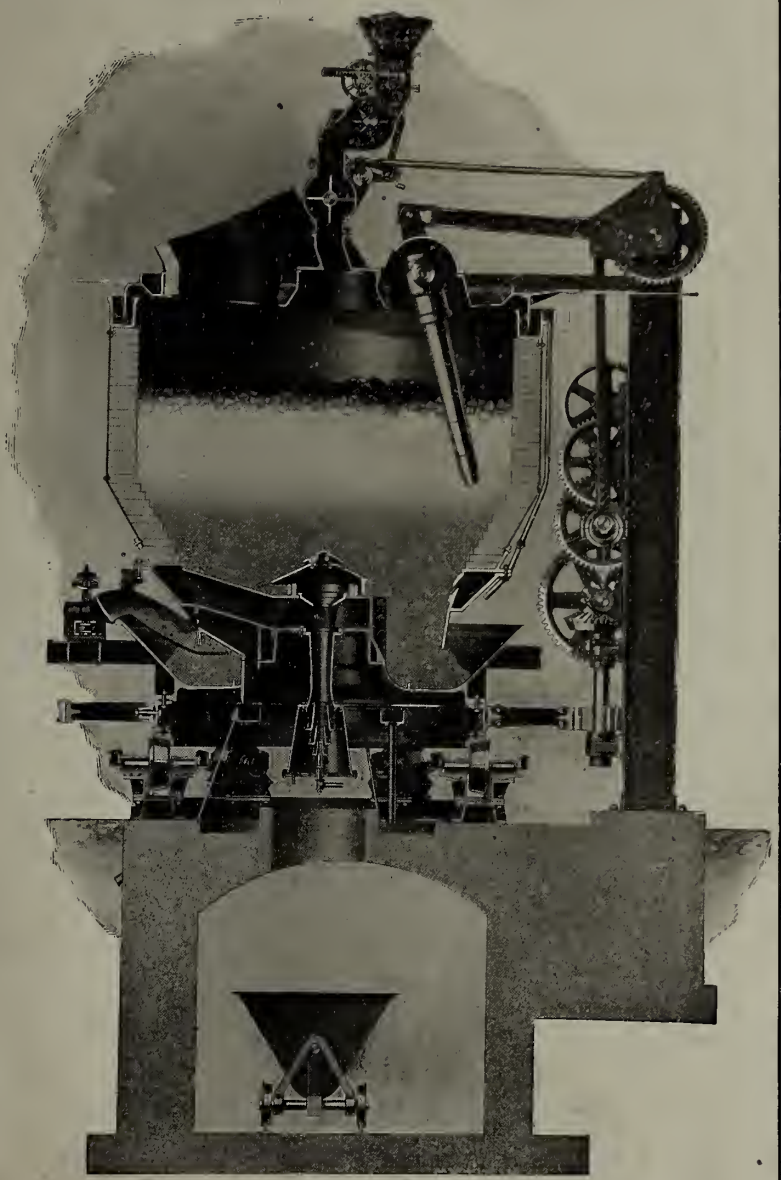
The Hughes Mechanical Gas Producer

REPEAT ORDERS Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron & Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.30c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	27.50 to 28.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melt'g steel, Birming.	22.50 to 24.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. quar. & east. Pa.	36.50
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.50 to 21.00
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.40
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.50 to 30.50
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	44.00 to 45.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	29.00 to 29.50
Busheling, No. 2, Chgo.	19.00 to 20.00
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	16.50 to 17.50
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast, borings, Cleveland	18.25 to 18.50
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	17.75 to 18.25
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	36.00 to 36.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	18.00 to 18.25
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 17.50
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wrgt., No. 2, Chgo.	31.00 to 31.50
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	25.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	31.25 to 31.75
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	36.50 to 37.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 27.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast No. 1, Cleveland	31.00 to 31.50
Cast, No. 1, Cincinnati	31.50 to 32.00
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	26.50 to 29.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	33.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.75 to 32.25
Malleable railroad, St. Louis	28.50 to 29.00
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	35.00 to 35.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	43.00 to 44.00
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, June 13, 1918 *No. 24*

Industry Bows to Broadened Rule

Complete Federal Domination of Distribution and Virtually of Production is Quickly and Quietly Effective—Resumption of Free Market Conditions Dependent Wholly on Pleasure and Will of Government—War Needs Supreme

WASHINGTON'S dominion of the iron and steel industry is complete. The final and historic chapter written by the war industries board June 6 is in full effect. Not a ton of mill or furnace product now is moving except in strict accord with federal rule or dictate. The whole industry within a few days has been formally and firmly planted on an absolute war basis. The small remaining vestige of a free market has been wiped out.

There has been some hesitancy, but no confusion. The gradual and sequential steps by which the industry has been brought to the concluding stage has made little readjustment necessary. Some recasting of individual policies of distribution and operation as have been required, have been quickly made. Producers on their part have received the new conditions with something of relief. They have accepted the agreement entered into by a joint committee of their number and of the war industries board as establishing a definite and all-inclusive plan of procedure for the period of the war. Consumers already convinced that their security lay only in their identification with essential production find their position virtually unchanged.

Responsibility is Centered

The literal significance of the agreement between the producers and the government is that it formally transfers from the manufacturer into the hands of the war industries board and the steel director the full responsibility for the shaping of production and distribution. The really new feature of this control is the function of the steel director to issue licenses or permits to producers for the disposal or delivery of any surplus that may remain after priority or nonpriority orders, falling within a specified list of essential purposes, shall have been satisfied. Whether this provision actually denotes that some tonnage in time will be made available to nonwar consumption is by no means assured. The list of nonpriority purposes which the government has set ahead of any nonwar distribution is very comprehensive. Furthermore, it is clearly indicated that it may be extended from time to time. This, in effect, gives the government an elastic control over such excess production as may appear from time to time. On this point it is significant that some large producers report that practically 100 per cent of their recent inquiries excluding export tonnage, are included within preferential list.

War Orders Keep Rising

In the meantime the approximately 17,000,000 tons of direct and indirect war orders filed with the steel director have been considerably enlarged and the total is growing steadily. In all discussions of war tonnage it is pointed out by producers, however, that time of delivery and not mere volume is the real essence. The 13,000,000 tons of shipping for which the capacity will be available next year will represent probably 3,500,000 tons of ship plates. The mills should have no difficulty in supplying this demand, especially with 1,300,000 tons of new capacity about to come in. The crux of the whole problem of war steel supply manifestly turns on the uncertainty as to what will be needed, caused by the ever-changing demands of the great conflict.

Iron Survey Aids Control

The pig iron situation promises to be little affected. The movement, dating back some weeks, to put that industry on a genuinely war basis now is well advanced. The survey of production and consumption now under way will harmonize well with the extended government regulations. Producers already are making use of the data obtained from their consumers through the questionnaires recently circulated to guide them in their shipments. New business largely is in the form of allocations. The new tonnage requested from the furnaces by the government this week is large.

JUNE 13, 1918

THE IRON TRADE REVIEW

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An Historic Agreement

HAD the government with one sweep of its sovereignty seized the iron and steel plants of the country for the purposes of war it could not have effected a more complete control of the industry than has been brought about by the memorable events of the past week.

By the agreement entered into by a joint committee of the war industries board and of the American Iron and Steel institute and now finally ratified by the war industries board not a ton of iron and steel is to be made or marketed unless it has first been formally vised by the proper government officials or unless its use is of such a character as to fall within the restricted classes officially set forth. The effect of this agreement is to give the government a hand in every transaction involving the products of the mills and furnaces. Heretofore its exercised jurisdiction has extended only to the requirements of war and of those lines of consumption which the government has considered of an essential character. Henceforth whatever vestige of an open market or of normal distribution there shall remain, will be by the sufferance and in accordance with the direction of the federal authorities through a system of licenses or permits to be issued upon application, by the steel director, who is backed by the powers recently vested in the war industries board.

This licensing or permit plan is the important and cardinal feature for the ordinary consumer of iron and steel of the new war control system. It effectually closes the final gap in the scheme of distribution under war conditions through which material may have passed to the open market at the will and preference of the producer. When and whether any steel will be subject to open sale now rests with the decision and judgment of those charged with the responsibility of supplying the essential requirements of iron and steel under war conditions. The individual producer thereby will be spared the perplexity and embarrassment of deciding himself between the conflicting claims of consumers for such surplus as may come into his possession from time to time. The government has assumed the full burden not only of seeing that the available material is placed to best advantage under present conditions but that it shall have first call upon anything that is within the capacity of the mills to produce. In substance, it will direct both production and distribution.

The question whether at any time there shall be a surplus of iron and steel rests wholly with the government. Direct and indirect war needs will not be the only determining factors. Before any surplus shall be available, the agreement provides a list of nonpriority uses shall be served. It is clearly intimated that this nonpriority but preferential list may be revised from time to time. There is nothing to prevent the government from extending it, at will, and thereby absorbing any surplus that seems likely to become available. This emphasizes the close and complete control which may be exercised over distribution at all times.

The new government plan, finally is a measure of conservation. It has become increasingly clear neither the government officials themselves nor the steel producers have any positive idea, how much tonnage eventually will be required by the war and when. The almost daily-changing demands of the great conflict are beyond human calculation. That being true, the part of wisdom has been that the full potentiality of the iron and steel industry shall be constantly at the call of the country and that every need, no matter how great, shall be met with the least delay. The new plan virtually insures this. War has been given precedence over every other consideration. In a matter so vital, an oversupply is the best insurance for the whole country. Whether in the end, there is to be a marketable surplus of iron and steel is to be settled only after essential demands of every possible character have been fully considered and satisfied as war measures. Considering the gravity of the occasion, the individual consumer of iron and steel could not expect that the government would stop short of anything but the most complete precautions.

Technical Meetings Essential

IN these days when every human activity must meet the single test, "Will it help to win the war?" a consideration of the functions of technical and engineering society meetings in relation to the national emergency is perhaps in order. When the war broke out last year a number of business and technical organizations took the stand that meetings should be greatly curtailed or abandoned, and in two or three notable instances prominent and long established conventions actually were canceled. Later President Wilson came out in favor of meetings as usual, on account of the potential value of such gatherings in the great work of perfecting our war organization.

A measure of the usefulness of the engineering societies and business organizations in wartime may be found in the recent spring meeting of the American Society of Mechanical Engineers at Worcester, Mass., which is reported in detail elsewhere in this issue.

Out of thirty-four titles on the program, including many purely technical papers, eighteen were on subjects relating directly to the war and perhaps ten others were of indirect war importance. Furthermore these papers and addresses contained numerous suggestions and ideas of tangible value on such important matters as emergency technical war training, labor turnover, fuel conservation, munitions manufacture, textile production, etc. Throughout the meeting the utmost liberality in disclosing manufacturing methods, the development of which in some cases had cost thousands of dollars, was evident. One manufacturer described in detail a method of drawing reverse tapers for detonating cases, thus doing away with expensive time-consuming machining operations. Another told at length how his factory was transformed from the production of luxuries to war necessities. A third took up the technical phases of air propulsion. Others contributed equally important bits of information. And if, as military experts claim, the war will be won by the side that finally mobilizes the most effective war-making machinery in overwhelming quantity, backed by a 100 per cent efficient organization in and behind the lines, "how to" information of the nature just described is invaluable to American manufacturers at the present time. Furnishing such information lies completely and solely within the province of engineering societies and the business press. Both are making good.

Universities as War Centers

THIS is the season of the year when our universities are holding commencement exercises. More significance attaches to them at present than ever before in the history of the nation. The value of the new product of our institutions of higher training cannot be overstated at this time. Already many seniors are in the military service. Instructions in the professions, sciences and arts have been intensified so that the classes are better equipped than heretofore to train minds in chemistry, mathematics, engineering, medicine, in the devising of munitions, in helping to plan campaigns, in figuring out gun ranges and on through the list.

They produce the sort of material, in the shape of trained minds, that is required in this day to conduct a war of superlative science and trained skill on a successful basis. If the work that universities have done and are doing in the way of preparing men for the military service in the numerous branches were reduced to a written report after hostilities have ended, it would supply one of the most inspiring and fascinating volumes dealing with the war.

Encourage Proved Efficiency

"Trust-busting", once a popular sport in the United States, seems to be falling into disrepute these latter days, and even courts, supposed to be cold and distant to the sentiments of the populace, appear to have been warmed somewhat by the change in general sentiment.

Recently the United States Supreme Court decided the suit for the dissolution of the United Shoe Machinery Co. by refusing to order the dissolution. In favor of these combinations the court has the following to say:

"The company indeed has magnitude, but it is at once the result and cause of efficiency and the charge that it has been oppressively used is not sustained. Patrons are given the benefits of improvements made by the company and new machines are substituted for the old ones without proportionate charge. There has been a saving as well in the cost of the manufacture of shoes. These are some of the results of the organization of the United company." The court is seemingly governed by common sense as well as by interpretation of the law when it says: "The idea is repellant that so complete an instrumentality should be dismantled and its concentration and efficiency lost."

Another instance of the value of large aggregations of capital and industrial ability is the United States Steel Corp., which has been and is rendering invaluable service in the prosecution of the war. Much efficiency now available would have been lacking without the aid of the men at its head. The two latest enterprises for the production of weapons is under its management and the government is not asked to pay a cent for the service. Only a large corporation could have done this service.

It would be to the good of public policy as well as an act of fair-minded justice if the suit for dissolution of the Steel corporation should be allowed to drop, in view of the service so freely rendered. Similar action in other suits against other alleged unlawful combinations of industry where the factor of proved efficiency is so clear would represent one offset of national benefit against the terrible cost of war.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1526

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.30
Basic, Pittsburgh	33.10
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.60
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	34.10
No. 2 foundry, Cleveland	34.10
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	45.50
Silveries, 8 per cent, Chicago	48.50
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon, furnace	50.00 to 52.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.25 to 37.50
Charcoal, Superior, Buffalo	37.50
Charcoal, southern to 2 per cent silicon	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot.	70.00 to 75.00
Spiegel, contracts, furnace.	75.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	150.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00 to 155.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base, Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	63.35
Six-inch and over, Chicago	60.35
Four-inch, New York	64.35
Six-inch and over, N. Y.	61.35
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Hot rolled strip steel, Pitts.	3.50c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh.	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets ⅞ in. & small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation, on leading products June 12, average for May, 1918, average for March, 1918, and average for June, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices June 12, 1918	Average prices May, 1918	March, 1918	June, 1917
Bessemer pig iron, Pittsburgh	$36.30	$36.15	$37.25	$55.20
Basic pig iron, Pittsburgh	33.10	32.95	33.95	50.20
*No. 2 Foundry pig iron, Pitts.	34.10	33.95	33.95	51.02
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	51.00
Lake Superior charcoal, Chicago	37.50	37.50	37.50	51.80
Malleable, valley	33.50	33.50	33.50	50.07
Malleable, Chicago	33.50	33.50	33.50	50.50
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa	32.00	32.00	33.00	46.37
**No. 2X Virginia, furnace	33.50	33.50	33.50	46.50
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	47.50
Ferromanganese, 70%, delivered	250.00	250.00	250.00	431.25
Bessemer billets, Pittsburgh	47.50	47.50	47.50	93.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	101.25
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	101.25
Open-hearth billets, Pitts	47.50	47.50	47.50	93.75
Steel bars, Pittsburgh	2.90	2.90	2.90	3.62
Steel bars, Chicago	2.90	2.90	2.90	4.50
Iron bars, Philadelphia	3.50	3.50	3.50	4.26
Iron bars, Cleveland	$3.64	3.64	3.64	3.50
Iron bars, Chicago mill	3.50	3.50	3.50	4.00
Beams, Chicago	3.00	3.00	3.00	4.63
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.18	3.18	4.66
Tank plates, Pittsburgh	3.25	3.25	3.25	4.50
Tank plates, Chicago	3.25	3.25	3.25	7.92
Tank plates, Philadelphia	3.435	3.43	3.43	9.66
Sheets, blk., No. 28, Pitts	5.00	5.00	5.00	8.13
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	7.57
Sheets, galv., No. 28, Pitts	6.25	6.25	6.25	9.95
Wire nails, Pittsburgh	3.50	3.50	3.50	3.62
Connellsville furnace coke	6.00	6.00	6.00	11.12
Connellsville foundry coke	7.00	7.00	7.00	11.18
Heavy melting steel, Pitts	29.00	29.00	30.00	40.00
Heavy melting steel, eastern Pa.	28.50	28.50	29.50	36.62
Heavy melting steel, Chicago	29.00	28.90	30.00	37.00
No. 1 wrought, eastern Pa	34.00	34.00	35.00	47.87
No. 1 wrought, Chicago	33.50	33.50	35.00	46.75
Rerolling rails, Chicago	34.00	34.00	35.00	46.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1526)

Iron Survey Aids New Control Plan

Data on Consuming Position of Individual Melters Helps Producers to Follow Extended Government Regulations Over Distribution—Some Users Refuse to Make Returns—Large Tonnages Up For Allocation

Philadelphia, June 11.—The impression prevails here that last week's announcement of the war industries board leaves the pig iron situation practically unchanged. As to the provision that arrangements to ship requirements not included under the preference list must be made with the steel director, the furnaces are confused. Until they receive specific instructions with respect to the procedure with latter orders, they will follow the policy of filling their contracts and giving preference to direct and indirect government requirements. Incidentally very few pig iron orders have priority certificates. It is learned that large tonnages of foundry have been sold by several eastern and Virginia makers and one southern furnace for forward shipment with provision that government orders and allocations will receive preference. Week's business included allocations of round tonnages of foundry iron. It is understood 180,000 tons of basic which the war industries board has been trying to place of which 120,000 tons are for Great Britain and remainder for domestic use, will be allocated in the south. In one case a furnace making basic has been instructed not to sell any more off iron until government designates the buyer. Leonard Pickitt, in charge of low phosphorus distribution, held a meeting of low phoshorus producers last week and now is compiling new figures showing the expected production of this grade, the tonnage sold for government purposes and the tonnage remaining unsold.

Open Orders Placed

Boston, June 10.—Many outlets exist for large tonnages of iron in this territory if the metal were available or the furnaces were at all interested. As neither of these latter conditions obtain, orders continue to pile up, for inquiries are no longer resorted as a means of locating supplies. The users have gotten into the habit of letting agents and brokers know actually what they could use and placing to the order on a good-till-cancelled basis. Every office locally will be found to have orders aggregating a big tonnage. In certain instances these figure up to 50,000 tons. These are largely for foundry iron. Whether these orders represent actual needs or have been placed as a measure of safety against possible nondelivery against contracts cannot be determined. Meanwhile, there are very satisfactory deliveries of iron to plants engaged on war orders who can supply the special necessary permit. It is now safe to say that arrearages among Alabama and northern furnaces have been pretty well made up and Virginia iron is moving with much more freedom than recently.

Conditions Unchanged in East

New York, June 10.—The assumption by the government of control of the iron and steel industry has not yet become apparent in visible developments in the pig iron market in this district. So far, pig iron sellers have not received any instructions as to how their selling policy will be effected by this move. The present situation, in fact, is exactly the same as in previous weeks; the furnace activities are restricted to making deliveries on contracts and no new sales are reported. Practically all

of the consumers in this district have filled in and returned their pig iron questionnaires. Only a few consumers still are to be heard from, and these are expected to report without further delay.

Refuse to Make Returns

Pittsburgh, June 11.—Refusal to fill out questionnaires in connection with the pig iron survey has been made by some consumers. These instances are rare, but have caused considerable surprise to the furnaces serving them. The failure of these consumers to report tonnages of iron they have on hand, their requirements and the use of the iron has been reported to the war industries board for such action as it may see fit. The committee on ore, pig iron and lake transportation has previously served notice that those not reporting would be considered in the nonessential class and be entitled to receive iron only in accordance with that class and this probably will mean a severe curtailment of supplies in some directions. Those who have declined to fill out the questionnaires say they do not consider it the business of anyone except themselves as to iron they have on hand and the use to which it is being put so long as they are satisfactorily filling government orders. Some of them are known to be engaged in war work of the most essential character. The survey is about completed, although delayed. The survey still shows that about 35 to 40 per cent per cent of the tonnage of foundry iron and 10 to 15 per cent of steelmaking iron is being used in nonessential manufacture and can be diverted to direct and indirect government work. Many producers are confident there will be enough iron for all essential purposes with the probability that there will be considerable tonnage available for purely commercial users. The questionnaire has brought about some interesting sidelights. Some buyers have reported they will not require all the iron they had contracted for and have asked the furnaces to divert the surplus to others engaged in essential work.

Consumers Well Covered

Buffalo, June 11.—Replies to questionnaires sent out by producers in this district show that the consumers are fairly well covered—better than had been supposed. This condition applies to consumers of the eastern district particularly. South of the eastern district it is not known that the same conditions prevail. About 50 per cent of the questionnaires have been turned in, in this district. Meantime, producers are going ahead and filling war requirements as they come up where they can. No other business is being handled and there is no selling of iron. Some makers here believe optimistically that there will be sufficient iron eventually to go round. The demand keeps up. Everybody wants a little iron and many want considerable tonnages, but there is no new business being handled, except now and then a carload of off-grade.

Date Is Helpful

Cleveland, June 11.—Information relative to the war status of consumers which has been obtained by the questionnaires recently distributed, is proving very helpful to producers in following the stricter regulations of distribution which have been promulgated by the war industries board. It is expected that this data from consumers will be of increasing value as a guidance in following the new plan. The collection of this information will fit in nicely with the new plan and accordingly every effort now is being made to complete the canvass. Returns of the questionnaires, while they have been speeded up somewhat, still are only partially complete and some time still will be required before they are all in. Government requests for the allocation of tonnage for various consumers have been heavy. These include about 20,000 tons of basic, 12,000 to 15,000 tons of bessemer, 12,000 to 15,000 tons of low phosphorus and 20,000 tons of foundry iron for various deliveries. A lot of 14,000 tons of basic for Monessen, Pa., has been allotted to valley producers. Allocations include 1250 tons of No. 2X foundry for a Detroit shipyard; 500 tons for a Baltimore consumer; 350 tons of foundry for a Buffalo fabricator and 200 tons of malleable and foundry for a Milwaukee shop.

The Interstate Foundry Co., Cleveland, is in the market for 9000 tons of iron, to include 6000 northern foundry, 1500 southern foundry, and 1500 of 8 per cent silvery. This company is manufacturing hand grenades under a contract which is said to cover about 30,000,000 castings. Gray iron grenades, numbering about 100,000,000 are expected to be contracted for soon in the Cleveland district.

Await Definite Orders

Chicago, June 11.—Pig iron producers are most interested at present in the interpretation to be put on the recent order taking over control of distribution by the war industries board. Inasmuch as iron must be shipped as made producers are continuing to distribute their product as before, using their best judgment as to where it should go, until definite instructions are available to guide. In the meantime consumers are being notified to start efforts to obtain priority certificates to cover their iron, so that delay may be avoided when matters are lined up by the industries board. Practically no selling is being done and producers are somewhat puzzled to know what can be done with such off iron as is produced from time to time. This has been disposed of readily in the past and it is a question now whether it should be sold as usual or await an interpretation of the recent orders covering such products. Consumers also are apprehensive of the effect of this order, those without war orders believing they will be cut off from supply in great degree and perhaps entirely. Efforts to obtain priority certificates are almost universal preparatory to the application of the new order of things.

Restrictions Halt Sales

Cincinnati, June 10.—Unaccustomed restrictions in the sale of both foundry and basic iron have caused a halt in all new transactions. The furnaces are not willing to take on any business just now, and they are awaiting some intimation from the government about disposing of iron that is available for the last half. A few sales of off-grade iron are made each day, but the tonnage of this is growing smaller. A difference of opinion is expressed as to the amount of foundry iron that can be had for last half shipment. There is none as to the supply of basic, which is practically all absorbed for this year by consumers doing war work. A few southern furnaces will have some iron to dispose of later. They still are not making contracts, however, no matter how urgent the demand may be from melters who wish to cover for sufficient iron to run them through the remainder of the year.

Consumers' Position More Difficult

St. Louis, June 8.—Inquiries for all varieties of pig iron this week have been enormous. Nothing daunted at frequently-reiterated statement by producers and agents that they have nothing to sell, users of iron for nonwar purposes are making known their needs right along in the hope that perhaps some stray tonnage may be made available. Many of the inquiries are urgent, and every possible influence is being brought to bear to secure material. Many of the in-

quirers specify they are prepared to furnish B priority certificate, but even this qualification has failed signally in getting them any iron. The representative of an important eastern producer reports new inquiries this week aggregating between 5000 and 6000 tons from the St. Louis district, and demands on other agencies have been proportionately heavy.

Government Control Felt

Birmingham, Ala., June 11.—Southern furnaces are rigidly carrying out instructions of the government in pig iron. They are shipping on priority orders and are selling only where there is no conflict with the needs of essential industry. Government orders are being accepted and 2000 tons will be shipped shortly to Panama. Federal railroad directors are giving the iron and steel manufacturers of this district every consideration and as a consequence there is further cutting down of old orders. Furnace stocks of iron are being steadily reduced.

Ferro Buying

Continued Despite Doubt Over Imports—Spiegel Shows More Strength

New York, June 10.—About 500 tons of English ferromanganese have been sold during the past week for future delivery. The time of shipment, however, was not specified, since importers are uncertain as to when they will be able to get British export and American import licenses. In fact, they have no assurance that the American licenses will be granted. However, the buyers felt reasonably sure that the supply of English ferromanganese cannot be entirely cut off, and that tonnages will continue to be exported more or less regularly. Therefore, they showed no hesitation in closing.

Market is Dull

Pittsburgh, June 11. — Dullness characterizes the market for ferroalloys. Small lots of 70 per cent ferromanganese are being sold at $250, delivered. Inquiry for 16 per cent spiegeleisen is quiet. The spot market seems to be quotable from $70 to $75, while contract tonnages appear at $70. Some makers of 50 per cent ferrosilicon are sold up till Sept. 1, and are not taking new business. Spot tonnages are quoted at $165 to $175, delivered, and it is reported that recently offerings were made and accepted at $162, delivered, for prompt shipment. Contract tonnages are quoted at $155, delivered.

Coke Contracts Expiring

Many Consumers Will Be On Lower Cost Basis July 1—Some Spot Selling is Being Done

Pittsburgh, June 11.—Large tonnages of coke are represented in contracts which will expire with the end of the current month. These contracts, when made before the government fixed prices for fuel, carry prices ranging from $7 to $9 and upward in most instances, it is understood. Provided prices of coke are not increased July 1, these consumers will pay less from the period for their coke and in this direction their costs in making pig iron will be lower. This advantage, however, will be partially offset by the increased freight rates which become operative on June 25, when the carrying charge from ovens in the Connellsville region to Pittsburgh will advance from 90 cents to $1.20 a ton. It is understood that in all advances the new rates are to take a decimal ending in the cipher so that if a flat increase of 25 per cent would mean a rate of $1.25, it will be moved up to $1.30, and so on. A number of sellers whose contracts with consumers are about to expire probably will not renew them but will continue to supply their regular customers insofar as possible. Light offerings of both furnace and foundry coke have developed and have been taken readily. Larger tonnages are expected to be available in the open market soon. The Monongahela railroad car supply continues to be 100 per cent in the coke region and that on the Pennsylvania has been maintained at or only slightly below that average. The supply exceeds the loading capacity, which has shown some improvement. Consumers appear to be receiving ample shipments. Production for the week ending June 1 totaled 343,020 tons as compared with 340,100 tons for the preceding week, according to *The Connellsville Courier*.

Submarines Delay Shipments

Boston, June 10.—A steady movement of coke from the local by-product ovens continues and because there are signs of a fuel shortage, shipments are being anticipated to a considerable extent by fully a month.

Foundries are well covered for the balance of this year, but are not much better than 50 per cent covered for the first half of next. The production of coal is not on such a scale as to create ease and confidence in the matter of future supplies of coke. Furthermore, much of the coal for coking comes north by water and as a result of the activity of the submarines off the coast, the natural inclination of ship commanders is to dodge into convenient harbors on the way. This, of course, means delays and unless the menace is overcome, it is not improbable that rail shipments will have to be resorted to as a measure to safety.

Production Is Better

Cincinnati, June 10.—According to reports from Wise county and Pocahontas districts, that are authentic, the production of both furnace and foundry coke is holding up better than was anticipated. The employes seemingly have been putting in more time than heretofore, but there is some complaint from both the New River and Connellsville fields.

Situation is Easier

St. Louis, June 8.—Improvement in the car supply has resulted in somewhat improved contract deliveries of Connellsville and Virginia coke in this district. Points to the west also report a slight easing in the situation, but none of the important users has a ton over what he needs to keep going, and in some instance curtailment has been necessary because of shortage. Nothing in the way of eastern coke is being offered here. Dealers are devoting their energies to getting shipments forward.

Labor Rather Indifferent

Birmingham, Ala., June 11.—To the indifference of labor in rendering a full week's work is attributed the curtailed and inferior production of coal. This is having effect on coke production. Appeals are being made to labor at the coal mining camps to give every day possible toward a better production and cleaner coal. Federal figures show a reduction in actual figures of coal production for the last half of the past month in comparison with the previous two weeks. The Birmingham district will ship much of the nut coke from by-product plants to New Orleans to replace the market for anthracite coal from Pennsylvania which will be cut off by order of the federal fuel administrator.

On June 1, the Alabama Co., Birmingham, Ala., blew in its Etowah No. 2 stack.

Expect Control of Scrap

Government Distribution of Old Material Believed Not Far Distant—Shortage Causes Collections to be Speeded Up

FOR COMPLETE SCRAP PRICES SEE PAGE 1525

Buffalo, June 11.—It is the opinion of well-informed persons interested in the scrap trade here that the government will, within a few months, take over the administration of the scrap production in order to properly distribute the large tonnages now coming from the ammunition plants, among consumers in need. It is being recognized that scrap is almost as great a component part of the steel production as pig iron, and present indications are that there will be a real shortage of heavy melting steel this winter. It is felt that a zone system should be established throughout the country to make a thorough survey of the stocks on hand and those being produced in each district. Consumers' stocks are undoubtedly low just now in most instances. The demand continues strong and there is no surplus of heavy melting steel available. Dealers are not able to secure any scrap from the railroad companies. Mixed country scrap which usually becomes a heavy source of supply at this time of year, is very scarce and shipments into this district now are about one-quarter of these received last year. Present government prices are subject to revision July 1, and the situation is being closely watched here. Reduction in the price of cast scrap and malleable is looked for and the placing of fixed prices on relaying rails will undoubtedly come up for consideration.

Turnover Is Good

Boston, June 10.—There has been a fairly good turnover of scrap in this territory during the past week; it might have been larger if the available supply was larger, while none too good shipping facilities also have interfered to some extent with business. New England foundries are still "hungry" for cast scrap and supplies are insufficient. Prices firm at full government maximums plus commissions.

Steel In Greater Demand

New York, June 10.—Increasingly heavy demand for virtually all grades of heavy melting material is the outstanding feature in the New York scrap market. As a result, off-grades are being more and more in demand. During the past week Pittsburgh consumers, with permits enabling them to pay the differential in freight between eastern and western Pennsylvania points, have been in the market for steel scrap in steadily increasing numbers. This demand, in addition to an improved inquiry from eastern consumers, has reduced the supplies of melting steel considerably. Other descriptions, due to the good demand of the past few weeks, also are scarce. Prices generally are firm at the government maximum.

Can't Locate Wrought

Philadelphia, June 11.—Very little activity prevails in the scrap market in this district. The mills and consumers generally have enough material for immediate consumption, although the scarcity of yard scrap promises trouble ahead. Wrought remains scarce. The American board of scrap iron dealers is making slow progress in locating 10,000 tons of wrought pipe.

Demand is Brisk

Pittsburgh, June 12.—Brisk demand exists for all of the leading grades of old material. Dealers report that supplies in this district, which consumes more than it produces, has been drawn on heavily and in consequence some buying from outside zones has taken place. One large consumer bought a round tonnage of heavy melting steel from a dealer in the east at $29, delivered, plus the commission of 3½ per cent together with the freight differential from Philadelphia. Permission to buy material in another district has to be obtained by consumers from W. Vernon Phillips, chairman of the subcommitttee on scrap. When the new freight rate advances become operative on June 25, the increases will be paid by dealers inasmuch as prices are fixed f.o.b. consuming points. Dealers also will have to pay the increaased freight rates for that portion of material they have bought which is not delivered previous to June 25. Some of them feel that in view this situation of higher prices should be granted for the third quarter.

Wonder as to Regulation

Cleveland, June 11.—Now that Washington has put all iron and steel products under its wing, scrap iron and steel dealers are wondering whether their industry is next. Most dealers here feel that so long as the trade keeps scrap moving to the mills in sufficient quantities there will be no change in the present status. The only government interference expected is help in uncovering supplies of iron and steel scrap that the trade itself cannot touch. Most producers of scrap feel that third-quarter prices will not be any lower and may possibly be higher, so they are holding to their material. Turnings have softened noticably. Melting steel continues scarce. Dealers are redoubling efforts to get as much scrap as possible moving before June 25, when the 25 per cent freight rate increase goes into effect. A Lackawanna railroad list closes June 18.

Round Steel Tonnage Wanted

Chicago, June 11.—Trading in iron and steel scrap in this district is only nominal, with demand slack and supply moderate. Consumers usually are taking small lots but an independent steelmaker is in the market for heavy steel and shoveling steel for immediate use and to build up a reserve for winter. As much as 20,000 tons may be involved. Prices remain approximately level with about half the items at the government maximum and the remainder somewhat below. Some grades continue practically unobtainable, including rerolling rails and wheels, while some other grades are in fairly heavy supply. Railroad listings at present are slightly heavier than is the rule, but the supply from this source is still far below normal. The Wabash offers 2000 tons, the Chicago, Milwaukee & St. Paul 1400 tons, included in which is 500 tons of steel rails, the Northern Pacific 950 tons and the Union Pacific 750 tons.

Inquiries More Numerous

Cincinnati, June 10.—A ripple was caused by inquiries that were put out quietly, for different kinds of scrap. No. 1 machine cast and heavy melting steel were both wanted. Although there were circulated reports that cast borings and steel turnings were bringing the maximum price allowed, this cannot be substantiated by any transactions. Steel turnings are somewhat stronger than iron borings, as they can be used by nearby rolling mills.

Drive For Country Scrap

St. Louis, June 8.—Prices for scrap iron and steel here this week have remained stationary, with the demand indifferent and sales extremely light. Dealers are at a loss to account for the apathy on the part of users, as the rate

of consumption continues large and stocks in many instances are nearing the vanishing point. The answer probably is that the leading melters are unusually well fortified with contract material, which is expected to materialize in augmented deliveries during June, July and August. There has been intermittent trading between dealers, and some outside shipments, notably to the Pittsburgh district. A vigorous campaign is being pressed by dealers here to stir up tonnages in the country. Connections in small towns are being circularized to assemble old material for shipment before cold weather. The lull in farm operations incident to completing corn planting has enabled farmers to haul their scrap to railroad terminals, and it is likely miscellaneous offerings will increase in the near future.

Shell Standards Revised

Physical Tests and Heat Treatment Requirements Made More Strict—Sheet Bar Shortage Remains Acute

Youngstown, O., June 12.—United States specifications for shell steel have been altered. Notices to this affect were received by makers here Tuesday. Stricter physical tests will be required from now on and mills already made preparations to conform to the new specifications. The government has not as yet placed any second-half shell-steel business in this territory, althuogh makers are of the opinion that vast tonnages will come out before long. Many mills in this district turning out shell steel will welcome second-half business for this material as first-half bookings are nearly completed. Two of the mills only have approximately a week's more rolling while another has about 20,000 tons yet to roll. The tonnage of shell steel rolled by the mills here has been enormous. But few tons remain in the mill yards waiting shipment. As fast as the steel was rolled it was forwarded to the various forge and heat-treating companies which now have an abundant supply to draw from. It is rumored the British requirements for shell steel have been satisfied and that the mills need not look for any further tonnages from them unless something unforeseen develops. Sheet bars are extremely scarce and mills are finding it hard to locate even small tonnages.

Scarcity Is More Acute

Pittsburgh, June 11.—Tonnages of semifinished steel are becoming scarcer and transactions are rare. Those made involve only small lots and follow vigorous efforts of consumers to find offerings. It is reported that small lots of billets and sheet bars have been sold during the past week, but so far as known there were no sales of slabs or wire rods. In all instances the material is going to consumers who are engaged in direct and indirect government work and is obtained through priority certificates.

Seek Higher Prices on Ore

Independents Meet Institute Committee—Increase in Costs From Higher Freight and Labor Rates

Higher prices on Lake Superior iron ore will be asked by producers when the iron and steel products committee of the American Iron and Steel institute and the war industries board meet within a few days to consider third quarter quotations.

This action results from a meeting held June 11 in Chicago of independent ore producers. They met to discuss costs in relation to increasing wages, freight charges and other factors and to bring these increases to the attention of the committee so that the entire question may be taken up thoroughly at the next price-fixing session.

A committee will be named to represent the independent ore producers, to act through the institute committee and represent this branch of the steel industry before the war industries board.

The recent rate increases of 33.6 cents per net ton on iron ore carried from mine to dock, together with the recent increase of 15 per cent in wages to mine workers, has proved a burden which independents feel must be shifted if mining is to return a profit.

A large representation of producers attended the meeting, armed with cost sheets and exhibits as to the effect of the new rates of freight and wages.

The committee has not yet been named but will be representative of all interests and will provide a point of contact between producers and the price-fixing authority.

Coincident with this gathering a meeting was held in Chicago between Judge E. H. Gary and a number of members of the iron and steel products committee and representatives of the ore producers. The members of the institute were on their way to Duluth to consider that city's claim to basing privileges. The conference was informal and was for the purpose of giving first-hand such information as the ore producers had so that the institute committee may be fully informed as to the conditions of ore production when the matter comes up for adjustment.

Better Output

Shown in Tin Plate—Ask Ruling on Off Lot Sales

Pittsburgh, June 12.—The tin plate industry continues to operate on a heavy schedule, although the production at the present probably is slightly under that which has been obtaining and which was in the neighborhood of 95 per cent. The hot weather together with the slight shortage of sheet bars appears to have affected production to a small extent. The industry, however, has been and is producing highly satisfactory results in connection with requirements for the war program. As in the case of sheetmakers producing tin plate, the war industries board has been asked for a ruling as to whether or not it will be necessary for consumers to get priority certificates in order to obtain off-size tonnages. Makers will not formally open their books for second half business. Producers are committed heavily on contracts for tonnages to enter into the manufacture of food containers program.

Confusion Caused

By Plan to License Surplus Tonnage of Wire Products

New York, June 10.—Wire producers, now that the government has taken over the iron and steel business, fearfully await the application of the priority system to their sales. So far no instructions as to changes in procedure have been received. In case a priority certificate is necessary with every order, endless confusion and detail are expected, since the large wire companies book hundreds of orders a day. It is pointed out that the volume of priority orders has not yet become large enough to take up the entire output of the mills.

Affected by Licensing System

Pittsburgh, June 11.—Makers of wire and wire products are affected appreciably by the licensing system adopted by the war industries board. These producers have had perhaps more capacity that could be diverted to the supplying of their regular customers than most lines in the iron and steel industry.

Buy Bars For Cars Direct

Builders Instructed to Place Tonnage Where They Can—One Seeks 25,000 Tons—Open Bar Iron Capacity Neglected

Chicago, June 11.—In ordering car material, most attention has been given to plates and shapes, while the requirements of steel bars have not been looked after in equal degree. In at least one case the builder has been instructed to obtain his bars, about 25,000 tons, wherever he can place the tonnage. Under present conditions, it had been supposed that bar iron and hard steel bars might be substituted to relieve the burden on soft steel, but up to this time western mills have not seen any signs of this. One reason for this is that iron bars are being sold at 3.50c, while the soft steel bar maximum is 2.90c, a difference of $12 per ton against iron bars. In the same way hard steel bars are $2 higher than soft steel bars and are exceedingly scarce on account of lack of rerolling rails. It has been suggested that the next announcement of maximum prices may bring a reduced price on rolling mill scrap and a corresponding cut in the maximum on bar iron, which would render this available as a substitute. Bar iron mills have comparatively little business on their books, having sold almost nothing for third quarter. Rerolling bars are in strong demand but mills are unable to meet it on account of lack of rerolling rails.

Produce Only War Demands

Pittsburgh, June 11.—Makers of iron and steel bars are taking business which is for direct and indirect war purposes only. Producers of iron bars are operating heavily to take care of the large demand and will be required to furnish a good-sized tonnage in connection with the carbuilding program. Capacity of steel bar mills is considerably in excess of requirements, but there are no offerings for purely commercial consumers for the reason that mills are getting only that portion of raw steel that is necessary to produce demands being made upon them for direct and indirect military necessities.

Are Operating at Capacity

Pittsburgh, June 11.—Capacity operations are being maintained by makers of nuts, bolts and rivets who continue to receive large orders for the government either direct or indirect. Producers are able to give good deliveries despite the heavy demands. No business is being taken from any consumers unless they are able to show priority certificates. Makers say they have been successful in their efforts to get enough steel bars to take care of direct and indirect war needs. Some producers of rivets claim they cannot manufacture profitably since the price was reduced $5 a ton, and it is understood they are preparing to ask for the restoration of the previous levels.

More Band Contracts Made

Pittsburgh, June 11.—The removing of bands from the bar card and the classifying of them with hoops by which the base price advanced from 2.10c to 3.50c, has resulted in an increase in booking contracts. Makers have taken these commitments from regular customers and with the understanding that they would make no promise as to deliveries. Sales of hoop steel are being made in fair volume for either direct or indirect war needs. Commercial consumers have found it difficult to obtain hoops and it has become impossible to do so under the licensing system of the war industries board in the absence of proper priority certificates.

Orders More Liberal

Cleveland, June 12.—Orders for nuts, bolts and rivets, outside of government business, are being placed much more freely than for some time. Makers consequently are further behind on deliveries than ever and with the increased difficulty in obtaining raw materials, continue to fill orders in rotation to the best of their ability. Some third quarter contracts for rivets are being placed.

Seek Bolts for Ships

Chicago, June 11.—An Inquiry for about 5,500,000 bolts, the larger portion being of one size, has been current in the west the past few days for the Hog Island shipyard. So far as known, no western maker is able to bid on this business. The quartermaster department still delays placing the large government inquiry which was put out several weeks ago. The allocating committee of the bolt industry is understood to have made a schedule for dividing this business, which is now in the government's hands, but apparently has not been acted on.

Japanese Plates Released

Government Asks Immediate Shipment of Approximately 200,000 Tons —Distribution of Car Steel—Tanker Tonnage Allotted

Chicago, June 11.—Two events of great importance to platemakers have just taken place, the releasing of ship plates for export to Japan and the placing of tonnage for carbuilding material. The former is the result of the agreement between the United States shipping board and Japanese builders to furnish this country with complete ships in return for plates. The order from Washington for releasing and forwarding these plates asks immediate delivery, and every consideration of haste in getting them through to Pacific coast ports for shipment to Japan. While exact figures are not available, it is understood about 200,000 tons are involved. An independent platemaker has been given orders, with priority certificates to follow immediately, for approximately 10,000 tons, which represents about half the tonnage he has on its books for this purpose. The division of material for freight cars, apparently places something over 300,000 tons in this territory. The leading interest has been given 261,000 tons with probably 100,000 tons additional yet to be heard from. It has been ordered to furnish 87,000 tons to the American Car & Foundry Co., 36,000 tons to the Pullman Co., 96,000 tons to the Standard Steel Car Co. and the Pressed Steel Car Co., 4000 tons to the Pacific Car & Foundry Co., and 38,000 tons to Haskell & Barker. The latter company also desires 25,000 tons of steel bars, which it has been instructed to buy where it can obtain them. Orders have not been received for steel to go into 4000 cars to be built by the Mt. Vernon Car Co., 1000 cars each by the St. Louis Car Co., and the Liberty Car Co., and 3000 cars to be built by the Bettendorf Co. The leading independent has been awarded 25,000 tons for the Pullman Co., 15,000 tons for the American Car & Foundry Co. and 10,000 tons for Haskell & Barker.

Cargenie Gets 24,000 Tons

New York, June 10.—Among orders for vessels recently placed by the navy department, is one for eight tankers

which will be built by the Newport News Shipbuilding & Dry Dock Co. For these vessels, 24,000 tons of plates have been placed with the Carnegie Steel Co.

Needs to Exceed Estimates

Philadelphia, June 11.—Information is reaching eastern platemakers that plans of the Emergency Fleet corporation call for future tonnage of this material far beyond expectations. This program is so vast that some mills doubt the possibility of its realization. The statement of Chairman Hurley, of the shipping board, at South Bend, Ind., that next year's shipping program will total over 13,000,000 tons, is accepted as including probably 10,000,000 tons of steel ships. Such a scale of construction would require approximately 3,500,000 tons of plates. In view of the heavy ship, allied, railroad and other domestic requirements, the output of plates it is feared by some makers may be insufficient for the preference list alone.

Consider New Shipyard

Cleveland, June 11.—Plans are now under consideration for the establishment of a new steel shipyard in this city. The success for the venture depends upon whether a contract for 10 ships is secured.

Award Fabricating Plants

McClintic-Marshall Construction Co. Proceeds to Build Two 10,000 Ton Monthly Units for Government—Ship Tonnage Let

Pittsburgh, June 11.—Work will begin at once on the erection of the two fabricating plants which are to be built by the McClintic-Marshall Construction Co., this city, for the Emergency Fleet corporation. Each plant will have a monthly capacity of 10,000 tons, and it is proposed to have both completed and in operation in nine months. One will be built on the site of the Riter-Conley Mfg. Co. at Leetsdale, Pa., in the Pittsburgh district, a subsidiary of the McClintic-Marshall Co., and the other at the site of its plant at Pottstown, Pa., near Philadelphia. The general construction will be done by the Hughes-Foulkrod Co., and each plant will require about 4000 tons of structural steel. Both plants will be engaged altogether in fabricating ship steel. Arrangements have been made for the purchase of shears, rolls, punches, cranes and other necessary equipment which will be furnished through priority orders of the government, as will also the steel for the plants. The equipment will cost virtually as much as the plants. The capacity will be above the average.

Ship Tonnage Distributed

New York, June 11.—Orders for some 12,000 tons of shapes to be used in the construction of eight tankers which the navy has placed with the Newport News Shipbuilding & Drydock Co. have been allocated the past week to a number of eastern mills. This was the most important business in plain shapes. Orders for shapes in this immediate district are of small moment and mills in all cases insist on priority certificates. The largest inquiry current involves 4000 to 5000 tons for the expansion of the Midvale Steel & Ordnance Co. works at Nicetown, Pa. The extension is understood to be to the machine shops.

Placing Shipyard Extensions

Philadelphia, June 11.—Large orders for structural steel for shipyard extensions are being placed. The McClintic-Marshall Co. has received 12,000 to 15,000 tons for six ways and buildings for the New York Shipbuilding Co., at Camden. It is expected that the extension of the Newport News Shipbuilding & Dry Dock Co. will require about 15,000 tons and that of the Sun Shipbuilding Co., about 8000 tons. Two new government projects now materializing in this district will call for 10,000 to 12,000 tons.

CONTRACTS AWARDED

Extension to plant of the National Screw & Tack Co., Cleveland, 480 tons to the Riverside Bridge Co., Cleveland.

Plant extension for the Aluminum Castings Co., Cleveland, 250 tons, to the Niles Forge & Mfg. Co.

Crane shop addition for Pawling & Harnischfeger Co., Milwaukee, 550 tons, to Northwestern Bridge & Iron Co.

Manufacturing building for Lavine Gear Co., Milwaukee, 125 tons, to Milwaukee Structural Steel Co.

Soaking pit building for Mark Mfg. Co., Indiana Harbor, Ind., 500 tons, to Northwestern Bridge & Iron Co.

Shop addition for Pressed Steel Tank Co., West Allis, Milwaukee, 125 tons, to Northwestern Bridge & Iron Co.

Three bridges for the Pennsylvania railroad 720 tons to McClintic-Marshall Co.

CONTRACTS PENDING

Virginia railroad 1800 tons of bridge work, bids being taken.

Viaducts at Providence, R. I., for the New York, New Haven & Hartford, 1300 tons, bids being taken.

Bridges for the Pennsylvania railroad 350 tons, bids being taken.

Sheet Makers Seek Ruling

Ask War Industries Board Whether Sales of Off Lots Must Be Approved—Production Still is Lagging

Pittsburgh, June 12.—Request has been made upon the war industries board to give a ruling as to what effect, if any, the adoption of the licensing system will have upon the sale of cut down, off-weight and off-size sheet tonnages. It is the practice of the trade to dispose of these lots, which represent an extremely and almost insignificant portion of sheet production, to jobbers and commercial consumers because the sizes could not be used for either direct or indirect war purposes. Lots of this kind are produced when the mills are heated up for the production of standard sizes. The mills want to know if it will be necessary for consumers to obtain priority certificates in order to get these odd tonnages. It is not believed consumers will be required to get the certificates.

Government Orders Large

New York, June 10.—The government thus far this year has ordered 600,000 tons of light sheets, including black, blue annealed and galvanized. Earlier in the year it estimated its requirements for the year at 75,000 tons, which was far below the actual needs. Thus far in 1918 about 400,000 tons of sheets have been rolled for the government.

Capacity Shut Down

Youngstown, O., June 12.—Throughout the valley many sheet mills are operating unsteadily for want of sheet bars. This material has now become so scarce that one sheetmaker is expected to shut down all mills the latter part of this week. Even self-contained sheetmakers are short of bars due to the shortage of bessemer steel and have several mills idle as a result. The action of the government in obtaining full control of the steel distribution has not affected makers here to any great extent. Nearly all mills have been giving the government, either directly or indirectly, their entire output for several weeks, and the announcement came as no surprise.

Government Control is Complete

All Distribution Now Being Regulated From Washington

Formal Agreement Entered Into Between War Industries Board and Producers Marks New Regime of War Administration—Specified Preferential Purposes Remain Basis of Plan—Steel Director to License Surplus Sales

GOVERNMENT control of iron and steel is now complete. On June 6 a historic and memorable document whose far-reaching effects will be felt in every quarter where iron and steel has been consumed was issued at Washington. This was in the form of an announcement by the war industries board that it had adopted an agreement entered into between a committee of its members and of the American Iron and Steel institute, whereby the entire output of the industry virtually would be commandeered for war and for those purposes which are related to war. This agreement provides that the war industries board through the priorities board and the director of steel supply shall exercise complete power over the production and distribution of every ton of iron and steel. This control is to be effected through priority certificates, nonpriority orders which fall within a stipulated schedule of purposes to be given preferential treatment; and through licenses to be issued by the steel director.

The adoption of the licensing system bears out the exclusive publication in THE IRON TRADE REVIEW of June 6, that such a plan had been framed and probably would be adopted. The licensing plan which is somewhat similar to that followed by Great Britain for several years, is the striking feature of the agreement and the vital point in the plan for nonwar consumers of iron and steel. Whatever surplus of iron and steel may remain after war and essential requirements have been filled will be distributed only with the direction and approval of the steel director. This licensing plan fills the final gap through which any material for ordinary commercial purposes previously would have passed at the volition of buyers and sellers. Its effect is to put the iron and steel industry completely under government domination.

Shift Final Responsibility From Makers

WASHINGTON, June 11.—Control of the entire output of the iron and steel industry passed to the government June 6 immediately upon ratification by the war industries board of an agreement between its representatives and the American Iron and Steel institute. Responsibility of distinguishing between essential and less essential consumers in order that every available pound of iron and steel contributed to the war thereby was shifted from the shoulders of each individual producer to those of J. Leonard Replogle, the board's director of steel supply. This action is regarded as constituting one of the most momentous and farreaching events in the history of iron producing and consuming industries of the country.

Government control means the licensing for consumption of every pound of pig iron or steel that is not already destined for direct or indirect war use under authority of a priority certificate or through strict observance of the general purposes list which is to be augmented, as far as practicable, by an itemized compilation of essential steel consumers. The licensing feature of the agreement was added by the government to the institute's request for continuance of the priority system and an itemized preferential list.

The extent to which the licensing system may be used in connection with the distribution of nonwar commercial steel may be had from this information: At the time when the war industries board ratified the agreement, direct and indirect war orders for steel constituted 85 to 90 per cent of the present production. Since that time fresh government requirements have been made known to the steel director and these materially reduce the 10 to 15 per cent going into commercial tonnage. And, it is stated officially, the end is not yet in sight.

The war industries board can give no assurance as to what extent steel consumers will be permitted to obtain this raw material. Each consumer will be considered according to his esential relation to the war. It is stated that no fixed percentage of curtailment in any industry can be determined because of such questions as the amount of steel required to complete an inventory, the value of the industry or plant in relation to war service, the volume of steel that may be diverted to any consumer without jeopardizing the war supply and still be fair to all nonwar consumers, etc.

In addition to giving war requirements 100 per cent fulfillment, the steel division of the war industries board wants to build up a reserve of materials, principally coke, pig iron and ore, to meet future unexpected war needs and also to be prepared to keep furnaces and mills operating on more essential war orders next winter. The railroad and fuel administrations are continually pointing out the almost certain tie-ups the winter is expected to bring. It is urged that especially trades like iron and steel do everything in their power to make the impending shortages as less severe as possible.

With this object in mind, the war

Historic Edict on Iron and Steel

BE IT RESOLVED by the war industries board that the following agreement, reached as a result of several conferences between a committee of this board and the American Iron & Steel Institute, be and the same is hereby ratified, confirmed and approved, to become effective at once.

The Formal Agreement

WHEREAS, a careful study of the sources of supply in connection with the present and rapidly increasing direct and indirect war requirements for iron and steel products has convinced the war industries board of the necessity for (1) a strict conservation of the available supply of iron and steel products, on the one hand, and (2) the expansion of existing sources and development of new sources of supply of iron and steel products, on the other hand; and

WHEREAS, the producers of iron and of iron and steel products in the main concur in this conclusion reached by the said board and have expressed their willingness to wholeheartedly co-operate with the said board in its efforts to provide for promptly meeting the direct and indirect war requirements of the United States and its allies for iron and steel products;

NOW THEREFORE, it is understood and agreed by the committee on steel and steel products of the American Iron and Steel institute and the war industries board that no pig iron or steel manufactured products shall be shipped or delivered, except as follows:

(1) By priority certificates issued by the priorities division of the war industries board; or

(2) After priority certificates shall have been issued for or filled, then producers of pig iron and of steel manufactured products may utilize such raw materials and manufacturing capacity, if any, as they may have available, to fill orders of their customers not covered by priority certificates, provided such orders are embraced within the schedule of purposes entitled to preference treatment as determined by the priorities board as follows:

(*Including all necessary raw materials, partially manufactured parts and supplies for completion of products.*)

Ships—Destroyers and submarine chasers.

Aircraft.

Munitions, Military and Naval Supplies and Operations—Building construction for government needs. Equipment for same.

Fuel—Domestic consumption, manufacturing necessities named herein.

Food and Collateral Industries—Foodstuffs for human consumption and plants handling same; feeding stuffs for domestic fowls and animals and plants handling same. All tools, utensils, implements, machinery and equipment required for production, harvesting and distribution, milling, preparing, canning and refining foods and feeds such as seeds of foods and feeds, binder twine, etc. Products of collateral industries, such as fertilizer, fertilizer ingredients, insecticides and fungicides. Containers for foods and feeds, collateral products. Materials and equipment for preservation of foods and feeds, such as ammonia and other refrigeration supplies including ice.

Clothing—For civilian population.

Railroad—Or other necessary transportation equipment, including water transportation.

Public Utilities—Serving war industries, army, navy and civilian population.

PROVIDED, HOWEVER, whenever the priorities board shall have promulgated and certified for observance to the producers of pig iron, and steel manufactured products, a revised preference list, no surplus material or capacity after filling or providing for all orders covered by priority certificates shall be used to fill non-priority orders save such as are placed by industries or plants embraced within such preference list; and

PROVIDED FURTHER, that each producer of pig iron and of steel manufactured products shall at the end of each week, ending with midnight Saturday thereof, prepare and forward to the director of steel supply of the war industries board a detailed statement of all shipments made during such week not covered by priority certificates.

BE IT FURTHER RESOLVED, that should any producer of pig iron or of steel manufactured products have any surplus war material or manufacturing capacity after filling (a) all orders covered by priority certificates and (b) all orders embraced within the schedule of purposes entitled to preference treatment or placed by industries or plants embraced within the revised preference list, after it shall have been promulgated and certified by the priorities board, then in such event such surplus materials or capacity may be disposed of by such producer or manufacturer to other customers subject to approval in writing of director of steel supply first had and obtained.

BE IT FURTHER RESOLVED, that the director of steel supply and a committee appointed by the American Iron and Steel institute shall jointly make a careful study of the present and prospective iron and steel requirements of each and every department and agency of the government of the United States and of its allies, and the capacity of the iron producing and steel manufacturing plants of the United States to meet such requirements and present to this board as early as practicable (1) a report of their findings together with (2) recommendations of measures, if any, which should be taken to stimulate and increase the production of iron and of iron and steel products in order to meet the direct and indirect war requirements and the demands of industries of exceptional or national importance.

industries board, which has taken over the conservation division of the the council of national defense, has announced a new plan looking to the conservation of all materials in which there is likely to be a shortage because of the government's being a factor in the market. This particularly applies to manufacturers of products whose raw materials include iron or steel. They are to be called to Washington to make known their requirements, to discuss the conservation policy and to determine what, if any, curtailments they could effect. The first of these conservation conferences was held last week when it was decided manufacturers of refrigerators would try to find some way of enameling on zinc, of which there seems plenty, in order that the pig iron now going into galvanized iron sheets used in ice boxes may be diverted to more essential war work. The fuel administration has been following this plan for months. Methods of factory fuel conservation are receiving attention.

Chairman Baruch, to whom is attributed the statement of ten days ago that there was then a 20 per cent margin between war requirements and present production, last week declared that not a shipyard, gun shop, projectile plant or munitions works requiring steel is short a pound of this material, as far as immediate needs are concerned. He said forging and projectile steel production has been ahead of consumption and that the only requests for available surplus steel has come from the shipbuilding industry. These surpluses are desired to offset transportation troubles of next fall and winter.

Replogle Commands All Iron and Steel

WASHINGTON, June 11.—The action of the war industries board in placing the entire iron and steel industry under the triple system of priorities, preference and license, put J. Leonard Replogle in a position which is as important to the welfare of the entire country as is the industry itself to the industrial fabric of the nation. He no longer directs the distribution of iron and steel only for government and allies account but controls the allocation of these materials for every commercial consumer. The authority he now holds is the same as that which would be exercised by any one else who might be steel director. He has the power of the President as the chief executive might wield it under the Overman bill.

Mr. Replogle's organization probably will become one of if not the largest under the jurisdiction of the war industries board. It has not been definitely determined to what extent it will be expanded, but the suite of offices now occupied in the war board building likely will be extended to an entire wing, both first and second floors. It now occupies six or seven rooms in wing five and likely will be transferred to wing six with Mr. Replogle's private office in the room occupied by W. S. Gifford, director of the council of national defense. This

Name of Company _____ *Report for the Week Ending* _____

WAR INDUSTRIES BOARD—OFFICE OF DIRECTOR OF STEEL SUPPLY
WASHINGTON D.C.

SHEARED AND UNIVERSAL PLATES

State all Tonnages in Net Tons of 2,000 Pounds

No. 2

	ORDERS FOR U. S. GOVERNMENT (DIRECT AND INDIRECT)*					DOMESTIC ORDERS NOT GOVT.	ORDERS FOR FOREIGN GOVERNMENTS									FOREIGN ORDERS NOT GOVT.	GRAND TOTAL
	ARMY	NAVY	EMERGENCY FLEET	OTHER U. S. GOVT.	TOTAL U. S. GOVT.		CANADA	ENGLAND	FRANCE	ITALY	RUSSIA	JAPAN	SOUTH AMERICA	OTHER FOREIGN GOVTS	TOTAL FOREIGN GOVTS.		
BROUGHT FORWARD FROM LAST WEEK																	
RECEIVED DURING WEEK																	
TOTAL ORDERS																	
SHIPPED DURING WEEK — CLASS A CERTIFICATES																	
SHIPPED DURING WEEK — CLASS B CERTIFICATES																	
SHIPPED DURING WEEK — ON PREFERENCE LIST																	
SHIPPED DURING WEEK — UNDER PERMIT																	
SHIPPED DURING WEEK — TOTAL SHIPMENTS																	
CANCELED DURING WEEK																	
TOTAL OUTSTANDING ORDERS END OF WEEK																	

ALL OUTSTANDING ORDERS AT END OF WEEK CLASSIFIED ON PRIORITY BASIS.

CLASS A CERTIFICATES																	
CLASS B CERTIFICATES																	
ON PREFERENCE LIST																	
UNDER PERMIT																	
TOTAL MUST EQUAL TOTAL ABOVE																	

* Orders for material to be used by the Government should be listed here whether the orders were placed directly by the Government or indirectly through a subcontractor on a government contract.

IF NOT OPERATING TO CAPACITY, ADVISE LIMITING FACTOR _____

NOTE.—Mail copies not later than Monday to the following addresses.

J. LEONARD REPLOGLE,
Director of Steel Supply,
War Industries Board,
Washington, D. C.

JAMES B. BONNER,
Vice Chairman, Subcommittee on Steel Distribution,
American Iron & Steel Institute,
Wilkins Building,
Washington, D. C.

Signed _____

By _____

NEW FORM ON WHICH PRODUCERS WILL REPORT CONDITION OF ORDER BOOKS AND OPERATIONS

is under consideration at this time.

Expansion of the staff under the steel director will undoubtedly mean a drain upon present mill and furnace executive and clerical forces. Experts must come from some source and that is the logical place. Additional divisions under Mr. Replogle, each in charge of practical steel men, will be established. Already the pig iron section is under Jay C. McLauchlan of Pickands, Mather & Co., the steel products section is in charge of Frank Purnell of the Youngstown Sheet & Tube Co., and the rail and alloy steel division under Paul Mackall of the Bethlehem Steel Co. Each now has an assistant, with the usual clerical help, and more will be provided.

In addition to the added burden of carefully supervising the issuance of iron and steel priority certificates, as well as being called upon to require strict observance of the preferential list of industries, Mr. Replogle will have the task of licensing the production of all remaining steel tonnages. Any one of these three in its own relation to the triple combination would require a fair sized clerical staff and the ensuing difficulties of obtaining a working organization.

The new requirement of reports of weekly production and shipments has necessitated some changes in the form of reports Mr. Replogle is to receive from each steel producer. Already the pig iron reports have been changed from their earlier form. The steel products reports are now on the press. The accompanying illustration, typical as to all reports except that on pig iron, shows the sheared and universal plates weekly statement as it will be revised to meet the preferential and license provisions of government control.

In addition to extending the shipments division of the report to meet the new requirements, it has also been decided to consolidate the steel priority clasification tables from A-1, A-2, A-3, A-4 and other Class A simply to Class A, to retain Class B and to drop Class C, making the proper substitutions of preference and license. The new report also provides space to inform the steel director why if a mill is not operating to capacity. This last provision is of significant importance.

Mr. Replogle also is to work with the steel distribution subcommittee of the institute in continuing the survey out of which the triple system has developed. This survey, while not likely to get a definite of war requirements, will obtain information which will be of great value in the industry's operation and in Mr. Replogle's direction of it. The survey is to show where steel plants may be converted to war production and to recommend additions where capacities, present or converted, cannot meet requirements. In this connection, it is know that new plate mills to come in before Jan. 1 will add 1,300,000 tons to present capacity.

The general resolution adopted by the war industries board refers to a list of preferred industries compiled under the classification outlined in the general purpose list. This preferred industries tabulation is now being compiled and may be ready for publication within the week. In the meantime, mill operators may obtain further guidance in finding preferred industries by consulting the priority list No. 1 of the fuel administration

Will There Be Any Steel For Open Sale?

What the General Industry Believes

PITTSBURGH, June 11.—The best opinion of the trade here as to when any iron or steel will be available for the open market under the federal licensing system is that it is impossible at this time to solve such a problem. The general belief, however, based upon the known wants of the government and estimated future requirements, is that it will be eight or nine months before any sizable tonnage is given to the open market, and some observers think it will be a year and a half or even more. Government needs in most lines in the way of actual tonnages are definite as applying to a short period only, the principal exceptions being ship and shell steel, of which the government has taken the entire output, practically the entire production in other lines which are operating fully is also going to war needs, but probably will not do so for so long a time as will shell and ship steel. The turn of the war on the battlefield of France is held to be the principal

The Iron Trade Review's Washington Service—

How It Scored on the Big News of the Week

The Forecast

From Issue of June 6

WASHINGTON, June 4.—A license system to regulate the use of pig iron and steel not going into direct or indirect war consumption probably will be adopted by the war industries board as the solution of the problem arising in the board's contention of an acute shortage of both materials and of the seel manufacturers' claim there will be sufficient steel, if properly allocated, for all essential consumers. It is understood the joint committee representing the board and the industry have agreed upon this plan which will be submitted to the board for its consideration and ultimate adoption.

The Facts

From Formal Agreement

"BE IT further resolved that should any producer of pig iron or of steel manufactured products have any surplus war material or manufacturing capacity after filling (a) all orders covered by priority certificates and (b) all orders embraced within the schedule of purposes entitled to preference treatment or placed by industries or plants embraced within the revised preference list, after it shall have been promulgated and certified by the priorities board, then in such event such surplus materials or capacity may be disposed of by such producer or manufacturer to other customers subject to the approval in writing of the director of steel supply first had and obtained."

In its May 30 issue THE IRON TRADE REVIEW exclusively published the list of priority purposes which the war industries board sets forth as the fundamental feature of the scheme of war distribution.

factor in considering the government's heavy steel requirements. Not knowing how long it will be before Germany is defeated, the trade takes the position it cannot say when it can offer tonnages of any size to commercial consumers. It is believed they will have their supplies cut more than ever, at least for the present, as a result of the licensing system

Can't Fill All Needs

Philadelphia, June 12.—Present indications in the east are that there is not enough iron and steel to cover all the uses set forth under the preferential list adopted by the war industries board. Efforts are to be made to provide for all, but some users under the list may experience considerable delay in getting material, at least in the near future. It is expected that for the present no users not covered by the list can obtain material. Steelmakers say the preferential list is so broad as to include all essential requirements; furthermore, it covers nearly all requirements for which there now is a demand, as other users such as new construction not included in the list have already practically eliminated themselves. One steel company reports that only inquiries it has received in recent weeks which did not come under the preferential list are from abroad.

Eastern iron and steel men interpret the preferential list as including all requirements as entitled to priority. Producers previously have been familiar with this list as it was originally announced by the war industries board May 16 and was published by THE IRON TRADE REVIEW in its May 30 issue. Any order covered by the list, they believe, may be shipped without the priority certificate being secured; in fact, the priority certificate simply hastens the shipment.

Nothing For Months

St. Louis, June 11.—The concensus of opinion among the best informed in the iron and steel trade here is that the government's new licensing system will fail to supply the open market with materials this year or for a period well into 1919. Every producer in the district is sold to capacity for the balance of 1918 and all are deluged with priority orders which they cannot possibly fill.

Don't Expect Much

Buffalo, June 11.—Buffalo iron and steel men do not look for any iron and steel material to be available for the open market soon and most of them do not believe it will be available for some time. The establishment of further government control of the industry is interpreted to mean that the nation's needs constantly will be greater, and that the measures are being taken to insure sufficient government supply, rather than for the protection of the open market. The opinion prevails that the government will take everything during the next eight months, as its steel needs for that period total 22,000,000 tons, while production is about 2,750,000 tons a month.

More Locomotives

Ordered by the Government—100,000 More Cars Probable.

Washington, June 11.—The railroad administration has awarded contracts for 390 more locomotives and is said to be considering the placing of orders for 100,000 more freight cars. The contracts for the locomotives bring the total number of those ordered to 1415. If the freight cars are ordered the total number will be 200,000.

Contracts for locomotives were awarded as follows: To American Locomotive Co., 130 light Mikado, 100 switchers of six-wheel type, 15 heavy Santa Fe, making a total of 800 locomotives ordered from this company; to Baldwin Locomotive Works 57 heavy Mikado, 13 light Pacific, 30 consolidated anthracite burners, making a total of 570 locomotives ordered from this company. The Lima Locomotive Works was awarded its first government contract for 45 light Mikado.

Whether more freight cars will be ordered depends on the possibility of obtaining steel. Allocation of steel for present car awards may be completed by June 29. The new car order undoubtedly is contemplated for 1919 delivery, which may make a difference in placing contracts.

Will Build New Stack

Directors of the Pittsburgh Crucible Steel Co., Pittsburgh, have authorized the construction of an additional new blast furnace. The furnace will be located at Midland, Pa., adjacent to the 85 x 21-foot stack which was built in 1916 and rebuilt in 1914.

The Non-Ferrous Metals

Copper Lead Spelter Tin

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	§Aluminum	Spot antimony
June 5	23.50	.....	7.25	7.25	33.00	12.25
June 6	23.50	.....	7.30	7.25	33.00	12.25
June 7	23.50	.....	7.35	7.35	33.00	12.50
June 10	23.50	.....	7.35	7.40	33.00	13.00
June 11	23.50	.....	7.35	7.42½	33.00	13.12½

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
§Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 33.10c; one to 15 tons, 33.20c.

New York, June 11.—The war industries board has fixed the price of copper at 23.50c to Aug. 15; the price of aluminum ingot at 33c to Sept. 1; the price of grade A spelter (navy specifications) at 12c to Sept. 1; sheet zinc at 15c to Sept. 1, and zinc plates at 14c to Sept. 1. Therefore, uncertainty as to this proportion of the major nonferrous metals has passed for the next several weeks. An open market remains for tin, prime western spelter and lead.

The government continues to estimate its lead requirements in advance, allocating them at the average price for the month as determined by one of the mining journals. As regards prime western spelter, or grade A spelter, army specifications, the government asks for tenders and accepts the lowest price with the best delivery.

The tin market continues the most enigmatical of all. American consumers are now purchasing their supplies largely in Singapore, excepting in some cases they are obtaining metal from the New York agents of London houses who in turn buy in Singapore. Only two American companies are figuring in the import of tin, one of these being the United States Steel Corp. and the other the National Lead Co.

The Singapore tin market has been fluctuating wildly of late. Last Monday the price was £336, c. i. f. London, compared with £359 on Friday. The trade here has not yet learned the reasons for the sudden reduction, but in the lack of information is not engaged actively in trading. Straits tin for August shipment has been quoted at 82c; for September at 86c and for July-August at 82.50c, all c. i. f. New York. Banca tin afloat on a declared steamer is quoted at 92c; Chinese No. 1, 99 per cent tin, for spot delivery in New York, 93c.

The war industries board recently inquired for 250 tons of antimony for June-July delivery, which is understood to have closed at a trifle below 12c, duty paid.

STORE COAL NOW AGAINST WINTER SHORTAGE

By W. H. LLOYD



Brownhoist Coal-Handling Bridge Crane at Plant of Astoria Light, Heat & Power Co., Astoria, N. Y.

WHEN the German, American and English allied forces entered Peking at the time of the Boxer rebellion in China, they were confronted by what seemed to be a great mountain. Upon investigation they found beneath the sod, brush, etc., an enormous pile of coal, started by the Ming dynasty which preceded that of the Manchus. This great reserve was intended to provide the city against almost any siege and represented many thousands of tons. Yet longside some of the piles of stored coal now found in Nova Scotia and other parts of Canada, in the vicinity of Duluth and in other Great Lakes districts, which often reach a tonnage of 500,000, it would be comparatively small.

With memories of the rigors of last winter, still fresh in mind, when shutdowns other than the mandatory one of the fuel administration, were caused by a lack of coal, heads of industry are looking to the future and are taking steps to prevent repetitions during the coming season. Now they are asking themselves, if coal was successfully stored in China and is successfully stored in Great Lakes ports why is it not practicable for them to accumulate it against a possible shortage, or an inability because of railroad inadequacies to supply the needs when it occurs. It is true that in the past season, the chief disturbing factor, was the congested railway facilities caused by the overload of war.

Fuel Shortage Already Anticipated

With America a contently greater factor in the war, and with the struggle at arms more drawn out than originally anticipated, no optimistic view of greatly-bettered railroad facilities for next winter generally is held. In fact from all reports circulated by the fuel and railroad administrations, even worse conditions are in store. Already warnings of a fuel shortage of upwards of 75,000,000 tons are being posted and it is almost certain that even with the close co-operation that exists between the fuel and railroad administrations, unless precautionary steps are taken now to insure a supply, industry is doomed to be crippled in greater measure than was true during the past season. More than merely wisdom then, it has become the stern duty of manufacturers who aim to stand back of the boys in the trenches by keeping a steady stream of supplies, munitions, etc., going over, to take steps to have ample fuel supplies on hand to meet any crisis.

Storage Attended By Few Risks

It is true that the storage of coal is attended by not a few risks and rather exacting requirements. One factor is space, since it requires about one acre to successfully store 6000 tons of coal. Coal needs of industrial center are enormous. Chicago alone consumes on an average, 2,500,000 tons a month, it is estimated. In 1912, approximately 17,500,000 tons were used in that city, and with the estimated rate of increase of 10 per cent, in 1918, it will consume, practically 30,000,000 tons. In Great Britain, it is estimated that between 180,000,000 and 200,000,000 tons is the annual consumption. During the extremely cold weather of the 1917-18 winter, one middle-western manufacturing plant used 60 tons a day when running full, and when it had to shut down during the life of the Garfield order, 35 tons a day were used to keep the manufacturing material safe on hand from damage by cold. Of the 640,000,000 tons of coal produced in the United States last year, which was approximately one-third of the total world's supply, 90,000,000 tons were anthracite and the remainder bituminous. Two-thirds of the coal used in the United States is consumed in the production of power for transportation systems and indus-

A Place for Patriotism

STORE coal, yes, but conserve while storing, was the message spoken in Chicago by E. W. Pratt, president of the International Railway Fuel association at its tenth annual convention recently. "If you don't put the red, white and blue into coal," he said, "the country will have an even greater coal shortage next winter than it did last." He cited figures to show that lack of rolling equipment is causing a production of only 60 per cent of capacity, despite a plentiful labor supply and said that repairs and additional trackage have speeded the mines up to make capacity production possible. He called attention to the fact that favorable weather and efforts of the railroad administration have cleared the tracks of the extended congestion which existed last winter. He appealed to the railways which use more than one-fourth of the country's coal output, to practice intensive conservation and to supply all the needed cars as expeditiously as possible. "There should be no Sundays or holidays," Mr. Pratt told the railway fuel men, in either mine, railroad or coal yard any more than there is in the trenches where the Hun is facing our boys and the war department's arrangement for deferred classification for skilled railroad men places on them a peculiar obligation for extra effort."

tries; one-sixth is ued for coke and its by-products. Therefore industrial requirements outweigh domestic needs five to one and this demonstrates the importance of industry looking to its fuel supply.

Submerged Storage Proves Best

Much has been written about the chemical and physical deterioration of coal in storage and while it is not the purpose of this article to enter upon an exhaustive discussion of these factors, it might not be out of place to refer to the 2-year storage tests made by the United States bureau of mines in 1909. Carried on at the suggestion of the navy department, this test was applied to New River coal from West Virginia, with interesting results on coal stored for two years: In fresh water, the loss was 0.000 per cent, from two tests; in salt water a loss of 0.395 per cent was the average of two tests; indoors when the coal was exposed to the air, the loss was 0.383 per cent, according to the average of six tests, while outdoors when uncovered, the loss was 0.997 per cent representing the average of eight tests. When it is remembered that coal reclaimed from the battleship Maine, submerged for 14 years showed a deterioration of about 160 calories or 1.09 per cent, and the test for the navy department showed no loss whatever in two years, it will be seen that of the three forms of coal storage, open-air, under roof and submerged, the latter is by far the most practicable, even though the cost is slightly increased. Not only is there little or no loss of calorific value but the danger of spontaneous combustion entirely is eliminated.

Danger from spontaneous combustion has been often referred to and the risk described. The majority of cases of spontaneous combustion occurs in bituminous coal piles, although fires of that origin in anthracite have frequently been reported, notwithstanding the popular fallacy that this grade is immune. Various methods looking towards its reduction to a minimum have been set forth in the columns of engineering journals and engineers' handbooks. One company installed an intricate system of pipes throughout its storage yard, the branches of which were perforated and had dead-ends. When fire was discovered, water was pumped into the pipes and sluced through the perforations to put the fire out. Authorities agree however that fighting fires in coal piles with water is not at all efficient or desirable, since it only serves to increase the danger of combustion. Iron temperature-divining rods placed at regular intervals through the storage pile have been successfully employed. These serve as indicators of the presence of abnormal heat. They are pulled out at certain specified periods and wherever a dangerous degree of heat is ascertained, the best practice according to the experience of many manufacturers, is to remove the heated portion in its entirety by the use of a crane-operated grab bucket. The removed portion is either used immediately or allowed to burn itself out. Tight stocking preventing air pockets, tends to reduce the danger of such firing.



FIG. 2—COAL-HANDLING BRIDGE CRANE WITH 2½-TON GRAB BUCKET



FIG. 1—SUBMERGED COAL STORAGE AT PLANT OF INDIANAPOLIS LIGHT & HEAT CO.

Machinery Reduces Overhead

Since modern equipment such as locomotive traveling, gantry and hammerhead cranes, can be used in many other ways than for handling and storing coal, their use makes for increased economy. Electric magnets and other lifting apparatus, pile driver hammers, pulling and grappling hooks, drag-line and orange-peel buckets to replace the coal and ore grab buckets permit the use of the cranes 24 hours every day if necessary. Thus overhead costs are reduced to a minimum. If however, the crane is used exclusively for coal handling, big economies are effected over the old-fashioned method of storing coal by hand. Three men working 10 hours a day could handle 50 tons per day, while a locomotive traveling crane will handle 60 tons per hour or from 500 to 600 tons per day. Figuring depreciation, 6 per cent interest on investment, upkeep, operator's wages, fuel, oil, etc., at the present time, handling coal by such machinery it is estimated costs between $15 and $17 per day of 10 hours or from 3 to 4 cents per ton, as against 18 to 20 cents per ton by hand. In normal times the cost of machinery handling would be much less.

A few instances from among the many industrial consumers of coal who are attacking the problems are illustrative of the general movement. In Fig 1 is shown submerged coal storage at



FIG. 3—UNLOADING COAL BY LOCOMOTIVE CRANE FROM BARGES

the plant of the Indianapolis Light & Heat Co., Indianapolis. A Brown-hoist locomotive crane operates on a trestle which runs through the center of a concrete tank. This crane has a capacity for handling 75 to 90 tons per hour when loading from storage into cars and from 50 to 60 tons per hour when unloading from cars to storage. It is equipped with a 44 foot boom and a 1½ ton bucket. Coal coming in is either dumped from cars or is unloaded by the crane. When it is needed in the power plant, it is reloaded into cars which are switched into the plant. The capacity of the concrete pit is 30,000 tons, with 13,000 tons under water. Provision is made for heating the water in winter, and electric searchlights are operated to permit night work.

Machines for Up-to-Date Plants

At the plants of the General Electric Co., Schenectady, N. Y., Toledo Light & Power Co., or the Acme Power Co., Toledo, O., the coal-handling bridge crane shown in Fig. 2 is employed. The Corrigan-McKinney Co., and the American Steel & Wire Co., Cleveland, use similar cranes for handling coal for their coke ovens. This crane has a 2½-ton bucket and a span of about 190 feet. The cantilever bucket has a drop of about 35 feet and operates on a rope trolley from the operator's cab located on the pier of the crane. It has a capacity of 135 tons per hour from storage to cars. The bridge travels 200 feet per minute and the bucket hoists with a full load at a speed of 225 feet per minute. The trolley travels 1000 feet per minute. At these storage plants coal is piled from 20 to 24 feet high.

The McKeesport Tin Plate Co., McKeesport, Pa., unloads its coal from barges brought down the river, as shown in Fig. 3. A locomotive crane with a 40-foot boom and having a 1½-ton bucket unloads coal from barges at the rate of between 50 and 55 tons per hour. The company's storage pile extends along the river bank at the rear of the plant. A similar crane is being installed at the plant of the Upson Nut Co., Cleveland.

Unloading coal from barges into a hopper is shown in Fig. 4 at the plant of Brown & Co., Pittsburgh. This locomotive crane on a fixed base, with a 44-foot boom and a 1-ton grab bucket unloads 45 to 55 tons of run-of-mine coal per hour.

Familiar to many iron and steel companies and used to advantage by large numbers of them, the patented circular system of the Link-Belt Co., for storing and reclaiming large bodies of loose materials, such as coal, stone, etc., has been often described. This circular storage plan is recommended for the handling of from 5000 to 100,000 tons and over. It consists of a long radius locomotive crane, equipped with and operating a self-filling grab bucket, traveling on curved tracks around a central point from which the bucket receives its material. The cranes are either steam or electric driven and are constructed entirely of iron and steel, which reduces the danger of damage by fire to a minimum. The Link-Belt Co. builds cranes of this type having a radius up to 110 feet, handling 5-cubic yard buckets and the largest size has been known to handle as much as 240 tons per hour. The New York Edison Co., Jersey City, N. J., maintains an exceedingly high capacity coal storage yard and employs this system. Two 20-foot gage, steam-operated locomotive cranes are used. These have a radius of 100 feet and with their 3½-ton buckets permit the storage of 225,000 tons of coal.

Coal Piled In a Circle

With the use of this system, the pile of coal or other material, assumes a circular contour and when a track pit is used the coal is dumped from railroad cars into the pit, removed by the crane and delivered to storage. Tracks are laid on ties upon the ground, ordinarily without the use of piles. Consequently no great expense is added for trackage. A continuation of the rack system and the formation of additional loops makes possible a series of storage piles and coal storage is limited only by the size of the property. When reloading, the coal is picked up from storage by the bucket and delivered directly into the cars, bin or to the pit at the central point.

Fig. 5, illustrates a section of the storage yard of the Northwestern Iron Co., at Mayville, Wis. This shows a 20-foot gage, electric revolving crane,



FIG. 4—LOCOMOTIVE CRANE ON FIXED BASE UNLOADS 45 TONS OF COAL PER HOUR



FIG. 5—TRACK ARRANGEMENT FOR NORTHWESTERN IRON CO.'S COAL STORAGE AT MAYVILLE, WIS.

with 100-foot radius, utilizing a 3-ton bucket. Practically 100,000 tons is the capacity of this storage equipment. With a smaller outfit, the Lackawanna Steel Co., Buffalo, N. Y., stores 80,000 tons at its West Seneca plant and this 20-foot gage, revolving crane, with 80-foot radius and a 2-ton bucket is shown in Fig. 7.

Hoists Replace Labor

With the scarcity of labor becoming an increasingly important factor in war times, the automatic skip hoists, designed to perform work previously done by manual methods are finding and filling an important place in industry. For the speedy and efficient as well as economical raising of coal and other materials from a low and delivering them to a higher level, the Otis Elevator Co., has designed apparatus, the operation of which is controlled by a push button. This allows the operator to continue with other work, as soon as he has pressed the button marked "up," which causes the machine to commence its automatic travel. It accelerates to full speed, the bucket rises to the upper level and at the proper point the hoist slows down with the bucket traveling into dumping position, where on single skips, it stops and automatically remains for a pre-determined period sufficient for the complete discharge of the material from the bucket. Without additional attention from the operator, the machine starts down and when the bucket reaches the lower level, it automatically stops in the loading position. If desired, the apparatus may be stopped at any time during the operation by pressure on the button marked "stop" and the machine's further operation is directed by pressure on either the "up" or "down" button.



FIG. 6—AUTOMATIC SKIP HOIST WITH BUCKET ASCENDING

Two general classes define the Otis product, namely the hoist with a bucket carrying the load vertically and one whose load travels on an incline. Both may be equipped with a single hoisting bucket, which may or may not require a counterweight, or with two buckets on separate tracks. One of these serves as a counterweight for the other.

Operator May Be Eliminated

By arranging for the automatic loading of the bucket or buckets, it is possible to do away with the operator's services entirely. When a predetermined load is received by the bucket, a contact is made, which is equivalent to pressure on the "up" button. When the bucket ascends, it automatically closes the loading chute gate. In descending, this gate is re-opened and the operation only ceases when the supply of material is not sufficient to fill the bucket. In one recent installation when the skip bucket reaches the lower landing, it automatically opens the track hopper gate. After a pre-determined amount of coal is deposited in the bucket, the spring under the latter is compressed, contact is made and the skip is automatically started again.

Various Uses

These machines are particularly adaptable for taking coal from storage for immediate use, or for transferring coal from a temporary storage level to the permanent storage bed. In power plants, the material is hoisted and dumped into elevated storage bins ready to be delivered by gravity either into cars or to mechanical strokers. In Fig. 6, is shown an Otis automatic inclined coal and ash hoist, with bucket ascending, at the plant of the W. J. Rainey Co., Allison, Pa., coal and coke operator, while in Fig. 8, the equipment used at the Consolidated Electric Light & Power Co.'s plant at Baltimore, Md., is illustrated.



FIG. 7—REVOLVING CRANE EMPLOYED BY LACKAWANNA STEEL CO. BUFFALO, FOR CIRCULAR STORAGE



FIG. 8—COAL-HANDLING EQUIPMENT AT PUBLIC UTILITY PLANT

Trade Papers Live for the Industry

A Discussion of the Relationship Between the Iron and Steel Trade Papers and the Business They Serve—Successful Publications Are Leaders of Thought and Action

BY B. S. STEPHENSON

NOT later than the sixth of June we shall know the tonnage of pig iron produced during the month of May. *The Iron Age* and THE IRON TRADE REVIEW will have this information available in their issues of that date. It will have to be compiled rapidly, for the most part by wire, but it will be accurate, as may be demonstrated when the American Iron and Steel institute publishes its statistics, in elaborate detail, for the six months' period. This is but one of the many substantial services rendered by the trade papers. One regularly records ore tonnages on lower lake docks. Another, a weekly, reports coke shipments from the Connellsville region. All through the summer and fall we shall trace through them the progress in the Great Lakes ore traffic on which the iron and steel industry so largely depends. When navigation closes, within a few weeks we shall know the tonnage shipped from every mine on the Lake Superior ranges.

These services, along with countless others, are accepted as a matter of course, for the trade press is one of the things which American industries commonly take for granted. It has been with us since the days of Bessemer and Kelly, the beginnings of bee-hive coke and the epoch-making shipment of those first few barrels of ore from Marquette. It has developed along with and as a part of the industry, which perhaps explains why we are sometimes prone to overlook its advantages and possibilities.

A Specialized Newspaper

In describing its province, some one has said that the trade journal bears exactly the same relation to the newspaper or general magazine that the engineer or technically-trained man bears to the average citizen. It is a *specialized newspaper,* fitting naturally into the modern scheme of specialized business. Occasionally this specialization runs to rather curious extremes. There are such publications, for instance, as *The Macaroni and Noodle Makers' Journal,* the clientele of which is obvious; *Brooms, Brushes and Handles; The Crow Bar,* which reports 4000 blacksmiths as subscribers; *Sunnyside,* which is a leading publication for undertakers; even *The Angora Journal,* which aims to record everything of interest regarding that particular kind of goat.

A Newark library recently held a trade journal exhibition and showed 1200 publications without presuming to exhaust the list. "Put several hundred such publications together in a small room," commented the librarian, "and you get an effect wonderfully similar to that produced by several hundred business men in a large room. They are dressed in varying degrees of good taste—some of them a little loud—but all of them, always and everywhere, cheerful and optimistic. This, at least, may be set down as a universal trait of trade papers."

This Newark librarian had original ideas of publicity. By his own admission he did not hope to attract many men of his own city to the exhibit. But he did figure on getting it advertised elsewhere, so that Newark men would hear from the outside that something worth while was happening there. "That is the kind of advertising which reaches the Newark man," he observed, "even though it is a very slow process. What we are trying to do is to impress our manufacturers and business men with the amount of current information on their trades. We want to make it available for them and we want especially to foster the trade-journal-reading habit."

* * *

The trade-journal-reading habit! Mark Twain once remarked that he had lived in the world a long, long time and he knew one must never judge an editor by what he puts in his paper. And even if we were inclined to accept the humorist's suggestion, many of us would not be in position to judge, for we have no idea what the editor does put in his paper. In fact, so far as most of us are concerned, it is harly accurate to speak of the trade-journal-*reading* habit, but rather of the trade-journal-*skimming* habit. And yet our trade and technical papers, to quote Mr. Hurley, are the best in the world. They are tools of the industry and they are made to be used.

Doubtless 95 per cent of the members of the American Iron and Steel institute regularly see or have immediate access to the leading publications serving this special field. A goodly portion will say that they are "regular readers", and some of them are. But for far too many of us this reading is of only "a lick and a promise" variety. Probably on an average it amounts to a rather careful survey of a column or two of general market summary, a hurried scanning of certain special market reports in a few important centers, and perhaps a casual glance over the personal and obituary items to see whether any business acquaintances are involved in developments of a noteworthy character. Possibly some pictures may catch the eye or some special article hold the attention for a moment before the paper is tossed aside—exhausted.

This estimate is not an exaggeration. The trade papers are read somewhat

The Truth About the War

A YEAR of war has recast business methods; it has also shifted our centers of news. During that time as our industries have admitted Uncle Sam, first as a by-no-means silent partner and later in the capacity of managing director, Washington's position as a business news center has become supreme. The trade papers were quick to appreciate this new condition and one can now look to them for industrial war news which is at once dependable, technically accurate and free from political flavoring. In particular, their reports of the many investigations which have stirred Washington and the country these last few months, carefully written for the business man's viewpoint, have been in refreshing contrast with the reports in the daily press. And in certain directions it is not too much to say that a careful reading of these business papers during the winter might have saved many of us from the hazards of crowded sleepers and Washington hotels.

A paper read at the annual meeting of the American Iron and Steel institute, New York, May 31, 1918. The author, B. S. Stephenson, is resident agent, M. A. Hanna & Co., Pittsburgh.

more carefully in quiet times, more hastily or not at all in busy periods, but this is a fair average and indicates our general neglect of a service of which our foreign competitors show a full appreciation. The size of our trade journals is often awe-inspiring, it is true, some of them approaching the bulk of a mail-order catalog. But, as a matter of fact, the weekly publications will average only about 64 pages of reading matter, because they are edited with the ever-present idea of condensation. Every line of every page is written with a view to reporting accurately some fact, condition, process or accomplishment of interest either to some special field or to the industry as a whole.

We are told that recently in a certain district some 17,000 homes were visited in the course of an investigation as to the publications read there. In one particular home it was found that the papers read were *The Butchers' Review, The Police Gazette* and *The Christian Herald;* furthermore, *The Christian Herald,* in this case was read by the cook. Now the point is that these publications were read in the home, and it is perhaps pertinent to suggest here that an occasional evening spent quietly at home with your favorite trade paper, whatever it may be, will show results both surprising and profitable.

Besides the strictly technical articles, one will find there much general material of timely interest. For instance, I believe the first satisfactory description of the Browning gun appeared in *The Iron Age.* Likewise *The Foundry* explained the manufacture of the improved rifle grenade which our malleable shops are now turning out by the millions. Recently a column of facts and figures in another publication, detailing the iron ore reserves of Alsace-Lorraine, Luxemburg and the Briey basin made clear the motive governing the direction of the first German drive in this war of steel. And these examples might be multiplied indefinitely, but the intention is merely to emphasize the appeal which the average trade paper can make even to the nontechnical reader.

Applied Efficiency

I hold no brief for the trade journals and the idea here is not to catalog their offerings, but rather to suggest that they merit our better acquaintance. I recall that, a dozen years ago, the owner of a small, isolated blast furnace remarked that he regularly read the several important publications touching his special field. His theory was that, if in the course of a year he could glean from them one good idea applicable to his plant, he would be well repaid. Today his furnace is the last word in equipment and efficiency and his business is highly successful. This plan of closely watching the technical press for practical, working ideas is now followed by many progressive concerns. Ordinarily it consists of a regular, systematic reading by the various executives and heads of departments. Suggestions are noted on a convenient cover slip and these are later discussed at regular conferences, frequently with the result of important improvements and economies. The plan deserves general adoption.

* * *

For many years the industry has found it convenient to use trade journal quotations as a basis for sliding-scale contracts. Pig iron and coke, ingots, billets, sheet bars and other forms of semifinished steel, copper and other nonferrous metals, ingot molds, even gray iron castings are among the products commonly distributed on such an arrangement. There is no means of estimating the volume of business now handled in this way, even in any one line of production, but it is always substantial and at times surprisingly large. During the chaotic price conditions of the early war period, when precedents were being swept away and new levels reached week by week, there was a very extensive recourse to this basis of dealing, as offering the only plan sufficiently flexible to conform to the feverish gymnastics of war time markets. It fitted in with Horace Greeley's sage observation of us, the American people, that "our foresight is not so good as our hindsight by a darn sight."

Just now, because of government price control, the sliding-scale is less extensively employed; yet it is interesting to note that, even during the last calendar year, a single producer in western Pennsylvania supplied a neighboring melter with $12,000,000 or $13,000,000 worth of pig iron invoiced on this flexible basis. When the government schedule was announced in September, the price on this sizable tonnage immediately dropped from around $55 to $36.30. The furnace interest, of course, had realized high prices much earlier than its competitors which were selling on a flat-price contract basis, hence its acceptance of the Washington scale occasioned no great hardships. The fact that the agreed prices automatically became operative on the heavy volume of products moving on sliding scale contracts was an important factor in their prompt acceptance and scrupulous observance by the entire industry.

The Editor's Problem

The sliding-scale system testifies to the accuracy of trade-paper quotations. Incidentally, as well, it increases enormously the responsibility of the editor. In every issue he must tabulate his ideas of current prices, whether or not they happen to be sharply defined. He knows that every written variation of 25 or 50 cents immediately multiplies itself by tens of thousands of tons, to the unfair advantage or disadvantage of some one. Actually he serves in the capacity of referee or arbitrator, and in the interests of justice should have all available information at his command. Yet too often the trade journal men find themselves compelled to pry out the facts from grudging witnesses, to content themselves with half-facts and to piece together scattered bits of obscure information in an effort to arrive at exact market conditions.

To my way of thinking, the point f view which necessitates such methods of news-gathering is radically wrong. It is an inheritance from the dark ages when, in the nature of things, every competitor was an object of suspicion and distrust.

Our entrance into the war opened up to the business papers of the country a new field for substantial service. On the first two Liberty loans they contributed more than 7000 pages of

A Sense of Honor

NOW it is only a fair proposition that if your business or your industry uses trade paper quotations as a basis for actual selling prices their representatives are clearly entitled to enough of your time and confidence to put them in possession of such facts as have a direct bearing on the current market. For obvious reasons, there are always certain developments on which publicity is out of the question. But the biggest men in the industry came to realize, a long while ago, that the trade press would respect their confidence absolutely. And they learned, as well, that the representatives of these papers would welcome a knowledge of facts, which, while they could not be printed, still could be kept in mind in shaping quotations on which they had a bearing. In these latter days the industry has come to regard the trade paper man as one gifted, not with a fine sense of rumor, but with a finely developed sense of honor and discretion. It naturally follows, though indirectly, that the buyer or seller who imparts either information which is untrue or half-facts which mislead by reason of what they do not tell, with the idea of manipulating quotations, should be set down as one whose methods of trading should very properly be watched.

advertising and editorial matter. Late in November the secretary of war sought their assistance in recruiting mechanics and skilled workmen for the aviation section of the signal corps. Only a few weeks then remained until the draft became effective, and the war department intimated it would be well satisfied with 12,000 men before that time. The number actually secured was around 43,000.

Early last summer the war and navy departments were in urgent need of machine designers. A four months' search had produced 40 and the task was then delegated to the editor of *The American Machinist*. Visiting some 17 machinery manufacturing centers, in 12 days he rounded up over 100 designers and persuaded their employers, not only to loan them to the nation, but also to pay the difference between their former salaries and the government limit of $1800 per year.

A Suggestion Accepted

It is also worthy of note that the far-famed Liberty motor had its origin in a trade paper idea. An automobile journal sent a representative to France and England to study airplane motors. He found some 30 types in use. Parts were not interchangeable and men familiar with one type could not operate the others. Astounded at the confusion and loss of efficiency, the editor laid these facts before the proper authorities at Washington, suggesting that America should concentrate on one standardized type. The Liberty motor was the result.

Regiments of road-builders, miners, railway operatives, quarrymen and lumbermen—to mention only a few—have been recruited largely through the efforts of the trade papers in their appropriate fields. They have been a vitalizing force in the several national campaigns for Red Cross and other relief funds. They have helped to mobilize, to readjust, to energize. And particularly during these last 12 or 14 months the work of the iron and steel publications have been such as to assist and to inspire. They have caught and reflected the spirit of that industry, which, we are proud to believe, has led in its wholehearted, enthusiastic response to the war needs of this nation and its allies.

* * *

A year of war has nationalized American business. It has brought a new ideal to dominate our industrial life. It has discarded the old-time considerations of profit and competition and has substituted a new-found incentive which is infinitely bigger. Its demands have speeded up the development of manufacture and trade, so that revolutionizing changes are now made, not in decades, but almost in days.

Along with these new conditions, the war has created a difficult situation in which a diminishing labor supply faces an imperative need for increased production sufficient to offset the things consumed and destroyed in carrying on the conflict. While it is on, and when it is over, when we enter that coming commercial struggle which someone calls "the war after the war", the measure of efficiency will determine the success of any business or any industry. And greater efficiency, as a well-known editor has suggested, "necessarily means a closer as well as keener interest in the experiences of others, livelier appreciation of new ideas, inventions and readjustments of methods. These constitute the very merchandise traded in by the business papers."

Already they are pointing the way in many problems dealing with the labor situation. We need go no further than *The Bulletin* of the American Iron and Steel institute to find whole issues devoted to some phase of the question, safety appliances, model gardens, workmen-owned homes and other matters of working and living conditions which go to make the laboring man interested, contented and self-respecting. It is a hopeful sign that scores and hundreds of American business papers have taken up this important work. There is no denying the force of persistent publicity and when it is coupled with the directional force which comes from a constant interchange of practical ideas, sure and steady progress is certain.

Discusses the Editorial Side

A few months ago a convention of trade journal publishers was held in Chicago. It was featured by an exhaustive discussion of the editorial side of their business, and running all through it we find special emphasis laid on what is termed "the creative idea in editing". "Sitting in an editorial sanctum is a worn-out method," said one of the speakers. "Business papers are now best edited from the field, and preferably in the shirt sleeves."

The old theory was to print the news, just the news and nothing more. Then the trade paper lived *on* its industry. The newer vision is that the trade paper has a far broader service to perform, a mission of leadership in helping the industry to shape its course. When it accomplishes this, the trade paper truly lives *for* its industry.

Trade Journals—A Full-Fledged Ally

BY JAMES R. MILLS
Manager of Sales, Cleveland District, Carnegie Steel Co.

A COLLEGE publication of the Middle West had in recent years for its motto this: "We aim not to mold public opinion, but to scrape the mold off of it." It can hardly be questioned that the iron and steel industry in times past has not given the heed that it should to uninformed and incorrect public opinion. Much of the time it has seemed that the industry was not sufficiently concerned to even attempt to keep off the mold. Yet, in its relations to the trade paper there has happily come a radical change for the better in recent years. In former days, the trade paper in its efforts to get facts, was kept at arm's length, except by a few unscrupulous traders whose effort was to constantly play upon the credulity of the trade journal by reporting purely imaginary transactions for the purpose either of mystifying competitors or indirectly influencing market quotations. Some manufacturers did employ press agents, but these for the most part were so restricted in what they were allowed to tell that they pretty well fitted the nickname given them by newspapermen, of "suppress agents". This attitude did not indicate any particular unfriendliness to the trade journals; it was the period when secrecy was regarded as an absolute essential, both as to important operations and commercial transactions.

The era of candor and co-operation which has followed, and in which this institute has played such an important part, has greatly changed the status of the trade journal. Suspicion of the trade journal has largely gone, along with suspicion of a competitor. With secrecy no longer considered a necessity, the task of a trade journal is greatly simplified. For the trade papers themselves, it must be said that in the changing conditions of the last 20 years they have fought as privates in the ranks, making common cause of all that is vital to the industry.

Mr. Stephenson has shown how

much of a necessity the trade journal has become, and how important is the information it gives us from week to week. In the broader field of informing public opinion the present times are giving new importance to the trade journal. In the notable work of Ivy L. Lee, in developing the public relations of the Pennsylvania railroad, Mr. Lee's aim was two-fold; first, to interpret to the directors and officials of the Pennsylvania railroad the opinions and feelings of their employes and of the public, their patrons; second, to interpret to the public the aims and purposes of the Pennsylvania railroad. Today there is scarcely an industry that is not vitally interested in what the steel trade is doing, and to a great many people this industry has become the commercial pathfinder. In interpreting to the public and to employes the aims and purposes of the iron and steel industry the trade journal fulfills one of its greatest services. It is the spokesman of the industry because no other agency has the background to fully comprehend the significance of what is occurring. The daily press, however willing, cannot do this. We heartily second Mr. Stephenson's plea that the trade paper be treated as a full-fledged ally entitled to our fullest confidence and cooperation.

Industry Needs Business Papers

BY A. O. BACKERT
Vice President, Penton Publishing Co.

IF YOU can imagine the existence of the iron and steel business without its trade papers, or the publication of the iron and steel trade papers without the great business of which you are a part, you will establish the relation that the one bears to the other. Let us first consider your industry without its trade papers. A condition of chaos would reign. You would grope in the darkness of misinformation or no information. You would be isolated almost as completely as the far-famed inhabitants of the South Sea islands. And without the trade papers you would be the target for the insidious, yellow-dog enemy propaganda that blazes-up in the by-ways while the spotlight is turned only on the highways. Progress in manufacturing methods would be halted and industry again would return to the era when the secrets of the arts were handed down from father to son. This is assuming much for the province of the trade papers, yet it might be said, with becoming modesty, that there is much to assume. And as for the iron and steel trade papers without the iron and steel business, there simply would be none.

Thrown to the Winds

But the term "trade", in its reference to these publications long since has been consigned to the discard. It smacked too much of barter and exchange. It recalled too vividly to the publishers the day when the paste pot and the shears were the editor's principal weapons of offense and defense. It reminded them also of that oleageneous, silk-hatted, frock-coated individual whom they employed in the guise of an advertising solicitor, but who instead accepted alms from the manufacturers, which were bestowed with grudging charity. But the paste pot and shears long since have yielded to the editorial staff of highly trained, energetic, up-to-the minute news gatherers. The editor has discontinued the sport of entering the seat of his trousers in a friction contest with the seat of his chair, while silk-hat Harry has been replaced by the advertising specialist who is versed in business building by properly-directed publicity aimed only at the man who is interested. This has been the evolution of the trade paper to the business paper and the business papers of the iron and steel manufacturers, in influence, scope and importance have paralleled the progress of and measure up to the great metal-working industry of which they are a component part.

What is the province of these publications? To disseminate news and information in a specialized field. To record the improvements in processes of today that will be the standard textbook practices of tomorrow. To present the experiences of one manufacturer so that the other may profit thereby. To point out to the industry loftier ideals to be striven for, but never attained. And as so aptly stated in a quotation in Stephenson's able paper, "these constitute the very merchandise traded in by the business paper". As merchandise it must conform to the latest and most modern styles and these change every day, every week or every month, depending upon the frequency of publication.

When you build a blast furnace you expect to operate it day in and day out, year in and year out along definite, standardized lines. You occasionally make a cast of off iron or blow off the top of the stack, yet your practice remains the same—it is standardized. The same is true of your mills, your steel furnaces and your converters. Now contrast your methods with those of the publisher. He cannot shut down for relining or because of a breakdown. His paper must be issued at the specified time regardless of contingencies. His publication cannot have an off-cast, since every inaccuracy will be caught by thousands of eyes. When one issue is off the press another must be constructed immediately. It must be fashioned to a different pattern than the previous number. It must have a new style, different make-up, and, if possible, a greater appeal than the previous issue. The publisher's practice is just the reverse of standard.

The successful editor of a business paper must be a human paradox. He must have no friends. He must have many friends. He must have no friends in the sense that his loyalty to them would warp his better judgment. He must have many friends upon whom he may depend as reliable sources of news and information. At one glance his vision must take in every point of the compass, for he has a solemn duty to perform alike for the backwoods foundryman and the producer of millions of tons of steel. Both are purchasers of the only merchandise at the disposal of the editor and the interests of both must be conserved.

Editor Between Two Fires

Before Uncle Sam wiped out the law of supply and demand as affecting iron and steel prices, the editor of the iron and steel paper held a position in no man's land, a target for sniping buyers and sellers. In a declining market he was assailed by the producers. In an advancing market, by the consumers. He was damned if he did and damned if he didn't. But government control has brought him relief and, temporarily at least, he is enjoying a much needed rest from the barrage that both sides formerly directed toward him.

For every human being the editorial sanctum of a publishing house holds enticing allurements. We all like to

see our thoughts in print. Every one of us, at some time or other, has cherished the conviction that he could write a play, sing a song or write for publication. And the latter desire occasionally also adds to the pleasantries of the editor's otherwise prosaic existence. When he receives a manuscript accompanied by a request that not one comma be changed, despite obvious grammatical errors, he must assume the role of a diplomat to appease the contributor. Yet communications and articles are invited and keenly sought and it is unfortunate that our American iron and steel manufacturers have been so engaged with the business at hand that they have not developed the writing habit to the same extent as men similarly employed in other important iron and steel producing countries.

Recently much ado has been raised over the paucity of text matter in our business papers as compared with the bulk of advertising. The business paper only performs its function when it builds for the busy business man. Reams and reams of manuscript are condensed to meet the needs of the reader whose time is drawn upon more heavily today than ever before. Twice the number of editorial pages could be printed, but with no obvious advantage, when the information can be presented more effectively in one-half the space. The iron and steel business paper is the fine-meshed screen through which news and information of value to the trade is sieved.

Long before the business papers of your industry attained their present place of importance and value, that great iron master, whom we all love and esteem—Andrew Carnegie—was outspoken in his warm and wholehearted appreciation of the function performed by them. You, too, have come to a like conviction as evidenced by the kindly receptions you accord both their editorial and advertising representatives.

Figures are Exaggerated

The business paper is so busily engaged directing attention to the developments of the day and the deeds and accomplishments of others, that its own great achievements pass unnoticed. Nearly two decades ago a strike of steel workers beset the industry. It was known among steel manufacturers that the number of men engaged in this strike as stated by the daily press was grossly exaggerated. But in the absence of definite information these mis-statements could not be corrected. It was one of your business papers that dug out the actual membership of this organization and it had the temerity to print these figures. These showed a shrinkage of over 2000 per cent as compared with the fiction fed to the daily press. Nor did this trade paper consider it had performed its function with its publication of these figures. Its editor saw to it that they were distributed broadcast by the news agencies, with due credit to the business paper. These figures were accepted without question by the news agencies because of the established reputation for accuracy of the business paper that gave them out. And public sentiment, when it realized how it had been duped, was crystallized against this strike which soon faded into the horizon.

To serve the interests of producer and consumer, large or small, at all times, is the greatest function of the iron and steel business paper. Information frequently is printed that hurts either maker or user. A case in point is the practice indulged in at one time of granting a concession to certain organized consumers for their year's requirements, which was not given to others. Every effort was made to conceal this practice and the news gatherers for the business papers displayed equal energy in attempting to obtain accurate information concerning it. And the information was obtained and was published. It resulted in concessions all along the line and represented great financial losses to the steel producers and proportionate gains for the consumers not previously preferred. This practice long since has been discontinued. It is an adage of the editorial departments of the business papers that every line has its soft spot; that information concerning a transaction, regardless of how carefully guarded is obtainable, if sought for diligently enough.

Within a year the entire phase of the iron and steel industry has been changed and with it every phase of the publication of its business papers. The bulwark of their market quotations has been uprooted and replaced by prices fixed by the government. The center of activity has been transplanted from Pittsburgh, New York, Chicago and Cleveland to Washington. Not content to follow, the business papers lead in this great transition. Editorial offices already established at Washington were enlarged to cope with the ever-growing importance of this center. With the rapid-fire changes that affect every previous method of business conduct, the iron and steel papers are serving a greater function today than ever before in their history. It is to them that the manufacturer turns for information concerning almost over-night developments and it is in them that he places his trust because of their established reputation for accuracy.

And in this and other ways the iron and steel papers are attempting to serve their country. When every producer and consumer of iron and steel products in the land was hungry for every bit of news concerning agreed prices the business papers furnished it to him. They sought out every hamlet and village where iron or steel was fashioned and carried the information to the manufacturer, wherever he was located. No agency is provided for the dissemination of this vital information other than the business papers.

Wherever the fortunes of this great conflict lead, the business papers will follow. They know their duty and may be depended upon to perform it, whatever contingencies may arise. And the business papers of your industry join you in pledging to the government their supreme efforts and their every resource to win this war.

Ready to Build Mill

The United Steel Co., Everett, Wash., is to start at once on erection of its buildings here and bids now are being received. The main building is to be 70 x 200 feet. It is the intention of the company to manufacture merchant steel and iron bars, including squares, rounds, flats, angles, tees, channels, concrete reinforcing, corrugated, twisted and special shapes. J. Johnson, general manager, states that all necessary machinery has been provided for. A considerable portion of it will be constructed locally at the plant of the Bayside Iron Works. A crane has been purchased. Two large magnets will be installed for handling scrap.

Builds Washing Plant

A washing plant of 1200 tons capacity is being built at the coal mines of the Dayton Coal, Iron & Railway Co., Dayton, Tenn. The company has not been able to obtain a supply of coke to operate its stacks, so that development work is being rushed at its coal mines and coke oven plant preparatory to blowing in its furnaces. Little repair work will be necessary at the blast furnaces and it is expected that within 60 to 90 days the ovens will be producing enough coke made from washed coal to accommodate the stacks.

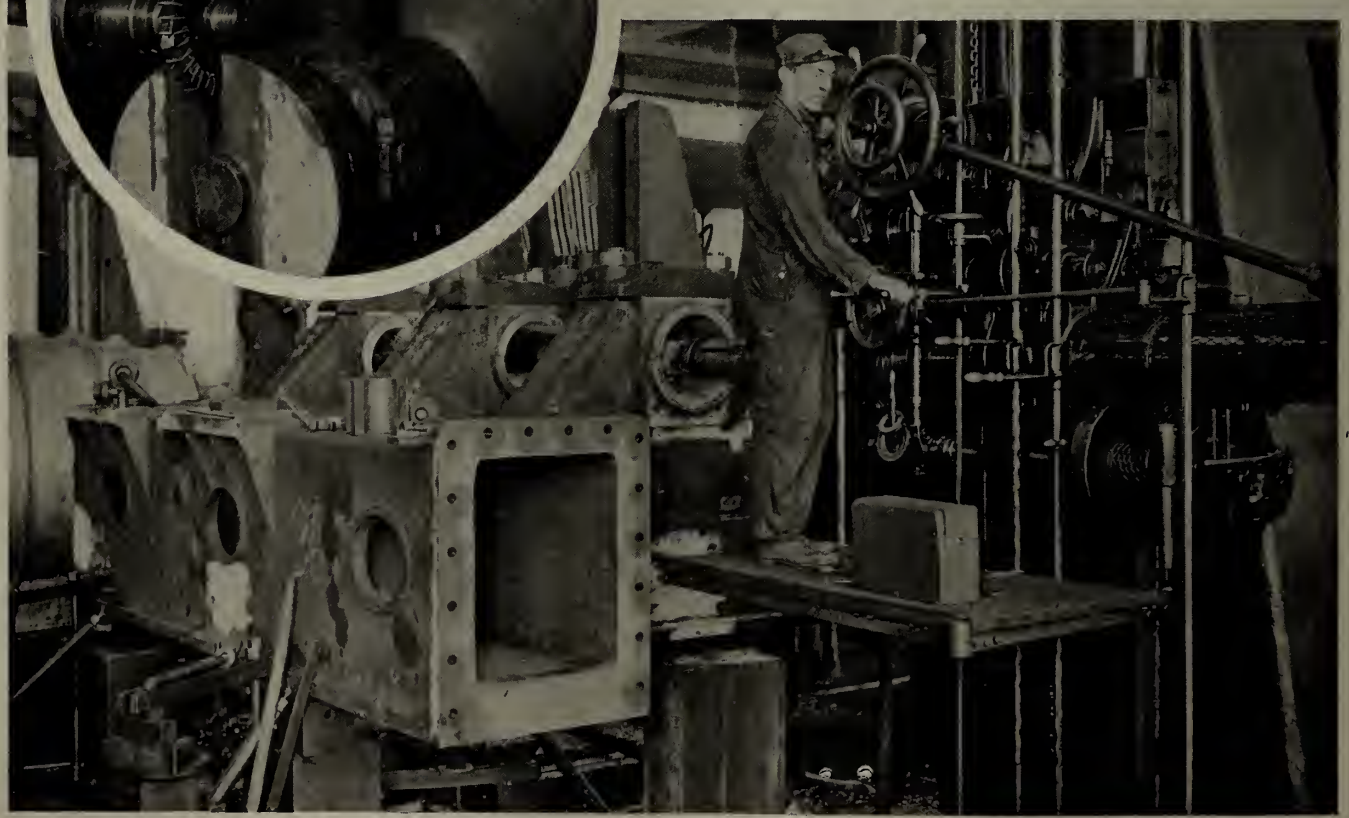
Keeping Up With Launchings in the

The Diversity of Machine Work Required in Ship Construction



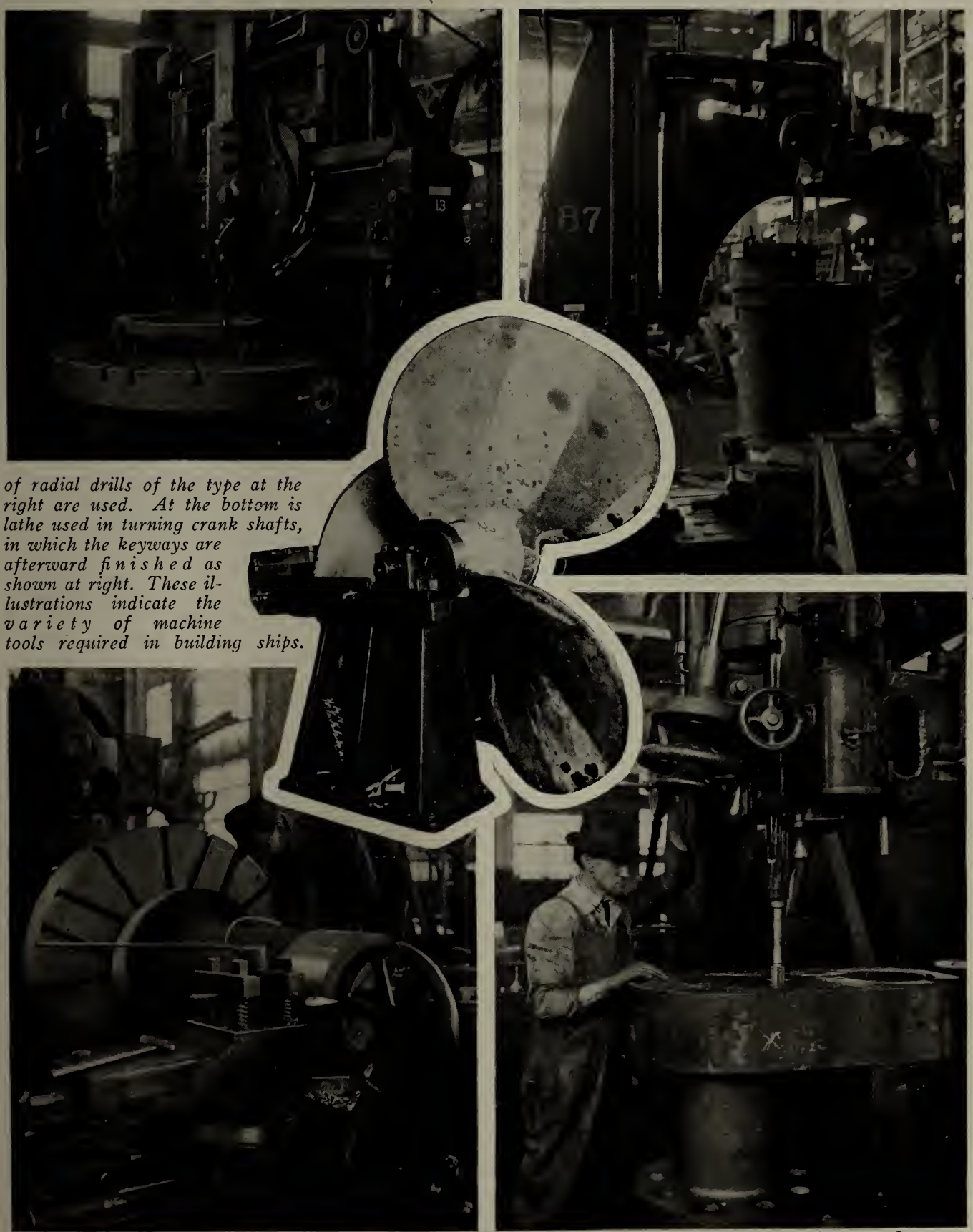


A ROUGH finishing lathe operation is shown above, while in the insert a miller is cutting a slot in the flange of a turbine rotor shaft. Below is a horizontal boring machine employed on heavy engine castings. In the center of the opposite page is a propeller mounted for planing the blades. The vertical boring mill shown at the top of that page is used for finishing the inside of cylinders. A great number



Machine Shops Throughout America

is Indicated by the Accompanying Shop Illustrations



of radial drills of the type at the right are used. At the bottom is lathe used in turning crank shafts, in which the keyways are afterward finished as shown at right. These illustrations indicate the variety of machine tools required in building ships.

Saving Manganese in Steelmaking

Curtailment of High Metallic Ore Imports Makes Necessary Reduction of Manganese Used and the Substitution of 60 Per Cent Ferro in Place of Customary 80 Per Cent in Steel Corporation Plants

BY A. N. DIEHL
Assistant to Vice President, Carnegie Steel Co.

THIS problem of manganese conservation divides itself automatically in two parts, namely, preparing the ferroalloys to the best advantage of the available ore supply, and ultimate use of the same alloy, and consuming the alloys to the best economic advantage, with regard to the proportionate supply, and adequate practice supervision.

In the United States manganese ore is scattered. It is found generally in pockets causing irregular production. No small proportion is high in phosphorus content. Any low phosphorus ore containing over 6 to 1 ratio between iron and manganese with a content of 40 per cent iron or over, might be considered as a source of recarburizing manganese. Mixtures of such lower grade ores with higher ones can be varied to produce any predetermined alloy, depending on the metallic ratios. A study of this phase after a canvass of the deposits might be made to determine if any grade between the commonly called ferromanganese and spiegel grades would be desirable.

Since manganese alloys with iron in practically all proportions, the terms manganiferous pig iron, spiegel and ferromanganese are merely arbitrary trade demarcations, but on account of their specific uses, have been often considered as alloys having different inherent qualities.

The production of 80 per cent ferromanganese requires ore of high metallic content, which is mostly imported. Transportation conditions make it absolutely necessary to use such cargoes to the best advantage by mixing with our native production in such manner as to make the greatest quantity of the latter available as an alloy. This will result in the application of lower alloys than those to which we have been accustomed. The application of the spiegel cupola practice, principally for low grade alloys, is extremely flexible, and a manufacturer of high carbon steel, especially in quantity, should consider such installation carefully. In most cupola practice, the alloy is diluted with pig iron to 5 or 6 per cent of manganese, depending on carbon and manganese specifications. A 16 per cent alloy cannot be used in open-hearth practice for carbon below 0.25 to 0.30 per cent and a portion of it will, at least, have to be melted or charged in the furnace.

Methods of Addition

Manganese is introduced in the steel in several different ways:

(1) In the ladle cold, or heated as is generally done in the bessemer process with a loss of 20 to 25 per cent.

(2) In the open-hearth furnace, where it is melted with the bath and having an accompanying loss of 50 per cent.

(3) As a combination of the two former methods where conditions are heavy with an average loss of approximately 50 per cent.

(4) In the molten condition introduced into the ladle with a loss of 15 to 20 per cent in spiegel and 20 per cent loss in ferro, or as in manganiferous pig iron recarburization where it is poured through the furnace showing a loss of 25 to 30 per cent. Such manganese should be considered as constituent of the iron rather than in the recarburizer class.

The chemical range of the carbon content, in the iron manganese alloy of 95 to 2, and 12 to 80 proportion, is approximately from 3.75 to 6.50 per cent, increasing gradually through the different ranges with slight variation, due to the other metalloids. As the carbon range is thus comparatively small, the manganese content is the principal factor determining which should be the proper alloy to use.

As long as 80 per cent ferro was available, the cold, ladle addition was the most economic course to pursue, and should be utilized to the fullest extent with the more diluted grades. Cold ladle additions up to 30 pounds per ton, should not be excessive. We have used 40 pounds per ton in 60-ton heats at a number of plants. Care in heat manipulation, however, is necessary in such cases. Obviously, the carbon requirement will be the determining factor. The Carnegie Steel Co., as well as other subsidiaries of the United States Steel Corp., for a considerable period have been using 60 per cent ferro as a substitute for the 80 per cent grade with equally good results. The only change noticed was a slight raise in the carbon limits, the low practical limit being about 0.12 per cent carbon. With a 50 per cent grade, making 0.50 per cent manganese steel, the carbon low limit would be about 0.16 per cent. All higher carbon or manganese specifications can be met without difficulty. The United States Steel Corp. has changed its spiegel grade to 16 per cent manganese with a prospect of still further reduction.

However, the greatest real conservation will be centered in the judgment and activity of the operator. He must appreciate the urgency and expediency of such effort. It might be well to add a few reminders in the form of "Do Nots" which while well known, are sometimes overlooked. They may serve either to close an avenue of loss, or as an idea inspiring additional investigation.

Do not, as an industry, retard your quality or quantity to any appreciable extent.

Do not forget that the foreign supply of manganese ore is largely embargoed, and water transportation almost prohibitive, and also that steel, up to the present date, cannot be made without manganese.

Do not overlook the fact that there are some low manganese deposits in this country which must be utilized to increase the available supply necessary to carry on full operations.

Do not, as a manufacturer of manganese alloy, allow any wastage of metallic content beyond what is absolutely necessary, and keep the percentage of fines to a minimum. Large lumps will sink into the bath while the fines will often be lost in the slag. Keep alloy away from moisture. Be careful to keep grades separated and ores properly analyzed, and mixed for specific grades.

Do not, as a manganese alloy consumer, allow melters and helpers to cover bad melting practice by large additions of manganese to restore over-oxydized conditions in the furnace. Proper attention to the melting of heats will save both manganese and money.

Do not use high grade alloy when a lower will suffice, as in our native

This articles was abstracted from the discussion of the paper by C. R. Ellicott on "Manganese Conservation," read before the fourteenth general meeting of the American Iron and Steel institute, at New York City, May 31. The paper was published in the June 6 issue of THE IRON TRADE REVIEW.

supply, the low grade ore is greatly predominant. Melting the recarburizer and pouring direct into the ladle, thereby being able to use a low alloy, should be done wherever justifiable and practicable. Also do not waste high manganese scrap or slag having the proper chemical contents for recovery. The scrap can be used in spiegel cupolas.

Do not put any alloy into the furnace direct, until the maximum of cold ladle additions are made. Preheat if deemed advisable. Authorities differ as to this, but we may assist in solving the controversy. Some few specifications will require a washing, and others excessive amounts of manganese, which must be furnace additions, but the most conservative methods should be applied in accomplishing the purpose.

Do not overlook the manganese in pig iron when it can be used to recarburize, as its manganese can be of great use, especially in high-carbon, low manganese specifications, also high-manganese iron will give three to five points more residual than a lower one, thus making available a supply otherwise wasted, as this manganese could not be considered under the recarburizer grade.

Do not forget that high carbon heats caught "coming down" will retain a high residual manganese if a 50-50 iron and scrap charge and no run-off slag is used; 0.20 to 0.25 per cent may be saved in many cases. With a run-off slag, the manganese is mostly lost.

Do not, as a steel consumer, insist on a maximum manganese specification if one of lesser chemistry is equally applicable, and possible of performing the same duty. The steel manufacturer must still meet the requirements and will not go beyond a point where the product may be affected, also some of the native ores contain considerable phosphorus, and a high limit to 0.06 or 0.07 in open-hearth and a few points in bessemer steel will not affect a hardship in many cases, especially in material where a little risk is encountered.

These "do nots" may outline a few of the ways saving might be effected. They are offered, not as a manufacturer's request, but as an urgent call for a general manganese conservation rally. The subject is of sufficient importance to justify every manufacturer or consumer to be equally concerned, and aid by every possible means, the conservation of this necessary element, as well as to make available a portion of our native resources, for which we have heretofore been dependent on other nations.

To Utilize Domestic Ores

BY G. B. WATERHOUSE
Metallurgical Engineer, Lackawanna Steel Co.

MANGANESE supply and conservation is a large subject and to us as steelmakers and steel users it is a vital one, since manganese has to be carefully considered in the making of every pound of steel. Because it is important, the subject has engaged the attention of various groups of men for many months. The American Iron and Steel institute may take pride in the fact that its subcommittee on ferroalloys has done and is doing some of the most valuable work in this connection in the country today. At a recent meeting called by the subcommittee in Pittsburgh, the decision was reached that standard ferromanganese should be lowered from 80 per cent to 70 per cent manganese, and standard spiegeleisen from 20 to 16 per cent manganese. This decision makes available large tonnages of ores in this country. Also our subcommittee is working in the closest touch with the United States shipping board, and the war industries board. The present arrangement with the former is that ship tonnage will be provided for the importation from Brazil of 35,000 tons per month of high grade manganese ore. Also the bureau of mines must be mentioned. This quiet but most efficient branch of the government service has been indefatigable in following up and placing on record all possible sources of supply in this country. It is also working with the steelmakers along the lines of the proper use and conservation of the various grades of manganese alloys when produced.

These various agencies have occupied themselves mainly with the obtaining of the necessary supplies of manganese alloys. It remains for us, as steelmakers and users, to devote our best efforts toward the proper and economical use of the alloys when made. There are numerous definite ways in which our own domestic manganese resources can be utilized without restricting the output or lowering the quality of the steel made, for two of the most important factors of this big subject are that tonnage must not be reduced, nor must quality be lowered.

As has been pointed out, the ordinary low carbon steels constitute about 50 per cent of the country's production. For the majority of these steels the low limit of the manganese specification should be removed entirely, which would allow the steelmaker to furnish steel with approximately 10 points less manganese than at present. This in itself would bring about a great saving, and by the use of a 70 per cent or even a 60 per cent ferroalloy, the domestic manganese ores could be drawn on to a much larger extent than at present.

Residual in Bath Increased

By making special arrangements and paying attention to local conditions the manganese in the basic open-hearth charge can be raised in many cases. This will bring about important results, among them being an increase in the residual manganese in the bath, and this in itself will greatly reduce the final additions of manganese alloy necessary. This is such an important matter, one that can lead to such great savings, and one so little understood even by open-hearth men, that a little more may be said on it. In the case of ordinary open-hearth plate, let us assume that the specifications are so changed that the steelmaker can safely aim at 0.35 per cent manganese in the finished steel. If the residual manganese in his bath is 0.10 per cent, then enough manganese alloy has to be added to take care of the oxidation loss and introduce 0.25 per cent into the steel. Now by making suitable arrangements let us assume that the manganese in the original charge is raised so that the residual manganese in the bath is 0.20 per cent. He then has to add enough alloy to his metal to take care of the oxidation loss (which in this case will be less) and to introduce only 15 per cent into the steel. This means a direct saving in final ferromanganese additions of 40 to 50 per cent. Nothing has been assumed but what is feasible, workable, and can be carried out in practice.

Utilizing Low-Grade Alloys

Another very important class of ordinary steels contains, 0.35 per cent and upwards of carbon, and at the present time constitutes certainly 25 per cent of the country's output. It includes all the rail and shell steel, and many forging steels. It would be injudicious to change the manganese specification in many of these steels, but some saving could be brought about by paying attention to the residual manganese in the bath. The most constructive work, however, in regard to these steels, and the greatest measure of conservation would be to adopt methods that would utilize the low manganese alloys. That is methods of adding manganese similar to those suggested

by Mr. Ellicott, two of which may be quoted:

(c) Melting spiegel in a cupola and adding direct or diluted into the steel ladle.
(d) Adding about 5 per cent manganiferous pig iron from mixer or cupola to furnace or ladle.

We have followed a method of this kind at the Lackawanna Steel Co. for a number of years in making these grades of steel, and a few details may be of interest. For instance, in making rail steel the open-hearth bath is tapped with 0.15 per cent carbon, and an addition of molten spiegel mixture is made in the steel ladle that will add the desired amounts of carbon, manganese and silicon. The usual practice on rail steel is to charge into the spiegel cupola a mixture of spiegeleisen and pig iron that will average 6½ per cent manganese, and the usual amount of molten spiegel is 28,000 pounds for a heat giving 100 tons of ingots. On shell steel the spiegel mixture charged into the cupola averages 9 per cent manganese, and the amount of molten spiegel added to the steel ladle is 14,000 pounds for a heat giving 100 tons of ingots. Such a method is entirely practicable, as may be judged from the fact that we use it in making about 50,000 tons of ingots each month. It does not interfere with the output but on the contrary, helps to increase the tonnage, and as regards quality, gives material that is remarkably uniform from one ingot to another, that rolls well, and that can be confidently subjected to the most rigid tests. There is no doubt that along the lines of methods similar to ours, and of methods (c) and (d) given above, the use of ferromanganese can be largely done away with in making these grades of steel, and a conservation of manganese be brought about that will be of great importance, because the low manganese ores of this country can be used in making the alloys required. It may be mentioned that President E. A. S. Clarke of the Lackawanna Steel Co., has publicly stated that we stand ready at any time to explain and show our method of using spiegel, and to do all we can to enable others to work out similar methods.

Norway Uses Substitutes

BY DR. J. W. RICHARDS
Professor of Metallurgy, Lehigh University

THE use of manganese to fill unnecessary specifications is certainly one which should receive immediate and effective attention. It is a clear waste.

A source of manganese for blast furnaces, not at present utilized, is the slags from spiegel furnaces. These contain considerable manganese. They would be self-flexing in the blast furnace, and a considerable proportion of their manganese saved.

A friend of mine, Mr. Poulsson of the Staranger Steel Works, in Norway, confirms the fact that spiegeleisen of quite low grade can effectively replace ferromanganese in most steels, and that calcium carbide can be partly substituted for ferromanganese in deoxidizing steel. In a recent letter to me he states that 10 to 12 per cent spiegel, or even 8 to 10 per cent can replace ferromanganese entirely in all grades of rail steel. The spiegel should be melted in an electric furnace to preserve the manganese and keep down the carbon, and not in cupolas. Necessary silicon can be added as ferrosilicon.

For soft steel, such as steel plates, angles, etc., the 80 per cent ferromanganese can be replaced by half its weight of 60 per cent ferromanganese, if calcium carbide is substituted for the other half. For instance, in place of 8 to 12 pounds of 80 per cent ferro, 4 to 6 pounds of 60 per cent ferro is used in conjunction with 14 to 16 pounds of calcium carbide. The latter is used in pieces 0.3 to 0.4 inch in diameter, is mixed with the ferro and thrown to the bottom of the ladle. The steel is poured upon the mixture, special care being taken that the steel strikes the carbide before the slag comes in. This is most easy to accomplish when using a tilting furnace. Additional deoxidation if required, can be done by powdered 50 per cent ferrosilicon and aluminum. The exact quantity of carbide to use for any steel can be easily found by a little experimenting.

Calcium carbide can thus be employed to diminish our manganese requirements. Whether it is commercially possible or not depends on the relative cost of 80 per cent ferro, 60 per cent ferro, and calcium carbide.

By the use of such and similar practices, by saving our manganese wherever possible and by increasing our domestic production as fast as possible, we can feel assured that within a short time this country will be independent of importations, and that the precious ships now used to bring in high grade manganese ores can be diverted to more useful and patriotic service for our army and navy.

Gives Ore Analyses

Complete average cargo analyses of Lake Superior iron ores for the season of 1917 are given in a booklet now being distributed by the Lake Superior Iron Ore association, Cleveland. Ores from the six large ranges in the Lake Superior district as well as from the Michipicoten and Sudbury districts of Canada are included.

Receives Edison Medal

For his work in the science and art of telephone engineering, the American Institute of Electrical Engineers awarded the Edison medal to John Joseph Carty at its annual meeting in the Engineering Societies building, 29 West Thirty-ninth street, New York, recently. Mr. Carty has received a commission as colonel in the signal corps of the United States army and holds degrees from various institutions. He also has received the following medals: Edward Longstreth, Franklin, Imperial Order of the Rising Sun, Imperial Order of the Sacred Treasure of the Meigi. Col. Carty was introduced by Michael I. Pupin, chairman of the engineering foundation and presentation of the medal by W. Rice Jr., president of the institute, followed. Previous holders of this medal are: Elihu Thomson (1909); Frank J. Sprague (1910); George Westinghouse (1911); William Stanley (1912); Charles F. Brush (1913); Alexander Graham Bell (1914) and Nikola Tesla (1916).

Pattern Makers Organize

To promote closer business relations among firms engaged in the production of wood and metal patterns, the Interstate Pattern Manufacturers' association has been organized and has established headquarters at Columbus, O., in charge of T. T. McGuire, secretary. Officers of this organization follow: President, E. F. Ball, Newark Stamping & Foundry Co., Newark, O., and vice president, Max A. Sills, Superior Pattern Works, Cleveland. In addition to the officers the following constitute the board of directors: E. O. Melvin, Melvin Bros., Columbus, O.; A. E. Schuchert, A. E. Schuchert Pattern Works, Cincinnati; Charles D. Smith, Morner & Smith, Dayton, O.; and J. H. Bridge, Maumee Pattern Co., Toledo, O.

Study Phosphorous Effect in Steel

Soft Acid and Basic Open-Hearth Material is Investigated to Determine the Influence of Varied Proportions of this Element in the Fabrication of Finished Articles Which Require Severe Cold Working in Their Production

BY. J. S. UNGER

EVERY metallurgist knows that phosphorus adds hardness to steel in the same manner that carbon or any true hardening element does. Many persons believe that, in addition, it produces brittleness or what is called cold shortness. Soft or low-carbon steels are made up in the cold state into many articles requiring severe stamping, pressing, drawing, bending or upsetting operations. Articles of medium or high-carbon steel requiring such operations are usually worked hot, giving little opportunity to observe their properties until after they have become cold.

Soft steels for use in articles requiring severe cold working in their production are rarely tested by means of physical tests, the fitness or unfitness of the steel being determined by the ability to fabricate the steel and meet the requirements of ordinary service. For this reason more attention was given to the fabrication of finished articles in this investigation, although physical tests of various kinds were made. Large numbers of the several articles were made up cold in a practical way, the aim being to carry out the experiment in accordance with current conditions, being careful not to change the shop conditions or methods of operating at any particular plant. By making a considerable number of each article, a fair average result was obtained, which is considered to be truly representative of regular shop practice. The steels were not given any special heat treatment, excepting such as is regularly given to ordinary soft steels, for instance the annealing of sheets or the pickling and annealing of wire. The effects of heat treatment was not studied, as soft steels are rarely heat treated.

Table I

Composition of Steel Used

Grade	C	Mn	P	S	Si	Cu
Acid O. H.. (Ladle Anal.)	.12	.36	.032	.036	.020	.014
3 ingots			.058			
3 ingots			.085			
3 ingots			.115			
Basic O. H. (Ladle Anal.)	.12	.36	.008	.037	.022	.012
3 ingots			.030			
3 ingots			.052			
3 ingots			.080			
3 ingots			.110			

Twelve ingots from the same heat of acid steel and 15 from the same heat of basic open-hearth steel, or 84 tons in all were used in this experiment. The normal composition of each steel is given in Table I. After the first three basic ingots had been poured, a sufficient amount of 17 per cent powdered ferrophosphorus was added during the pouring of the next three ingots to increase the phosphorus to 0.030 per cent. To the following three ingots the addition was increased to show a phosphorus content of 0.055 per cent, the next three to 0.085 per cent and the next three to 0.110 per cent phosphorus. The same method was adopted in the ingot additions to the acid steel, excepting that only three sets of three ingots each had additions of ferrophosphorus made to them, as the original phosphorus in the steel was higher to begin with.

The ferrophosphorus additions to the last set of ingots of each steel raised the phosphorus considerably above that regularly found in either acid or basic open-hearth steel, but these additions were made to secure steels containing as much phosphorus as is ordinarily found in bessemer steel. Any higher phosphorus content than that found in bessemer steel was of no practical value, consequently, a study of steels containing higher percentages of phosphorus was not considered. The method described furnished steels practically alike in every particular, except in the amount of phosphorus they contained; therefore any differences found in the tests or finished products could be attributed to the phosphorus content. All the phosphorus in the ferrophosphorus was absorbed by the molten steel without appreciable loss. The amount of phosphorus found in the ingots and the various steel articles checked the phosphorus additions closely. These

Table II

Longitudinal Tensile Tests on Sheet Bar 0.467 Inch Thick

Kind of steel	Phos. content	Elastic limit lbs. per sq. in.	Ultimate strength lbs. per sq. in.	Elongation in 8-in. per cent	Reduction of area per cent
Acid O. H.	0.032	30,750	54,280	29.3	58.7
Acid O. H.	0.058	31,215	57,290	32.0	58.7
Acid O. H.	0.085	33,120	59,200	30.6	57.1
Acid O. H.	0.115	35,665	62,070	29.4	47.0
Basic O. H.	0.008	29,130	50,780	34.3	61.0
Basic O. H.	0.030	30,405	51,940	32.4	63.2
Basic O. H.	0.052	30,675	54,350	32.4	62.6
Basic O. H.	0.080	30,540	55,820	31.2	56.8
Basic O. H.	0.110	32,550	58,635	31.2	55.9

Table III

Transverse Tensile Tests on Sheet Bar 0.467 Inch Thick

Kind of steel	Phos. content	Elastic limit lbs. per sq. in.	Ultimate strength lbs. per sq. in.	Elongation in 8-in. per cent	Reduction of area per cent	Actual elongation in 2-in. per cent
Acid O. H.	0.032	32,320	55,840	28.0	48.1	41.0
Acid O. H.	0.058	32,550	59,410	24.0	43.9	35.0
Acid O H.	0.085	31,840	59,530	29.0	41.1	43.0
Acid O H.	0.115	35,770	63,700	24.0	46.4	35.0
Basic O. H.	0.008	30,900	52,400	29.0	48.5	43.0
Basic O. H.	0.030	31,160	53,440	27.0	49.9	40.0
Basic O. H.	0.052	31,010	55,840	28.0	51.2	41.0
Basic O. H.	0.080	31,840	57,740	26.0	44.9	38.0
Basic O. H.	0.110	33,060	60,970	27.0	41.0	40.0

Abstract of paper presented at the annual meeting of the American Iron and Steel institute, New York, May 31. The author, J. S. Unger, is manager, central research bureau, Carnegie Steel Co., Pittsburgh.

Table IV

Drift Tests and Load Required to Crack Specimens

Kind of steel	Phos. content, per cent	Diam. hole punched away from surface, inches	Load req., pounds	Diameter drilled hole, inches	Load req., pounds	Diam. hole punched towards surface, inches	Load req., pounds
Acid O. H.....	0.032	1.26	28,000	1.65	35,200	1.46	27,600
Acid O. H.....	0.058	1.23	32,700	1.58	31,000	1.39	30,100
Acid O. H.....	0.085	1.26	32,400	1.44	30,800	1.35	30,700
Acid O. H.....	0.115	1.22	33,200	1.40	34,100	1.42	32,000
Basic O. H.....	0.008	1.30	28,400	1.83	32,200	1.45	25,100
Basic O. H.....	0.030	1.26	27,400	2.00	35,900	1.58	27,500
Basic O. H.....	0.052	1.28	28,100	1.65	31,800	1.50	27,500
Basic O. H.....	0.080	1.32	28,600	1.70	33,500	1.47	28,000
Basic O. H.....	0.110	1.30	28,600	1.64	34,300	1.35	29,100

Table V

Results of Shearing and Riveted-Joint Tests

Kind of steel	Phos. content, per cent	Load to double shear ¾ inches diam. rounds, in pounds	Strength of hot-riveted joint, in pounds
Acid O. H.....	0.032	36,985	79,100
Acid O. H.....	0.058	38,830	82,400
Acid O. H.....	0.085	40,165	88,200
Acid O. H.....	0.115	40,080	86,700
Basic O. H.....	0.008	34,845	74,700
Basic O. H.....	0.030	36,180	76,200
Basic O. H.....	0.052	36,475	78,300
Basic O. H.....	0.080	36,340	81,900
Basic O. H.....	0.110	36,220	79,800

Table VI

Results of Bending and Drawing Tests

Kind of steel	Phos. content, per cent	Bending tests, sheets 0.096 in. thick. As rolled Long.	As rolled Trans.	No. bends Normalized at 900° Cent. Long.	Normalized at 900° Cent. Trans.	Erichsen test, sheets 0.048 in. thick. Depth of cup, millimeters
Acid O. H.....	0.032	3	3	4	4	9.22
Acid O. H.....	0.058	4	3	5	4	9.08
Acid O. H.....	0.085	3	3	4	4	9.04
Acid O. H.....	0.115	3	2	4	3	8.71
Basic O. H.....	0.008	4	4	4	4	9.77
Basic O. H.....	0.030	4	3	4	4	9.65
Basic O. H.....	0.052	3	3	4	4	9.35
Basic O. H.....	0.080	3	3	4	3	9.13
Basic O. H.....	0.110	4	3	5	4	9.23

Table VII

Results of Cold-Drawing Experiment

Kind of steel	Phos. content, per cent	Diameter of bar before pickling, inches	Diameter of bar after pickling, inches	Condition of surface after pickling	Diameter of bar after drawing, inches
Acid O. H.....	0.032	1.016	1.011	Smooth	0.933
Acid O. H.....	0.058	1.016	1.007	Smooth	0.933
Acid O. H.....	0.085	1.016	1.006	Rough	0.933
Acid O. H.....	0.115	1.016	1.003	Rough-Seamy	0.933
Basic O. H.....	0.008	1.016	1.013	Smooth	0.933
Basic O. H.....	0.030	1.016	1.011	Smooth	0.933
Basic O. H.....	0.052	1.016	1.009	Moderately smooth	0.933
Basic O. H.....	0.080	1.016	1.006	Rough	0.933
Basic O. H.....	0.110	1.016	1.002	Rough-Seamy	0.933

Table VIII

Tests and Mill Practice on Wire Products

Kind of steel	Phos. content per cent	Wire rod 0.406-in. diameter ult. str. lbs. sq. in.	Elongation wire rod per cent in 10-in.	Wire 0.365-in. diameter ult. str. lbs. sq. in.	Elongation wire per cent in 10-in.	Button-head rivets per cent good heads	Flat-head rivets per cent good heads
Acid O. H..	0.032	51,500	21.2	82,000	*	41.2	6.2
Acid O. H..	0.058	56,500	24.2	83,500	3.8	90.0	0
Acid O. H..	0.085	56,900	23.8	81,000	3.5	14.8	0
Acid O. H..	0.115	63,500	23.7	89,900	*	15.4	0
Basic O. H.	0.008	48,800	26.7	75,600	*	100.0	88.6
Basic O. H.	0.030	50,900	25.0	78,600	4.8	100.0	21.8
Basic O. H.	0.052	54,300	23.8	80,000	5.0	85.7	2.0
Basic O. H.	0.080	54,700	25.0	83,200	4.7	40.7	3.7
Basic O. H.	0.110	58,700	27.2	85,500	4.9	96.6	0
Reg. dead soft O. H. 0.06 Cent.....	.....	39,250	27.5	71,000	6.5	100.0	13.9

*Broke in jaws.

tests were made in duplicate and the average analyses are shown in Table I. With the same phosphorus content, the acid steel shows approximately 3000 pounds higher ultimate than the basic.

The ingots were stripped and charged hot into the soaking pits, heated and rolled in the regular way into billets, slabs and sheet bar. A discard of about 25 per cent was made from the top of each ingot to remove any pipe, sponginess or usoundness. None of this material was chipped after rolling, and no difference was observed between the different ingots in the rolling mill. These semifinished products were then shipped to the various mills to be rolled into sheets, wire rods and rounds, from which the finished articles were made.

Physical Tests

Longitudinal and transverse tensile, cold bending and drifting tests were made on the sheet bar, which was 0.467-inch thick. Tensile, vibratory and impact tests were made on the untreated and treated 1-inch rounds, and in addition, shearing tests were made on the same material, untreated. Longitudinal and transverse specimens from sheets 0.096-inch thick were tested by alternate bending, and specimens from sheets 0.048-inch thick were tested for their drawing qualities by the Erichsen test. Tensile tests were made on both the wire rod and the wire. The results of these tests are shown in Tables II and VI. On account of the width of the sheet bar, the transverse tests were pulled in 2-inch sections and calculated to 8 inches for comparison.

Longitudinal and transverse bends were made on the same material. All longitudinal bends closed up flat without showing any cracks on the outer surface. The transverse bends were closed until slight cracks could be seen, the bending then being stopped. The bent specimens are shown in Fig. 1.

Drift tests were made on 18-inch pieces from the sheet bar, having three holes 15/16-inch in diameter along the center of specimen, sufficient distance between holes and from ends of piece to avoid disturbing the surrounding metal. The upper hole was punched away from the surface, the center hole was drilled and the lower hole was punched toward the surface. A drift ⅞-inch at the small end and 2¾ inches at the large end and 13 inches long was forced into each hole until cracks appeared at the edge of the hole on the under surface. The load required and the

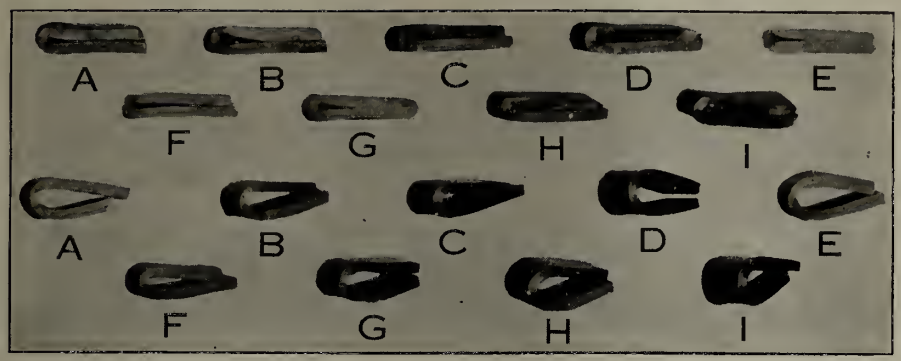


FIG. 1—BEND TESTS OF ACID AND BASIC OPEN HEARTH STEEL
Specimens in upper two rows were bent longitudinally. Those in the lower two rows were bent transversely. The phosphorous content of the specimens is as follows: A, 0.032; B, 0.058; C, 0.085; D, 0.115; E, 0.008; F, 0.030; G, 0.052; H, 0.080; I, 0.110.

diameter of the hole after drifting are given in Table IV.

The vibratory tests were made on specimens ⅜-inch in diameter by 6 inches long. The specimens were gripped 4 inches from one end and vibrated ⅜-inch in each direction at 650 vibrations per minute until failure occurred. The specimens were long enough to make a test at each end.

In the impact tests, a standard S. A. E. specimen, 10 millimeters square, notched 2 millimeters deep and 1 millimeter wide, was tested with a 200 foot-pound pendulum machine, without being able to break the specimen, as they were so tough they would bend over and wedge under the tup. Repeated trials by cutting the notch 5 millimeters deep did not improve matters. The notch was finally cut 6½ millimeters deep and turned away from the tup, when a clean break was obtained. The writer's previous experience with both vibratory and impact tests has led him to place little confidence in either test, and the present tests have not proven an exception.

These tests, particularly the impact tests, were made to try to show that the higher phosphorus steels were brittle under a dynamic or shock test. Nothing seems to be indicated by the conflicting results and nothing is claimed for them, excepting that they have not shown any greater brittleness on the high-phosphorus than on the lower-phosphorus steels.

Shear tests were made on specimens ¾-inch in diameter subjected to double shear in a shearing block, using a shearing blade 1-inch thick. Riveted joints were prepared by riveting up a joint of two bars 5 inches wide and 1¼ inches thick with two 1-inch, hot-driven rivets, spaced 2 inches from centers of rivets and 1½ inches from ends of bars. The results of these tests are given in Table V.

Several rivets 12 inches long from each grade of steel were cold flattened to ¼-inch thick, as shown in Fig. 2, no cracks developing on the flattened edges. Additional rivets were gripped under the head in a strong clamp and bent into a rough shape like the letter S, afterwards being closed up tight under the steam hammer, to try to snap the head off or break the rivet by bending under cold impact. No cracks developed on bending. Fig. 2 shows the rivets after testing.

Bending Tests on Sheets

Longitudinal and transverse test pieces were cut from sheets 0.096-inch thick and given a bending test by gripping vertically in a vise and attaching a clamp to the part projecting above the vise jaws, fastening the clamp the thickness of sheet above the jaws; then bending back and forth through an angle of 90 degrees from both sides of the vertical until broken. Each motion through 90 degrees is counted as one bend. Duplicate specimens were tested as rolled and after normalizing at 900 degrees Cent. for five minutes. Drawing tests were made in duplicate on the Erichsen machine on sheets 0.048-inch thick. The results are shown in Table VI.

Duplicate rolled rounds 30 feet long and 1.016 inches diameter were pickled at one time in the same acid solution and then drawn into rounds 0.933-inch in diameter. As the phosphorus content increased the effect of the pickling acid became greater. This is shown in the gradually decreasing diameters and the condition of the surface of the bars before drawing. This was pronounced enough to enable one to tell the phosphorus content by the diameter of the bar after pickling. After drawing, straightening and inspection, every experimental bar was commercially perfect and was applied on current orders. The results are given in Table VII.

Three 4 x 4-inch billets of each grade were rolled into wire rod, then drawn into wire of various sizes and used to make 1-inch ten-jaw barbed roofing nails with 7/16-inch heads; button-head rivets, length 1 inch, diameter of shank ⅜-inch, diameter of head ⅝-inch; flat-head rivets, length ⅝-inch, diameter of shank ⅜-inch, diameter of head ⅞-inch and thickness of head 0.145-inch. In drawing the wire, it was found that the steel was harder to draw and more breaks occurred in drawing as the phosphorus content increased.

In making the roofing nails, it was necessary to regrind the hammers more frequently than on regular dead-soft open-hearth stock, as the wire was harder to head up. Outside of this trouble, all grades were made up into perfect roofing nails. In heading the button-head rivets the results were erratic, due probably to some small difference in the operation. It can be said in a general

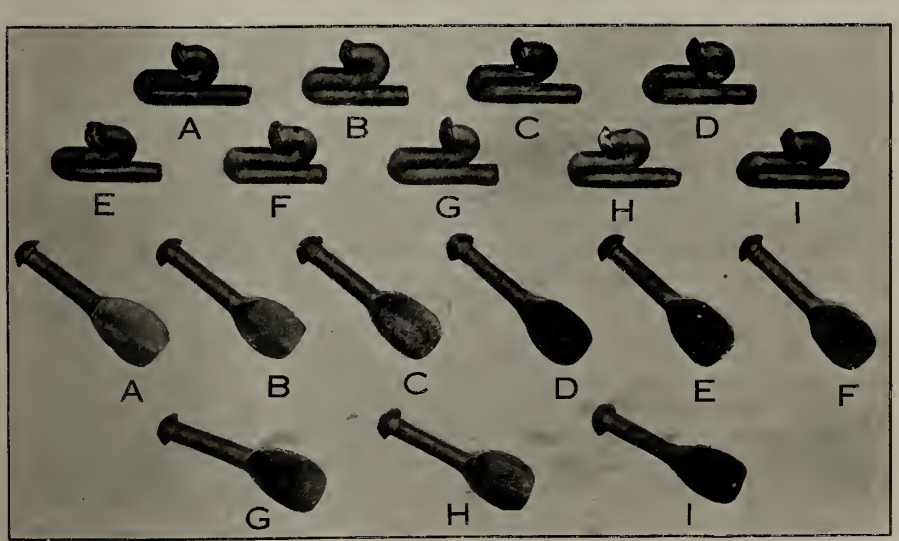


FIG. 2—COLD BEND AND FLATTENING TESTS ON RIVETS
Specimens in upper two rows were bent to try to snap head off. Those in lower two rows were flattened to see if cracks would develop. The phosphorous content of the specimens is as follows: A, 0.032; B, 0.058; C, 0.085; D, 0.115; E, 0.008; F, 0.030; G, 0.052; H, 0.080; I, 0.110.

way only, that the harder the steel, the greater the difficulty in heading the rivet. The flat-head rivet was a severe upsetting operation. It may be called a dynamic upsetting test, and unless the steel is soft, it will not produce a head free from cracks at the edges. The tests on the wire rod and the mill practice on the button-head and flat-head rivets are given in Table VIII on page 1496. For purposes of comparison, a dead-soft basic open-hearth regular steel of about 0.06 per cent carbon was carried along with the experimental steels.

Two sizes of automobile corner panels were made of each grade of steel. For the large size, sheets 35 x 84 inches x 20 gage were used; and for the smaller size, sheets 34 x 48 inches x 20 gage. This operation is severe, and while the results were to some extent erratic, the stiffer or harder steels as a whole gave poorer results than the steels with lower tensile strength, or in other words, the higher phosphorus steels were too hard for the purpose.

Sheets of each grade, 18 gage, were made into cream separator bowls. The process of manufacture consisted of four drawing operations, followed by an annealing and a fifth drawing operation; after which the bowl was hydraulically expanded to shape, edges curled, opening punched for outlet drain, bowls cleaned, pickled and then tinned. The finished bowl is 8 inches deep, 14⅛ inches in diameter at the belly and 12⅜ in diameter at the neck.

The first drawing operation is particularly severe, owing to the size and shape of depression for the outlet drain. Unless the steel is very soft and ductile, it will tear at the deep end of this depression and cause the rejection of the bowl. The higher phosphorus steels were too hard and stiff for this operation, and a number of them failed, particularly the 0.085 and 0.115 per cent phosphorus acid steels. A total of 315 sheets were used, or 35 of each grade, and a total of 194 perfect bowls were made and used in the manufacture of cream separators.

Conclusion

The results of this investigation speak for themselves. None of the steels showed brittleness under cold working, due to the phosphorus. An examination of the results of the various mechanical tests, cold bending of the rivets under a hammer, the severe upsetting in making large headed nails or rivets, or the fabrication of barrels, automobile parts and cream separator bowls indicate nothing more than an increased hardness due to increase in phosphorus. This condition remains the same regardless of whether the force was applied slowly or statically, or if applied by shock or blow.

The results show that in soft steels an increase in phosphorus of 0.01 per cent is equivalent to an increase in tensile strength of about 850 pounds per square inch, which is practically the same as would be obtained by increasing the carbon 0.01 per cent. Hence, higher phosphorus, soft or low-carbon steels can be used for various purposes, provided the carbon content is decreased sufficiently to compensate for the increased hardness due to the phosphorus.

Indians Mined Wyoming Iron Ore

The Sunrise, Wyoming, iron ore mine of the Colorado Fuel & Iron Co., Denver, Colo., was originally discovered by the Indians who operated it as a source of supply for war paint. As the ore they sought was a soft, red oxide of iron, it probably suited the purpose admirably. How long ago the mine was discovered is a question of conjecture, according to the April *Bulletin* of the Colorado company.

Implements discovered in the ancient workings indicate that operations of the aborigines date back to the Stone Age, because stripping and other excavating work has uncovered working places fully 30 feet below the present ground surface. Wash from the surrounding hills has, of course, obliterated all traces of the workings of other days which could not have been disclosed without modern excavating tools and appliances.

Stone implements such as hammers and digging tools, left by these Indians, have been brought to light by modern excavating. Many excellent specimens of arrow heads made of agate and flint have also been found and in the more recent workings, implements of iron and steel. The latter were used by the Sioux, Cheyenne and Arapahoe tribes who inherited the land from their forefathers.

At one time, the property was worked as a copper mine but the results were not satisfactory. In prospecting for copper, however, the fact was established that a large body of bronze hematite iron ore was available.

The Colorado Fuel & Iron Co. secured the property in 1899 and began the development of the iron ore body on a large scale. For many years the mine was worked with steam shovels but at the present time about 75 per cent is obtained by underground mining methods.

How to Mark Express Containers

An announcement of considerable importance to iron and steel shippers has been issued by the Express Tariff association, which is composed of all the large express companies of the United States and Canada, covering new regulations as to the marking of express shipments. These regulations recently became effective, and are designed to eliminate the delay now occasioned by the improper marking of material. It is stated that in the warehouses of New York City alone there are more than 75,000 metal articles which cannot be forwarded due to insufficiently clear marking. The new regulations, as they apply to castings, machine parts, shafting, pipe, rods, bars and other metal articles, follow:

When boxed, barreled, crated or trussed, container must be marked with pen, brush, stencil, waterproof pen, or by label securely attached with glue or equally good adhesive.

When not boxed, barreled, crated or trussed, and there is sufficient smooth surface for the purpose, the address must be plainly marked on the article with durable paint. Such shipments must not be accepted unless marks are thoroughly dry.

When not boxed, barreled, crated or trussed, or when not possible to mark as provided in preceding paragraph, shipments must be marked with not less than two wooden, leather, metal, cloth, rope stock or sulphite fibre-tag-board tags. Rope stock or sulphite fibre-tag-board tags must test not less than 14-point 50-per cent rope, have reinforced metal eyelets and must be attached by wire not less than 23 gage, or strong tarred cord. Tags must be attached wherever possible to unexpected parts of the article in order that they may not become detached in handling.

Rods, shafting, bars, pipe, iron bed slides, automobile springs and other articles of like character marked with tags, as provided in the preceding paragraph, must have the tags securely wired to the article, and in addition, a concealed tag bearing the same address, must be bound to the article with burlap covering, the latter securely wired at each end.

When metal articles are shipped in sacks, the address must be shown on tag conforming to the specifications in paragraph "3", attached either by wire or strong cord, and an additional tag bearing the same address must be enclosed in the sack.

Engineers Grapple War Problems

Spring Meeting American Society of Mechanical Engineers Alive With Important Suggestions and Ideas of Direct War Value—Anti-Efficiency Legislation Denounced—War's Technical Problems Discussed

DAY by day the part played by engineers in the prosecution of the war grows more important. To a large extent this explains the unusually heavy attendance at the spring meeting of the American Society of Mechanical engineers, held at Worcester, Mass., last week from Tuesday, June 4 to Friday, June 7. It was essentially a war meeting. The program was arranged primarily to permit free discussion of war problems and to stimulate action looking to increased effectiveness in the production of necessary war materials. That much-bandied word *nonessential* was scarcely uttered during the 11 sessions. Everyone's mind was focussed on the problems of direct war enterprises. Over 900 members and guests were registered.

Among the speakers were several military authorities, and their viewpoint was admirably summed up by Lieut. Andre Morize, a French veteran, who said: "The man with the rifle and bayonet cannot win the war. It will be won by the technical specialists in and behind the lines who are responsible for the development and maintenance of the huge engines of destruction and complex organization necessary for the success of a modern military campaign. The production, transportation and use of tremendous stores of *material* is the problem of the hour. Men cannot be used to advance against or destroy *material*. It must first be annihilated by superior equipment on the side of the attacking force. The real reason for the recent heavy German advances lies in their development of a method of moving up artillery more efficient than any previously known system, enabling the artillery virtually to keep pace with the infantry."

Down to Work

After the customary addresses of welcome and felicitations at the opening session and reception Tuesday evening, the meeting settled down to work at the first session at Worcester Polytechnic institute on Wednesday morning, June 5. Chas. T. Main, Boston, president of the society, occupied the chair.

Early in the proceedings Alfred D. Flinn, secretary of the engineering council created for war service by the United Engineering Societies, stirred the audience to tremendous applause by citing the effective results secured by the council's subcommittee on industrial affairs in eliminating the anti-efficiency, anti-scientific management riders on the great appropriation bills in congress. A partial victory has already been secured in the case of the naval bill, in which the provisions prohibiting the payment of bonuses or premiums for efficiency have been eliminated, leaving intact, however, the clause forbidding time-studies on government work.

Action Taken

MANY important matters were acted upon at the spring meeting of the American Society of Mechanical Engineers. A proposed amendment to the constitution designed to take the appointment of the nominating committee out of the hands of the president and place it with the voting members was favorably received. It probably will be finally sanctioned at next year's meeting. This amendment marks the culmination of a long agitation to place the control of the society's affairs more directly in the hands of the members. A resolution backing up the engineering council's fight against anti-efficiency riders on congressional appropriation bills was passed unanimously. Assent also was given to a resolution approving the action of the Pennsylvania fuel administrator in forcing coal operators to wash coal at mines before shipment. These resolutions must go before the council of the society for final ratification. The council took steps looking toward the elimination of alien enemies, numbering about 100, from the roster of the society.

Instead of showing a patriotic appreciation of the needs of the day by withdrawing its opposition to scientific management and efficiency in production, Mr. Flinn said the labor lobby in Washington is taking a more reactionary stand than ever. Many congressmen are afraid to take any steps that may be construed as antagonistic to the labor interests, and therefore a hard fight will have to be made to secure the repeal of all the anti-efficiency riders. Mr. Flinn's remarks made such an impression that a resolution introduced by Arthur M. Greene Jr., professor of mechanical engineering, Rensselaer Polytechnic institute, strongly endorsing the action of the engineering council was unanimously passed. The consideration, much less the adoption, of resolutions of this character on the floor of A. S. M. E. meetings is a rare event.

A Message From Belgium

An ovation greeted Prof. O. E. Steels, president of the University of Ghent, Belgium, who spoke on the work of the Belgian commission on industrial rehabilitation of which he is chairman. In perfect English he described the industrial condition of Belgium before the war, sketched the destructive tactics of the Hun and touched on the problems of reconstruction for which the Belgian government is already preparing. Chas. T. Main requested that engineers everywhere co-operate with Dr. Steels by furnishing him with drawings and data covering the layout and construction of industrial establishments of all kinds.

"The Small Industry in a Democracy," an address by Prof. George H. Haynes of Worcester Polytechnic institute, was the feature of the Wednesday morning session. Prof. Haynes approached his subject from the standpoint of an economist trained in the mutual relations of business and government. When our young soldiers return from the front with broadened vision and a keen appreciation of their own powers the demand for more democracy in industry will become overwhelming, Prof. Haynes pointed out. On that day we must be ready to march with the times, nevertheless avoiding the pitfalls and chaos of Bolshevism. The small industry, naturally more democratic than the large one, may in such an event become the bulwark of the nation. Prof. Haynes' address will be published in a later issue of THE IRON TRADE REVIEW.

At the conclusion of the Wednesday morning session warm tributes to the memory of the late Frederick R. Hutton, honorary secretary of the society, were paid by Worcester R. Warner, Warner & Swasey Co., Cleveland, and William Kent, consulting engineer, Montclair, N. J.

Continuing the discussion of war problems Wednesday afternoon with Chas. T. Plunkett, vice president of the society, and president of the Berkshire Cotton Mfg. Co., Adams, Mass.,

in the chair, J. E. Rousmaniere, New York, made an address on "The Textile Industry in Relation to the War," illustrated by numerous samples of war textiles.

Mr. Rousmaniere was followed by John S. Holbrook, Gorham Mfg. Co., Providence, R. I., who spoke on "Converting a Factory for Munitions Work." In normal times the Gorham company specializes on the manufacture of high grade silverware. Within the past three years the works has been greatly enlarged and transformed almost entirely into a munitions factory, working mainly on cartridge cases and other brass ordnance specialties. The plant is now equipped to make 10,000 75-millimeter cartridge cases per day, to machine, assemble and load 100,000 hand grenades per day, together with 15,000 Newton-Stokes trench mortar shells per day and innumerable other products. The transformation has been accomplished, Mr. Holbrook pointed out, largely by building new plants, equipped with new machinery and by training new forces of employes, many of whom are women. The grenade plant, for instance, was placed in operation in 45 days after the ground was broken for the building foundations.

Describes New Process

George I. Rockwood, president, Rockwood Sprinkler Co., Worcester, Mass., discussed Mr. Holbrook's paper and described experiments leading to the invention of a method of drawing a reverse taper on booster or detonator cases for shrapnel and high explosive shells. These cases are 3 inches long and 0.9-inch in diameter, with a screw thread on one end. Unlike a cartridge case which is thick at the base and thin at the lip, with a natural taper from the standpoint of the draw-press expert, the booster cases are thickest at the lip, which carries the thread and thin at the base, or cupped end. The French have never succeeded in drawing these cases successfully, and today they draw them with parallel sides and turn down the outside to obtain the requisite taper. By the invention of the Rockwood Sprinkler Co. reverse taper cases are drawn smoothly and accurately in an ordinary press. This is accomplished by using a punch too small for the die. At the end of the first operation the taper is irregular the metal being bunched in five places corresponding to the first five drafts. A straight taper is produced by finishing with a punch itself provided with a reverse taper, that is, larger in diameter at the lower than at the upper end. It was found necessary to use talcum powder in addition to the usual tallow for lubricating the dies.

At the general war session Wednesday evening, C. E. Parsons, paymaster, United States navy, described the purchasing methods of the navy department, emphasizing that it is the desire of the department to deal with manufacturers on a co-operative basis instead of antagonisticly. "We realize," he said, "that the navy is the servant of the people and we believe the best results can be secured by taking manufacturers into our confidence. We give particular attention to the routine of our purchasing system to the end that manufacturers may be paid promptly. We believe in doing business on a business basis, and I am glad to say that at present the average time for the payment of our accounts, after goods are accepted and bills rendered, is seven days."

A Silversmith's Bit

A GLIMPSE of the tremendous war preparations of the United States and its allies, as well as a pointed lesson for manufacturers of nonessentials, was contained in an address by John S. Holbrook of the Gorham Mfg. Co. In the fine tableware and jewelry trade the Gorham company's name stands high among producers of expensive and artistic luxuries. In the munitions field it is rapidly assuming an equal prominence. Today this firm of silversmiths is making 10,000 75-millimeter cartridge cases every 10 hours, together with a daily production of 100,000 loaded hand grenades, 2500 naval 4-inch cartridge cases, 15,000 Newton-Stokes trench mortar shells and innumerable small-arms cartridge cases. Since March 1, 1917 the company has made or has on order, 6,600,000 brass and gilding-metal light arms cups; 275,000,000 brass and cupro-nickel cups (for Italy); 600,000 U. S. navy landing-gun casings; 3,875,000 75-millimeter American type cartridge cases; 600,000 4-inch naval gun cartridge cases; 9,000,000 hand grenades; 750,000 trench-mortar bombs; 1500 75-millimeter gun sleeves and 5000 airplane bombing sights. Numerous naval gun plotting boards and fine nautical instruments also are manufactured. To accomplish these results the Gorham Mfg. Co. has invested millions of additional capital and greatly enlarged its plant facilities at the same time applying the peculiar skill of its highly trained metal and jewelry workers to direct war production.

Again at Thursday's sessions, war problems occupied the center of the stage. Special interest was manifested in the session on emergency technical war training held at Worcester Polytechnic institute Thursday morning. Dean Chas. H. Benjamin, Purdue university, Layfayette, Ind., presided. The remarks of Lieut. Andre Morize of the French army already have been quoted in part. Lieut. Morize was preceeded by Maj. James E. Cassidy, U. S. R., engineer corps, who emphasized the necessity for the emergency technical training of tens of thousands of men for service in the army and in war industries. He cited lack of trained men as one of the reasons for the slow development of airplane production. He said there is room for men of all degrees of technical experience. Entirely new instruments of warfare must be developed and manufactured in huge quantities, he declared, adding that right now there is a crying need for a lighter and more mobile field gun of about 2¾-inch calibre. Tank construction also is pressing.

Urges Complete Training

Arthur L. Williston, principal of Wentworth institute, Boston, and educational director for New England, committee on education and special training, war department, urged that on account of the shortage of shipping, men be trained as completely as possible in this country, so they may go immediately into active service upon arriving in France. Mr. Williston said that 90,000 men are now being given special technical war training in American colleges and that 40,000 more soon will be added.

Through the courtesy of Maj. Frank B. Gilbreth, now at Fort Sill, Okla., moving pictures of the construction and operation of the heavy Browning machine gun were shown. In a preliminary announcement by Mrs. Gilbreth, who has been closely associated with her husband in the development of motion pictures for technical and industrial training, it was stated that the general staff is now engaged in making a large series of films which will show the methods of making and using practically all kinds of ordnance material.

Closely related to the problem of stimulating direct war production was the special fuel session Thursday morning at which Prof. L. P. Breckenridge, Sheffield Scientific school, Yale university, New Haven, Conn., presided. The proceedings were opened by a paper on the fuel problem in the middle west by A. A. Potter, University of Kansas. This was followed by a topical discussion on fuel economy, at which over 60 written discussions were submitted. The necessity for increased coal production, and for economy in consumption through improvements in boiler efficiency and in the transmission and use of power, was given special stress. These discussion

will be summarized in a later issue of THE IRON TRADE REVIEW. A resolution was adopted approving of the stand of the fuel administrator of Pennsylvania in insisting on having coal washed before shipment. It is pointed out in the resolution that great waste both in railway facilities and boiler capacity results from shipping unwashed coal containing large amounts of noncombustible matter.

At the general session Wednesday afternoon at which Prof. Arthur M. Greene Jr., Rensselaer Polytechnic institute, Troy, N. Y., presided, a paper by Prof. William W. Bird, Worcester Polytechnic institute, on "A Foundry Cost and Accounting System," was rather severely criticized. Written discussions were presented by Benjamin D. Fuller, superintendent, Cleveland plant, Westinghouse Electric & Mfg. Co. and president, American Foundrymen's association; Robert E. Newcomb, superintendent, Deane works, Worthington Pump & Machinery Corp., Holyoke, Mass.; Robert S. Dunham and J. M. J. House. It was pointed out that while what Professor Bird had written might be applicable to a small foundry, it would hardly do in larger organizations. Dr. Richard Moldenke, Watchung, N. J., and William Kent, consulting engineer, Montclair, N. J., also contributed to the discussion.

Following Professor Bird's paper and its discussion was one by Morris L. Cooke, engineer, Philadelphia, on engineering ethics. This paper in brief contains a demand for a new code of ethics for the mechanical engineering profession, with special regard to the public interest. Mr. Cooke declared that while the first consideration of the engineer should be the interests of his employer or client, there are other interests no less important and he said engineers should take the same attitude toward the public as the medical profession. The discussion of the paper was almost unanimously in favor of the desire expressed by Mr. Cooke for a code that would obviate the unethical and questionable. Discussions were presented by Robert J. Hearne, secretary-treasurer, Durbrow & Hearne Mfg. Co., 12 Wooster street, New York City; Oberlin Smith, past president A. S. M. E., and president, Ferracute Machine Co., Bridgeton, N. J.; Thomas M. Roberts, bureau of yards and docks, Washington, D. C.; Augustus F. Nichols; Fred J. Miller, formerly general factory manager, Remington Typewriter Co. and now in the army; Richard A. Feiss, general manager, Joseph & Feiss Mfg. Co., Cleveland; Charles M. Horton, Hadley, N. Y.; C. Wellington Coiner; and John B. Mayo, engineer, Electric Boat Co., Groton, Conn.

The attention of the meeting was directed by Secretary Rice to the fact that Isham Randolph is now engaged on a code of ethics for the American Society of Civil Engineers, and it was voted that the secretary of the A. S. M. E. write Mr. Randolph of what the latter society proposes in the way of raising its ethical standards.

During the three days' professional sessions a large number of purely technical papers were read. In most cases the discussions were limited. Several of these papers have been published in recent issues of THE IRON TRADE REVIEW, including the following: "Efficiency of Gear Drives," by C. M. Allen and F. W. Roys; "Stresses in Machines When Starting or Stopping," by F. Hymans; and "A High Speed Air and Gas Washer," by Lieut. John L. Alden.

Reports were presented by the committees on screw thread tolerances, steel roller chains and weights and measures. The latter embodied a summary of the questionnaire of the American Institute of Weights and Measures on the use of the metric system in export trade. This feature of the report, which upheld the existing English system, was vigorously attacked, chiefly by C. A. Briggs, associate physicist, bureau of standards, Washington. Dr. Briggs questioned the fairness of the report.

The Worcester local committee supplied a delightful entertainment program. Numerous plant inspections were scheduled. Luncheon was served at Worcester Polytechnic institute on Wednesday and at the plant of the Norton Co. on Thursday. Dinners were given Wednesday evening at the Bancroft hotel and Thursday at the Worcester Country club. The latter function was followed by a lawn party. Special excursions were provided for the ladies during the meeting. Friday was devoted to an all day automobile trip through eastern Massachusetts, including Camp Devens and the Wayside inn.

Speakers Bring War Near

On June 12, at the Allyn house, Hartford, Conn., the regular monthly meeting of the New England Foundrymen's association was held. At 3:15 p. m., after a buffet luncheon was served at the Allyn house, automobiles took those in attendance on a tour about the city and returned for the dinner which was served at 6:30 p. m. The war was the theme of both speakers of the evening, Lieut. J. W. Norsworthy, of the 73rd Royal Highlanders, the famous "black watch" Canadian regiment, and Sergeant Nelson Byrne of the 20th Royal Huzzars of England. They related a number of interesting anecdotes with the recital of their experiences while in the service.

25,000,000 Tons

Of Merchant Ships Are Predicted By Chairman Hurley By 1920

After an expenditure of $5,000,000,000, required to finish the shipping program for 1918, 1919 and 1920, America will have a merchant fleet aggregating 25,000,000 tons. This is one of the outstanding features of an address delivered by Chairman E. N. Hurley of the United States shipping board at South Bend, Ind., June 10, where he addressed the graduating class of Notre Dame university. "Our program," he said, "calls for the building of 1856 passenger, cargo, refrigerator ships and tankers, ranging from 5000 to 12,000 tons each, with an aggregate deadweight tonnage of 13,000,000. We are also contracting for 200 wooden and 50 concrete barges, 100 concrete oil-carrying barges and 150 steel, wood and concrete tugs of 1000 horsepower for ocean and harbor service which aggregate a total deadweight tonnage of 850,000. Exclusive of these, we have 245 commandeered vessels, taken over from foreign and domestic owners which are being completed by the Emergency Fleet corporation. These average 7000 tons each, which means a total deadweight tonnage of 1,715,000. This means a total of 2101 vessels exclusive of tugs and barges which are being built and will be put on the seas by the Emergency Fleet corporation in carrying out its present program, with an aggregate deadweight tonnage of 14,715,000."

Chairman Hurley give the workmen due credit for their part in what has been accomplished. He said: "American workmen have made the expansion of recent months possible and they will make possible the successful conclusion of the entire program. On July 1, 1917, there were less than 45,000 men engaged in shipbuilding yards. Today, a force of 300,000 men is employed and 250,000 men are engaged in allied trades and this force will be continuously increased. From present indications the probabilities are that by 1920, nearly 1,000,000 men will be at work."

While in 1919 the output will exceed 3,000,000 deadweight tons, Mr. Hurley said, 1919's output with the new yard capacity would exceed 13,500,000 deadweight tons, with the new capacity. This will be more than Great Britain, heretofore the greatest builder of ships, has completed in any five years of her history. "We have 819 shipways in the United States," said Mr. Hurley, "and of these, a total of 751, all but 90 of which are completed, are being utilized by the Emergency Fleet corporation to build American ships."

West Still Speeding Up Ship Work

Skinner & Eddy Corp. Increases Capacity to Accommodate New Government Orders —Additional Shipyards Near Completion in Northwest—General Industry Stimulated to High Degree by Demands of Vessel Construction

(Staff Correspondence)

SEATTLE, Wash., June 8.—Industry in the Pacific northwest is being frequently accelerated by movements tending to speed up the production of ships. The most noteworthy event of this nature took place at Seattle recently when a contract for additional steel ships said to approximate $100,000,000 was awarded to the Skinner & Eddy Corp., bringing the total shipbuilding contracts in this city alone up to $250,000,000. This yard is leading the country in the delivery of ships and also all yards in the driving of rivets. The closing of this contract by the Emergency Fleet corporation follows the consummation of two important events which have a direct bearing on it. The Emergency Fleet corporation some days ago purchased the plant of the Seattle Construction & Dry Dock Co., the latter retaining its ship repair plant which it will move to another site. Following this the Skinner & Eddy Corp. leased the yard of the Seattle Construction & Dry Dock Co., and these two plants will be utilized in handling the $100,000,000 order just placed. The two yards adjoin each other and have a combined area of 55 acres. Both have been working at top speed to turn out steel vessels for the government and have payrolls approximating 6000 respectively.

Ship Contracts Numerous

This with other orders placed recently throughout the territory mean the stabilization of industry and the steady employment of large numbers of men for considerable time to come. The Standifer yards at Vancouver, Wash., at which ten 9500-ton steel ships will be constructed are well on the way to completion. The Northwest Steel Co., Portland, a short time ago was awarded a contract for eight 8800-ton steel ships and the Columbia River Shipbuilding Co., at that place, has large orders of a similar nature. The Albina Engine & Macine Works in that city also is very active. The Foundation Co., at Tacoma, Wash., is extending its yards for steel ship construction. A short time ago J. F. Duthie & Co., Seattle, were awarded a contract for ten 8800 ton steel vessels for the Emergency Fleet corporation. While the shipyards of J. Coughlan & Sons, at Vancouver, B. C., which have an extensive contract for constructing steel ships for the British government were put out of commission for the time being and suffered a loss of $1,500,000 to $2,000,000 by fire, they are to be reconstructed at once and the work of turning out ships is to be speeded up. The West Coast Shipbuilding Co., Everett, Wash., which proposes to construct concrete ships is making progress with its plans and contemplates having extensive work under way in a short time for private interests. A number of 7500-ton cargo vessels, barges and ocean-going tugs are included in the list. I. W. Hubbard, engineer division of shipyards and plants of the Emergency Fleet corporation is visiting various points in the northwest looking into the possibility of concrete shipbuilding plants in the section.

Another thing which makes for stability is the fact that the shipping board is pursuing a liberal policy in the matter of wooden ships and has decided to award contracts for 200 additional vessels of this kind. It is expected that fully half of this lot will be directed to Washington and Oregon yards. The northwest has many of these yards, all of which are turning out ships in the speediest manner possible. The materials are near at hand and climatic conditions are such that work can be carried on at all seasons. This is also destined to have a good effect on the lumbering industry, one of the chief assets of the Pacific northwest.

This activity is having the effect of causing an upward trend to those industries which have to do with supplying materials for ship construction. Many new concerns are being formed locally and others from the east are establishing offices or branches in the field. The Liberty Steel Products Co., of New York, has established offices at Seattle. Vice President A. H. Dillon, of this company, states that the local demands for steel products, ship, railroad and mill supplies is such that the opening of offices to handle the volume of business was imperative.

In the matter of the proposed $25,000,000 steel plant to be erected on Puget sound by B. L. Thane, manager of the Alaska-Gastineau Mining Co., of Juneau and others, the latter announced, when in Seattle recently, on his way to New York, that plans for the new plant are materializing satisfactorily. He said announcement of details and time of beginning construction may be expected within the next 30 days.

To Make Steel Castings

Denoting the growth of industry and increasing demand for foundry products, is the announcement of the Everett Steel Co., Everett, Wash., headed by T. B. Sumner, of the Sumner Iron Works in that city, for the purpose of making steel castings. A building, 70 x 100 feet, is to be erected. The Liberty Foundry, Inc., has been organized at Portland by William Cornfoot and others with a capital of $50,000 and building for plant has been leased. The American Foundry Co. has been organized at Seattle by Sumner K. Prescott, E. L. Prescott and others with offices at 408 Occidental avenue. A site 150 x 180 feet has been leased and a 15-ton gray iron foundry will be installed. Much of the equipment has been ordered from the Whiting Foundry & Equipment Co., and the balance will be procured locally. Frank Waterhouse & Co., shippers, of Seattle, have purchased the plant of the Vulcan Mfg. Co., in that city, which engaged in the manufacture of structural steel, iron and steel castings, engine parts, cylinder heads and other appliances for the shipyards. Considerable sums of money will be spent in making additions to the plant's equipment. The blast furnace of the Washington Steel & Iron Co., at Sedro Woolley, Wash., has been completed and operations started. It has a capacity of 60 tons per day. Extensive orders for Scotch marine boilers are being filled by the Willamette Iron & Steel Works, at Portland. The Wright Steel Foundry Co. has been incorporated at Seattle by E. E. Hinsdale, Charles Stewart and Ruby E. Wright, with a capital stock of $100,000. E. E. Hinsdale, who has been secretary of the Aurora foundry in Seattle, has sev-

ered his connection with that concern and has become secretary and treasurer of the new company. Option has been taken on a site and it is expected that work will be started in the near future on construction of a 70 x 100-foot steel foundry. The initial installation will be a 3 or 5-ton electric furnace with a 15-ton daily output.

One of the larger companies coming into the field which will manufacture extensively for shipping interests is the Gulowsen-Grei Engine Co., incorporated for $560,000 and which has started construction of a plant on Salmon bay at Seattle to cost $400,000. Large foundry building warehouses and assembly building will be erected. The engine to be made is a crude oil internal-combustion engine suitable for use in the larger ships turned out on Puget sound.

Small Bars Active

While there is some difficulty on the point of obtaining licenses for export, there has been considerable activity at Seattle in steel bars of certain sizes for export. Where a mill can roll bars of a certain size it is assumed that the plant will be utilized for rolling shell rounds. There has been no difficulty in securing licenses for bars under 2½ inches. These bars are in the main for shipment to Japan and considerable tonnage has been moving at 3.95c, Seattle. There has been a fair demand for light rails for export especially 12 pounds and it has been hard to obtain them for quick delivery. Some 20-pound rails also have been sold. One order recently placed was for 250 tons at $70, mill. These were for Japan. The freight to Seattle was 45 cents per 100 pounds. Export licenses for rails to date have been very easy to obtain.

One Seattle concern reports sale of 1000 tons of structural material for export during April at 5c, Pittsburgh, plus the freight of 45 cents per 100 pounds. In boiler plates there was little activity, the price being considered prohibitive for the local consumer, if he does not have government work on hand.

No. 1 pig iron is quoted at $50, Seattle, and very hard to get, practically all of the furnaces having withdrawn their quotations. There is a limited amount of No. 3 at $48. Delivery of pig iron is one of the problems in the Puget sound section, deliveries being about 40 per cent short. The situation is not as serious however as might have been because heavy shipments were received by the foundries in March. The future, however, is causing uneasiness. Labor shortage in the east and the demands of numerous new foundries starting in the northwest tend to aggravate the situation. Another reason for the shortage is the fact that 1000 tons were purchased for the first half from the Rome, Ga., furnace, but this stack was banked for three months due to shortage of coke. This furnace is to start up again in about three weeks.

Difficulty is still being experienced in securing coke from the east. The government is very strict about loading the cars to capacity. The fact that the local supply of fuel has so greatly improved in quality that the foundries could with one or two exceptions, get along without eastern coke is of great importance to consumers. There is an ample supply of the local product. It is only in case of one or two of the foundries that run unusually large heats where eastern coke is found absolutely essential.

Cast iron pipe remains the same as it has been for some time, $64 a ton at Seattle, which includes $19 freight. There is a heavy demand for brass and copper tubes from all the shipyards. As the output of brass and copper tube shops has been practically taken over by the government, very few quotations are being made for outside work at the price of 37 cents per pound. An attempt is being made to take care of some regular customers outside of the government.

During the past month there has been no material change in the price of steel scrap at Seattle. The prevailing price is $27.50. Some sales have been made at $30 recorded and $25 is the figure at which some has been under contract for considerable time.

A month ago prices of steel castings ranged from 10 to 45 cents per pound depending on the nature of the casting. Recently prices have become somewhat unsettled and are running slightly above these figures. The application of the government prices to local conditions has not been fully worked out as yet. On account of increased freight rates and rising cost of labor, Pacific coast foundrymen are finding it rather difficut to meet the government prices. The situation with iron foundries is also uncertain in some respects, owing to the fluctuations of the scrap market. As high as $37 is being paid for cast scrap. Some sellers are asking as high as $40, and the threat is still being made to take the scrap to Portland and San Francisco. There is a slight upward trend in the price of iron castings over that of 7 to 8 cents prevailing a month ago which can be attributed to increase in wages and in general costs.

A shortage of common labor and helpers is reported at Seattle. The city is paying $4 for common labor, the rate prevailing in the yards and shops. The city's payroll is rather extensive and many are being attracted to it. Aside from this, new factories and foundries are being added, making further demands on man power. The situation is steadily growing more acute.

Reduced Prices

In Magnesite Brick Caused by Increased Supply—Other Grades Unchanged

Pittsburgh, June 11.—Increased supplies are responsible for the reduction in the price of magnesite brick, which now is quoted at $110 to $130 per 1000, f. o. b. works, for 9x4½x2½-inch size, depending upon the quantities involved. Some transactions at these prices have taken place during the past week in this district. Inquiry for this grade is only fairly active. First quality fire clay brick still is in strong demand for blast, open hearth and heating furnaces and soaking pits. Producers say they are able to take care of requirements, the production being about on an even keel with inquiries and satisfactory deliveries are being made. Prices remain unchanged, Pennsylvania first quality being quoted at $45 to $55 per 1000, f. o. b. works. Fair demand also exists for second quality fire brick.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.

(First Quality)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK

(Second Quality)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESITE BRICK

(Per Net Ton)

9 x 4½ x 2½	$110.00 to 130.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK

(Per Net Ton)

55 per cent	$40.00 base
76 per cent	100.00 base

Steel Exports Show Better Shipping

April Tonnage Considerably Over February and March—Semifinished Shipments Are Running Heavy—Scrap Exports Completely Disappear Reflecting Domestic Shortage—General Iron and Steel Imports Are Negligible

RECENT improvement in shipping facilities is reflected in the report of iron and steel exports for the month of April, which has just been issued by the bureau of foreign and domestic commerce. In that month, 462,887 tons of iron and steel products were shipped from this country. While the total is somewhat below the average of the past 12 months, being 54,896 tons less than the figure for April, 1917, it shows an increase of 82,963 tons compared with March shipments of 379,924 tons, and is 24,039 tons greater than the February total of 438,848 tons. The increased tonnage is covered entirely by such commodities as are being used by our allies in prosecuting the war.

IMPORTS AND EXPORTS, GROSS TONS

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,949
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,885	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,219
December	44,134	580,988
1917		
January	40,910	608,281
February	24,947	449,099
March	37,943	606,559
April	48,213	519,397
May	26,013	588,514
June	28,419	614,600
July	28,859	357,776
August	22,635	519,518
September	20,196	482,311
October	14,225	557,138
November	13,995	473,549
December	13,769	654,867
1918		
January	12,875	495,057
February	12,941	438,848
March	14,345	379,924
April	11,371	462,887

IRON AND STEEL IMPORTS

	April 1918	April 1917	Ten months ending April 1918	Ten months ending April 1917
Pig iron	3,125	8,771	45,173	107,445
Scrap	3,499	34,681	59,073	191,864
Bar iron	22	60	2,321	4,208
Ingots, blooms and billets	2,772	3,930	39,735	19,431
Structural shapes	157	63	6,879	793
Rails	374	577	7,985	11,606
Sheets and plates	44	97	1,961	1,482
Tin and terne plate	.....	34	32	608
Tin scrap	792	348	6,887	6,333
Wire rods	586	.....	3,464	2,063
Total	11,371	48,561	173,510	345,833

Shipments of steel ingots, billets and blooms increased appreciably in April, with a total of 177,128 tons, a gain of 32,685 tons compared with the March, 1918, total of 144,443 tons, and 16,163 tons more than the April, 1917, total of 160,695 tons. Sheet and plate exports amounted to 61,508 tons, compared with 51,503 tons in March, and 69,258 tons in April a year ago. Steel bar exports also increased from 48,135 tons in March, to 60,477 tons in April. Pig iron shows a slight increase over March, but is only about one-fourth of the figure for the corresponding month of last year. Other products showing an increase in April, compared with March, are wire rods, steel rails and barbed wire.

IRON AND STEEL EXPORTS, GROSS TONS

	April 1918	April 1917	Ten months ending April 1918	Ten months ending April 1917
Scrap	13,166	21,826	216,727	
Pig iron	11,282	44,783	331,378	690,412
Steel billets, ingots and blooms	177,128	160,965	1,678,620	1,575,961
Wire rods	18,952	11,834	168,031	114,463
Steel rails	39,463	35,061	353,450	510,727
Steel bars	60,477	73,227	530,142	635,186
Iron bars	3,273	3,467	41,877	50,843
Struc. iron and steel	18,169	26,434	209,389	285,210
Hoops, bands and scroll	4,499	3,471	51,101	35,808
Sheets and plates	61,508	69,258	640,426	511,362
Tin and terne plate	24,235	19,958	183,467	184,226
Barbed wire	12,509	13,798	143,442	277,322
All other wire	12,219	16,453	146,382	200,572
Cut nails	678	318	4,204	3,878
Wire nails	6,074	6,999	97,182	104,722
All other nails incl. tacks	556	1,810	11,259	15,221
Pipes and fittings	9,120	11,931	151,474	202,878
R. R. spikes	471	813	12,526	15,501
Bolts, nuts, rivets and washers	1,868	2,119	25,612	24,529
Horseshoes	252	460	8,357	3,704
Cast radiators	154	458	2,492	3,225
Total	462,887	517,783	4,812,637	5,662,477

A remarkable feature of the April report is that not a ton of scrap was exported from the United States during that month. For some time past, scrap exports have been rapidly falling off, so that the total for the 10-month period ending April, 1918, amounted to only 21,826 tons, or a little more than one-tenth of the total of 216,727 tons for a similar period in 1917. In March these shipments amounted to only 307 tons, but in April, 1917, the tonnage was 13,166. This decrease in scrap exports can no doubt be attributed to the fact the domestic supply of this material is short and during the past few months a very small quantity has been imported. In April only 3499 tons of scrap were shipped into the United States, compared with a total of 34,681 tons for April, 1917.

The tonnage of all iron and steel imports for the month of April was so small as to be almost negligible. A comparison of the April total of 11,371 tons with the March figure of 14,345 tons does not indicate the rapid decline which has taken place in imports of iron and steel products. The figures for the 10-month period, however, give a total for 1917 of only 173,510 tons, which is about half the total of 345,833 tons for a similar period in 1918. All of the important products show a loss in April, compared with March.

EXPORTS, GROSS TONS

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	163,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555
1918		
Jan.	20,581	195,385
Feb.	10,540	173,272
Mar.	9,849	144,443
Apr.	11,282	177,128

Following the improvement in March, April iron ore imports again show a substantial increase. In that month, 75,114 tons of iron ore were received in the United States, which is well over the April, 1917, figure of 58,878 tons, and also exceeds the total for March, 1918, of 65,372 tons. Almost the entire tonnage, or 63,950 tons, were received from Cuba.

IRON ORE IMPORTS, GROSS TONS

	April 1918	April 1917	Ten months ending April 1918	Ten months ending April 1917
Spain	.....	24,943	26,093	199,582
Sweden	.....	1,022	17,718	128,358
Canada	1,164	128	160,203	88,999
Cuba	73,950	31,625	498,107	551,545
Oth. countries	.....	1,160	1,634	60,994
Total	75,114	58,878	703,755	1,029,478

Tools Will Win The War

—HENRY FORD

DETROIT, Mich., June 10.—This war is the greatest engineering feat the world has ever known and tool power will win it, in the opinion of Henry Ford. He says:

"The United States produces half the steel and coal of the world. Converted into machinery of warfare this would be decisive on the west front.

"Russia, with man-power of 185,000,000, was almost entirely lacking in machine-power. She mobilized 15,000,000 men, but she sent them into battle poorly equipped, armed with obsolete rifles, small-caliber guns, and in many cases only with clubs. This poorly equipped and poorly armed army was pitted against the vastly superior rifles, machine guns, and large-caliber cannon which were turned out in vast quantities by great factories and a highly organized railroad system in Germany.

"Russia lost 5,000,000 men and her power collapsed.

"The lesson for us is that not numbers nor latent resources, but better machinery and better organization are decisive in warfare.

Machines to Wreck Trenches

"Trenches can be conquered and the stalemate of the west front broken if we develop and use the right machinery. For a long time in the Middle Ages castles were impregnable when men attacked them with spears and catapults, but they fell easily to the new tools using gunpowder. To me it seems out of place to send men with bare bodies and rifles against trenches of concrete fortified with barbed wire, machine guns, and cannon.

"A small tank can be made for attack that will carry two men and a machine gun with armor protection strong enough to resist the hail of machine-gun bullets and shrapnel splinters. Such tanks, if standardized to one model, could be made in three months. Distributed equally along the west front, this would place one tank every 18 feet. In each tank two men shielded by armor-plate with a machine gun would have the offensive power of 50 soldiers with rifles. That advantage would come from possession of the better piece of fighting machinery. Soldiers would stand in line to have a chance to attack in such outfits.

"In our food problems also we have failed to realize that the solution lies in the increase of tool-power on the land. The farms of England, France and America have been drained of their men, first to fill the armies, then to fill the munition factories, so that today food production lags. For three decades men have been leaving the farm to get to the easier work of the factories and on railroads where engine power has removed the drudgery of heavy muscular labor. The curse of Adam to "labor in the sweat of the brow" still rests upon farm workers. It remains for America to carry engine power to agriculture. Until 1850 harvesting and threshing were done by human muscles using sickle, scythe and flail. Then America invented the binder and harvesting machine and shifted these two tasks to the animal. Today America must substitute engine power for human and animal muscles on all kinds of farm work."

Light Army Trucks Placed

The motor transport service is placing orders for 8000 motor trucks designated as Class B Standard for army service. These trucks which will have a capacity of from 3 to 5 tons will be assembled, only, working parts having previously been ordered. Sixteen companies are expected to share this order, 15 having already contracted for a number of the trucks. The latter are: Gramm-Bernstein Motor Truck Co., Lima, O.; Kelly-Springfield Motor Truck Co., Springfield, O.; Indiana Truck Corp., Marion, Ind.; Service Motor Truck Co., Wabash, Ind.; Republic Motor Truck Co., Alma, Mich.; Selden Truck Co., Rochester, N. Y.; Bethlehem Motor Corp., Allentown, Pa.; Diamond T. Motor Co., Chicago; United States Motor Truck Co., Cincinnati; Brockway Motor Truck Co., Cortland, N. Y.; Healy Motor Corp., Moline Ill.; Sterling Motor Truck Co., Milwaukee; Garford Motor Truck Co., Lima, O.; Packard Motor Truck Co., Detroit; and Hurlbert Motor Truck Co., New York. The contract price for assembling will be $567 per truck, and delivery is to be made betwen Aug. 1 and Dec. 1.

Engineers Expel Aliens

By resolution the board of directors of the American Institute of Mining Engineers, at a recent meeting in New York City, dropped from the roll the names of all enemy aliens living in enemy countries. Enemy alien members of the organization outside of enemy territory will be called upon to explain their attitude toward the government. Upon the ascertainment of such attitude, the directors will consider and act upon each individual case.

This action, according to Bradley Stoughton, secretary of the institute, immediately affects the status of 21 German scientists and one Austrian professor, who held either honorary or active membership in the organization. Mr. Stoughton said that among the many who have been exceedingly active in furthering Germany's war aims through scientific invention or research are Prof. B. Draeger of Luebeck, who invented the German gas mask. Before the war, he was one of Germany's leading mining engineers and perfected a steel helmet for miners, which was later modified for soldiers. Prof. L. Edeleanau, a Prussian authority on petroleum; H. C. Emil Schroedter, Dusseldorf, secretary of the German Society of Iron and Steel Makers; Walter Mathesius, copper expert, Charlottenburg, Germany; Dr. W. Oswald, leading German chemist of Coblentz, also are among those expelled from this society.

Form New Coal Company

To develop a new coal field in Garrett county, near Oakland, Md., at Offutt station on the main line of the Baltimore & Ohio railroad, the Taylor-Offutt Coal Co., 300 Chestnut street, Philadelphia, with branch office at Oakland, has been incorporated under the laws of Maryland. The company will operate under a lease from the Offutt estate, which owns the property. It is expected that coal will be mined from a 4-foot Freeport seam about Aug. 1, and the entire output will be consumed by the N. & G. Taylor Co., in the manufacture of high grade steel and tin plate at Cumberland, Md. Officers of the company follow: President, Hollinshead N. Taylor, of N. & G. Taylor Co., Philadelphia; vice president, William R. Offutt, Oakland, Md.; secretary, Julius C. Renninger, Oakland, Md., and treasurer, Wm. W. Justic, N. & G. Taylor Co., Philadelphia. N. Allen Stockton, consulting mining engineer, Real Estate Trust building, Philadelphna, is in charge of the development of the property.

Lukens Buys Land

The Lukens Steel Co., Coatesville, Pa., has purchased the 533-acre farm of Charles L. Huston, on the Delaware river between Wilmington and New Castle. The company already owns a tract close by.

Nation Supplies Essential Workmen

United States Employment Service With 340 Branch Offices Will Withdraw Men From Nonwar Industries to Supply Demands for Approximately 4,000,000 Essential Workers—Demand Heavy for Machinists and Toolmakers

CIRCULATED to inspire a more complete co-operation between industry and the United States Employment Service, Director General John B. Densmore has issued a call to all commercial organizations and employers of the country in an effort to meet the increasing pressure of the labor demands. As pointed out by Mr. Densmore, the great need is for publicity to assist his department in its work of finding new workers and withdrawing mechanics from nonessential enterprises. Since January of this year, the United States Employment Service is a separate branch of the department of labor and branch offices have been opened in nearly all large cities of each state. It is now the nation's central machine for recruiting and distributing labor.

In five months, 340 branch offices have been established in the industrial and agricultural districts, linking up all state and municipal services. It now is placing between 150,000 and 175,000 workers of all kinds each month. A large corps of traveling examiners is maintained whose specialty is placement, putting the men in their rightful places. An agreement has been reached with the post office department whereby all third and fourth class postmasters and rural carriers, numbering 100,000, approximately, are authorized to act as labor agents of the employment service.

Country Has Thirteen Districts

Similar to the federal reserve banking system the country has been divided into 13 districts, each of which has a superintendent. Each state is in charge of a federal state director, appointed only after recommendation by the state council of national defense and employers as well as employes in his respective state. State directors have charge of the federated offices and labor clearances in the state, while district superintendents have general supervision over the states within their districts and clearances between those states.

William E. Hall, Washington, is national director of the recruiting division of the employment service which is known as the public service reserve. It has approximately 20,000 enrollment agents who bring the potential war workers of the farming and industrial communities into direct contact with the national office at Washington.

Various war industries, including agriculture, will require over 4,000,000 workers during the next 12 months. It becomes the duty of the United States Employment Service, with its nation-wide recruiting machinery, to find these men and place them. Common labor demands for construction work are heaviest and next requirement is for machinists and toolmakers. To supply these demands, workmen are to be withdrawn from nonessential industries with a minimum of hardship, without wasting the effort of one man.

As an instance of the withdrawal of men from nonessential to place them in essential work, the American Chain Co., Bridgeport, Conn., is one of the first industries in the east to release or loan a number of its employes to a factory that is engaged in war work. It has loaned about 300 of its employes to the Remington Arms-Union Metallic Cartridge Co., Inc., in the same city. A plan has been devised in that state whereby idle or partially idle factories shall loan their men to essential plants, and when the pressing need for this extra labor is over they are to go back to the plants where they worked originally.

In addition to supplying workmen, the employment service is a clearing house of information for manufacturers. Its inquiry and education section, in charge of Roger W. Babson, the statistician, will answer inquiries on any phase of the labor problem. After and during the war, when soldiers return to this country and places must be found for them in industry, the employment service and public service reserve will have charge of the work.

Increase Will be Asked

Early reports stated no change in base wage rates for the ensuing year would be asked by the Amalgamated Association of Iron, Steel and Tin Workers, but official reports of the forty-third convention held recently at Joliet, Ill., indicate that delegates to the conference with manufacturers in Atlantic City, commencing June 17, will ask a 10 per cent increase for tin mill heaters, 10 per cent for doublers and 6 2/3 per cent for shearmen. Another demand scheduled is that tin workers shall be paid every alternating Saturday. A new scale for all tin house workers will be recommended for consideration by the conference. This association has approved a resolution to the effect that any member affiliated in any way with the Industrial Workers of the World shall immediately terminate such connection or be expelled from the Amalgamated association.

Railroad Turnover Large

To ascertain its labor turnover as well as the extent to which women are replacing men, the Pennsylvania railroad kept a record from May 27 to June 5 on all divisions of the lines east of Pittsburgh. In that 10-day period, 4477 employes left the company's service and 5122 were hired. The net gain of 645 occurred in the last two days of the period and was entirely sporadic. The figures relate to divisional forces only and exclude the forces in the general offices. In that time the number of women employed had increased from 5682 to 7227, all of which indicates a gain of 1545 women workers and a loss of 900 male employes. Since the total divisional forces recently have been averaging between 148,000 and 150,000, this 10-day test indicates a rate of 100 per cent a year. Few changes took place among the enginemen, conductors, etc., holding positions which are only reached after lengthy service. Other trainmen are coming and going constantly, however, such as shop employes, trackmen, etc. At present a scarcity exists in firemen, brakemen, car and engine repairmen, track laborers, etc. The great scarcity in car repairmen is reflected in that there are currentiy about 14,000 "bad order" cars on the Pennsylvania railroad's lines east, a figure which is approximately 4000 above normal.

Effective June 1, the Empire Steel & Iron Co. has advanced the wages of its employes 10 per cent at its plants at Catasauqua, Topton and Macungie, Pa., and Oxford, N. J.

Obituaries

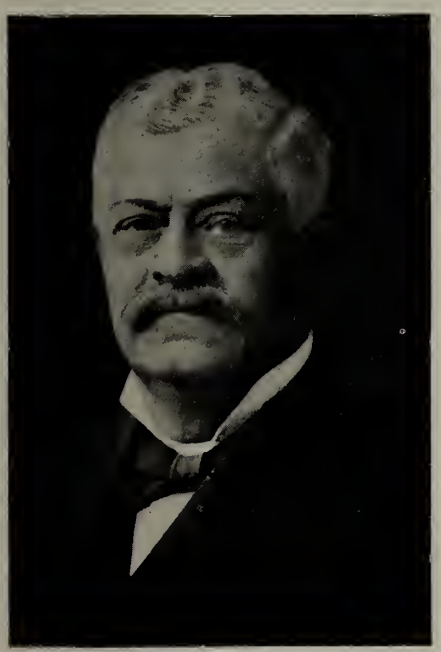
FRANK H. BUHL, better known as "first citizen of Sharon, Pa.," died at his home in that city, June 7, aged 69. In the IRON TRADE REVIEW of Aug. 17, 1916, in an article describing the 300-acre farm, which he had donated for a park and model playground, a paragraph stated: "He knows that all the kiddies living within a radius of 50 miles from Sharon love him, and he wants no further recompense for his generous gifts." Up to that time, his donations to the city of Sharon were estimated in excess of $1,000,000. He was born in Detroit, Aug. 3, 1848. His father, Christian H. Buhl, was first mayor of that city and later moved to Sharon, where he founded the Sharon Iron Works. Frank H. Buhl became a clerk in the office, later was made manager of the company and in a few years, purchased the controlling interest. In 1896, when the Buhl Steel Co. was organized in Sharon, Mr. Buhl was elected president. One year later, the open-hearth department was placed in operation and the blooming mill soon after. It was absorbed by the National Steel Co., in March, 1889, and it later became a unit of the Carnegie Steel Co. With John Stevenson Jr., Mr. Buhl built the Sharon steel works in 1899, and in February, 1900, the Sharon Steel Co., commenced to operate at South Sharon, now Farrell, Pa. This plant was sold to the Steel corporation in 1902 and now is the Farrell works of the Carnegie Steel Co. Mr. Buhl then retired from active business life. The establishment of the two works which now are part of the Steel corporation, however, does not cover his entire connection with the iron and steel industry. To Mr. Buhl and Dan Eagan is given the credit for developing steel casting manufacture, which was almost unknown until they built the plant of the American Steel Castings Co., now the American Steel Foundries, at Sharon.

William A. Jenks, treasurer and general manager of the Sayles & Jenks Mfg. Co., Warren, Mass., died of heart failure at his home in Worcester, Mass., May 26, aged 64.

Rudolph R. Baizley, president of the John Baizley Iron Works, and of the City Iron Works & Machine Co., Philadelphia, died recently at Mount Clemens, Mich, aged 70 years. Mr. Baizley at the age of 20 became head of the John Baizley Iron Works, founded by his father. He was one of the first to do pile driving by hydraulic pressure, this work being undertaken in the construction of what is now Young's pier, Atlantic City, 40 years ago. John Baizley, his son, is treasurer and general manager of the City Iron Works & Machine Co.

Henry S. Bemis, aged 68, director of the Bemis & Call Hardware & Tool Co., Springfield, Mass., died suddenly of heart disease at his home in that city, June 4.

Edward C. Meier, president of the Heine Safety Boiler Co., Phoenixville, Pa., died suddenly at a recent meeting of the district production division of the Emergency Fleet corporation in Philadelphia. He was born at Wyandotte, Kan., April 28, 1870.



FRANK H. BUHL

Edward T. Dravo, who at one time was vice president and director of the Pittsburgh Gage & Supply Co., Pittsburgh, died May 27 at his home in Sewickley, Pa., aged 83. He was a pioneer business man of Pittsburgh and retired from active business life about 20 years ago.

Eben Boye, Rockville Center, N. Y., aged 44, who served as assistant to the vice president in charge of sales, Manning, Maxwell & Moore, Inc., New York, died recently at Nassau hospital, Mineola, Long Island, N. Y., following an operation. Since 1900, he has been affiliated with that company's sales force, having had charge of its Chicago, Cleveland and Cincinnati offices at various times. His service with the company was interrupted for a short time when a few years ago he became sales manager of the Warner & Swasey Co., Cleveland, for a short time, and was then placed in charge of its Chicago office.

L. W. Anderson, who until he retired several years ago, was president of the Cincinnati Shaper Co., Cincinnati, O., died May 27, as a result of an operation upon his throat. Since his retirement, Mr. Anderson has been engaged in patriotic and Y. M. C. A. work.

David Spence, for a generation known as one of the leading experts in the making of pressed boiler plates, died at his home in Nashua, N. H., May 30, aged 69. For 10 years he was a member of the firm of Spence & Rideout, who operated the plate works at Nashua Junction, selling out a year ago on account of ill health.

George A. Leighton, who founded the Leighton Machine Co., Manchester, N. H., and served as its president for many years, died recently in Los Angeles, Cal., where he had lived for nearly 20 years. He maintained his interests in Manchester, and about two years ago organized an iron foundry there, in which town he resided each summer.

Henry Fairbanks, for many years vice president of the E. & T. Fairbanks Co., St. Johnsbury, Vt., died June 8 in that city, aged 88. Following his graduation from Dartmouth college and Andover Theological Seminary, Mr. Fairbanks was ordained a minister of the Congregational church. He preached for three years and then went to Dartmouth as professor of natural history and natural philosophy. In 1868 he became associated with the company founded by his father, Thaddeus Fairbanks.

J. Henry Optenberg, who organized the Optenberg Iron Works, Sheboygan, Wis., retiring from active business in March of this year because of ill health, died recently at his home in Sheboygan, aged 66. He founded the Optenberg Iron Works at New Holstein, Wis. in 1883 and in 1892 he sold the business to John Lauson of that city. The present Optenberg boiler, structural and machinery plant in Sheboygan was established by him in 1893. Mr. Optenberg learned his trade in the Battis Machine Works, Oshkosh, Wis.

Price Fixing Again Near at Hand

Iron and Steel Makers Not Yet Called to Washington for Quarterly Meeting But Next Week is Expected Time—Effect of Freight Rate Changes May Be Taken Into Account

WASHINGTON, June 11. — With the problem of steel distribution in the hands of the government and off their minds, at least as far as responsibility is concerned, the iron and steel producers of the country still have occasion to be gravely interested in what is going on in Washington. Among such questions as heavier taxation, higher freight rates, labor shortages, etc., to say nothing of submarine raids, western front changes and other developments which show themselves in steel orders, is the one of prices. It is to be answered, at least for the third quarter, before July 1.

The price-fixing committee of the war industries board, of which Robert S. Brookings is chairman, has not yet determined when the iron and steel industry, through its accredited representative, the steel and steel products committee of the American Iron and Steel institute, will be given an opportunity to be heard in the matter. So far it is impracticable to venture an opinion as to what may be done, despite the report of the newspapers that no attention will be paid to the McAdoo 25 per cent freight rate increase. Except in a general way, it is said the steel price question has not been before the committee.

Higher Price Requests Justified

Washington so far has not heard any intimation of what the position of the steel men will be as to higher or lower quotations, but the opinion is held that, on the face of things, the steel producers would be justified in seeking higher prices. Whether advanced quotations would be justified, is the question, however. This will depend largely upon the cost data being collected by the federal trade commission whose chairman, W. B. Colver, is a member of the price-fixing committee, and upon how strong a case the industry may present. One point to be considered also is the fact that the government today is the industry's biggest customer.

If the same time in the month as the three previous steel price conferences is to be about the period when this matter comes up again, then it would be logical to look to some day next week when the steel committee will come here to go over the many points involved. The price-fixing committee has had its hands full considering the price question on many commodities, including zinc, aluminum, domestic manganese ore, wool, lumber, etc., not forgetting pickled sheep pelts. Other such matters are likely to be acted upon before the steel meeting convenes.

Attack on Commodity Rates is Blocked

WASHINGTON, June 11.—Nothing for the present at least is to come out of the effort of the railroads to pyramid increases of freight rates on iron and steel products taking the pig iron, billet, and cast iron schedules, by putting them on the class instead of the commodity freight basis. The interstate commerce commission will deny the petitions recently filed by the carriers to bring about this practical wiping out of commodity rates. It is understood already some of the applications filed by the traffic association have been withdrawn voluntarily. The proposed increase on iron and steel rates still is on the commission docket but it is stated positively here that this will be stricken before June 25.

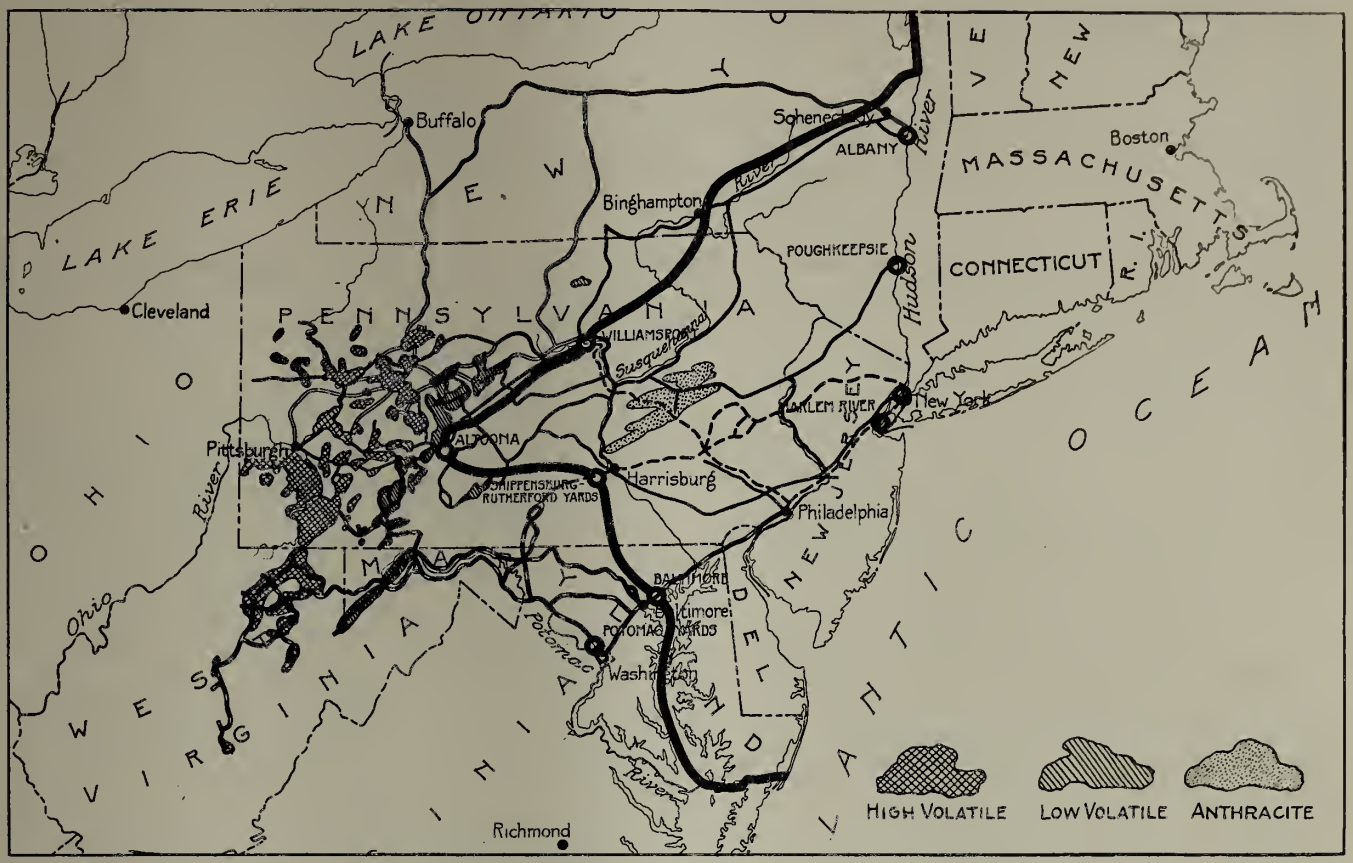
This action of the interstate commerce commission leaves Railroad Director McAdoo supreme in the matter of establishing freight rates. The commission takes the position that the director general of railroads should make the rates and that its function should be only to adjust them to preserve existing equalities. Doubt is expressed in official circles that the commission will grant an increase in the iron and steel schedules even after the 25 per cent general advance becomes effective June 25 until further notice.

The commission also has announced that all changes in freight rates on which orders have been issued to take effect between May 25 and June 25 are to be rescinded. These two moves in effect are stopping all changes in rates for the month elapsing betwen the announcement of the 25 per cent increase and the effective date. As soon as these are in force, it is expected that the commission will entertain and consider in turn such complaints as may be laid before it, in fulfilling its function to preserve prevailing differentials and rate relationships.

Only Essential Plants May Be Built

WASHINGTON, June 11.—War considerations will be the determining factor in the government's sanction of new factories or additions to plants in the northeastern district of the United States. The fuel, rail and war industries administrations jointly have decided to grant only such requests for permission to make extensions as can stand the acid test: Are they necessary for the winning of the war? The government thus hopes to avoid waste of fuel and nonessential employment of material and equipment. Extensions practically are forbidden unless they are imperative to the one big task.

The restricted area lies east of a line drawn from Montreal, Que., to within the vicinity of Saratoga, N. Y., southwest from there but north of Schenectady to Binghamton, continuing through Williamsport, Pa., to Altoona; back eastward to the Shippensburg-Rutherford yards near Harrisburg, southward through Baltimore



MAP SHOWING AREA IN WHICH PLANT CONSTRUCTION IS BARRED EXCEPT BY GOVERNMENT SANCTION

and Chesapeake Bay to the Maryland-Virginia state line, thence east along that line. The accompanying map, prepared by C. E. Lesher of the geological survey, defines this area.

A tightening of the restrictions governing the building of factories in all parts of the United States is indicated by the fuel administration's request: "Before locating new plants, or extensions of old plants, anywhere in the United States, either in or outside of this area, please confer with the general director of distribution of the fuel administration with regard to the possibility of obtaining adequate fuel supply".

J. Leonard Replogle, director of steel for the war board, in a letter to the old capital issues committee of the federal reserve board, urged curtailment of construction primarily to coserve pig iron. The fuel question also plays an important part as the fuel, rail and war industries administrations announce that the amount of fuel consumed in the northeastern district must not be increased.

Army is Calling For Many Engineer Officers

Washington, June 11.—Approximately 2000 additional engineer officers are immediately required for the army. To obtain these officers, with a minimum of delay, a board of examining officers will be sent out from Washington, for the purpose of examining such members of the engineering profession as may desire to serve their country in the present emergency.

All who are professionally and otherwise qualified may obtain the necessary blank forms of application by written request, addressed to the Chief of Engineers, United States Army, Washington, D. C. These applications should be filled out in strict compliance with the instructions thereon, and mailed to the Chief of Engineers, Washington. If the application is accepted, the applicant will be notified of the visit of the examining board to his locality, and advised of the time and place where the examination, both mental and physical, will be held. Should he be found qualified, his papers will then be forwarded to the Chief of Engineers of the army, at Washington, who will take the necessary steps to have him commissioned as an officer in the engineer reserve corps.

The examining board will only receive applications for appointment in the grades of first lieutenant and captain, and only those applicants meeting the stipulated requirements will be considered.

The age limits: For the grade of first lieutenant are 32 to 36 years; and for captain, 36 to 42. These limits may be slightly increased or decreased, in special cases, except that no one who is within the draft age will be considered.

Applicants must be engaged in the active practice of the engineering profession, in one of its various branches, and be in good physical condition.

On professional qualifications and experience, no set rules have been established. An applicant's fitness for commission will be determined by the examining board.

All applicants must be citizens of the United States.

No application will be received from anyone now in government service.

Applications will not be considered from any one born in a country with which the United States is at war, or born in a country allied with a country with which the United States is at war, even though he be a naturalized citizen of this country.

The war department in its call for applications further says:

All applicants accepted by the examining board will be commissioned within 10 days or two weeks, and within a few days thereafter will receive orders to report at an Engineer Officers' Training Camp, either at Camp Lee, Petersburg, Va., or at Camp Humphreys, Va., near Washington, where they will be given a course in military training previous to being assigned to duty with engineer troops.

Applicants must understand, however, that it is required of an engineer officer that he not only be professionally qualified, but must also possess the requisite qualities of leadership and temperament to fit him

for the command of troops. The case of each student officer will be carefully considered by a board of officers of the corps of engineers of the regular army, just previous to the completion of his course of instruction (unless circumstances necessitate an earlier consideration) and, as a result of the showing which he has made, he will either be allowed to retain his commission, or will be honorably discharged.

The government will allow traveling expenses at the rate of 7 cents per mile to applicants who may be commissioned, and they will also receive, while in the training camp, the regular pay of an officer of their rank.

Applicants who receive commissions and are ordered to camp should provide themselves only with the usual engineer officers' uniform, cap, puttees and tan shoes. For training purposes, the camp authorities will issue them, on memorandum receipt, equipment, and will provide the necessary sleeping accommodations.

Capital Odds and Ends

WASHINGTON, June 11.—Announcement has been made by the war trade board of its supplementary plan by which exports will be licensed for shipment to Norway. Among the associations and articles on which they will give their approval the plan refers to these: Oil and Color Mfgrs. association, sulphate of iron ore, copper, sulphuric acid; and the Norwegian Paper Makers' association, sulphur, hoop iron, baling wire, lead, and leather machine belting. The plan is:

"Applications for licenses to export commodities which are not to be consigned to a Norwegian import association will not be considered unless the prospective importer has given a guarantee certified by the Norwegian finance department and further certified by an American consul in Norway, who will furnish the importer a code word and an identification number. This code word and identification number should be forwarded by the importer to the prospective exporter in the United States and specified on Supplemental Information Sheet X-106 which should be attached to the application when applying for an export license. Temporary arrangements have been consummated, in accordance with which commodities consigned to Norwegian import associations may be exported on the basis of import certificates issued by such associations either subsequent or prior to May 10, 1918. Certificates issued prior to May 10, 1918, must be confirmed subsequent to May 10, 1918, by the import association which issued the same. Exporters in the United States should not apply for licenses to export to Norway on the basis of old import certificates until they are advised that such certificates have been confirmed."

* * *

Reparation in the sum of $217.75, overcharge on two carloads of old rails and fastenings from a point in Kansas to the Zelnicker Car Works at East St. Louis is sought by the Walter A. Zelnicker Supply Co., St. Louis. The complaint is lodged against the Missouri Pacific and the Warren & Ouachita Valley railroads.

* * *

Increase ranging from 30 to 40 per cent per gross ton in the handling charges on ore from cars to vessels at Portland, Me., is sought by the Grand Trunk Railway system.

* * *

Albert C. Richie, attorney general of the state of Maryland, has been made counsel of the war industries board. Mr. Richie has already taken up his new duties.

* * *

The Carolina, Clinchfield & Ohio railroad asks for cancellation of the carloads commodity rate of $1.62½ per 100 pounds on picric acid and dry trinitrotoluol, minimum weight 24,000 pounds, from Kingspoint, Tenn., to Rigand, Que.

* * *

Announcement has been made of the appointment of John W. Poe of Roswell, N. M., as federal fuel administrator of New Mexico, to fill the vacancy caused by the death of William C. McDonald. Mr. Poe is president of the First National bank of Roswell and a member of the state tax commission.

* * *

F. J. Goodfellow of Bradford, Pa., has been named by the fuel administration to be manager for apportionment and distribution of charcoal in carload lots for the district east of the Mississippi river and north of Mississippi, Alabama, Georgia and North Carolina. Mr. Goodfellow is secretary-treasurer of the National Wood Chemical association.

* * *

Drawback on hacksaws manufactured by the Quality Saw & Tool Works, Inc., Springfield, Mass., with the use of imported tungsten steel provided by the treasury decision of April 6, 1916, has been extended to provide for drawback on such articles manufactured by the Napier Saw Works, Inc., successor to the Quality company.

Ingot Output

In Past 12 Months Shows Decline From 1916 Production

During the 12-month period ended May 31, 1918, which covers practically the first year of war, the steel plants of the United States produced 40,140,000 tons of ingots. Compared with the calendar year 1916, when steel ingot production totaled 41,401,917 tons, this is a loss of about 1,260,000 tons. The loss was practically all in bessemer steel. Production of open hearth ingots for the 12 months being 30,228,271 tons, compared with 30,238,978 tons in 1916; while the bessemer tonnage was 9,757,794 tons, compared with 10,916,248 tons in 1916.

These statistics are based on the report just issued by the American Iron and Steel institute, covering 29 companies which in 1916 produced 88.14 per cent of the country's total tonnage. Their output in May was 3,256,965 tons, the largest total since October, 1917, and a gain of 93,555 tons compared with April. The May daily average of 105,063 tons showed a loss, as the April daily average was 105,447 tons.

The following table shows in detail the production of steel ingots by the 29 companies, from June, 1917, to May, 1918:

Mos.	Open hearth, gross tons	Bessemer, gross tons	All other, gross tons	Total, gross tons
June, 1917	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
Sept.	2,195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195,832	524,084	13,806	2,733,722
Jan., '18	1,763,356	429,588	10,901	2,203,845
February	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381
April	2,377,974	769,249	16,187	3,163,410
May	2,444,863	796,244	15,858	3,256,965

Unfilled Steel Bookings Continue to Decline

A continued and steady decline marks the record of unfilled orders of the United States Steel Corp., since the first of the year. The total unfilled tonnage May 31, was 8,337,623, which is 404,259 tons less than it was April 30. This would seem to reflect the continued and increasing absence of commercial tonnage. A contrasting condition existed a year ago, when unfilled bookings of Jan. 31, 1917, totalled 11,474,054 tons. From that date they mounted steadily upward to April 30, 1917, when the record figure of 12,183,083 tons was reached. On May 31, 1917, the total was 11,886,591 tons, which descended month by month until the Nov. 30, 1917, figures of 8,897,106 tons was followed by the total of 9,381,718 tons on Dec. 31 of that year.

From April 30, 1916 to date, the monthly record of unfilled tonnage is as follows:

Date	Total	Change, tonnage	Change, per cent
May 31, 1918..	8,337,623	404,259—	4.60—
Apr. 30, 1918..	8,741,882	314,522—	3.47—
Mar. 31, 1918..	9,009,675	232,049—	2.49—
Feb. 28, 1918..	9,288,453	189,400—	1.99—
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,856—	0.48—
June 30, 1916..	9,540,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM P. SNYDER, Jr., who was recently elected president of the Shenango Furnace Co., Pittsburgh, is a graduate of Yale university. He has served the company as assistant to the president and more recently as vice president in charge of operations for about eight years, advancing steadily to the important position he now holds. His father, William P. Snyder, Sr., who has been president of the company since its organization in 1906, was elected chairman of the board, a newly created position. By this change the latter will be relieved of many business responsibilities and be able to give his attention to matters of a personal character. C. D. Dyer, who is a member of the American Iron and Steel institute's subcommittee on iron, iron ore and lake transportation, was re-elected vice president but will be relieved of some of his duties on account of the outside work he is doing, particularly in connection with that committee. George L. Collord, who has been general manager of the company's furnaces and who was recently promoted to the position of vice president and general manager is a graduate of Princeton university. Formerly he was general superintendent of blast furnaces for the Clairton Steel Co. He resigned that position in 1903 to assume similar duties with the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., then operated by the Republic Iron & Steel Co. A little over 10 years ago, or in January, 1908, he entered the service of the Shenango Furnace Co. as general manager of furnaces. Henry Irwin, Jr., and H. N. Wilson were re-elected treasurer and secretary, respectively. The Shenango Furnace Co. had as its parent interest W. P. Snyder & Co., which was organized in 1888. In 1917, it took over the Shenango Steamship & Transportation Co., operating three great lakes ore freighters. The furnace company has three stacks at Sharpsville, Pa. Other units of W. P. Snyder & Co. include the Shenango Steamship Co., organized in 1907, and operating two great lakes ore freighters; the Aontoine Ore Co., with mines on the Menominee range in Michigan, and the Lake Erie Limestone Co., a Pennsylvania corporation, with quarries near Struthers, O.

George K. McLeod, formerly of Cleveland, has been made manager of the Perfection Tube Co., Painesville, O.

H. M. Wilson, secretary of the Shenango Furnace Co., Pittsburgh, who has been seriously ill from pneumonia for some time is recovering slowly.

Walter J. Cummings, vice president of the McGuire-Cummings Mfg. Co., Chicago, has been elected president to succeed John J. Cummings, deceased.

E. C. Burnes, formerly affiliated with Alley & Page, is now located in the sales department of the Matlack Coal & Iron Corp., 52 Vanderbilt avenue, New York City.

G. M. Barkley of the sales department of the Cleveland Steel Co., Cleveland, has gone to Washington to serve as one of the assistants of Steel Director G. Leonard Replogle.

C. W. Bonfield, formerly of the New York office of the Wm. F. Davis Machine Tool Co., Inc., has been appointed Washington representative of the same company with offices at 945 Pennsylvania avenue.

H. G. Benedict recently resigned his position with the Glenn L. Martin Co., Cleveland, to become works manager of the Steel Products Co., that city, which is engaged in the manufacture of airplane-engine parts.

C. B. Leeds, who has been affiliated with National Automatic Tool Co., Richmond, Ind., for some time, is now employed in the machinery sales department of the Cadillac Tool Co., Detroit.

J. W. Dickson, salesman in the offices of Edmund W. Mudge Co., Pittsburgh, has resigned and become associated with the war industries board under J. Leonard Replogle, director of the steel supply.

Carl Anderson, vice president of the Oakes Pressed Steel Co., Minneapolis, Minn., recently visited a number of old acquaintances in Worcester, Mass. He formerly was superintendent of the Worcester Pressed Steel Co.

D. M. Perrill has been made advertising manager of the Lyon Metallic Mfg. Co., Aurora, Ill., in charge of advertising and promotion work. He recently resigned from a similar position with the Lodge & Shipley Machine Tool Co., Cincinnati.

R. J. Sheridan is New York resident sales manager for the Parkesburg Iron Co., Parkesburg, Pa., while G. W. Denyven is Boston resident sales manager. Effective July 1, J. A. Kinkead will serve in that capacity in San Francisco.

Henry G. Wickham, president of the Matawan Steel & Iron Co., Matawan, N. J., is doing experimental work for the government with the Standard Aeroplane Corp., Elizabeth, N. J. His brother-in-law, L. C. Gorsuch, has been made general manager of the Matawan steel and iron plant.

Leon Beige, managing engineer of the export and import firm of Philippe Berger, 2 Square de l'Opera, Paris, France, has had to postpone his journey to the United States in the interests of his company, owing to the fact that circumstances connected with the war have impeded the work it has in hand.

James H. Hay became superintendent of the Lavine Gear Co., Racine, Wis., upon his resignation from a similar capacity with the Wallis Tractor Co., that city. He became superintendent of the Wallis plant upon its removal from Ohio several years ago.

H. D. Gates, who resigned four years ago from the position of sales manager of the Pangborn Corp., Hagerstown, Md., to take charge of sales of the Mott Sand Blast Mfg. Co., New York, has returned to the Pangborn Corp. to assume his former duties. F. J. Hull likewise has returned as assistant engineer. When he resigned about five years ago to become affiliated with the Mott Sand Blast organization, he held the position of engineer. Charles T. Bird, who has been identified with the production and engineering departments for a year has been transferred to the sales department of the Pangborn Corp., in charge of the home territory embracing eastern Pennsylvania, southern New York, New Jersey, Delaware, Maryland, District of Columbia and Virgnia. His headquarters will be at Hagerstown, Md.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM W. Corlett has been appointed general solicitor of the United States Steel Corp., by Chairman E. H. Gary. He has been acting general solicitor since May of last year. He now succeeds Col. Raynal C. Bolling, who was killed in airplane service in France in April. Mr. Corlett is a graduate of Harvard university and Columbia law school, and became affiliated with the Steel corporation's legal staff about 10 years ago.

Newlin T. Booth, formerly assistant superintendent of the steel foundry department of the Steelton, Pa., plant of the Bethlehem Steel Corp., South Bethlehem, Pa., was recently made superintendent to succeed Bent L. Weaver, resigned. Mr. Weaver is now head of the Vulcan Iron Works, Wilkesbarre, Pa.

Morris W. Bush, president of the Shelby Iron Co., the Majestic Coal Co., the Imperial Coal & Coke Co., Birmingham, Ala., and connected with other large interests in Alabama, has been named as Birmingham regional director of the resources and conversion section of the war industries board.

Robert J. Anderson, who has been United States government resident chemist at Youngstown, O., attached to the government laboratories of the Youngstown Sheet & Tube Co., has been transferred to the bureau of aircraft production and is now located in Pittsburgh at the general laboratories of the signal corps.

John F. Darrah becomes the sole representative of the Link-Belt Co., Chicago, in Alabama, since E. Francis McCrossin has found it necessary to withdraw from the firm of McCrossin & Darrah on account of his engineering work, which requires his entire attention. Mr. Darrah is located at 751 Brown-Marx building, Birmingham, Ala.

William E. Manning, vice president and general manager of sales of the Youngstown Sheet & Tube Co., Youngstown, O., who has been discharging the duties of secretary for a number of years, has been succeeded in the latter office by LeRoy A. Manchester, the company's general counsel. Mr. Manning will continue to give his attention to the duties of the vice presidency and of the sales management.

N. E. Wahlberg, who for some time was assistant chief engineer of the General Motors Co., Detroit, and recently chief engineer of the Nash Motors Co., Kenosha, Wis., has reported in Washington. He will be granted a major's commission in the army. His orders were to prepare for immediate service in Europe and as far as is known, he will be assigned to the ordnance department.

Harry E. Ensley resigned recently as vice president of the Wharton & Northern railroad, which is owned by the Wharton Steel Co., Wharton, N. J. He will confine his work hereafter to his duties as chief counsel for both corporations. Lewis E. Waring was made assistant to the president of the Wharton Steel Co., recently, as well as vice president of the railroad.

R. Bryant Henning, former assistant purchasing agent, succeeded W. I. Denny as chief purchasing agent of the Davis Mfg. Co., Milwaukee, builder of tractor engines, now a part of the Avery Co., Peoria, Ill., upon the latter's resignation to accept a commission in the ordnance department of the army. Mr. Denny was ordered to report for duty at Chicago.

L. Stewart Love, who formerly was sales manager for the Sherritt & Stoer Co., Philadelphia, machine tool dealer, with George A. and Edward L. Steinle of the Steinle Turret Machine Co., Madison, Wis., has organized the Machine Tool Engineering Co., Singer building, New York. A machine tool business will be conducted and the company will specialize in complete manufacturing equipments, machine press and forge shops.

Arthur G. Kimball has been elected president of Landers, Frary & Clark, New Britain, Conn., to succeed Charles F. Smith, for many years president and treasurer, who has been made chairman of the board of directors. Mr. Smith retains his position as treasurer. Joseph F Lamb has been added as a director of the corporation. Maxwell S. Hart, who has been vice president of the Hart & Hutchinson Mfg. Co., New Britain, Conn., has been elected president to succeed Howard S. Hart, who has been made chairman of the board of directors. Loren E. Page, secretary, assumes the added duties of vice president and Donald R. Hart, formerly assistant treasurer becomes treasurer in place of Norman P. Cooley, who remains a director.

Charles W. Schmidt, formerly connected with the Philadelphia office of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has been promoted to be district sales manager, with headquarters in the Oliver building, Pittsburgh. He will represent that company and its subsidiaries, the Tioga Steel & Iron Co., Philadelphia, and Wm. Wharton Jr., & Co., Easton, Pa. Mr. Schmidt succeeds J. S. Morrison, who recently resigned.

M. C. Turpin, formerly assistant to the manager of the publicity department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., resigned recently to enter federal service. He will be located at Washington as assistant to the manager of the technical publicity bureau, ordnance department. Mr. Turpin will handle information from the war department for manufacturers, through the medium of the trade journals.

J. C. Kimes, division freight agent of the Baltimore & Ohio railroad at Pittsburgh, has resigned, effective June 15, to become traffic manager of the United States Steel Corp., ordnance department, Union Arcade building, that city. Mr. Kimes will have charge of the movement of material entering into the construction of the ordnance plant to be built on Neville island as well as the movement of the guns and shells after the plant is built.

George A. Gaston will continue as president of Gaston, Williams & Wigmore, Inc., although William H. Williams and James A. Wigmore have retired. At an organization meeting of the new board, Charles A. Corliss, president of the Lamont, Corliss & Co., was elected a director. Mr. Corliss, Harry Payne Whitney, and G. M. Dahl, vice president of the Chase National Bank, were elected directors of the Gaston, Williams & Wigmore Steamship Co., Ltd.

Iron and Steel Men in War Machine

Howard P. Ingels, Secretary, War Industries Board

HOWARD P. INGELS is one of the best informed men in Washington on general industrial conditions of the country. That means he is one of the best informed men with reference to the iron and steel industry today. As secretary of the war industries board, he has to be. The board is in contact with the iron and steel industry perhaps more than any other line of business because it is difficult to conceive of any wager requirement of war in which iron and steel does not serve as an essential. Mr. Ingels' position requires his presence at every meeting held by the board and its sessions are almost continuous. This has brought him prominently into all of the general sessions which the war industries board has held with the iron and steel producers of the country. He is present at all meetings where the board's policies are decided upon. He keeps the records of every meeting and consequently, his familiarity with the inner workings of this important branch of the war machine is comprehensive. It is Mr. Ingels who is responsible for the collection of the data, upon which the war industries board bases its course of procedure and without which it could not function for long. To this position of prominence and responsibility, he has risen from that of assistant secretary of the original general munitions board, out of which grew the present war industries board. At one time he served as acting secretary of the price-fixing committee of the board. In fact, he has had considerable to do with the price-fixing activities of that body.

Mr. Ingels is a comparatively young man and has gone far since 1905, when he was graduated as a mechanical engineer from the University of Kentucky. His first position was in the engineering department of the American Car & Foundry Co. By reason of his ability, he soon was promoted to take charge of the company's engineering department at Milton, Pa. For a while, he was New York sales manager in charge of export business of the Youngstown Car Mfg. Co., Youngstown, O. He then became in turn, engineer, sales manager and assistant general manager of the William Todd Co., Youngstown.

In 1915, he identified himself with war business by placing several orders for 6-inch shells for Great Britain with American makers. He acted as consulting engineer and manager of a plant which produced 2000 shells daily. Mr. Ingels has been devoting his entire time to the government for over a year and is one of the one-dollar men, and he is one of that vigorous, aggressive and resourceful army of younger men at Washington to whom this war is giving the opportunity to show their mettle. His rapid rise to his present position of responsibility and trust, strikingly reflects the intelligent grasp which he has possessed regarding the essential part which general industry bears to the war machine and as to the sound and constructive methods whereby production can be brought into ac effective co-ordination with military demands.



HOWARD P. INGELS

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Business Closely Follows Tax Hearings

NEWS from Washington that through an arrangement between the war industries board and the American Iron and Steel institute, the government was to have complete control of the steel industry, caused some selling of steel stocks last Friday, declines of about 1 point being general in the steel list.

But the importance of the development was almost lost in Wall street, where keenest attention was centered on the proposed revenue legislation. Secretary McAdoo last week wrote a letter to Representative Kitchen, chairman of the house ways and means committee, in which he went into considerable detail, outlining the attitude of the treasury. He said that if the present rate of expenditures should continue for six months, the treasury will actually have to disburse $24,000,000,000 during the fiscal year ending June 30, 1919. During the fiscal year ending June 30, 1918, disbursements will have been between $12,500,000,000 and $13,000,000,000, of which one-third or $4,000,000,000 will have been raised by taxes and two-thirds or $8,000,000,000 by loans. In view of the tremendous increase the next year Secretary McAdoo urged that at least $8,000,000,000 should be raised by taxes.

Wants More Profit Taxes

The secretary offered the following suggestion as to the proposed revenue legislation:

"That a real war profits tax at a high rate be levied on all war profits. This tax should be superimposed upon the existing excess profits tax in such a way that the taxpayer should be required to pay whichever tax is the greater. The existing excess profits tax should be amended in certain important particulars so as to remove inequalities.

"That there should be a substantial increase in the amount of normal income tax upon so-called unearned incomes. Under existing law earned incomes above certain exemptions are taxed 4 per cent as an income tax and 8 per cent as an excess profits tax making a total of 12 per cent, while unearned incomes, derived from securities, etc., are taxed only 4 per cent. The 8 per cent tax should be recognized as an income tax and the rate of 12 per cent (4 per cent normal and 8 per cent excess profits), in respect to earned incomes, while a higher rate than 12 per cent should be imposed on unearned incomes.

"That heavy taxation be imposed upon all luxuries."

Committee Hearings Opened

Hearings on the proposed legislation opened last Friday. Benjamin Marsh, executive secretary of the Farmers National Committee on War Finance was the first witness before the ways and means committee. He advanced the opinion that the net taxable income of corporations should be subjected to a tax of 50 per cent on both excess and war profits taxes. He argued that all incomes up to $50,000 were sufficient for patriotic citizens and that all incomes above this amount should be taken for war purposes. Mr. Marsh's theories, while somewhat remarkable, probably will be quite moderate as compared with some which will be advanced before the hearings are completed. Business men are becoming more and more awake to the importance of the tax legislation and it is probable they will have something to say, not with a view to evading the responsibility of the war burden, but to do all possible to induce legislation along sane and equitable lines.

Earnings Reduced Despite Capacity Operation

After a year, with all facilities worked to capacity, due to the unusual demand, the International Nickel Co. reports that its gross earnings for the fiscal year ended March 31, 1918, were $16,181,501, or $798,107 less than the year before. The comparative income account for fiscal years ended March 31, is as follows:

	1918	1917	1916
†Earnings	15,791,485	16,728,913	14,091,612
Other income	390,016	250,695	249,354
Gross income	16,181,501	16,979,608	14,340,966
Exp., tax, &c.	*4,200,860	1,430,371	870,860
Deprec., &c.	1,850,653	1,991,267	1,721,827
Surplus	10,129,988	13,557,970	11,748,278
Preferred div.	554,756	534,756	534,756
Common div.	‡7,530,228	10,040,304	9,431,803
Balance	2,065,004	2,982,910	1,781,719

*Includes $3,590,835 federal and state taxes.

†Earnings of all properties after deducting manufacturing, selling expense, ordinary repairs, maintenance, and foreign taxes.

‡In addition, the company paid from surplus an extra dividend (Red Cross) of $418,346 on the common stock.

Business prospects point forward to full operations in the current year, including the extensive additions made to the corporation's plants. W. A. Bostwick, president, in his annual statement, said that the plant additions of the last three years had prevented a serious shortage in the supply of nickel and a consequent delay in the war programs of the allied countries.

"The company's new refinery at Port Colborne, Ontario," he added, "is now approaching completion, and it is anticipated that it will be placed in operation during the coming summer unless still further difficulties of shortage of labor and materials are experienced."

Buys Steel Foundry

The Universal Draft Gear Attachment Co. has bought from the Whiting Foundry Equipment Co. the latter's steel casting works at 147th and Lincoln streets, Harvey, Ill., the price being $75,000. The purchasing company is controlled by John T. and James S. Llewellyn of the Chicago Malleable Castings Co., and S. J. Llewellyn of the Interstate Iron & Steel Co., who have formed the Allied Steel Castings Co., which will operate the plant. The property includes about five acres, improved with brick buildings, formerly owned by the Calumet Engineering Co., about 125x500 feet. Additional equipment costing about $75,000 will be installed and the plant will have a capacity of about 1000 tons of castings per month.

Profits Are Decreased

A decrease of $969,505 in net profits from the record-breaking year of 1916-1917 is noted in the report of Dominion Steel Corp., for the fiscal year ending March 31, 1918. Net profits for the year amounted to $7,601,660 as against $8,571,165 for the previous year. Last

year's net profits, however, were an increase of $4,586,435 over two years ago. Earnings were at the rate of $23.68 a share on the $32,097,000 common stock outstanding, as against $26.71 last year and $9.39 two years previously. Net earnings after the usual administration charges, taxes and depreciation were $11,030,112 as against $12,967,874 a year ago, a decrease of $1,937,762. The fact that the decrease in the balance available for the common stock was nearly $1,000,000 less is to be explained by a marked decrease in the deductions necessary for depreciation, interest and sinking funds, while the wiping out of the item of discount on securities sold a year ago eliminated an annual charge that had been varying from about $100,000 to $325,000.

As to the decrease of $1,937,762 in net earnings the war tax provided for a year ago was the tax of the previous year, 1915-16, when earnings were relatively small, while the tax charged up this year is the tax for the record-breaking year of 1916-17.

Financial Crop Ends

At a meeting of stockholders of the General American Tank Car Corp., to be held June 25, the proposal to increase the authorized 7 per cent cumulative first preferred stock from $2,500,000 to $4,000,000 will be voted upon.

* * *

G. W. Bent Co., 93 Causeway street, Boston, and 42 Main street, Lewiston, Me., has purchased the business of the Gibson Bedstead Co., 25 George street, Boston. It will continue the manufacture of the Gibson company's leading patterns at its Everett plant, in conjunction with its own extensive line.

* * *

The Asbestos Protected Metal Co., Pittsburgh, which since the establishment in 1905 has been known by that title, has changed its name to the Aspromet Co. The change became effective recently. When the company was organized its sole product was asbestos protected metal, but since then other lines of building materials have been added, causing the old name to be misleading.

* * *

For the nine months ended March 31, the Pittsburgh Steel Co., Pittsburgh, reports sales aggregating $28,242,031, as compared with $22,822,118 in the same period a year ago. Net profits however, were $3,891,204 this year as against $7,460,422 for last. This figure of $3,891,204 was reached after setting aside $2,218,163, estimated income and excess profits taxes.

* * *

A change in the ownership of the American Range & Foundry Co., Cleveland, recently has taken place and the firm name has been changed to the Vahan Foundry Co. Officers of the new organization follow: President, Frank S. Shields, president, Cleveland Milling Machine Co.; vice president, R. B. McHenry, formerly affiliated with the Johnston & Jennings Co. and Joseph Dyson & Son; and secretary-treasurer, L. M. Lucius. A specialty will be made of light and medium gray iron castings.

* * *

On June 24, receivers for the Camden Iron Works, Trenton, N. J., will make application before Judge Heaight in the United States district court for permission to pay $300,000 in dividends on unsecured claims against the company, totalling $1,000,000. Walter Wood of R. D. Wood & Co., is seeking to foreclose a mortgage against the iron works for $27,000. The court announced it would order the payment of the mortgage on the condition that the proceeds are applied in the cancellation of claims held by the iron works against Walter Wood and his company, aggregating $48,000.

* * *

The National Stove Repair Co., Miamisburg, O., recently organized, has acquired the plant of the Hoover & Gamble Foundry Co., and is specializing in stove and range repair parts. The stove and range repair department of the John B. Morris Co., Cincinnati, has been purchased by the National company which will continue to make this line of work. In addition to the large foundry, the plant at Miamisburg has a warehouse containing 50,000 square feet of floor space in which an extensive line of castings and patterns will be carried in stock.

* * *

By the issuance of serial 7 per cent coupon gold notes, dated April 1, 1918, maturing at the rate of $200,000 per year for five years, the Wright Wire Co., Worcester and Palmer, Mass., will increase its capital to $1,000,000. Liggett & Drexel, New York bankers have bought the issue and will offer it to the public. Proceeds will provide for future extensions, but since George M. Wright, president and manager declares that no new construction will commence until after the war, the proposed rod mill erection at Palmer is delayed.

Open New Plant

The Smith Gas Engineering Co. has about completed its new plant at Moraine, O., near Dayton, and will shortly start manufacturing. The main building is 110 x 420 feet and is being equipped with modern tools to take care of the increased demand for Smith gas producers. The company's Lexington plant, which is now working to capacity, will be kept in operation. The main offices of the company will be moved to Dayton about April 15.

A new grade school which just has been erected at New Enterprise, Bedford county, Pa., has been named in honor of J. Leonard Replogle, who obtained his early education on the site where the new building is located.

Toluol Lots

For General Consumption Released—Navy Buys Solvent Naphtha

New York, June 8.—Action on a number of applications for toluol for June delivery to commercial consumers was taken by the toluol division of the war industries board this week. Such releases are being made sparingly. As far as known, the government price of $1.50 per gallon at producers' plants for tank cars, and $1.55 in drums, is being quoted on all commercial business. Large future orders for solvent naphtha have been distributed by the navy department and the tone of the market is exceedingly strong. Prices continue unchanged.

Large sales of spot phenol were made this week at 48 to 52 cents per pound.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.25 to .30
Toluol (on sales sanctioned by governm't) (tank cars)	1.50
Toluol (drums)	1.55
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.48 to .52
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.65 to 5.75

Contract

Pure benzol	$0.25 to .30
Toluol	no market
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

The quantity available, steadily is becoming larger. In naphthalin, all producers continue far behind in deliveries, and are unable to make sales, so that the market is nominal.

The lower prices on benzol have brought out a large amount of business on the basis of 25 to 30 cents per gallon chiefly for spot delivery. There is growing disinclination among producers to book large forward contracts for benzol, because a large amount of business is expected to be placed by the government.

Practically all of the current output of sulphate of ammonia is going to the government. Government orders already distributed are sufficient to take up the entire output over the next six or eight weeks. The price to the government is $4.50 per 100 pounds at producers' plants. On commercial business the prices nominally are at $5.65 to $5.75 per 100 pounds at seaboard.

Need More Tools for Shipyards

Pyramiding Inquiries Continue to Come for Machines for Shipbuilding Plants—Huge Requirements Are Involved in Lists Now on the Market—Government Fabricating Plants Call for Much Equipment

SHIPBUILDING constitutes the major influence in the machine tool market at the present time. In addition to the eastern yards whose large inquiries came on the market last week, western builders are becoming increasingly important from the machine tool standpoint. The Skinner & Eddy Corp., Seattle, which recently took over the shipyards of the Seattle Drydock & Construction Co., is planning extensive plant additions. In that connection alone about $1,600,000 worth of equipment is being sought. The New York Shipbuilding Co. and the Newport News Shipbuilding & Drydock Co. are still in the market for extensive machine tool requirements. Other shipbuilding plants which will involve millions of dollars worth of machinery and equipment are under consideration. Much structural shop equipment is being called for by the two fabricating plants which the McClintic-Marshall Construction Co. will erect for the government to produce ship material. In the central and western districts, the railroad lists occupy the greatest attention, although new munitions contracts are offering some business. Continuous pressure on the manufacturers engaged in war work is suppling a consistent demand for duplicate tools to increase production. New shell and ordnance work is expected in the Chicago district, but few inquiries are coming on the market from this source. Motor truck contracts are developing considerable business from Detroit. One large manufacturer in that city is expected to issue a large list of tools during the next few weeks. Deliveries continue to be slow on many classes of tools. Planers in particular are difficult to obtain, and builders of this class of equipment report that the government and prime producers of war supplies are taking all their available output. One manufacturer of planers states that the manufacture of planers up to about 48 inches is being discouraged, and that the government will require all of those which are produced in larger sizes. An advance of about 25 per cent on planers is expected, and other classes of tools are advancing but in smaller amounts. Under the new conditions machine tool dealers are serving more as procurement agents for buyers, rather than sales agents for manufacturers.

Government Repair Shops Require Equipment

DESPITE the huge volume of business now pending, trading in the eastern machine tool market still is being confined chiefly to small, miscellaneous lots. No formal action has yet been taken on the requirements for the ordnance plants to be erected by the Midvale and United States Steel corporations, which combined form the great bulk of the machine tool business in prospect, nor have the railroads been large buyers during the past week. With these latter interests it is understood that uncertainty continues to exist over appropriations, but it is believed in well-informed quarters that the buying of railroad equipment will set in before the end of this month in a volume far larger than indicated by current lists.

Large Demands From Western Shipyards

Skinner & Eddy Corp., Seattle, one of the largest shipbuilding interests on the western coast, is inquiring for machine tools in the amount of $1,600,000 for a plant extension ordered in connection with the recent purchase of the works of the Seattle Construction & Drydock Co. This inquiry in connection with negotiations on large lists issued by three eastern shipyards mentioned last week, constitutes shipbuilding as the controlling factor in the eastern market. Little actual buying has been consummated on any of these requirements. It now develops that the requirements of the New York Shipbuilding Co. and the Newport News Shipbuilding & Drydock Co. will aggregate upwards of $2,000,000 worth of tools. The Bethlehem Shipbuilding Co., which has been planning the construction of a shipyard on the Pacific coast and another on the Atlantic coast, has temporarily, at least, abandoned this latter project. The Sun Shipbuilding Co. is expected to be a large buyer of machine tool equipment shortly, as a result of plans now under way for materially increasing its plant. The Republic Shipbuilding & Drydock Co., Baltimore, is planning to construct a $2,000,000 yard near that city, for which considerable equipment will be required. The quartermaster's department closed during the past week on 40 tools of various types for export to France. Nine milling machines also have been purchased for the Pensacola aviation school in Florida. The American Steel & Forge Corp., Philadelphia, is asking prices on a large list of machines for a proposed plant for the production of crank shafts. Prices on machine tools continue to climb. During the past week a line of milling machines has gone up 10 per cent, while an equal advance also has been noted in sensitive drills. A well-known make of lathes is expected to go up 10 per cent before the end of this week. Planers are expected to advance 25 per cent.

Heavy Crane Demand Continues

The Westinghouse Church Kerr Co. has closed on the 10 electric cranes recently inquired upon for the Baltimore & Ohio shops at Glenwood, Pa. The Morgan Engineering Co., Alliance, O., and the Toledo Bridge & Crane Co., Toledo, O., secured this business. The Westinghouse company is now in the market for 7 ½-


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ton traveler for another project. The Pennsylvania railroad is inquiring through its Philadelphia office for eight 100-ton electric cranes with 88-foot span. Bids are to be in by June 19. The New Britain Machine Co., New Britain, Conn., is inquiring for two 5-ton cranes, of 20 and 25-foot span respectively, and one 10-ton crane of 40-foot span. The Groton Iron Works, Groton, Conn., has amplfied its recent inquiry and is now asking for seven cranes of five, 10, 15 and 20 tons capacity. The Industrial Materials Co., 104 West Fortieth street, New York, is in the market for 47 electric wharf cranes for export to Norway. Twenty of these cranes are to be of one and a half tons capacity each, while the remainder are to be of two and one-half and five tons capacity. The United States Cast Iron Pipe & Foundry Co. is inquiring for two 5-ton and two 10-ton traveling cranes for its plant at Scottsdale, Pa. The Worthington Pump & Machinery Corp. is in the market for a 15 or 20-ton locomotive crane for delivery to Buffalo. The Cape Ann Anchor and Forge Co., Gloucester, Mass., is inquiring for a 15-ton 50-foot span crane. L. H. Shattuck Co., Manchester, N. H., is inquiring for a 15-ton, 24-foot span crane. The Atlantic Refining Co., Philadelphia, is in the market for a 5-ton 20-foot span crane. The Vulcan Detinning Co., Sewaren, N. J., is inquiring for a 7½-ton 24-foot crane. The war department has awarded two 75-ton cranes to the Toledo Bridge & Crane Co., Toledo, O., and eleven 10-ton cranes to Pawling & Harnischfeger, Milwaukee. During the past week the Hay Foundry & Iron Works, Newark, N. J., has awarded three 10-ton cranes to the Morgan Engineering Co. The Terry Shipbuilding Co., Savannah, Ga., has purchased four 10-ton electric cranes from the Cleveland Crane & Engineering Co. The American Locomotive Co. has bought a 15-ton crane from the Morgan Engineering Co.

Will Build Motor Repair Shops in the South

Kearney-Haynes Co., San Antonio, Tex., has been awarded the contract for the construction of motor repair shops to cost approximately $1,000,000. These shops will take the place of a number of smaller army stations at different points. The present motor repair shops, designated as Mechanical Repair Shop No. 304, is located between Fort Sam Houston and Camp Travis, and is in charge of Major Mark Ireland. The new repair depot will be one of three, the other two being at Atlanta, Ga. and Baltimore. The Atlanta shops are nearing completion at this time. The machine tool requirements of these undertakings will be large.

Priority Certificates Demanded in Chicago

DEMAND for machine tools continues strong in the Chicago district, mostly from buyers of one or a few tools rather than in large lists. Increasing difficulties are being met in placing orders on account of restrictions placed on raw material and sellers find themselves forced to exact priority certificates from all buyers in order to have the orders properly booked. Manufacturers find they are forced to show that their product is to be used for war purposes before they can place orders for castings to go into the machines. Railroads are quiet and among the several lists which have been pending for the past few weeks comparatively little buying has resulted. Shipbuilding interests are taking considerable heavy equipment including boring mills, lathes, milling machines and slotters. The McDougal-Duluth Corp., Riverside, Duluth, Minn., has been in the market recently for this class of machines. Announcement is made by the Chicago Association of Commerce that a shell-making plant to cost $6,500,000 is to be built in Chicago to produce heavy shells for the United States ordnance department. This should call for a large quantity of heavy equipment. It is understood also that a large plant to manufacture gun mounts is likely to be established here and inquiries have been made already as to the possibility of obtaining equipment. The Electric Steel Co., Chicago, has let a contract for its foundry addition. Armour & Co. has let a contract for a machine shop at the Union Stock Yards. The General Motors Co. will build a drop forge shop at its Detroit plant. The Lapeer Tractor Truck Co., Lapeer, Mich., will build a tractor manufacturing plant. The Pressed Steel Tank Co., West Allis, Wis., will build several additions. The Oliver Chilled Plow Co., South Bend, Ind., will build an addition to its forge shop. The Washburn-Crosby Co., Minneapolis, Minn., will build a machine shop addition. The Pacific Electric Railway Co., Los Angeles, has let a contract for numerous shops, including a machine shop and forge shop.

Pittsburgh Anticipates Need for Heavy Machines

DEMAND for machinery and machine tools coming into the Pittsburgh district is principally for government requirements. The Neville island ordnance plant will call for great quantities of equipment and considerable difficulty promises to be met in getting the large forging presses and lathes. Makers of the former are limited in number and perhaps are confined to the Bethlehem Steel Co., South Bethlehem, Pa., the Midvale Steel & Ordnance Co., Philadelphia, the United Engineering & Foundry Co., Pittsburgh, and the Mesta Machine Co., Pittsburgh. A plant will be built at Landisville, Pa., by the Kennedy Refractories Co., Union Arcade building, Pittsburgh, which has plants at Barntridge, Pa., and Bettsville, O., producing a basic lining for open hearth and crucible steel furnaces. Expansion of plants in the Pittsburgh district does not involve any big undertakings. The Pittsburgh Crucible Steel Co. has just authorized construction of its second blast furnace at Midland, Pa.

Large Lists Remain Open in Cleveland

SEVERAL large lists and a continued call for duplicate machines from firms engaged in war work is providing an active market in the Cleveland district. Pressure to induce increased production is bringing into the market, manufacturers whose shop equipment was deemed adequate to handle the contracts allotted at the time they were placed. No business has been closed on the lists of the New York Central and the Lake Erie and Western published in detail in last week's THE IRON TRADE REVIEW. A wider distribution of this business is expected among the machine tool dealers than has been the custom in the past, as the specifications have been given to a greater number of dealers. The Grant Motor Car Co. is still negotiating on a large list of requirements for the new plant at Findlay, O. It is stated that the entire amount of the machine tool requirements for this plant will reach $750,000. The Templars Motor Corp., Cleveland, is expected to issue a list of shell making tools at some time during the coming week. It is understood that this equipment will be supplementary to its present facilities. The Electric Steel & Forge Co., Cleveland, which recently has taken over the holdings of the Crucible Steel Co., plans to erect two new buildings. One of these will house a complete rolling mill, for which machinery will be needed, and the other will be for warehouse purposes. The Cleveland Armature Works, Inc., will build a factory addition. The National Screw and Tack Co. will construct a 7-story addition to cost $120,000. Arthur G. McKee & Co., Rockefeller building, Cleveland, are inquiring for a boring mill, a converter blower and a No. 3 or No. 4 press. The Firestone Steel Products Co., Akron, O., is inquiring for a 72-inch boring mill. The allotment of large contracts for trucks is expected to bring considerable tool inquiry from Detroit.


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Among New England Factories

BATH, ME.—The Kelly-Spear Co. plans to reconstruct its shipbuilding yard at a cost of $30,000.

BIDDLEFORD, ME. — The Saco Lowell Co. has awarded the contract for a 5-story, 25 x 65-foot machine shop addition to the Glynt Building & Construction Co., Palmer, Mass.

BURLINGTON, VT.—The Vermont Mill Chocolate Co. will build a brick, mill construction, fireproof, 1, 2, and 3-story, 150 x 163-foot factory and a 51 x 42-foot boiler house to replace its plant recently damaged by fire.

BOSTON.—A. J. Tower has awarded the general contract to W. A. & H. A. Root for construction of two factory buildings. The proposed structures will be five stories, 42 x 213, and 64 x 133 feet, respectively.

HOLYOKE, MASS.—The Walsh's Holyoke Steam Boiler Works has let the contract for a brick, mill construction, 3-story, 30 x 70-foot office building and garage, to cost $30,000.

IPSWICH, MASS.—The Ipswich Mills has let the contract for a brick, 2-story, 100 x 100-foot storehouse. Lockwood, Greene & Co., Boston, are the engineers.

PEABODY, MASS.—The A. C. Lawrence Leather Co. will build a 7-story, 72 x 88-foot addition to its administration building.

SPRINGFIELD, MASS. — The Bemis & Call Hardware & Tool Co. will build a brick and steel, fireproof, 1-story, 34 x 60 foot factory.

WORCESTER, MASS.—The Liberty Screw Co. has let the contract for a brick, 1-story, 60 x 150-foot factory.

CENTRAL FALLS, R. I.—Salembier & Clay have let the contract for a brick, mill construction, 1-story, 40 x 100-foot addition to the weave shed of the Fortuna Silk Mill.

PROVIDENCE, R. I. — The American Emery Wheel Works has let the contract for a 1-story, 38 x 85-foot addition to its plant.

PAWTUCKET, R. I.—A $175,000 extension will be made to the plant of D. Goff & Son by the Cruise & Smiley Construction Co.

SOUTH KINGSTON, R. I.—The Rocky Brook Mills Co. will build a $50,000 mill extension, 1-story, 46 x 116 feet.

BRIDGEPORT, CONN.—Harvey Hubbell, Inc., has let the contract for a brick and steel, fireproof, 2-story and basement, 60 x 120-foot addition to its factory.

BRIDGEPORT, CONN.—The general contract for a 2-story, 40 x 70-foot foundry, has been awarded by the Bullard Machine Tool Co. to John R. Sheehan.

STAMFORD, CONN.—The Stamford Gas & Electric Co. has awarded the general contract for a pump and valve house, costing $10,000, to the Guono Construction Co.

WATERBURY, CONN. — The American Brass Co. is building a 1-story, 30 x 137-foot addition.

WATERBURY, CONN. — The American Mills Co. has let the contract for a 1-story, 60 x 90-foot addition.

Along the Middle Atlantic Seaboard

BALLSTON SPA, N. Y.—A 3-story, 52 x 130-foot knitting mill will be erected here by F. J. Schutts & Co., Amsterdam, New York. The Strever Construction Co., Ballston Spa, will be in charge.

BLACK RIVER, N. Y.—A $500,000 power development will be undertaken at this place by the Northern New York Utilities Co., Watertown, N. Y.

BROADALBIN, N. Y. — The Broadalbin Knitting Co. is drawing plans for $50,000 mill extension, three stories, 62 x 92 feet.

BROOKLYN, N. Y,—Plans have been revised for a $20,000 plant addition for the Decorative Metals Co., 196 Degraw street.

BROOKLYN, N. Y.—The Kimble Realty Co., 1042 Dean street, is drawing plans for a $20,000, three and five-story factory addition.

BROOKLYN, N. Y.—The Atlantic Basin Iron Works, Imlay and Van Brunt street, has awarded the general contract for a $25,000 warehouse addition to William F. Henry, 316 Flatbush avenue.

BUFFALO.—Cousins & Son are receiving bids on a $25,000 boiler shop.

BUFFALO.—Liberty Aircraft Corp., Tonawanda, N. Y., will build a branch plant here.

BUFFALO.—Donner Steel Co., 475 Abbot road, will build a blowing mill.

BUFFALO.—M. J. McNiven, this city, will build a machine shop at Niagara street and Burd avenue.

BUFFALO.—Stewart Motor Corp., 9 Randall street, is arranging to build an addition 90 x 100 feet.

BUFFALO.—The Buffalo General Electric Co. is having plans drawn for a $17,000 addition to a substation. The proposed structure will be 1-story, 95 x 106 feet.

DEPEW, N. Y.—The Gould Storage Battery Co. contemplates the erection of 2-story, 75 x 90-foot factory extension.

DUNKIRK, N. Y.—The American Locomotive Co. is receiving bids for 1-story, 85 x 120-foot addition to its plant.

FAIRPORT, N. Y.—A power plant will be erected by the Douglas Packing Co. A. S. Crocker, Rochester, N. Y., is engineer in charge.

FAYETTEVILLE, N. Y.—The Precision Dye Castings Co. will erect a $5000, 1-story, 60 x 90-foot plant extension. The Central City Construction Co., Syracuse, N. Y., bas the general contract.

GENEVA, N. Y.—A $50,000 plant extension is being planned by the United States Lens Co., of which A. T. Wilson is president.

JAMESTOWN, N. Y.—The Art Metal Construction Co. will make an extension to its boiler shop. F. A. Shoemaker, Buffalo, will be engineer in charge.

LONG ISLAND CITY, L. I., N. Y.—The Neuer Steel Barrow Co. will start work shortly on an addition and several alterations to its plant.

LONG ISLAND CITY, L. I., N. Y.—A 1-story, 75 x 100-foot machine shop will be erected by Frank J. Ciancy, and will be leased to the Pressed & Welders Steel Products Co., 66 Myrtle avenue, Flushing, L. I., N. Y.

PHOENIX, N. Y.—Preliminary plans are being drawn for a 3-story, 50 x 200-foot silk mill for John Dunlop Sons.

ROCHESTER, N. Y.—Architects Hutchison & Strutz are receiving bids for a 50 x 100-foot warehouse for the Monroe Iron Metal & Cooperage Co.

SCHENECTADY, N. Y.—Bids on a 1-story, 120 x 175-foot boiler shop addition are being received by the American Locomotive Company.

SHOOTER'S ISLAND, L. I., N. Y.—The Staten Island Shipbuilding Corp., 44 Whitehall street, New York, will erect a compressing building, 1-story, 40 x 184 feet, at this place.

WARSAW, N. Y.—The Warsaw Elevator Co., C. E. Ketchum, president, will erect an addition to its power plant.

THE NATION IS COUNTING ON SPEED



—Speed in the air, on the land, and on the sea—on the battlefields of France, in the munition factories of our great cities—and on the vast agricultural fields of the country. Everywhere we must have SPEED—and then MORE SPEED.

And wherever extra speed is applied, there will be an unusual strain or exertion which must be met. Ordinary machines will not do—we are at war—we must have machines that will be able to keep up the pace set by the wheels of war.

TODAY—whether you are building airplanes, motor trucks or farm tractors, you must have castings of exceptional quality—you must have castings built to meet SPEED STRAINS.

SPECIFY OHIO STEEL CASTINGS and YOU WILL NOT BE DISAPPOINTED.

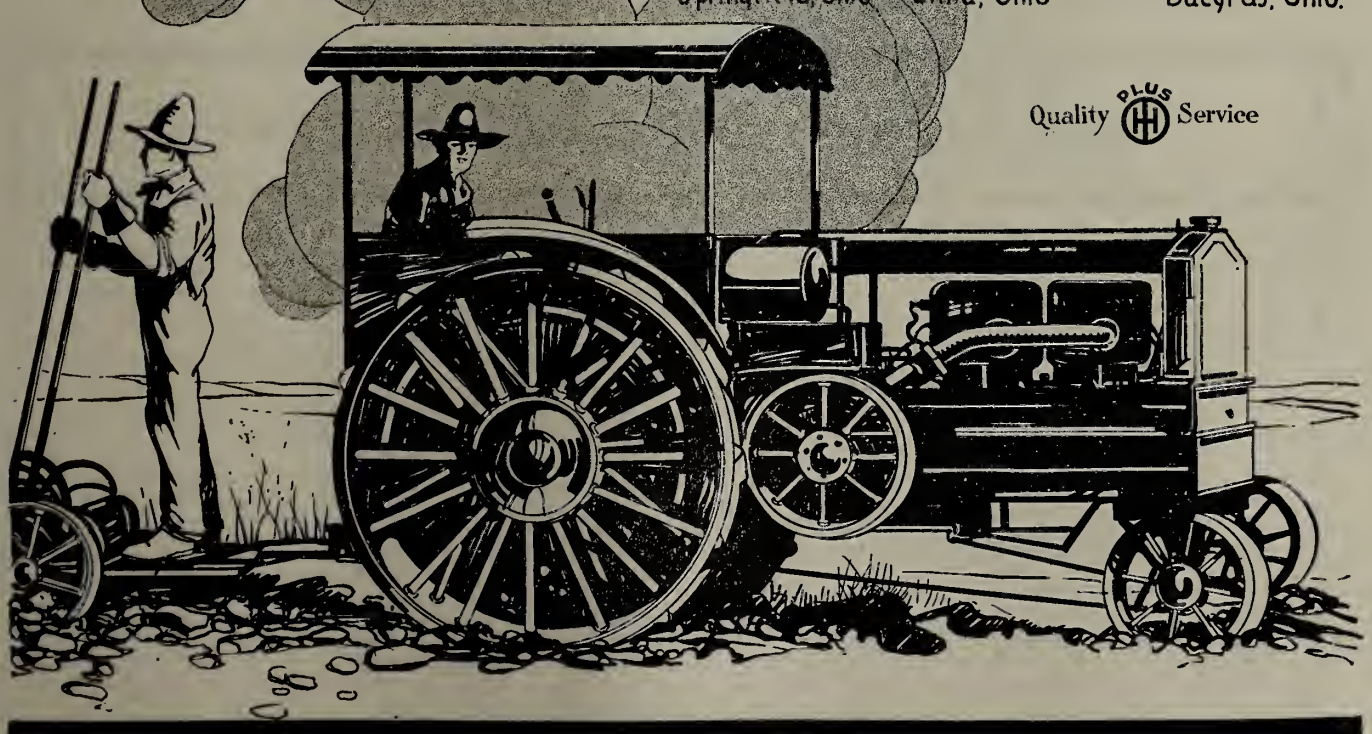
Let us figure on your requirements.

The Ohio Steel Foundry Co.

PLANTS

Springfield, Ohio Lima, Ohio Bucyrus, Ohio.

Quality PLUS Service



ALLENTOWN, PA. — The Aldrich Pump Co. will receive bids shortly on a $6000 addition to its foundry.

AVONMORE, PA.—The National Roll & Foundry Co. is building an 80-foot addition to its foundry and is installing its third air furnace.

BETHLEHEM, PA.—The Bethlehem Steel Co. is now receiving bids on a $6000 blower house.

HILLSVILLE, PA.—Carbon Lime Stone Co., this place will make extensive improvements to its plant at once.

LENNI, PA.—The Lenni Steel Co. contemplates the erection of a foundry in this city. C. W. Jenkins, 130 South Fifteenth street, Philadelphia, will be in charge of construction.

NEW BRIGHTON, PA.—Pittsburgh Tool Steel Wire Works has let the contract to Micklin Bros., Rochester, Pa., for an addition to its plant here, to cost $11,000.

NEW CASTLE, PA.—The Pennsylvania Engineering Co. has the contract for fabricating steel for rebuilding a blast furnace at the Farrell works of the Carnegie Steel Co.

OAKDALE, PA. — Aetna Chemical Co., this place, whose plant blew up recently, is arranging to build another plant somewhere in the Pittsburgh district. Address Benjamin B. Odell Jr., care the company.

PHILADELPHIA. — A $40,000 warehouse addition will be erected by the Schuylkill Warehouse Co. Peuckert & Wunder are drawing plans.

POTTSTOWN, PA.—The Industrial Foundry & Machine Co. is erecting an addition to its plant, which includes a machine shop, 90 x 140 feet, metal house and pattern works.

READING, PA.—Work has been started on a $30,000 enameling shop for the International Money Machine Co.

SHARPSVILLE, PA.—Yankee Steel Co., of America will have a plant built at Truxall city, near here, under direction of Ephrian Truxall, 1014 Union bank building, Pittsburgh, who is president of the company.

VANDERGRIFT, PA.—Phillips Bros., this place, will build a commercial garage and machine shop on the site of the Hunger building.

CONSTABLE HOOK, N. J.—A $130,000 coaling plant will be erected here by the bureau of yards and docks for the navy department. The bureau of yards and docks, Washington, is in charge.

ELIZABETH, N. J. — Plans have been completed by the Singer Mfg. Co. for construction of a $500,000 addition to its plant. The new addition will be 265 x 600 feet, of brick and steel, three stories.

JERSEY CITY, N. J.—Preliminary plans are being drawn by the Terminal Transit Co. for a shipbuilding plant in this city, comprising four ways. J. T. O'Connor, 1 Broadway, New York, is manager of the Terminal Company.

NEWARK, N. J.—Pierce Mfg. Co. will erect a factory for manufacture of boilers and plumbing fixtures.

NEWARK, N. J. — Ballinger & Perrot, Philadelphia, is drawing plans for a $25,000 plant addition. Name of the owner is withheld.

NEWARK, N. J.—The Butterworth-Judson Corp., 61 Broadway, New York, has filed plans for a 1-story, 42 x 52-foot addition to its plant in this city.

NEWARK, N. J.—The Newark Wire Cloth Mfg. Co. contemplates construction of a two or three-story factory building, 40 x 60 feet.

NEWARK, N. J.—Plans have been completed by the Hays Foundry & Iron Works for a 1-story, 50 x 250-foot addition. The construction will be done by the American Concrete Steel Co.

RIDGEFIELD, PARK, N. J.—The British American Chemical Co. contemplates the erection of a 1-story addition to its plant at this place. L. G. McNab, 42 Vanderbilt avenue, New York, is secretary.

BRUNSWICK, MD. — The Baltimore & Ohio railroad has awarded the general contract for $100,000 round house to Frannie Bros. & Haigley.

FREDERICKSBURG, VA.—A 2-story, 64 x 100-foot boiler and engine shop will be erected by the State normal school. E. G. Heeflin has been awarded the general contract.

Government Inquiries

Bids on the following equipment are desired by the navy department bureau of supplies and accounts.

Machine tools, including boring machines, duplex and profiling machines, 1843, no date, Washington.

Electric welding outfits, 4633½, June 18, Washington.

Four boring machines, 4636½, June 17, Washington.

Two grinding and shaping machines, 4638½, June 17, Washington.

Five toolmakers lathes, 4639½, June 17, Washington.

Two precision lathes, 4641½, June 17, Washington.

Eleven engine lathes, 4644½, June 18, Washington.

One radial drill, 4645½, June 18, Washington.

Shaping machine, 4646½, June 18, Washington.

One planer, 4649½, June 18, Washington.

One planing machine, 4650½, June 18, Washington.

One surface grinding machine, 4651½, June 18, Washington.

One jig boring machine, 4652½, June 18, Washington.

One grinding machine, 4653½, June 18, Washington.

One radial drill, 4655½, June 18, Washington.

Three grinding machines and drop press machine, 4657½, June 17, Washington.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

Activities in the Central States

ASHLAND, WIS.—P. V. Rundlett, Ashland, has taken the contract for the erection of a 2-story brick and concrete warehouse building, 50 x 120 feet, for the Ashland plant of the Charcoal Iron Co. of America.

BARABOO, WIS.—The Prothero & McGinnis Auto Co. will build a 1-story brick addition to its machine shop and garage.

BELOIT, WIS.—Fairbanks-Morse & Co., C. H. Morse Jr., president, 900 South Wabash avenue, Chicago, is planning a foundry to cost $300,000.

BURLINGTON, WIS.—The C. E. Reed garage and machine shop on Washington street is being enlarged by a 1-story brick addition, 31 x 92 feet. Matt Rewald is general

CHIPPEWA FALLS, WIS.—The Chippewa county board has appropriated $12,000 as its share of one-half of the cost of building 13 reinforced concrete and steel highway bridges in five townships this summer.

CLINTONVILLE, WIS. — The general contract for the erection of a new high school in this city has been awarded to the Hegner Construction Co., Appleton, Wis.

CUDAHY, WIS.—The Ladish Drop Forge Co. will build a boiler house, 50 x 60 feet, under direction of Klug & Smith, consulting engineers, Mack block, Milwaukee. The cost is estimated at $20,000, including new boilers.

EAU CLAIRE, WIS.—The common council has decided to engage an engineer to prepare plans and estimates of a new steel and reinforced concrete viaduct, to consist of four 210-foot spans and two 35-foot approaches.

KENOSHA, WIS. — The Pittsburgh-Des Moines Steel Co., Pittsburgh, has taken the contract to furnish and erect a steel water tank, mounted on a steel tower, for the Willowbrook Sanatorium, Kenosha, at $4750.

KENOSHA, WIS. — The Macomber & Whyte Rope Co. is building a 1-story brick and steel storage building, 60 x 200 feet. The work has been let to the Wisconsin Bridge & Iron Co., Milwaukee.

MADISON, WIS.—The board of regents of the University of Wisconsin has awarded the general contract for the erection of the new $125,000 Cornelius Bradley Memorial Hospital and Infirmary to Dahl-Stedman, 1011 Lumber exchange, Chicago. Arthur Peabody is university architect.

MARINETTE, WIS.—Bids are being taken by Architect Derrick Hubert, Spies building, Menominee, for the erection of a 2-story brick and concrete factory addition, 30 x 130 feet, for the Aerial Cutlery Co. C. F. Jaeger is manager.

MENASHA, WIS.—A $75,000 plant for manufacture of wire looms and wire cloth will be erected in Menasha by a company organized by John M. Graef. Plans call for two buildings, 110 x 150 feet, and 42 x 150 feet, 1-story, of reinforced concrete, steel and brick. Contracts will be awarded about June 1.

MIDDLETON, WIS.—Architects Law & Law, Madison, Wis., are preparing plans for

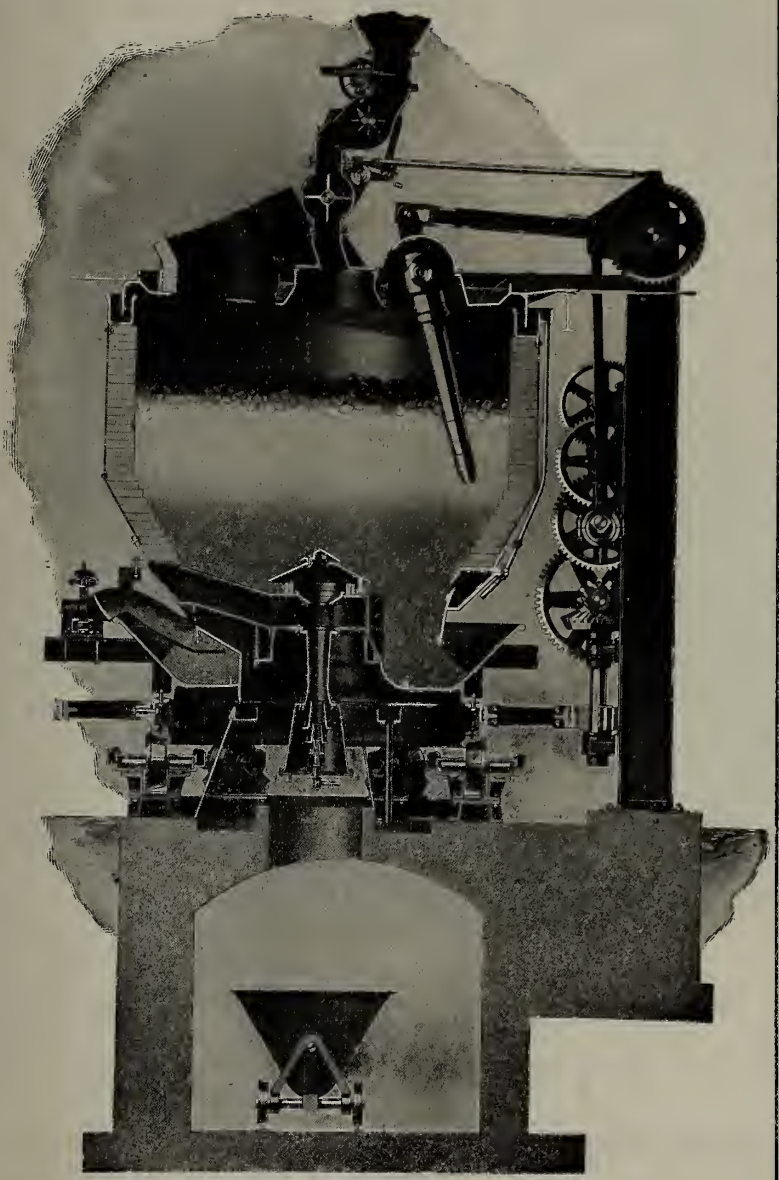
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron & Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

Say you saw it in THE IRON TRADE REVIEW

a 2-story brick and concrete high school building, 60 x 110 feet, costing $50,000.

MILWAUKEE.—The Cutler-Hammer Mfg. Co. is starting work on a foundry, 50 x 75 feet. The steel work has been let to the Worden-Allen Co., Milwaukee.

MILWAUKEE.—A 1-story reinforced concrete addition, 60 x 110 feet, will be erected by the Richardson-Phenix Co., Reservoir avenue and Hubbard street.

MILWAUKEE.—The Cream City Casket Co. awarded the general contract for a 3-story addition, 40 x 94 feet, costing $22,000, to Marggraff Bros., 2303 Cold Spring avenue. Leiser & Holst, architects.

MILWAUKEE.—The Crucible Steel Casting Co. has awarded contracts for the erection of a solid brick foundry addition at its plant at 612 Clinton street. The work will cost about $10,000.

MILWAUKEE.—Architects E. Brielmaier & Sons, 428 Broadway, Milwaukee, are ready for bids for erection of a 4-story brick and reinforced concrete hospital building and power plant for the Sisters of Mercy at Muskegon, Mich.

MILWAUKEE.—The Pressed Steel Tank Co. has awarded the general contract for designing and constructing a 1-story brick and steel galvanizing shop, costing about $12,000, to Kulg & Smith, consulting engineers, Mack block, Milwaukee.

MILWAUKEE.—The Milwaukee Pattern & Mfg. Co., Thirtieth and Locust streets, Milwaukee, will award contracts at once for construction of a 2-story pattern shop and storage addition, 58 x 74 feet, and will install new machinery and equipment. F. A. Drolshagen is manager.

NEW LONDON, WIS.—The common council awarded a contract to Victor Thomas to erect a 2-story addition, 28 x 50 and 32 x 28 feet, to the municipal light, power and waterworks pumping plant.

OCONTO, WIS.—The Oconto Service Co. has engaged Mead & Seastone, hydraulic engineers, 530 State street, Milwaukee, to prepare plans for a new concrete dam and improvements to its hydro-electric plant on the Peshtigo river.

RACINE, WIS.—The Hamilton-Beach Mfg. Co. is taking bids through Architect A. L. Flegel for erection of a 3-story factory and warehouse addition, 80 x 150 feet, which with equipment will cost about $45,000.

SHEBOYGAN, WIS.—A new contral exchange and administration building costing about $65,000 will be erected by the Citizens Telephone exchange.

SHEBOYGAN, WIS.—The Jenkins Machine Co. contemplates erection of a 2-story addition to its plant soon. The new structure will be fireproof, and equipped with modern machinery. The building will have a complete cupola elevator, and cleaning and core room equipment. A. G. Stuedeman is president.

SOUTH MILWAUKEE, WIS.—Emil Beetinger will build a new public garage and machine shop, 45 x 120 feet. It will cost $15,000.

STURGEON BAY, WIS.—The board of public utilities will build a pumping station and extend the waterworks system.

SUPERIOR, WIS.—The Globe Shipbuilding Co., B. C. Cook, president, is preparing plans for a 1-story machine shop 80 x 100 feet.

TURTLE LAKE, WIS.—Architect W. L. Alban, Endicott building, St. Paul, is preparing plans for a new high school building, costing about $45,000.

WAUWATOSA, WIS.—The asbestos mill operated here by the H. W. Johns-Manville Co., Second and Clybourn streets, Milwaukee, is being enlarged by the erection of a one-story addition, 60 x 140 feet.

WEST ALLIS, WIS.—The Universal Machinery Co., E. C. Devin, president, 784 Thirtieth street, will build a plant costing $250,000.

WEST ALLIS, WIS.—The Pressed Steel Tank Co., R. H. Hackney, president, contemplates building a 1-story addition to its finishing building and additions to its galvanizing shop, to $35,000.

WEST ALLIS, WIS.—The F. A. Gardner Machine Works, Seventy-fifth and National avenues, recently purchased by Menningsen & Karth, will be enlarged by the erection of a two-story brick addition, 50 x 85 feet.

DETROIT.—The Burroughs Adding Machine Co. is having plans prepared for a 5-story plant, 66 x 472 feet, costing $750,000.

DETROIT.—The Douglas & Lamoson Machine Co. will build a 4-story addition, 76 x 80 feet, to cost $20,000.

GRAND RAPIDS, MICH.—The Accounting Machine Co. is erecting a 2-story brick, 50 x 175-foot factory building. Contracts for most of the equipment have been let. John J. Harris is president and general manager.

PONTIAC, MICH.—The Wilson Foundry & Machine Co., C. B. Wilson, general manager, will build a 1-story machine shop addition, 41 x 169 feet.

SAGINAW, MICH.—The General Motors Co. is having plans prepared for a gray iron foundry. W. B. Durant, Flint, Mich., is president.

CHICAGO.—The Henry Lindahl Machine Co., 954 West Lake street, will build a 3-story machine shop, 50 x 50 feet, to cost $18,000.

CHICAGO.—William H. Vallas, 2855 West Lake street, will build a sheet metal shop on Sacramento avenue near West Lake street, to cost $20,000.

JACKSONVILLE, ILL.—The Jacksonville Reduction Co. will make extensive improvements at its plant.

LAKE FOREST, ILL.—Lake Forest will build an addition to its waterworks plant, 50 x 180 feet, and a chemical building, 33 x 48 feet, to cost $175,000.

CONNERSVILLE, IND. — The Indiana Lamp Co., F. M. Ansted, manager, will build a 1-story addition, 120 x 1000 feet, to cost $50,000.

CINCINNATI.—The General Briquetting Co., Chicago, has leased a building from the M. B. Farrin Lumber Co., and is installing machinery to make briquettes from cast borings.

Up and Down the Pacific Coast

PORTLAND, OREG.—The Pacific Marine Iron Works, East Main and Water streets will erect a dock, to cost $47,000, at Belmont and East Water streets.

CHOWCHILLE, CAL.—George R. Perry has let a contract for a 1-story machine shop, 50 x 100 feet, equipped with grinders and machinery to handle automobile and tractor construction and repairs.

HAMILTON CITY, CAL.—John Berlinger has secured the contract for the erection of a grain elevator for Andrew Kaiser, to cost $25,000.

LOS ANGELES.—C. J. Kuback Co., Merchants National bank building, has secured the contract for erection of a 5-story building for S. W. and H. E. Bixby.

OAKLAND, CAL. — The Hanlon Drydock & Shipbuilding Co. has undertaken on its own account, erection of a restaurant to cost $5000; machine shop, $10,000; blacksmith shop, $3500; office addition, $2500; hospital $1200, and wharf, $30,000.

RICHMOND, CAL.—The Pacific Oil & Lead Co. is starting work on its plant on the deep water frontage on the Richmond Belt railway.

SAN FRANCISCO.—The Engineer Office, U. S. A., 405 Customs House, is asking for bids for steel rails and accessories.

SAN FRANCISCO. — The Pacific Coast Boiler Works, 235 Main street, was recently damaged by fire with a loss of $15,000 to the buildings and an undetermined damage to machinery and equipment.

SAN FRANCISCO. — The Emergency Transportation Co., Oakland, Cal., has been granted permission by the state railroad commission to build an 8-block single track line on Chestnut street.

SAN FRANCISCO.—The Spencer Kellogg & Sons Linseed Oil Co., Monadnock building, has obtained property in Oakland, Cal., upon which erection of a large plant is planned.

SAN FRANCISCO.—The Lindgren Co., Monadnock building, has secured the contract for the construction of several brick and steel buildings for the California-Hawaiian Sugar Co. at Crockett, Cal. Estimated cost is $200,000.

SAN FRANCISCO.—The Union Construction Co., 604 Mission street, is taking figures for the construction of a 1-story, mill constructed or steel frame plate shop, 90 x 380 feet. R. S. Henningsen, Security Bank building, Oakland, Cal., is the engineer.

SAN FRANCISCO. — Under an understanding reached between the city authorities and representatives of the Emergency Fleet corporation, the government is to supply the necessary money and materials and pay for the building of an extension of the municipal street railway to the shipbuilding yards at Hunters Point, the city agreeing to take it over at the conclusion of the war.

SAN PEDRO, CAL.—F. W. Colegrove, 573 Seventh street, secured the contract for the erection of a corrugated-iron cannery building for the Seacoast Canning Co.

SANTA ANA, CAL.—Bond issues of $38,500 for construction of Main street bridge and $7700 for construction of Flower street bridge have been voted.

HANNA



M.A. HANNA & Co.

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Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
"CHERRY VALLEY "ZUG"

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Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

M·A HANNA & Co.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports	
Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	27.50 to 28.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melt'g steel, Birming.	23.00 to 24.50
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. guaranteed E. Pa.	36.50
Shoveling steel, Chicago	29.00
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 24.50
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	20.50 to 21.00
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 21.50
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.40
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	39.5 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.50 to 30.50
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	44.00 to 45.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	29.00 to 29.50
Busheling, No. 2, Chgo.	19.00 to 20.00
Busheling, No. 1, St. Louis	28.00 to 28.50
Cast borings, New York	16.50 to 17.50
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast, borings, Cleveland	18.25 to 18.50
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	17.75 to 18.25
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.00
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	37.00 to 37.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	17.00 to 17.75
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	19.00
Machine turnings, Birming.	16.50 to 17.00
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wrgt., No. 2, Chgo.	31.00 to 31.50
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	24.00 to 25.50
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	33.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.90
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	24.90
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	36.50 to 37.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 26.50
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, Birmingham	22.50 to 23.50
Cast, No. 1, cupola east. Pa.	34.00
Cast No. 1, Cleveland	31.00 to 31.50
Cast, No. 1, Cincinnati	31.50 to 32.00
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	26.75 to 27.25
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	33.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.75 to 32.25
Malleable railroad, St. Louis	28.50 to 29.00
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	35.00 to 35.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	43.00 to 44.00
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, June 20, 1918 *No. 25*

Firm Control Speeds Readjustment

Government Domination of Iron and Steel Distribution Forcing Swift Concentration of General Industry on Essential Production—Many Plants Face Suspension—Third Quarter Prices Up for Fixing This Week

WHOLESALE transformation of industry to accord with government dictates is in swift progress. The tight grip on all iron and steel supplies taken by Washington has brought this movement to a decisive stage. Two weeks of this complete rule has been sufficient to drive home forcibly upon manufacturing consumers what the supremacy of war demands means. Basic material is being denied to them except where it will serve ultimately the line of battle. The market has been stripped of normal commercial enterprise. Many plants already are feeling the pinch. Suspensions especially among smaller shops have been numerous. The future holds out little promise of relief to the nonwar producer. Direct war requirements and those lines of production given the government stamp of essentiality, are coming forward in unending tonnage and on a scale absorbing the full output of the mills and furnaces.

Perfect Plan of Control

The secondary chapter of complete control of iron and steel is at hand. The government is shaping the machinery looking toward a simplified system covering the administration of distribution so that tonnage shall be applied to best advantage within the three general classes of priority, preference and surplus requirements. The priorities committee of the war industries board is working out a rating for all essential orders. This will serve to guide the producers in shipping, since many of them have been in some doubt how to proceed under the government's general schedule of preferred purposes. Many makers have declined to deliver material unless a priorities certificate was furnished, although this has not been strictly required under the government plan. In some lines, notably wire and bessemer steel bars, the mills with some tonnage at hand over essential obligations, have been distributing this surplus among regular customers.

Great tonnages of iron and steel for war purposes are being distributed among the manufacturers. Allotment of the material for the government cars and locomotives now has been practically completed. Another heavy installment of shell steel for third quarter and last half has been placed. A Chicago producer has received 60,000 tons. A partial award for new lake boats involving 56,000 tons, has been made to Pittsburgh.

To Regulate the Jobbers

The position of the jobbers has received Washington's attention in the past week. Mill material passing through the hands of these distributors is to be made subject to similar regulation as in the case of the producers. Only to the extent that jobbers serve direct and indirect needs of war, will the replenishment of stock be assured. A system of monthly reports to the steel director has been proposed. Heavy hardware dealers are to be submitted to a somewhat similar control. This involves the reduction of styles, sizes, stocks, etc., in a manner paralleling that being worked out in the case of manufacturers of stoves, refrigerators and other users of iron and steel considerably removed from the war class.

New Factors in Prices

New factors will enter into the deliberations at Washington, Friday, of the general committee of the American Iron and Steel institute and the price-fixing committee of the war industries board to determine prices dating from July 1. Principally these will include the $1.50 to $2 per ton addition to production costs imposed by the general increase in freight rates effective next week. Pig iron makers located farthest from raw material bases are pressing their claims for an advance. This has lead to consideration being given to a plan of zoning prices in accordance with the freight haul on ore or coke. In the same connection iron producers are taking into account their position should an advance be obtained on iron ore for which independent operators are making a vigorous fight.

JUNE 20, 1918

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An Effective Yet Simple Control

EVERY well ordered scheme, however vast in its ramifications, must be founded upon simplicity. The scheme which has been worked out by the war industries board for the control of the iron and steel industry, meets this requirement. It provides that iron and steel may be shipped only when destined for a purpose included in the war industries board's so-called preference list. All orders which are entitled to priority certificates come within the scope of this list. All orders coming under the list may be shipped whether or not they have a priority certificate, except that priority orders must have first attention. Orders not coming within the scope of the preference list, may not be shipped until all preference purpose orders are filled, and then only after written approval has been received from the steel director.

In effect, this scheme, which was embodied by the war industries board in its announcement of June 7, embraces little that is new. The essentially new feature is that the steel director shall control the distribution through a license or permit system, any surplus that may remain after priorities or preferential purposes are satisfied. Iron and steel producers previously had pledged themselves to furnish the greatest possible portion of their output to the government, and a very thorough priority system had made it possible to carry out this pledge. The announcement of June 7 presents the working basis for which previous actions had paved the way. It definitely and clearly establishes the wartime status of the iron and steel industry. From the standpoint both of the producer and consumer this status should prove satisfactory. The system applied by the war industries board relieves the producer of the necessity of exercising his judgment with reference to requirements, and spares him the importunities of his customers. Consumers, on the other hand, know that there is not enough iron and steel to meet all requirements, but they are definitely assured by the preference list as to whether or not their particular needs will be taken care of. They now know that they must manufacture essentials or cease business.

The announcement of June 7 applies a licensing or permit system to requirements which do not come under the scope of the preference list. This list, however, is so broad that practically all essential requirements are covered by it with no fixed boundary. On the other hand, all requirements are essential from a relative standpoint, and if worst came to worst, the human race, despite the elimination of the less hardy, undoubtedly could survive with nothing but food and drink. Therefore, it also is likely that the scope of the list may have to be curtailed, as dictated by the volume of production.

No all-embracing scheme like this ever was put into practice without minor hitches and confusion. The foundation is there, however. In some lines, like pig iron, the situation is complicated. The blast furnaces making foundry iron, as an example, have very few priority orders, and need definite instructions before they are able to make their shipments conform to the announcement of June 7. In the steel industry as a whole, however, the priority system has been pretty thoroughly applied, and in any doubtful cases the steelmakers quickly can get a decision from the authorities at Washington. The language of the war industries board announcement as a whole is perfectly clear and the system promises to be functioning smoothly before many days have elapsed.

Basing Points and Markets

DULUTH'S desire backed by a rather vigorous effort to make itself a basing point for steel prices is understandable as a matter of local pride or ambition. Many other cities have at times entertained a similar conviction that they were entitled to such distinction and some of them have had plausible arguments to advance their case. They have found, however, that it has required more than the mere location of a plant or two to win a standing. The scope and importance of the market which these plants have served have in the end determined whatever individual-

ity as basing points they have acquired. Chicago and Birmingham are examples of this rule.

The fact that Duluth has the ore near at hand is far from a conclusive argument that it is a logical basing point. It is one thing to have the raw material and another thing to have the market. Duluth has the former but not the latter. Judge Gary points out that the Duluth plant of the Steel corporation was established more by a desire to recognize the great ore head of the lakes than by practical business standards. It has required many years to establish the steel industry of the south on a stable basis notwithstanding the fact that cheap ore and fuel were abundant.

It is unfortunate that the old sore of a proposed tonnage tax on the iron ore leaving the state of Minnesota should have been brought into this discussion It is difficult to see where the state of Minnesota could profit in the long run from the adoption of such a policy. If Minnesota should see fit to tax outbound ore to Illinois and Pennsylvania, it is conceivable that a tonnage tax on coal from the latter states going to Minnesota might follow in the end. Minnesota needs coal just as badly, if not worse, than Pennsylvania and Illinois need Minnesota ore. Such retaliatory action on either part would be ill-advised and obstructive to the mutual interests. There is no time or room, under war conditions, for any such baiting of local sensibilities.

McAdoo's Warning All-Inclusive

"LOYALTY to country" is a term which has become more familiar in the last 13 or 14 months than it ever was before, to millions of Americans. It now holds a depth of meaning to all Americans, whether Americans by birth or by choice. Of equal importance, however, has become the phrase "loyalty to employer". It is synonymous with the first, since practically no work is being done today which cannot be linked up with the government's effort in the titanic struggle which confronts the sane world. In final analysis, the workmen will win the war, be they in uniform or not. Those not in uniform, whether engaged in direct war work or not, are depended upon to back up those who do wear the uniform of the United States army.

This is more than true ever since Provost Marshal General Crowder's ultimatum of "work or fight" was given out. Even if they are not engaged on essential war work, however, wage earners are using as much of their remuneration as their circumstances will permit, in the purchase of liberty bonds, thrift stamps, in relief fund contributions, etc.

Director General McAdoo's warning therefore, to the striking railroad employes to the effect that "the government cannot be coerced or intimidated by any of its employes" is in reality, all-inclusive. It is universally applicable. Every man, woman and child in the United States or its possessions is really in the employ of the government "for duration" since upon all rests the responsibility of winning the war.

Strikes in railroad shops inspired Mr. McAdoo's statement that there shall be no more such disturbances, and that to strike against a railroad is not to strike against a private corporation but against the government of the United States. This puts the matter in a serious light. These remarks might well be directed against any striking body of workmen today, since any action which curtails production or delays plant effort has the same effect as treason.

No shirking is possible by the army in uniform. It should be made more impossible by the army which while not in uniform is none the less important in the effort of the allies to win the war.

The French battle cry is "they shall not pass". That of the English is "carry on". The one made famous by the American boys is, "over the top and at 'em". Let the battle cry of the workmen's army be "100 per cent united".

A Wholesome Sign of Service

UNDER present conditions of absolute control of railroads by the government, as represented by the railroad administration, it is a most welcome sign of efficiency and of desire to serve in the best possible way, that the federal authorities are willing to pause and avoid a mistake when an announced step brings protest.

The recent ruling that all freight bills must be paid in cash on receipt of goods, and prepaid freight must be paid on delivery to the carrier, with leeway of 48 hours to concerns filing a surety bond, promised to impose great hardships on shippers, consignees and the railroad accounting departments. As soon as the order was digested it was seen at once by men who would have to handle the detail that it meant a mountain of work, far out of proportion to the benefits likely to accrue from the cash payment plan.

On representations from railroads and shippers that such was the case, an order was entered giving a month from July 1, the original effective date until Aug. 1 to allow an investigation and such modification as would make the system just and practical. This is an admission of possible error on the part of the railroad administration and a willingness to co-operate.

Incidentally it was represented to the administration that if money due the government through the railroads must be paid "on the nail", the same business men, most of whom are creditors of the government for goods and materials furnished for war needs, can with full justice ask payment for their shipments on the same basis of promptness. It would be no harder for the government bureaus to pay at once than for the large business organizations to do the same on their freight bills. In this connection, most of the steel companies have bills against the railroads the payment of which is months overdue.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1586

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.30
Basic, Pittsburgh	33.10
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.60
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	34.10
No. 2 foundry, Cleveland	34.10
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	45.50
Silveries, 8 per cent, Chicago	48.50
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon, furnace	50.00 to 52.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.25 to 37.50
Charcoal, Superior, Buffalo	37.50
Charcoal, southern to 2 per cent silicon	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00 to 77.00
Spiegel, contracts, furnace	75.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	150.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00 to 155.00
Bessemer ferrosilicon, 10 per cent	55.00
Bessemer ferrosilicon, 11 per cent	58.30
Bessemer ferrosilicon, 12 per cent	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base, Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	63.35
Six-inch and over, Chicago	60.35
Four-inch, New York	64.35
Six-inch and over, N. Y.	61.35
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Shafting, Pitts., carloads	17 off to list
Cotton ties, May, per bundle	$1.91

RIVETS

Structural rivets, Pittsburgh	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets ⅞ in. & small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation, on leading products June 19, average for May, 1918, average for March, 1918, and average for June, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices June 19, 1918	Average prices May, 1918	March, 1918	June, 1917
Bessemer pig iron, Pittsburgh..	$36.30	$36.15	$37.25	$55.20
Basic pig iron, Pittsburgh.....	33.10	32.95	33.95	50.20
*No. 2 Foundry pig iron, Pitts.	34.10	33.95	33.95	51.02
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	51.00
Lake Superior charcoal, Chicago	37.50	37.50	37.50	51.80
Malleable, valley	33.50	33.50	33.50	50.07
Malleable, Chicago	33.50	33.50	33.50	50.50
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.....	32.00	32.00	33.00	46.37
**No. 2X Virginia, furnace....	33.50	33.50	33.50	46.50
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	47.50
Ferromanganese, 70%, delivered	250.00	250.00	250.00	431.25
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	93.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	101.25
Open-hearth sheet bars, Pitts..	51.00	51.00	51.00	101.25
Open-hearth billets, Pitts.....	47.50	47.50	47.50	93.75
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.62
Steel bars, Chicago.....	2.90	2.90	2.90	4.50
Iron bars, Philadelphia.....	3.50	3.50	3.50	4.26

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices June 19, 1918	Average prices May, 1918	March, 1918	June, 1917
Iron bars, Cleveland.....	$3.64	3.64	3.64	3.50
Iron bars, Chicago mill.....	3.50	3.50	3.50	4.00
Beams, Chicago	3.00	3.00	3.00	4.63
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.18	3.18	4.66
Tank plates, Pittsburgh.....	3.25	3.25	3.25	4.50
Tank plates, Chicago.....	3.25	3.25	3.25	7.92
Tank plates, Philadelphia.....	3.435	3.43	3.43	9.66
Sheets, blk., No. 28, Pitts.....	5.00	5.00	5.00	8.13
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	7.57
Sheets, galv., No. 28, Pitts....	6.25	6.25	6.25	9.95
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.62
Connellsville furnace coke.....	6.00	6.00	6.00	11.12
Connellsville foundry coke.....	7.00	7.00	7.00	11.18
Heavy melting steel, Pitts.....	29.00	29.00	30.00	40.00
Heavy melting steel, eastern Pa.	28.50	28.50	29.50	36.62
Heavy melting steel, Chicago..	29.00	28.90	30.00	37.00
No. 1 wrought, eastern Pa....	34.00	34.00	35.00	47.87
No. 1 wrought, Chicago.....	33.50	33.50	35.00	46.75
Rerolling rails, Chicago.....	34.00	34.00	35.00	46.00

(For Additional Prices See Page 1586)

Await Third Quarter Prices on Iron

Some Producers Make Strong Claims for Advance Because of Increased Freight Costs—Survey of Consumption to be Wound Up Quickly—Inquiry for 1919 Delivery Continues to Appear

Pittsburgh, June 18.—Practically all of the questionnaires sent out by blast furnace interests in connection with the pig iron survey have been filled out and returned by consumers. In rare instances users have declined to fill out the questionnaires and they will be placed in the nonessential class so that in order to get pig iron after the licensing system is fully in effect it will be necessary for them to obtain orders on furnaces from the war industries board. Undoubtedly, some of them will be unable to get these credentials. The questionnaires as returned appear to show but little if any difference than has been previously indicated with regard to percentages of steelmaking and foundry iron that are entering into essential manufacture. It is estimated that about 80 per cent of the former grade and 65 per cent of the latter grade are being so used. Under the system of priority consumers will be supplied with iron according to the percentage they are using for direct and indirect war purposes. Any surplus that may be available will be supplied for other uses, but approval from the war industries board probably will be necessary in order to get tonnages. There also may be considerable diversion of tonnages from nonessential to essential users. Inquiries for iron are almost a thing of the past, not because of a lack of necessity but simply for the reason that consumers appreciate there are no offerings and that it is useless to go into the market. Distribution of tonnages these days rests largely with the war industries board and it is through that medium that many consumers are getting supplies. Reports are heard that pig iron prices may be increased $1 or $2 a ton during the third quarter owing to higher freight rates and greater labor costs.

Furnaces Await Instructions

New York, June 17.—It is expected here that the subcommittee on pig iron, iron ore and lake transportation, and the pig iron division of the war industries board will have digested the pig iron situation shortly, as reflected by the questionnaires, and that it will not be long after July 1, before the furnaces receive such instructions as will enable them to make shipments in complete conformity with government wishes. In the meantime, eastern furnaces are taking pains to follow as fully as possible the spirit of the war industries board's announcement of June 7. Where there is doubt as to whether consumers are entitled to iron, the case is taken up with the pig iron division of the war industries board, or the subcommittee on pig iron, iron ore, and lake transportation. In general, the furnaces are going by the questionnaires which recently were filled in and returned by the consumers. These show the percentage of the melter's business which comes in the preference list classes. The only new pig iron sales reported involve considerable southern iron which has been sold for second half delivery in the west. No business of any moment is reported in this territory.

Await Definition of Regulations

Buffalo, June 18.—The exact meaning of the government moves in relation to the industry during the past week is not clear to all producers in this district and they are in the position of waiting for the situation to

clarify. Summed up, the opinion of the furnace interests here is that no material change will result from the new regulations. In other words the industry has been under government wraps for some time and the new regulations merely mean that what the furnaces have been doing voluntarily for some weeks past now becomes compulsory. There will, in consequence, be no startling change in the methods of the trade. Furnaces here have nothing to sell. They say they may have something later on but the information concerning this is indefinite, and in any case, it is not believed the tonnage will be extensive. No booking is being done, nor will any be done, according to one interest, till it actually has iron on hand to be sold. All furnaces are sold up for the balance of the year or nearly so. Though all interests have not demanded priority certificates it has been because they were satisfied that the material was going into government work.

Price Meeting Holds Interest

Philadelphia, June 18.—Interest of pig iron producers in this territory is focused on the meeting at Washington Friday between representatives of the iron and steel industry and the price fixing committee of the war industries board when prices dating from July 1 will be fixed. Virgina producers held a meeting in this city today to determine what action they should take with regard to price revision. Costs of production in Virginia have been increased more than $2 per ton by the general freight advance effective June 25. The pig iron committee is preparing to allocate 8750 tons of foundry iron for the Baldwin Locomotive Works, Eddystone, Pa., and 2575 tons for the Westinghouse Electric & Mfg. Co., Essington, Pa., both for last half delivery. Sales include 2000 standard low phosphorus for the government.

Trying to Complete Survey

Cleveland, June 18.—Some producers of pig iron now are not accepting orders unaccompanied by priority certificates unless they are in the form of allocations. In making shipments, they are being guided by the data developed from their customers through the recent questionnaires which disclose the amount of war or preferred work which each consumer is performing. A strong effort is being made by the committee on pig iron, iron ore and transportation to complete the canvass this week. To this end, Steel Director Replogle has dispatched a letter to the furnace operators urging upon them the importance and necessity of winding up the survey without delay. Producers continue to encounter a few cases where consumers refuse to give the required information. It is felt these will be effective ways of bringing these recalcitrants to time. One northern Ohio interest which has practically completed its canvass shows 80 per cent of its customers' capacity is engaged on work prescribed by the government as essential and 20 per cent as miscellaneous; a western Pennsylvania interest shows 84 per cent essential and 16 per cent miscellaneous. Heavy allocation requests in malleable have come up for the railroad administration covering recent government car requirements. These amount to 23,000 tons. Basic iron is being sought on all sides in heavy tonnage. New requests announced this week total 25,000 tons, and there is a much larger amount still up for action. New foundry requests reach 3000 tons. Allocations made in the week include 17,000 tons of basic for delivery over the year to Midland, Pa.; 2000 tons each of early basic to Chrome, N. J., Newport, Ky., Erie and Pittsburgh; 800 tons of foundry for a Chicago buyer and 700 tons for Providence. A lot of 8750 tons of foundry for Eddystone, Pa., is unplaced as well as about 8000 tons of bessemer for Midland, Pa. Much low phosphorus tonnage awaits action as this grade is scarce. An open inquiry for 1000 tons of bessemer ferrosilicon is up. One of the Cleveland Furnace Co. stacks has gone out for six weeks to reline. Pig iron producers met in this city on Monday and considered the matter of pig iron prices dating from July 1, preliminary to a conference with the general iron and steel committee at New York Wednesday. In some quarters, producers hold a well-defined belief that some increase in price is necessary to absorb the higher freight cost soon to apply on their raw materials.

More First Half Inquiry

Chicago, June 18.—Additional inquiry for pig iron for the first half of 1919 is appearing as melters come to the opinion that they should take some action toward covering their requirements into next year. Some makers are booking these inquiries in the form of contracts with the provision that prices shall be regulated by the government figures applying at the time of delivery and that shipment shall be subject to whatever regulations are imposed by the war industries board. Manufacturers of Lake Superior charcoal iron are also receiving inquiries for next year's delivery but up to this time have not considered the tonnages placed before them. It seems probable that the plan followed early this year of tabulating all inquiries from regular customers and apportioning the probable production among them pro rata will be followed. Practically no selling of pig iron for delivery this year is now being done by any producers. Occasional small carlots of off iron are being disposed of with especial care to place them with manufacturers of essentials, according to the government's recent announcement. Makers have not yet received official notice as to making delivery of iron on present contracts, but are endeavoring to observe the spirit of the order in the absence of explicit instructions. It is believed that something more definite will be available to guide their action when announcements are made of prices to govern after July 1.

Fail to Submit Data

Cincinnati, June 17.—A contributing factor to the uneasiness of some melters is the uncertainty of whether they will be classed in the list of essential industries. A few concerns postponed sending in their questionnaires and these will probably be subjected to considerable hardships in establishing the fact that their products are for war purposes under the meaning of the government's announcements. However, as yet no priority certificates are necessary and it is more than probable that firms which are really engaged in war work can readily establish the fact and escape the obvious penalty for delaying their returns. Inquiries relate more to requests for additional tonnages on former contracts than to the speeding up in the movement of iron. With the railroads in the hands of the government, most melters feel that everything is now being done to send the metal forward as fast as it is possible to do so. Every consumer wants all iron possible to be forwarded before June 25 to take advantage of the old freight rates. It is currently reported that an advance in both foundry and basic iron will be considered at the American Iron and Steel institute meeting scheduled to take place Wednesday of this week. Local furnaces are inclined to think that the present schedule will be allowed to stand.

Adjusting to New Conditions

St. Louis, June 18.—Taking over by the government of entire control of the iron and steel industry has caused a theoretical halt in pig iron activities here, during which producers and consumers are seeking to ascertain in exactly what position

they stand and to prepare themselves for conditions which must follow the new arrangement. Several of the larger interests have sent representatives east to get fully posted on all details and ramifications of the new order, and meantime are exercising their own best judgment in conducting their business. Plants working on nonwar products look for only a short respite before lack of iron supplies will compel them to curtail to a minimum or entirely suspend operations. It is expected that the stove and bed manufacturing interests in this district will be among the first to feel the pinch. Dealers and producers of pig iron report a marked falling off in general commercial inquiry since the war industries board took over control. During the past few days demands have been confined to makers of essentials, and all have been accompanied by the several degrees of priority certificates. The leading selling interests are discouraging all efforts of others to purchase. So far as pig iron is concerned, the new railroad rates, which shortly go into effect, will cause relatively little inconvenience to producers here, their outputs being placed nearly 100 per cent in the district proper. Southern furnaces, however, are considerably worked up over the advance. Shipments from the south continue to come along in good shape under more liberal allowance of cars and improvement of transportation facilities generally.

Government Control Complete

Birmingham, Ala., June 18.—Government control is practically complete in the pig iron market in the south. Furnace companies are not attempting to do much business except through government agencies. The production is being closely watched, the effort being made to get out as large an output as possible. Belief is expressed that the production for June will be as good, if not better than last month, though two furnaces are undergoing repairs and one recently has gone in. Labor efficiency still is below expectations and is having its effect on production. Shipments of iron are steady and furnace stocks continue to show reductions. Some arrearages on old contracts continue.

Made Selling Agents

New York, June 18.—Crocker Bros. have been appointed exclusive sales agents of the Seaboard Steel & Manganese Corp., Temple, Pa., manufacturers of ferromanganese, spiegeleisen and pig iron.

Car Supply Exceeds Coke

Connellsville Roads Now Furnishing Full Service—Seek to Arouse Indifferent Labor—One Contract Placed

Pittsburgh, June 18.—The supply of cars on both Monongahela and the Pennsylvania railroads in the Connellsville coke region is being maintained at 100 per cent and is considerably greater than the loading capacity. Shipments to furnaces, however, appear to be adequate and no complaints are heard from makers of pig iron on account of the lack of fuel. At the same time it would be desirable to increase production, but slow progress in this direction is being made owing to the indifference of laborers. The labor situation in the region is being investigated by government agents with a view to adopting some plan to persuade or force employes to work more consistently and energetically in order that production may be increased. Campaigns to arouse employes to the necessity of increasing output have been conducted by operators through appeals printed in newspapers and placed in their pay envelopes but the results obtained have been only partially satisfactory. Inquiries which recently developed from consumers of furnace coke whose contracts will expire July 1, have not resulted in much new business. One contract has been closed by an eastern furnace interest but usually both buyers and sellers are content to allow their business to stand on an open order basis which means that fuel will be shipped in accordance with requirements to the extent that the supply permits. Production for the week ending June 8, totaled 341,020 tons as compared with 343,020 tons during the preceding week according to the *Connellsville Courier*.

Urge Demand Shipments

Cincinnati, June 17.—Some consumers of both furnace and foundry coke are asking that shipments be forwarded as promptly as possible. As the fuel is going to essential industries, the question of sending it forward does not hinge entirely on priority orders. A well-informed house states that labor is causing some uneasiness in the Connellsville field and that if some improvement cannot be brought about soon, the output may decline considerably. The matter of rolling stock appears to have been solved in a satisfactory way and cars are now more plentiful. No sales of consequence have been made lately and all efforts are now directed to getting the coke moved to plants that are doing war work.

Sell By-Product Fuel

Cleveland, June 18.— Owing to the blowing out for repairs of one of the stacks of the Cleveland Furnace Co., considerable by-product coke has been made available to the local foundry trade for July and August delivery. The offering of this coke is giving the foundries an opportunity to stock up for the winter. Sales are being made at $8.75, Cleveland ovens, with the provision that the maximum permissible price in effect at the time of shipment shall prevail. This clause covers the changes growing out of increased freight rates June 25 or any subsequent revision of prices.

Demand Greatly Exceeds Supply

St. Louis, June 18.—Aside from a partial relaxation from the recent stringency caused by improvement in deliveries from the east, the coke situation here has undergone absolutely no change during the past few days. The demand from all sources continues vastly in excess of available supplies, and dealers report melters resorting to every subterfuge to secure even a few cars of metallurgical coke. Representatives of eastern ovens say they have not a pound to offer for sale and do not expect to have for an indefinite period. Gas and by-product plants in this region have been combing the principal coal fields intensively during the past few weeks but with rather disappointing results. Reports from their scouts are to the effect that production has been placed for months ahead, and that extremely little coal suitable for coking purposes can be had.

Labor Still Indifferent

Birmingham, Ala., June 18.—Coke production is being held down by the labor indifference. Governmental and local speakers now are going into the coal and coke fields and calling on the loyalty and patriotism of the toilers. In some portions of the Birmingham district it is reported the coke production could be raised from 5 to 10 per cent in both quantity and quality through steady work at the coal mines and around the ovens. Priority orders for coke are being filed and deliveries are being made in accordance with government desires.

No Scrap Changes Sought

Committee Makes No Recommendations on Prices or Differentials But Will Rewrite Certain Classifications—Supply Grows Shorter

FOR COMPLETE SCRAP PRICES SEE PAGE 1586

Philadelphia, June 18.—No recommendations for changes on scrap prices and differentials effective July 1, it is understood, were decided upon at the meeting of the subcommittee on scrap of the American Iron and Steel institute, held in this city yesterday. This indicates that present prices are regarded as satisfactory. Attention largely was devoted to the point whether the present classification of scrap meets all requirements. It is understood the subcommittee will make a change in the unguaranteed low phosphorus classification to oppose the efforts of some dealers to take advantage of this section. These dealers have been trying to deliver selected heavy melting steel as unguaranteed low phosphorus at $34, delivered. The classification will be reworded to prevent such attempts. It is understood also the subcommittee will rewrite the cast classification to prevent attempts of sellers to deliver grades other than No. 1 cupola cast at $34.

Scarcity Grows Pronounced

New York, June 17.—Increasing scarcity of practically all grades is being noted in the New York scrap market, as a result of continued active demand. Consumers in the Pittsburgh district still are buying steel scrap in this district, although some little difficulty is being experienced in getting material through due to traffic congestion. The trade continues to be in more or less of a quandary as to the scope of the proposed freight advance effective June 25. The uncertainty is whether or not the full increase of 25 per cent proposed will affect rates on New Jersey points, which were advanced 15 per cent late last fall, or rates on New England points, which were increased about a month ago. It appears to be the consensus of opinion that points already affected will be subject only to advances equivalent to the difference between the proposed increase of 25 per cent and those now in force.

The International Arms and Fuse Co., Bloomfield, N. J., is taking bids on 20,000 tons of shell turnings.

Demand Greater Than Supply

Pittsburgh, June 18.—All of the leading grades of old material are in active demand and supplies in this district are not sufficient to meet the requirements. Consumers of scrap for open-hearth consumption are especially active in their efforts to get tonnages and direct buying from producers still is being done on a rather broad scale. Transactions of this kind do not involve the payment by users of the commission of 3½ per cent to dealers and brokers. Heavy melting steel and guaranteed low phosphorus scrap are perhaps in greatest demand. Owing to the inability of consumers to cover their needs in this district tonnages are being bought from outside zones, calling for the payment by users of freight differentials. Dealers and brokers will have to bear the increase of 25 per cent in freight rates, effective June 25. Some dealers, however, have bookings for unshipped tonnages based on a delivery basis of f.o.b. yards, instead of f.o.b. consuming points, the sales being made at the government prices less the present freight rates. It is uncertain how these orders unshipped by June 25 will be affected. Obviously with this increase made the levels on this class of business would exceed those established by the war industries board. Among sales made is one of 500 tons of heavy melting steel at the government price of $29, plus the commission, and another of 200 tons of cast borings at the fixed level of $19 plus the commission. One prominent consumer is said to be offering only $18 with commission for the latter grade, but no tonnages are said to be available at less than the government figure.

Scour Market for Steel

Buffalo, June 18.—Inquiries from outside sources for heavy melting steel are flooding the market. Most of the inquiry comes from the Pittsburgh and Youngstown districts. There is no question but that there is at the present time a real shortage of this principal grade. In the large yards of this district there is today not a single ton of heavy melting steel unsold. Some dealers believe the shortage of heavy melting steel indicates that the day is not far distant when the government will take steps to bring the production of scrap under its control. The demand for every grade is good. Complaints are numerous that some dealers are offering prices in excess of the government price for shoveling machine shop turnings for open-hearth purposes for delivery to Pittsburgh and valley districts. Considerable speculation is being indulged in concerning the meeting of the subcommittee of American Iron and Steel institute in New York this week to consider prices of scrap effective July 1. It was generally felt before the increase in freight rates was announced that reductions in the prices of all grades would be made. This forecast now has been modified. A price will be fixed, it is expected, on relaying rails.

Await New Prices

Cleveland, June 18.—The closer price-fixing day—July 1—approaches the more consumers and dealers of scrap iron and steel are holding off trading. Most consumers believe prices will remain stationary. Producers of scrap, by the same reasoning, are holding on to their supplies. Dealers consequently have abandoned most efforts to trade. Concensus of opinion here continues that so long as the trade keeps the mills supplied with scrap, government control will not be extended to cover it. In any event, the government is the only customer, and were it not for the freight-rate advance, dealers would be more fearful of a slashing of prices for the third quarter. One dealer here has several thousand tons of $39 low phosphorus which is not moving. No. 1 busheling continues firm. So do borings and turnings. Steel is difficult to buy in the open market, though many yards are shipping it out in huge quantities.

Taking Inventory of Supplies

Chicago, June 18.—Pending the next announcement of maximum prices to apply after July 1, scrap trading continues dull. An independent steel maker which recently has bought considerable tonnage of heavy melting and shoveling steel continues in a receptive mood and is understood to be willing to take on further tonnage for winter use, following the request of the war industries board that stocks of scrap and fuel be accumulated before winter interferes with transportation. It is believed the same consideration may move other consumers to seek larger supplies as soon as price levels are made stable. The American Iron and Steel institute, through W. Vernon Phillips, chairman of the subcommittee on scrap, is asking the co-operation of scrap men in reporting all lots of unprepared material being withheld from the market, as well as a report on tonnage of all sorts now on hand and the tonnage on hand June 1, 1917. The purpose of this

questionnaire is to afford an inventory of scrap resources which will be of value in determining many things relative to the probable supply of raw materials for steelmaking. The Chicago, St. Paul, Minneapolis & Omaha offers 500 tons of scrap, including 100 tons of steel rail. The Grand Trunk has issued a list containing 2300 tons of which 1088 tons are unsorted.

Fear Shortage of Supply

Cincinnati, June 17.—All quotations are firmer and there seems to be some anxiety on the part of dealers that their stocks will not be sufficient to take care of the demand later on. The reason given is that the offerings of scrap are growing lighter while the demand is improving. Whether yard stocks will be able to stand the strain much longer is a question. They are rapidly becoming smaller. Gray iron foundries are especially interested in arranging for a future supply, as some of them will have to add to what they have bought for the last half if the present melt is kept up. Cast borings and steel turnings are stronger. No. 1 railroad wrought is close to the maximum. No. 1 machine cast also is stronger.

Differ Over Government Control

St. Louis, June 15.—Considerable difference of opinion exists among scrap interests here as to whether the government will take over the scrap industry. So long as things are running along as at present, and users are being regularly supplied, it is believed little advantage could be gained by changing the status. On the other hand, it is pointed out, these are times of centralized control, and an industry so closely related to production as scrap can hardly expect to remain an independent factor. The interminable and broadly distributed sources of supply, it is thought, would make federal handling of the business extremely difficult. Summer dullness has settled on the market here, sales of all grades being at a minimum. Even the usual interchange between dealers has been unusually light. Consumers are showing little interest in the market, claiming to be well covered for an indefinite period with contract material. Offerings are insignificant. Prices remain stationary.

Yard Stocks Are Depleted

Birmingham, Ala., June 18.—Yards of scrap dealers in the south are becoming depleted as shipments on old contracts are being rushed and local consumers will not pay the maximum prices under the government schedule, warranting the bringing in of country scrap in quantity.

Big Shell Steel Awarded

Third and Fourth Quarter Tonnage for 6 and 9 Inch Projectiles Placed—Sheet Bars May Be Pooled

Youngstown, O., June 19.—Orders for government shell steel for third quarter shipment have begun to come out and makers here have taken on heavy tonnages. Some tonnage for fourth quarter shipment has also been placed but these are small. The sizes wanted range between 6 and 9 inches. One maker will begin to roll next quarter's booking the latter part of this month, as only a small tonnage of the last large government order for this material remains on his books. Before the government placed its last big shell-steel order, all the shell-steel makers convened in New York and agreed to take on as much second quarter business as their mills could produce. A few makers here completed their allotment ahead of the scheduled time and hence were anxious to have the government announce its future shell-steel program. The sheet-bar situation has not improved to any considerable extent and as a result the sheet mills continue to operate in an up-and-down manner.

Effect Will Be Slight

Pittsburgh, June 18.—Adoption of the permit or licensing system by the war industries board will have slight, if any, effect on the distribution of semifinished steel. For a long time the entire output has been going to consumers engaged in essential manufacture and generally in accordance with the importance of lines being turned out, as seen by the sellers. Sheetmakers, however, who are producing government work altogether have suffered severely from a shortage of sheet bars and it is reported that these tonnags may be pooled and distributed among the finishing mills with relation to their capacity and the bookings they have on hand. Slabs, billets, and skelp also are in strong demand, but none is available with the exception of infrequent and light offerings which are quickly taken. Output of wire rods is extremely limited, owing to a scarcity of steel and some makers have suspended production entirely. Priority orders are demanded by makers before they take any orders. Those taken involve small lots chiefly in rods 0.70 to 0.75 and higher in carbon, which sell at $90 a ton, mill.

Axle Billets Placed

Chicago, June 18.—The leading independent steel maker in this district has been awarded 9000 tons of axle billets to be furnished to the South Chicago plant of the Pollak Steel Co., for axles to be used in equipping the government's freight cars.

Strip Operations Vary

Pittsburgh, June 18.—Shortage of steel is being felt seriously by hot and cold rolled strip steel mills and their operations vary from 60 to 80 per cent. Direct and indirect government requirements are taking practically all of the output and are furnished only upon the furnishing by consumers of priority certificates. Stocks of some makers are exhausted, while with others are small. Demand from manufacturers of automobiles is extremely light.

Price Satisfactory

To Tin Plate Makers if Reasonable Tin Were Assured

Pittsburgh, June 18.—Tin plate makers are giving attention to the matter of fixed prices of their products for the third quarter beginning with July 1. The subject will be discussed in New York tomorrow, it is understood, between the chairman of the tin plate committee and the committee on steel and steel products of the American Iron and Steel institute preliminary to the question being taken up on Friday by the war industries board in Washington. Producers would be satisfied to have the current price of $7.75 per base box maintained provided some plan were adopted by which they would be assured of a supply of pig tin at approximately 70 cents a pound. Some makers now are paying as high as $1, and even more for tin whereas when the price of $7.75 for tin plate was fixed last November tin was bought at about 60 cents a pound. Palm oil also has advanced in price, but there is now enough of this on hand in the United States to supply users for the remainder of the year.

Scratch Off Nonwar Orders

Youngstown, O., June 19.—Demand for tin plate has increased among the valley mills and production is close to 100 per cent. The government has distributed several orders for bread cans among various canmakers, and orders for tin plate to be used for this purpose are beginning to come in.

Heavy Bar Orders Placed

Government Car Requirements Direct Large Tonnage to Mills—60,000 Tons for Shells Placed—Selling Bessemer Bars

Chicago, June 18.—The leading independent steel producer has been given 60,000 tons of shell steel for last half delivery to the Standard Forge Co. at Indiana Harbor, Ind. This is for 9.2 inch shells. Carbuilding companies, which have been requested by the railroad administration to buy their bars wherever they could place them, have not yet been able to obtain contracts with mills and this business is still pending. Demand for bar iron is increasing and part of the enlarged inquiry is from consumers who never before have used this material. Greater difficulty in obtaining soft steel bars is turning these buyers to the use of iron. Railroad and car builders, who had been relied on for considerable business, are not much in evidence. Some small tonnages are being sold for third quarter delivery. Inquiry is decidedly more active. Reinforced concrete builders are becoming more active and are using every effort to have their requirements covered by mills. Shortage of steel rails for rerolling limits the tonnage which can be booked and most mills are working only part time. The Chicago Heights mill will be down about half of July while its furnace is being repaired.

Unused Capacity Considerable

Pittsburgh, June 18.—Makers of iron and steel bars are booking tonnages which are to enter into essential manufacture only. Operations of iron bar makers are heavy and while producers of steel bars have increased their output there is yet considerable unused capacity. Steel bar tonnages for cars to be built for the government have been placed with makers in this district. The Carnegie Steel Co. is said to have been awarded about 40,000 tons for the Pressed Steel Car Co., and the Standard Steel Car Co.

Allocations are Small

New York, June 17.—The only orders for iron and steel bars for fairly early delivery being taken by sellers in this district are those which come under the preference list and for which priority certificates can be secured if necessary. Orders which do not come under the preference list are being booked with the understanding that they will be shipped only after preference list orders have been taken care of, and then only by written permission of the director of the steel supply. Included in the recent business are numerous orders involving lots of 25 tons or less of steel bars which have been allocated by the subcommittee of the American Iron and Steel institute. Most of these are to be filled with high carbon bars rolled from shell steel discards. Iron barmakers are sold up for a considerable time ahead, and there is no disposition apparently to quote less than 3.50c Pittsburgh.

Bolt Order Not Fully Allocated

Pittsburgh, June 18.—The government has allocated only 25 per cent of the 129,000,000 bolts for which inquiry was put out some time ago. The quantity allocated came from the stocks of makers. It has been expected for the past two weeks that the remaining 75 per cent would be distributed, but for some reason there has been a delay. Other large orders are said to be pending. Business is being placed steadily with makers and represents large requirements, calling for capacity operations. Steel bars are becoming more difficult to get and in all cases call for the showing by makers of nuts, bolts and rivets of government orders or priority certificates. The Bolt, Nut and Rivet institute will hold its regular meeting tomorrow in New York, and it is said will discuss routine matters only. It is not improbable, however, that it will develop a discussion over the recent reduction of $5 a ton in the price of rivets.

Barrel Makers Take Hoops

Pittsburgh, June 18.—Makers of oil and rosin barrels are taking hoop steel and are given a good rating of priority because of the essential nature of their products which are used as containers of military necessities. Demand for bands is only fairly active and some producers are understood to be diverting steel into the manufacture of other lines.

For Government Purposes Only

Pittsburgh, June 18.—Business being taken by makers of cold rolled shafting involves tonnages which are either direct or indirectly for the government. No other class of business is being considered by producers. The larger sizes are in greatest demand, and deliveries are promised in 60 to 90 days. Output has been curtailed considerably owing to a scarcity of steel and is estimated at 75 per cent.

Bolt Demand Steady

Chicago, June 18.—The government has not yet closed its former inquiry for several million bolts and other consumers are coming into the market with a heavy demand, which is increasing steadily. Inquiries now ask for bolts by the million and as these are being accepted, most shops are booked fairly heavily.

Stronger Market

Continues to Show in Spiegel—Ferromanganese Standing Firm

New York, June 17.—Sales of spiegeleisen have been more numerous during the past week. On the whole, however, business booked was comparatively small, since only carloads and moderate sized tonnages were taken. The price for 16 per cent spiegeleisen continues unchanged at $75, furnace, for second half, while $75 to $77 is asked on spot.

The only important business in ferromanganese involved a round tonnage which the Whittaker-Glessner Co. purchased for second half. Ferromanganese continues to be quoted at $250, delivered, for 70 per cent metal. Fifty per cent ferrosilicon continues quiet at $150, to $160 delivered, for spot shipment and $150 to $155 for contracts.

Ferrotungsten is firm at $2.40 per pound, furnace, for 80 per cent metal, and $2.25 to $2.35 for 70 per cent. Demand is fair.

Numerous sales of spot 60 to 70 per cent ferrochrome are reported. Metal containing 4 to 6 per cent carbon, is bringing around 40 to 42 cents at the furnace, while metal containing 6 to 8 per cent carbon is going at 35 cents.

Gravel fluorspar for spot shipment is in good demand and is quoted at $28 to $30 per ton, shipping point. Gravel spar on contract is from $25 to $30, spot lump around $35 and acid lump from $40 to $45.

Spiegeleisen Market Stronger

Pittsburgh, June 18.—No further sales of 16 per cent spiegeleisen at $72, furnace, for spot delivery are reported. This level seems to have disappeared and sellers now are asking $75 furnace, for prompt and $77 is quoted infrequently. The last sizable transaction at $72 in this district involved 500 taken for July delivery by La Belle Iron Works, Steubenville, O. More than 15,000 tons of this alloy has been sold during the past few weeks, according

to reports, and this has cleaned up surplus supplies. A consumer in the Pittsburgh district who recently came into the market for 500 tons is said not to have covered. So far as known here the McKinney Steel Co., Cleveland, and the Mesta Machine Co., Pittsburgh, have not closed for the 1200 and 500 tons, respectively, of 30 to 40 per cent spiegeleisen which they recently asked. This grade is quoted at from $4 to $4.10, furnace, per unit. The market for 70 per cent ferromanganese is quiet. Limited activity characterizes 50 per cent ferrosilicon. This market appears easy at $165 to $175, delivered for spot. Offerings are said to have been made during the past week at $160. Second half tonnage commands $155. Sellers of ferrotungsten report sales at $2.40 a pound, furnace. Light offerings of ferrovanadium are being made at $5 per pound, furnace.

Miami Adds Furnace

Chicago, June 18.—The Miami Metals Co., which has been producing ferromanganese at a furnace in South Chicago, has just put into blast a second stack, located at Goshen, Va.

Wire Shipments

Being Made to General Consumers—Washington Ruling Awaited

New York, June 17.—No instructions from the war industries board as to how to make their distribution policy conform to the announcement of June 7, yet have been received by the wire mills. Although numerous orders with priority numbers have been placed, they are not nearly sufficient to take up the output of the mills. Consequently, the wiremakers are pursuing the policy of making shipments as usual on their contracts, with first attention to priority and preference list orders, and they will continue along this line until they receive definite instructions as to just what the government desires.

Require Priority Certificates

Pittsburgh, June 18.—Makers of wire and wire products now are requiring consumers to show priority certificates before they will fill their requirements. Considerable tonnages which have been booked but not specified probably will be cut off from some users in view of the adoption of the licensing system. Government buying has not been heavy the past week. The railroad building program will require 18,000 kegs of nails. Demand for wire nails coming from commercial consumers is heavy, but cannot be satisfied.

Plate Allotments Large

Car and Ship Contracts Bring Forth Great Tonnage—Locomotive Orders Distributed—Place 56,000 Tons for Lake Boats

Chicago, June 18.—Further tonnages of material for government cars have been placed with western mills. The leading interest is to furnish the Bettendorf Co. 6000 tons, the Mt. Vernon Car Mfg. Co. 12,000 tons and the Pacific Coast Car Co. 2000 tons, plates representing about half of these lots. Further tonnages of shipbuilding material, largely plates, are being allocated and during the past week, government orders have aggregated the heaviest ever experienced. The leading interest has been given 16,000 tons for the Columbia River Shipbuilding Co., and 9000 tons for the Northwestern Steel Co., a shipbuilding concern. The same interest has been given 9400 tons for the Long Beach Shipbuilding Co. and has also received word that it is participating in the materials for eight hulls to be built by the same yard, the tonnage for which is not mentioned. The Mark Mfg. Co., which is building a plate mill at Indiana Harbor, Ind., primarily to roll skelp for its pipe plant, is understood to have been given 14,000 tons of plates for a carbuilding plant nearby. This is a new factor in the market and it is expected the plate mill will be ready to operate early in July. Steel companies find buyers are prone to send in orders with the statement that priority certificates will follow.

Large Allocations Made

Cleveland, June 18.—Large allocations for plates for government work have been made in this territory. The Carnegie Steel Co. has received 56,000 tons of hull material for 24 boats to be built at Detroit and 14 at Lorain by the American Shipbuilding Co. for the Emergency Fleet corporation. The remaining tonnage, about 35,000 tons, for 22 additional vessels, is yet to be placed. One local mill has received 17,000 tons of car plates covering 2000 cars to be built by the government by an Indiana plant. This business was placed at 3.25c, Chicago.

Tonnages are Allocated

Pittsburgh, June 18.—Tonnages of plates for the Pressed Steel Car Co. and the Standard Steel Car Co. to meet requirements of their plants in this district covering government cars have been allocated among local mills. Details have not been announced, but it is understood that the Carnegie Steel Co. will furnish plates for the 7500 cars to be built by the Pressed Steel Car Co. in this district. This will involve approximately 80,000 tons of plates. The leading interest also is said to have been given about the same tonnage for the Standard Steel Car Co.

Capacity is Reserved

Buffalo, June 18.—Plate mills are not making new commitments till they have more complete explanation of the new government regulations. They desire to reserve all capacity for the government.

Ore Producers

Will Put Cost Figures Before War Industries Board

Cleveland, June 18.—Vigorous efforts to secure higher prices on Lake Superior iron ore are being made by independent producers. Advancing costs have aroused independents who feel that some equitable adjustment of prices must now be made to take care of these higher costs. Increased freight rates and the approaching conference on third quarter prices have brought the situation to a head.

Independent iron ore producers are meeting in New York today. The conference is preliminary to the price fixing meeting on Friday at Washington between the war industries board and the institute committee.

These producers at the Chicago meeting last week appointed a committee to present their case. The members are: John A. Savage, W. G. Mather, George A. St. Clair, C. B. Warren, T. D. Heed, G. D. Van Dyke and R. G. Schlessinger. Cost figures were presented at Chicago which showed an average loss of 28 cents per ton on 1918 business. Vermillion range figures were not included, but for the other five ranges the losses were given as follows: Mesabi, 37c; Cuyuna, 6c; Gogebic, 64c; Marquette, 17c; and Menominee 15.4c. These figures do not take into account the increased cost resulting from the advance in freight rates on June 25.

Higher freight rates, under present anouncements, will fall upon producers of iron ore as the increase will be paid on ore carried from mine to upper lake docks. This brought to a head the situation in which independent ore producers find themselves and the conferences were called to give the producers an opportunity to present their case prior to the third quarter price-fixing conference.

Structural Awards Decline

May Contracts 7200 Tons Less Than in April—Heavy Distribution of Plain Material—Ship Fabrication Capacity Extended

New York, June 18.—A total of 108,000 tons of work representing 60 per cent of the fabricating stock capacity of the country was contracted for during May, according to the monthly records of the Bridge Builders and Structural society. This compares with 64 per cent and 115,200 tons in April. A comparative statement of the report over a period of months is as follows:

Month	Per cent	Approx. tonnage
May, 1918	60	108,000
April	64	115,200
March	47	84,600
February	55½	99,900
January	53	95,400
December, 1917	121	205,200
November	77	138,600
October	61½	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Comparative activity has featured the eastern structural market during the past week. All of the lettings were in connection with essential structure, including railroad bridges, buildings at military camps, power houses and manufacturing buildings. The largest business placed involved 1500 tons which will be furnished by independent fabricators, for a number of bridges for the Pennsylvania railroad.

Filled for Many Months

Philadelphia, June 18. — Eastern shape mills now have enough government tonnage on their books to take up their output for six months. It is estimated that at least 50,000 tons of shapes on old orders for Japan have been released for rolling in accordance with the arrangement recently concluded by the government whereby steel is to be released in exchange for finished ships. Among recent allocations made was a considerable tonnage for England.

Add Capacity Quickly

Pittsburgh, June 18.—Expediting of the shipbuilding program has made it necessary for the Emergency Fleet corporation to increase the fabricating capacity. It has arranged for the Pressed Steel Car Co., and the Standard Steel Car Co., to do fabricating work at their plants at Allegheny and New Castle, Pa., respectively, with a monthly capacity of 10,000 tons each. This added to the two fabricating plants to be built by the McClintic-Marshall Construction Co., with a capacity of 10,000 tons monthly each, to be in operation within nine months, will mean an increase of 40,000 tons monthly in output. It is understood that still further expansion is being contemplated by the government.

Building Demand Quiet

Chicago, June 18.—No tonnages of structural material for building purposes have been placed in the west recently. Placing of material for railroad cars has given structural mills considerable tonnage, as about half the material placed is for shapes and the other half for plates. On this basis, the leading interest has been asked to furnish about 10,000 tons of shapes, including 3000 tons, to the Bettendorf Co. 6000 tons, to the Mt. Vernon Car Mfg. Co. 6000 tons and about 1000 tons to the Pacific Coast Car Co. Of recent allocations for shipbuilding purposes, a fair proportion also calls for structurals. The government continues to place tonnages of plain shapes to be furnished fabricating shops supplying ship material.

CONTRACTS AWARDED

Plant extension for Timken Roller Bearing Co., Canton, O., 235 tons to independent shops.

Bridges for Chesapeake & Ohio railroad, 400 tons to American Bridge Co.

Bridges for New York Central railroad, 325 tons to Fort Pitt Bridge Works, L. F. Shoemaker & Co., and Phoenix Bridge Co.

Forge shop for Bartlett-Hayward Co., Baltimore, 700 tons to Gerber Engineering Co.

Boiler shop for American Locomotive Co., Dunkirk, N. Y., 200 tons to Lackawanna Bridge Co.

Power house for Central railroad, of New Jersey, Jersey City, N. J., 300 tons to an independent fabricator.

Rod mill for Michigan Brass & Copper Co., Detroit, 550 tons to independent fabricators.

Building for government at Camp Perry, O., 500 tons to be furnished from stock by Christopher & Simpson, St. Louis.

Power house for government at Langley field, Va., 500 tons to Fort Pitt Bridge Works.

Bolt shop for government at Philadelphia, 600 tons, to independent fabricators.

Bridges for Pennsylvania railroad, 1500 tons to independent fabricators.

CONTRACTS PENDING

Bridges for Virginian railroad, 300 tons, bids being taken.

Signal bridges for Philadelphia & Reading railroad, 250 tons bids being taken.

Ordnance machine shop buildings for Midvale Steel & Ordnance Co., at Nicetown, Philadelphia, 4500 tons, bids being taken.

Michigan Central railroad, Detroit, priority obtained for 600 ton structural work.

Addition to the plant of the National Aniline & Chemical Co., 700 tons of reinforcing bars. Bids being taken.

Expect Car Sheet Orders

Big Awards of Galvanized Believed Near—Makers Satisfied With Present Prices—Mills Interested in Jobbers' Plan

Youngstown, O., June 19.—Reports are current here that the government is about to place great tonnages of galvanized sheets for roofing box cars. While no tonnages have as yet been allocated, the orders are said to be under consideration and may be expected in the near future. One maker believes the orders will be so large that he will not be able to take on any more galvanized business before the first of the year. Several mills here continue to ship galvanized to various fabricators for additional buildings at cantonments. Heavy shipments of black sheets are also being made for powder containers. All mills continue to operate at reduced capacity on account of the scarcity of sheet bars. One mill is operating at only 75 per cent, having been ordered to do this by the government until further notice. Whether or not this order was served on account of the sheet bar condition is not known. Another maker who has found it exceedingly difficult to locate any tonnages of sheet bars only operated two days last week.

Will Talk Prices

Pittsburgh, June 18.—Prices of sheets for the third quarter beginning July 1 will be discussed in New York tomorrow between representatives of the sheet and general committees of the American Iron and Steel institute preliminary to the subject being taken up in Washington by the war industries board on Friday of the current week. The chairman of the sheet committee is W. S. Horner, of Pittsburgh. The trade generally appears to be satisfied with existing prices of sheets and probably will not object to them being continued provided they do not have to pay higher costs for labor and material.

Foundry Capacity

Sought by Committee of Steel Casting Manufacturers

As a result of suggestions by members of the Steel Founders' society, a war service committee, the purpose of which will be to co-ordinate the needs of the steel foundries with those of the government, has been organized. L. B. Thomas, vice president and general manager, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., is chairman of the committee, the other members of which are W. D. Sargent, president, Bayonne Steel Casting Co., Bayonne, N. J.; J. P. Allen, president, Union Steel Casting Co., Pittsburgh; H. J. Klaer, vice president, Penn Seaboard Steel Corp., Philadelphia, and H. D. Hammon, sales manager, American Steel Foundries, Chicago.

The committee will assist in the distribution of government tonnage throughout the industry and will attempt to eliminate some of the difficulties that now exist in properly proportioning the business. In other words it will act as an intermediary between the government and the founders. To the end that the committee may have accurate data covering the capacity of the steel foundries of the country, a questionnaire has been prepared and distributed. The molding floor area in square feet of all plants is requested. Data as to the number of molders and other kinds of labor employed, the number of employes engaged in each branch of the work, the maximum number that can be employed to advantage and the approximate number employed during the past month, also are requested.

Information is sought as to the number and kinds of melting units installed, the capacity of each unit per heat or blow, the number of heats or blows per unit each 24 hours, the number of units under construction and whether the furnaces are open hearth or electric, acid or basic.

Data as to Orders Sought

Founders are asked to state the normal melt in net tons of metal charged per month and how the metal charged and production is divided. A detailed summary of casting orders is sought, the average output per month and the number of months per year that the plant is run. Data as to just what every plant can produce in castings for essential purposes are asked for in detail. The summary of ingot orders asks for capacity, tonnage on order, average output per month and the number of months run on blanks or slugs for projectiles or shells, forging ingots and rolling ingots.

Information is sought as to the character of additional castings for the government that can be made at the present time, founders being asked to particularize as to snap molding, machine work, the use of green and dry sand, floor work requiring crane service, whether under 500 pounds, from 500 to 5000 pounds or over 5000 pounds.

Tonnage on order, capacity per month, production per month in percentage of normal capacity, and retarded production per month in percentage of normal capacity are sought together with the reasons for the retarded production, whether due to delays in the receipt of raw material, shortage of labor, lack of suitable orders, or inspection delays. If insurmountable difficulties exist in securing sufficient and suitable raw materials to produce the maximum output, details of requirements and source of supply must be given. The committee also wants the facts in detail if the inability of the foundries to secure suitable scrap is due to the use of low phosphorus scrap in basic furnaces by steel mills.

Rail Output

For 1917 Shows 3.14 Per Cent Gain Over Previous Year

Production of rails in 1917 totaled 2,944,161 gross tons, an increase of 89,643 tons or 3.14 per cent over 1916 but 558,619 tons less than 1913, the high water mark according to the statistics of the American Iron and Steel institute.

In 1917, 2,292,197 tons of rails were produced by the open-hearth process, an increase of 9.95 per cent over 1916, and 533,325 tons were produced by the bessemer process, an increase of 21.18 per cent. The production by the bessemer process for 1917 was 1,351,117 tons less than in 1910, the banner year for the mills. The production by all other processes in 1917 was 118,639 tons, a decrease of 18.08 per cent. The production of alloy-treated steel rails in 1917 was 16,535 tons, 12,027 tons less than in 1916.

Of the total 1917 rail production, 763,526 tons were represented by 100 pounds and over sections; 989,704 tons by 85 and 100 pounds; 882,673 by 45 and 85 pounds and 308,258 tons under 45 pounds.

The employes of the Lynn, Mass., branch of the General Electric Co. have been notified of an advance of 10 per cent in wages for all hour and piece workers, effective July 1. The branch employs more than 6000 hands.

Furnace Operators

In Tennessee Organize—Sand Committee to Seek Price Increase

After discussing the need of a trade organization for several years, owners of iron furnaces in Tennessee finally have formed the Tennessee Pig Iron association with W. H. Smith of the Bon Air Coal & Iron Corp., as president; L. C. Crewe, La Follette Iron & Coal Co., as vice president, and Harry F. Ambrose, Standard Iron Co., as secretary and treasurer. Those present at the meeting included H. F. Ambrose, Standard Iron Co., Nashville; Joseph Warner and J. H. Bandy, Warner Iron Co., Nashville; Graham McFarland, Red River Iron Co., Clarksville; Harry Williams, representing Hickman, Williams & Co., Chicago; L. C. Crewe, La Follette Iron & Coal Co., La Follette; Morrow Chamberlain, Roane Iron Co., Chattanooga; E. H. Jacoway, Chattanooga Coal & Iron Co., Chattanooga; C. Cooper, Suwanee Coal & Iron Co., Suwanee; J. M. Durett and W. H. Smith, Bon Air Coal & Iron Corp., Nashville. W. H Lindsay, of the Napier Iron Works, Nashville, was unable to attend the meeting, but expressed a desire to join in any movement undertaken by those who did.

Subjects discussed included the proposed increase in freight rates on raw materials, the increase in labor cost and the necessity of applying to the government for permission to raise the price of pig iron. A committee was named to visit Washington to present the matter of increased price to the government officials before the new schedule is fixed, effective July 1. This committee consists of Whiteford R. Cole, president of the Napier Iron Works, Nashville; Harry F. Ambrose, president of the Standard Iron Co., and L. C. Crewe, president of the La Follette Coal & Iron Co. An executive committee was chosen consisting of W. H. Lindsay of the Napier Iron Works, Harry F. Ambrose, L. C. Crewe, Graham McFarland and W. H. Smith.

The furnaces represented at the meeting have an annual output of approximately 500,000 tons. Letters were read from many furnace operators in Tennessee and several in Georgia, who were unable to attend.

On June 12, a similar meeting was held in Birmingham, Ala. Representatives of the Tennessee association in attendance were Messrs. Smith, Crewe and Jacoway. While no Alabama association was formed, several operators of that state expressed their desire to unite and co-operate with the Tennessee organization.

Will Simplify Government Control

Priorities Committee Understood to be Working Out General Rating of All War Orders to Guide Producers—Steel Director to Provide Regular Form of Permit—Strict Distribution Wanted

WASHINGTON, June 18.—Centralization in the director of steel supply of the responsibility for the proper distribution of the country's iron and steel output means that in the final analysis, mill and furnace operating departments will be held strictly to account for production of all of these materials. The priorities committee of the war industries board must, of course, be held answerable for such steel as it directs delivered under priority, and the steel director must bear the burden for manufacture of any steel ordered on permit. But the leeway between priority and permit—that provided by preference—greatly increases the remaining responsibilities of iron and steel manufacturers.

In many mills before the government ratified the agreement between the industry and the industries board which put the trade in federal hands, orders for steel were accepted only on written assurance of the direct or indirect war purpose of the tonnage involved. This was particularly true of mills in the east. That this practice will be continued by these mills and adopted generally by others, may be accepted as a foregone conclusion. Operators everywhere want to give all production possible in order to hasten the end of the war, but the responsibility of selecting customers, even from a field well-defined as is that in the general purposes list, is felt to be vitally heavy.

Work On Simplified System

The government is already trying to evolve a simplified priority system and the steel director shortly will provide a regular form of permit. Just what simplified form of priority the priorities committee is working out has not been disclosed but it is understood to provide for a general priority rating of all government orders, in accord with a schedule to be determined, which will be stamped on all war orders and to be effective unless modified by the committee. This plan then would require the committee's approval only on such orders as may be of special importance or of an urgent or emergency character, or which may be determined as not requiring priority consideration at all. Since the 100 per cent pledge meeting of the steel industry, the board has been swamped with applications.

The necessity of every ton of iron and steel going to strictly war production is recognized as placing a moral responsibility upon manufacturers which is even greater than the financial or commercial responsibilities of peace times. Because of the great possibility that any one of hundreds of junior clerks may make mistakes, or that misunderstandings may arise between sales and operating departments, the opinion has been expressed that operating departments should demand absolute proof of the purposes for which its steel will be used. If these departments over the country do make such requirement, then preference license as well as priority or permit assurance, would ease this burden.

Steel Quarters Extended

Steel Director Replogle now is established in room 812 of the war industries board building and the steel division has occupied the entire second floor of the same building. This expansion has been required to meet the demands of the new system of handling steel. Additions to the personnel of the steel director's organization will be completed shortly.

The priorities committee has announced several preferred producers of war materials who are to receive priority shipments of fuel:

The National Carbon Co., Cleveland, with branch plants at Niagara Falls, Clarksburg, W. Va., Scranton, Pa., Cleveland, Fremont, O., Fostoria, O., Nobelsville, Ind., and Jersey City; the Amoskeag Mfg. Co., Manchester, N. H.; the Babcock & Wilcox Co., Bayonne, N. J.; the Randolph-Clowes Co., Waterbury, Conn.; the F. W. Poe, Mfg. Co., Greenville, N. C.; the U. S. Metal Refining Co., Chrome, N. J.; the Tennessee Copper Co., Copperhill, Tenn.; the Raraitan Copper Works, Perth Amboy, N. J.; the Quincy Smelting Works, the Quincy Mining Co., Hancock, Mich.; the Nicholas Copper Co., Laurel Hills, Queens, N. Y.; the Washington Brick & Terra Cotta Co., Waterloo Siding, Alexandria county, Va.; the Wilford Hall Laboratories, Portchester, N. Y.; the North & Judd Mfg. Co., New Britain, Conn.; the Burns & Russell Co., Dundalk, Baltimore county, Md.; the Norton Co., Niagara Falls and Worcester, Mass.; National Abrasives Co., Hamilton, Ont.; the Carborundum Co., Niagara Falls; the Exolon Co., Thoroid, Ont., and Blasdell, N. Y.; the General Abrasives Co., Inc., Niagara Falls; the Basic Refractories Co., Natural Bridge, N. Y.; the Union Stone Co., Mt. Wolf, Pa.; the J. E. Baker Co., Bainbridge, Pa., all cotton and woolen mills; hotels, hospitals, Salvation army, grain threshers; the Whitall-Tatum Co., Keyport, N. J.; the Skinner Engine Co., Erie, Pa.; the Ludlow Mfg. Associates, Ludlow, Mass.; the Peck, Stow & Wilcox Co., Southington, Conn.; the Waterbury Battery Co., Waterbury, Conn.; the M. W. Kellog Co., Jersey City, N. J.; the New York State barge canal and connecting waterways, New York to Buffalo; and all cement plants in New York, eastern Pennsylvania, New Jersey, Delaware, Maryland and Virginia; American Smelting & Refining Co., Murray, Utah, East Helena, Mont., and Perth Amboy, N. J.; American Brass Co., Torrington, Conn., Kenosha, Wis., Waterbury, Conn.; William Harvey Corp., Mill island, Jamaica Bay, Brooklyn, N. Y.; the International Nickel Co., Bayonne, N. J.; Tacoma Smelting Co., Tacoma, Wash.; Garfield Smelting Co., Garfield, Utah; Baltimore Copper Smelting & Rolling Co., Canton-Baltimore, Md.; Calumet & Hecla Smelting Works, Hubbell, Mich.; Ducktown Sulphur, Copper & Iron Co., Ltd., Isabella, Tenn.; Lake Superior Smelting Co., Dollar Bay, Mich.; Norfolk Smelting Co., Inc., West Norfolk, Va.; Federal Lead Co., Federal (P. O. Alton), Ill.; International Lead Refining Co., East Chicago, Ind.; Balbach Smelting & Refining Co., Newark, N. J.; Ajax Clay Works, Macon, Ga.; Baltimore Brick Co., Baltimore, Md.; Sayre & Fisher Co., Sayreville, N. J.; Southern Sewer Pipe Works, Birmingham, Ala.; Knoxville Brick Co., Powell Station, Knox county, Tenn.; Fulton Brick Works, four miles east of Richmond, Va.; St. Croix Paper Co., Woodhaven, Me.; United Lead Co. (Jas. Robertson Lead Co. branch), Baltimore.

Conserves Railroad Scrap

WASHINGTON, June 18.—The railroad administration has forbidden the scrapping of all old locomotives, cars, rails, fastenings, etc., until railroad officials are absolutely certain they can no longer be safely and economically used. This will, for several months to come, greatly curtail a formerly bounteous supply of old materials and will in-

crease the demand by the railroad for spare parts, tools and iron and steel products with which to make repairs. It is one of the largest movements for the conservation of metals ever undertaken by an individual steel consuming industry.

The effect of this decision of the administration, which has been handed down to the individual shop foremen through the regional and federal directors, will be felt among scrap consumers, especially rerolling mills and open-hearth plants. Dealers who have been accustomed to handle cast-off railroad materials are likely to find the demand much greater than their supply. How long this condition will exist cannot be estimated, but in time the situation is bound to improve with the final scrapping of wornout equipment.

Of almost as much interest to scrap dealers and consumers as is the railroad administration's conservation course, is the war industries board's acceptance of the iron and steel industry's agreement that the government should regulate the distribution of all iron and steel for the period of the war. However, the scrap industry is not to be taken over as was the iron and steel trade, it is stated on good authority. The war industries board feels the dealers will naturally turn their supplies into channels which contribute directly or indirectly to the war. Since the products of steel mills are to be controlled by the government, evidently there is but one course for the scrap supply to follow, and that is to the rerolling mills and remelting furnaces whose ultimate production is for the war. The commercial uses of steel are now in federal hands, as far as the steel supply is concerned, and as a result jobbers are not likely to find a very large market for nonwar scrap.

Another phase of the railroad conservation movement is one which has been in effect for some time and which has, according to the administration, greatly improved transportation conditions. The railroads went under government control with approximately 20 per cent of their cars in bad order. Today the number under repairs is said to be approximately 6 per cent, and that it is expected the number will be reduced to between 4 and 5 per cent. The number of engines repaired since Jan. 1 and now in the shops will add between 20 and 25 per cent to the motive power operating in December.

Defers Freight Prepayment

WASHINGTON, June 18.—That the railroad administration realizes its mistake in requiring the prepayment of freight charges and allowing 48 hours' credit only in case of surety bond being filed is evidenced by the fact Director General McAdoo has postponed from July 1 to Aug. 1 the date on which the new rule was to have become effective. The administration evidently hopes that within the additional 30 days some modification of the order may be determined without revolutionizing the industrial banking fabric as the rule, now drawn, would surely do.

Protests have swamped the administration. They point out that payment of freight bills within two days of the time of shipment would impose excessive hardships upon every manufacturer, purchaser, shipper, consignee and banker in the country and benefit only the railroads. The proposed plan would not benefit the railroads very much at that, it is stated, because the added burden of handling waybills, invoices, etc., under two-day pressure would more than offset any advantage of collections daily instead of monthly.

While this question still remains unsettled, for both the railroads and the industries of the country, iron and steel manufacturers are favored by a decision of the director general which, in this case, is even more effective than any similar action by the interstate commerce commission. This decision prevents railroads at present from putting iron and steel articles on class rate bases instead of commodity, although the commission, possibly by a tip from the inside, was to refuse the railroads' applications. This means that the McAdoo 25 per cent freight rate advance now will be on present rates rather than on changes which would have added as much as 76 per cent, in some cases, to present rates before the McAdoo increase would have been applicable. This decision, which came in a modification of the general order increasing freight rates, says:

"Section 20 is amended to provide specifically that the rates to be increased are those existing on May 25, 1918, including changes previously published not then effective and not under suspension, except that increases will apply to rates authorized or ordered by the interstate commerce commission prior to May 25, 1918, and published between May 25, 1918, and June 15, and that where rates so authorized or ordered are not published before June 15, they may be increased as provided in the order by subsequent provision."

In announcing postponement of the plan to put transportation charges on a cash basis, the director general declared the rules will not apply to transportation service given the various departments and bureaus of the United States government, the nations allied with the United States in war, the various states of the United States, the counties and municipalities of such states, the District of Columbia and Alaska, and the American Red Cross.

Ship Steel

In Quantity Will Be Fabricated By Pittsburgh Car Plants

Pittsburgh, June 18.—Ship steel will be fabricated at the Allegheny, Pa., plant of the Pressed Steel Car Co., and the New Castle, Pa., plant of the Standard Steel Car Co., arrangements having been made by the Emergency Fleet corporation, through Admiral F. T. Bowles. By this plan fabricating capacity available to ship construction has been increased 20,000 tons per month, each of the two plants named having a capacity of 10,000 tons. They will do such work as punching, countersinking, riveting and hydraulic pressing. The purpose of the Fleet corporation is to make the ship yard a point for rapid assembling. Fabrication at the Allegheny and New Castle plants will be confined to material which will meet the clearance measurements of the lines over which the steel is to be transported.

Government engineers think also that the system of fabricating material away from the shipyards will help in the solution of the labor problem and at the same time eliminate in part the necessity for duplicating at tidewater large installations of machinery for punching, reaming, pressing and fabricating with which plants such as those located in the Pittsburgh district are adequately equipped. It is also pointed out that the plan will offset the migratory tendency on the part of labor.

During recent years the railroad companies connecting Pittsburgh with such coast cities as New York, Philadelphia and Baltimore have been increasing the bore of their tunnels, eliminating curves, low bridges and heavy grades. The result is that it is now possible to ship by rail sections of steel fabrication which a few years ago could not have been accepted.

Pipe Reports

Asked from Jobbers by Mills to Show Distribution

Cleveland, June 18.—A questionnaire is being sent out to all customers by the leading steel pipe makers in the middle west. This questionnaire requests of jobbers answers to questions setting forth the tonnages placed, where pipe thus ordered is going, into what use it will be put, etc. Jobbers are endeavoring to reply but experience difficulty in answering as desired because of trouble in themselves receiving information on the destination of pipe already sold. The National Tube Co. asks for a report on 20 items and for a weekly report, while Republic Iron & Steel Co. and the Youngstown Sheet & Tube Co. asks for a monthly report. The understanding appears to be that the report system from pipe jobbers is to begin as of June 1, but some mills have asked reports on May sales.

More Ovens Planned

Philadelphia, June 18.—A by-product plant of 100 coppers ovens will be built by the Alan Wood Iron & Steel Co. at Sweden, Pa. The Reineywood By-Product Co. is being organized to build and operate the plant.

Urge Foundrymen to Get Maximum Production

Pittsburgh, June 18.—Co-operation between employers and employes to insure maximum production was the keynote of the annual outing of the Pittsburgh Foundrymen's association. This outing, attended by over 200 foundrymen, their wives and guests, held at the Westmoreland country club, was presided over by President I. W. Frank of the United Engineering & Foundry Co. Mr. Frank urged the foundrymen to have daily talks with their employes to inspire the proper spirit, looking toward most efficient workmanship to support the allied armies. John A. Penton, Cleveland, publisher of THE IRON TRADE REVIEW, declared that "next to the German line, the greatest menace America faces is the propaganda of the demagogue who spreads discontent among workmen and who stirs up troubles which result in strikes to the detriment of our war preparations." Officers were elected for the ensuing year as follows: President, J. Lloyd Uhler, Union Steel Casting Co.; vice president, A. M. Fulton, Fort Pitt Malleable Iron Co.; secretary, Bayard Phillips, Phillips & McLaren Co.; treasurer, William J. Brant, W. J. Brant Co. The executive committee consists of A. J. Hartman, United Engineering & Foundry Co.; F. H. Clay, Allegheny Steel Co.; L. A. Way, Lewie Foundry & Machine Co.; J. S. McCormick Co.; and John B. Coates, Pittsburgh Malleable Iron Co.

To Handle Cast Scrap

Emery E. Smith has been appointed by Chairman Gary as a member of the subcommittee on scrap iron and steel of the American Iron and Steel institute to serve on the Pacific coast. Mr. Smith is with the United States shipping board at San Francisco.

Agreement Reprints Ready

Consumers and producers of iron and steel are finding themselves obliged constantly in their daily business, to consult carefully the regulations prescribed by the government in its complete control of distribution. THE IRON TRADE REVIEW has had reprinted on glazed papers for desk use, the agreement between the iron and steel industry and the war industries board, setting forth these regulations in complete form. Copies will be supplied to any subscriber on application.

Shape Recommendations

New York, June 19. (By wire.)—Leading iron and steelmakers began this morning at the Waldorf-Astoria hotel a meeting with the general iron and steel committee of the American Iron and Steel institute, with Judge Gary presiding. Recommendations are to be formulated covering prices effective July 1, and will be presented to the price-fixing committee of the war industries board at Washington, Friday.

Following a meeting of the finance committee of the Steel corporation yesterday, Judge Gary stated that the finishing mills of the largest producer now are operating at 93.4 per cent, which is the maximum point of the war.

The Non-Ferrous Metals

Copper Lead Spelter Tin

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	§Aluminum	Spot antimony
June 12	23.50	.....	7.50	7.50	33.00	13.12½
June 13	23.50	.....	7.50	7.50	33.00	13.12½
June 14	23.50	.....	7.62½	7.60	33.00	13.12½
June 17	23.50	.....	7.75	7.65	33.00	13.12½
June 18	23.50	.....	7.82	7.70	33.00	13.12½

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.
†No spot Straits tin offering.
‡Outside market, prompt shipment.
§Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 33.10c; one to 15 tons, 33.20c.

NEW York, June 17.—Copper producers will meet again with the war industries board on Aug. 7, to discuss the price schedule. The present agreement terminates Aug. 15. Producers say that the advance of 25 per cent in freight rates effective June 25 will increase their costs of production about 1c a pound. Little copper is being used outside of direct and indirect war work, estimates being that ordinary commercial consumption is absorbing little over 10 per cent of the current output. Business in copper and brass products, aside from war work, is almost at a standstill.

The market for prime western spelter is strong despite the fact that stocks remain large. C. E. Siebenthal, of the United States geological survey, last week made public figures showing that stocks of Grades C and D totaled about 37,500 tons, and that consumption was exceeding production at the rate of about 2000 tons a week, which would indicate that months would pass before the weight of surplus stocks would be lifted from the market. Mr. Siebenthal suggested that smelters close down for several weeks, coincident with a shutdown of mining operations, so that the market be given a chance to regain its balance. The navy is inquiring for about 3,000,000 pounds of spelter.

The tin market is quiet. No spot tin is offered, excepting some small lots of Lamb & Flagg, 99 per cent tin, at around 93c, New York. Chinese tin offerings for all positions have become scarce. Some July shipment from the Far East is to be had at around 90c, New York. Banca tin afloat is offered at 89.50c. Straits tin for July-August shipment from Singapore is quoted 82c.

The advance in lead prices by the American Smelting & Refining Co. to 7.82½c, came as a great surprise. Most independents were not selling June or July shipment and little metal was in the hands of the speculative operators. A temporary price was set at 7.82c, New York. Little metal is available for July. June has been strong because of the desire of consumers to buy metal for shipment prior to June 25, when the increased freight rates become effective.

Following the recent purchase of antimony by the war industries board, prices have been easing somewhat, metal now being offered at 13.12½c, duty paid, New York.

Blast-Furnace Hoist Installations

Recent Developments in the Design of Alternating-Current Apparatus Have Resulted in the Successful and Advantageous Use of This Current for Operating Blast Furnace Skip Engines

BY DAVID L. LINDQUIST

WHILE it is apparent that there is a wide variation in the conditions and requirements to be met in furnace-hoist service, the importance of many of these conditions is perhaps not generally realized. It is well known that there is a wide range in the loads to be hoisted during normal operation. During abnormal operation a still further variation is found in that it may be required to hoist an empty skip or lower the maximum load. In addition we have the single or double-skip type of hoist each with its various loading and dumping arrangements.

Many double-skip load diagrams indicate that when starting from limits of travel, the load is greater than when running. This is due to the loss in effective weight of the empty bucket in its dumping position, where one bucket does not balance the other. The effect of this unbalance naturally increases the load on the machine and motor, and the percentage of increase depends upon the track arrangement at the top; the dumping angle of the bucket and the relative location of the head sheave. In order to select the motor with a sufficient amount of torque to start and accelerate the entire moving mass, it is necessary to lay out a load curve for each particular dumping arrangement used. The next point to be considered relates to the conditions of stopping. These are usually of more importance than the starting conditions. The effect of dumping the charge and loss in effective weight of the bucket at limit of travel results in a generator load on the motor.

An examination of a single-skip diagram shown in Fig. 6 indicates that the loads in the stopping zone first change to generator and then to a motor load when the charge in the bucket is lowered into the furnace top. Irrespective of the different loads and arrangement of loading and dumping, it may be stated generally that the more important requirements are continuous, safe and uniform operation.

Hoisting Speeds

Another point to be considered is the speed at which the loads must be hoisted. The increased output of the modern blast furnace has made it necessary to operate the machines at a much higher speed than formerly. It may be of interest to know that electric machines are now being built to give hoisting speeds of 600 feet per minute. The higher running speed results in greater wear on the mechanical parts; requires more accelerating force, thereby placing increased strains on the machine; and most important of all, makes it more difficult to obtain accurate stops. The high speed requires additional refinements of the speed control in order to obtain accurate stops.

The earlier type of direct-current furnace hoist machine consisted of a high-speed motor, magnet brake, solid coupling, two reductions of spur gears and one or more drums.

The use of a high-speed motor resulted at times in gear vibration which was apt to cause damage to the motor and other parts. In the more recent types of geared machines, as shown by Fig. 1, several improvements have been made in order to reduce this vibration. One of the more important of these changes is the use of herringbone gears instead of spur gears, as the smooth action of the herringbone gears materially reduces vibration. Another important change is the use of a flexible coupling between the armature shaft and pinion shaft, thereby reducing to a minimum the amount of vibration transmitted from the gears to the motor. In the effort to eliminate excessive wear, oil-tight gear cases have been provided together with dust guards over exposed parts; the object being to keep oil in and the dust out. The necessity of making provision for quick replacements has brought about the use of removable bearing sleeves, which can be taken out and replaced without removing the shaft. In addition the flexible coupling is so designed as to permit

From a paper presented at a recent meeting of the Association of Iron & Steel Electrical Engineers, Pittsburgh. The author, David L. Lindquist, is associated with the engineering department of the Otis Elevator Co., New York.



FIG. 1—DIRECT-CURRENT, FURNACE HOIST ENGINE EQUIPPED WITH HERRINGBONE GEARS

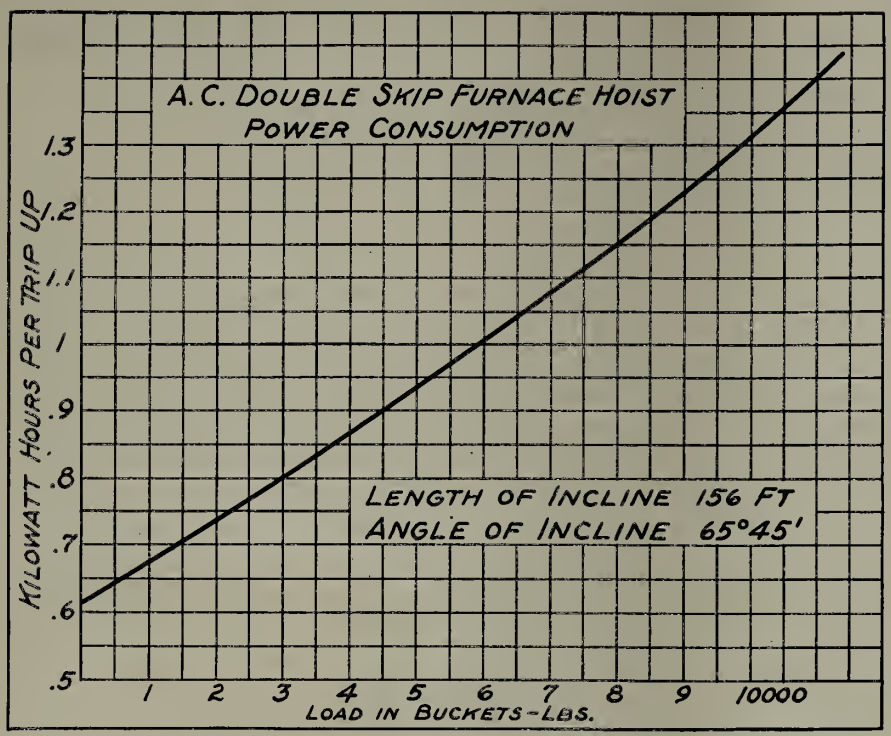


FIG. 2—ALTERNATING CURRENT POWER CONSUMPTION IN KILOWATT HOURS PER TRIP FOR VARIOUS LOADS IN BUCKET

removal of the armature from its bearings without disturbing the brake or brake setting.

The latest type of direct-current furnace-hoist machine is gearless. Although the herringbone gears are a most suitable means for obtaining a speed reduction between the motor and drum, it is possible with direct-current to eliminate all gears by the use of a slow-speed motor. A gearless machine in which the driving sheave is mounted directly on the armature spider has already reached a high state of development in its application to high-speed elevators, and it only remained to adapt this arrangement to furnace hoist service. Fig. 5 shows this arrangement.

This machine as designed for blast-furnace service can best be described by stating that it consists of a motor, brake, and one or more drums mounted on an extension of the armature spider. Where conditions are suitable, traction drive may be used instead of drums. A machine of this type to operate successfully involves the proper design of a comparatively slow-speed motor, and in a particular case requires a motor of 180 horsepower output at 38 revolutions per minute maximum.

The general arrangement of the gearless furnace-hoist machine shows the extreme simplicity of construction and minimum number of parts subjected to wear. Since there are only two bearings, it is evident that with reference to wearing parts, we have reached the "irreducible minimum."

Brake and Oil-Dash Pot

Mention should be made of the brake used and the development of an oil-dash pot that makes it possible to instantly apply the brake with a predetermined amount of initial pressure, and permits of quick but gradual application of the full pressure.

The dash pot is designed in such a manner as to allow the use of a loose fitting plunger, because the retardation is required for only a small fraction of a second. As the plunger has a loose fit and the dash pot is entirely enclosed so that no foreign substance can get in, it makes it impossible for the dash pot to stick. Even a considerable amount of wear of the rubbing surfaces will not materially affect the proper action of the dash pot. A mineral oil which is perfectly stable and has a low viscosity should be used in the dash pot, thereby giving a practically constant retarding effect, irrespective of temperature changes to which the dash pot may be exposed.

Fig. 3 shows this brake which is of the shoe type and is applied directly on the drum by spring pressure. It is released by an electro-magnet. While we might elaborate upon other features of the gearless hoist it is sufficient to state that it represents the latest type of the direct-current hoisting machine.

The direct-current furnace-hoist machine of either the geared or gearless type is operated by a motor, brake, master switch, stop-motion switch and controller. The motor is of the multi-pole, compound-wound type with interpoles and of liberal design for the continuous duty. The series field is used only during acceleration and slow down and is short-circuited when the motor runs at full speed. The brake is released by an electro-magnet and is spring applied as mentioned before.

Control Mechanism

The master switch is the means provided for the operator to run the hoist. A stop-motion switch is used for slowing down and stopping the hoist at limits of travel independent of the operator. This switch is oper-

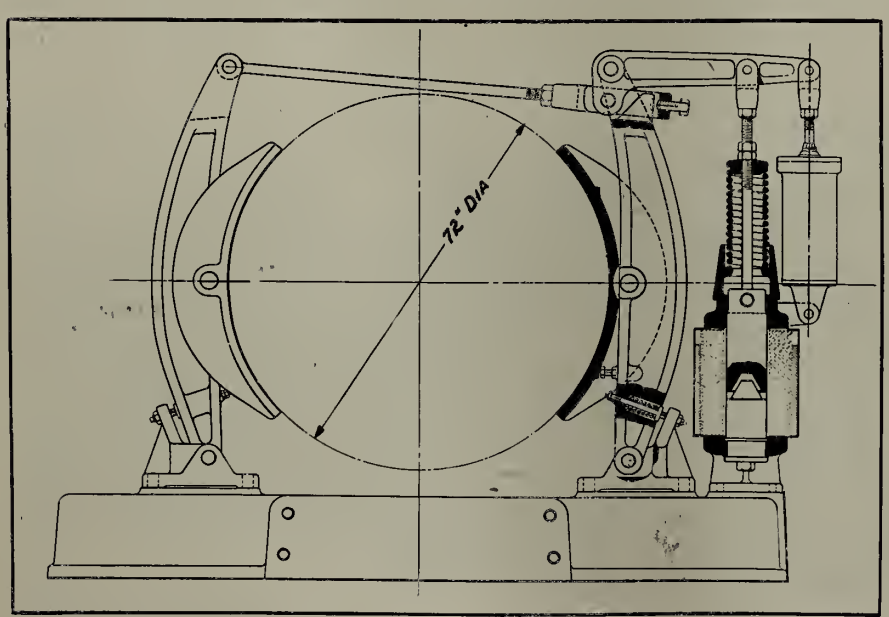


FIG. 3—SHOE-TYPE BRAKE WHICH IS DIRECTLY APPLIED ON DRUM BY SPRING PRESSURE

ated through gearing from the drum shaft.

The controller consists of slate panels on which are mounted a number of electro-magnet switches to control the acceleration, running, slowing down and stopping of the motor. Speed control of the motor is obtained first by field control and second by resistance in series and parallel with the armature.

Alternating Current is now Used

The application of alternating current for a geared furnace hoist machine is a comparatively recent development. The mechanical parts of the machine include all of the latest improvements of the direct-current geared machine, such as herringbone gears, oil-tight gear cases, flexible coupling, removable bearing sleeves, etc.

Up to the present time, a gearless alternating-current machine has not been considered feasible due to commercial limitations, as the size and cost of the alternating-current motor for the extremely slow-motor speed required with this type of hoist would be prohibitive. The alternating current geared furnace-hoist machine is operated by a motor, brake, master switch, stop-motion switch and controller.

The motor used is of the two-speed, slip-ring, induction type, with two windings on the stator connected in series and with two windings on the rotor. The conditions requiring a two-speed motor for furnace-hoist service will be described later. One stator winding is called the fast-speed and the other the slow-speed winding. The same designations apply to rotor windings. These windings are so made that with the line connected to one stator winding the motor will run at a certain definite speed, while with line connected to the other stator, the motor will run at another definte speed. The ratio of the fast to the slow speed is usually 5:1 or 6:1, but this ratio may be as great as 10:1 if conditions demand this amount of speed reduction. Should the conditions be such as to require a speed reduction greater than 10:1 this can be accomplished by means of an auxiliary device connected to the main machine; or in other words, what is known in elevator practice as the micro drive.

The stator coils of the two-speed alternating-current motor are of the form-wound type and are placed in open slots. The same slots are used for both the fast and slow-speed windings. The coils used for slow speed are placed in the top of the slots next to the airgap and those for the fast speed in the bottom of the slots. The rotor coils are of the hair-pin type and are placed in semiclosed slots. The same slots are used for both the fast and slow-speed windings. The coils used for slow speed are placed in the top of the slots next to the airgap and those for the fast speed in the bottom of the slots. The location of the fast and slow-speed coils with reference to the airgap is a matter of design, and we have found that the arrangement just outlined gives the most satisfactory results.

The rotor windings are connected to five independent slip rings, insulated from each other and completely insulated from the rotor shaft. One slip ring is common to both rotor windings. The slip rings are used to connect external resistance to the rotor windings as will be more fully described later. The two-speed motor may be designed to start from rest on either the fast-speed or slow-speed winding as conditions demand.

The brake is of the same type and has the same mechanical parts as the direct-current brake. With alternating current it has until recently been the general practice to use either a brake magnet operated by direct-current or by a small alternating-current motor. Realizing the disadvantages of using direct current for brake operation with an alternating-current main supply, and considering the disadvantages of the motor-operated brake, a magnet-operated brake using alternating current as shown by Fig. 4 has been developed. A magnet-operated brake possesses several advantages over a motor-operated brake, namely, simplicity of construction, ease of adjustment, quick release and regulation of braking power.

The alternating-current brake magnet has three coils open to the air. These coils are of the shunt type and depend for their operation on the voltage and frequency of the main line. Any one of the three coils may be easily removed and replaced. This brake is provided with an oil-dash pot and permits of instantaneous application of the brake with a predetermined amount of initial pressure, and of quick but gradual application of the full brake pressure.

The oil-dash pot is of the same design as that used on the gearless hoist. The master switch and stop-motion switch are of the same type used on the direct-current hoist and for the same purpose. The controller consists of an iron frame supporting slate panels, on which are mounted magnet switches designed to control the operation of the hoist. Two resistance units, one for fast speed and one for slow speed, are furnished. The controller is operated by alternating current of the same voltage and frequency as used by the motor. No direct or rectified current is used anywhere in the system. The control magnets are of the single-phase type, with split-phase secondary, and have ample power to make and maintain proper contact pressure.

Construction of Switches

All switches which make and break high current are equipped with carbon to copper contacts for making and breaking the current and separate copper to copper contacts for carrying the current. The potential switch and reversing switches are operated by the master switch and close and open the circuit to the moter and brake, not only during normal operation from master switch and stop-motion switch, but also upon the operation of any of the safety devices such as limit switches, slack cable switch, reverse-phase relay, etc.

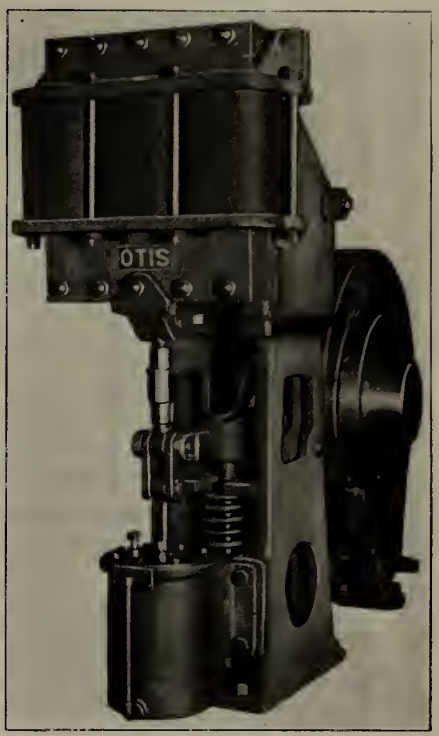


FIG. 4—A MAGNET-OPERATED BRAKE

The fast and slow-speed switch is also operated from the master switch, and has two sets of contacts. One set, which controls the fast-speed stator winding, is mounted on the upper end and the other set, which controls the slow-speed winding, is mounted on the lower end of the pivoted arm. The switch is so arranged that the upper set of contacts is closed when the magnet coil is energized, and the lower set is closed when the mag-

net is de-energized, at which time the weight of the magnet arm and core, operating by gravity, makes certain that the upper contacts break and that the lower contacts make. From this it is evident that the motor is connected for fast speed only when the fast and slow-speed switch is energized and is connected for slow speed only when this switch is de-energized. A wiring diagram of the main line strator circuits is shown in Fig. 7.

In describing the general features of the motor, mention was made of the fact that the stator windings are connected in series. This series arrangement of the windings consists of connecting one phase of the slow-speed stator winding in series with the corresponding phase of the fast speed stator winding.

Two sets of accelerating switches are provided, one set for fast speed and one for slow speed. These

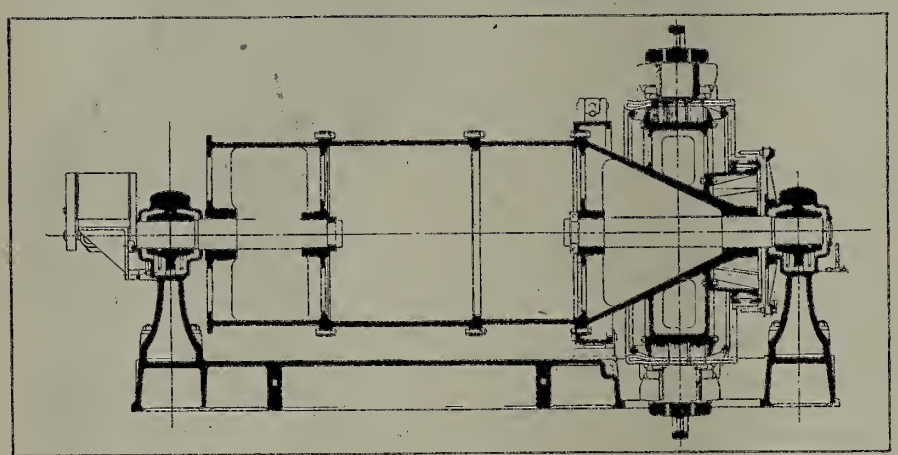


FIG. 5—GEARLESS HOIST ENGINE IN WHICH DRIVING SHEAVE IS MOUNTED DIRECTLY ON ARMATURE SPIDER

switches are used for short circuiting the starting resistance which is in series with each rotor winding. The three accelerating switches for slow speed operate only when the stator windings of the motor are energized in the slow-speed connection. These switches operate successively, one after the other, short-circuiting the slow-speed starting resistance.

The six accelerating switches for fast speed operate only when the stator windings of the motor are energized for the fast-speed connection. These switches work in sequence and short-circuit the fast-speed starting resistance. The overload switch is provided to operate in case of excessive overload on the motor, and is furnished with an automatic reset. The reverse-phase relay is provided to operate in case of phase reversal of the main supply lines, or in case of phase failure. This switch operates each time the hoist is started and stopped.

The introduction of the electric-driven furnace hoist has made it desirable to use an electric-bell machine operating automatically in conjunction with the furnace-hoist machine, resulting in uniform and automatic operation for any desired sequence of charging the furnace. The use of electric machine, however, is not limited to bell operation only but can be employed to automatically operate the gas slide and large bell in conjunction with the furnace-hoist machine.

The automatic operation of the bell-hoist machine where two bells, located at the furnace top are used, is obtained in the following manner:

The small-bell machine is operated by means of a contact on the furnace-hoist machine. Immediately after the furnace-hoist machine has started, a contact is made by the stop-motion switch. This establishes a circuit which starts the small-bell machine so as to open the bell and automatically reverses and closes the bell. This stop-motion switch contact cannot be operated again until the machine has started the other bucket on its up trip. This arrangement permits stopping the main hoist and bringing the ascending bucket to its starting position, with out resulting in an additional small-bell operation.

Just before the small bell closes a contact on the bell machine is made which operates a sequence switch on the large-bell controller. This switch is provided with a ring having contacts so arranged as to correspond to the desired charging cycle. Each controller is electrically interlocked so that only one bell can be operated at a time. One or more extra skip loads can be added to the furnace burden without affecting the automatic sequence. Likewise each bell can be operated independently of the automatic arrangement by means of push buttons without altering the sequence. The furnace and bell-hoist equipment therefore can be arranged to give automatic operation of the bells for practically all desired sequences of charging the furnace.

Early Methods of Bell Operation

The type of electric machine that has been quite generally employed up to the present time for bell operation has made use of a crank to operate the bell lever. The crank is driven by means of an electric motor through suitable gearing and the machine is provided with a magnet brake and stop-motion device. The operation of the machine is governed by a magnet controller providing an automatic operation previously described. The bell is opened by turning the crank through one-half of a revolution and is closed by turning the crank through the remaining half of its revolution. The throw of the crank must equal the travel of the rope at the point where it is attached to the bell lever, plus the allowance necessary to make for rope stretch and rope sag.

Having in mind the many disadvantages inherent with the crank-type machine and counterweight, an arrangement has been devised, making use of a standard reversible elevator-drum machine with a comparatively small amount of counterweight on the bell lever. The arrangement overcomes the numerous undesirable features of the crank-type machine. To accomplish this result, the pivoted-bell lever is used with a counterweight sufficient only to balance about four-fifths of the weight of empty bell and bell rod. A separate counterweight located on the ground or on a structure near the ground acts as a sealing weight. With the bell closed, the sealing weight is just slightly raised off its support, when it is effective for the purpose of obtaining a definite sealing pressure.

Operating the Bell

Before the bell starts to open, the machine is operated so that the rope unwinds, letting the sealing weight down on its support. As soon as this weight is down, the continued unwinding of the rope causes the bell to open, because the amount of weight on the bell side is greater than on the counterweighted side of the bell-lever fulcrum. In order to open an empty bell the amount of counterweight on the bell lever must always be less than the corresponding effect of the weights of empty bell and rod in order to obtain an overbalance on the bell side.

The bell is closed by operating the machine in the reverse direction,

thereby winding up the rope and pulling the counterweighted end of the bell lever down. During this operation, the sealing weight remains on its support because it is greater than the pull required to close the bell. This weight does not move until the bell seats against the hopper, when the continued winding up of the rope at slow speed lifts the sealing weight off its support. The instant the weight starts to move it strikes a limit switch, and opens the limit-switch contact, thereby stopping the machine. This arrangement makes certain that the bell will always seat against the hopper with full sealing pressure independent of rope stretch and sag. The sealing weight is provided with a spring hitch designed to absorb any shock which may occur when the weight is picked up.

The drum-type machine will permit changing the opening distance of the bell by adjustment of the automatic limit-stop on the machine. This is not possible with the crank-type machine. Probably the most important consideration as already mentioned, is that the apparatus be designed to take care of an abnormal condition without breaking down.

Comparison of Bell-Operating Machinery

Should an obstruction prevent the bell from closing, the sealing weight may be immediately picked up, and as soon as its limit switch opens, the controller is so arranged that the machine will at once automatically reverse, thereby opening the bell. This arrangement provides an automatic clearing of the bell under abnormal conditions with an obstruction between the bell and hopper, and gives an immediate reversal of the bell motion, which does not take place under normal conditions when the bell closes against hopper. This is a decided improvement over what happens under these conditions with a crank-type machine, where an interference with the closing of the bell usually results in an open bell or damage. From this comparison it is evident that the new arrangement of sealing weight and use of a drum machine will insure reliability of operation not possible with the crank type. In considering the use of either alternating or direct current for bell hoists, the conditions are such that there is little preference in either case. In considering the use of either alternating or direct current for the furnace hoists, there are a number of important points.

The first consideration is the source of power. It may be stated that many of the blast-furnace plants include in their equipment, apparatus for generating alternating current, and the tendency seems to be toward a more extensive use of alternating current for power purposes. Since this is the case, the use of alternating current for the furnace hoist can be considered as an advantage over the use of direct current. Whenever the main-power supply is alternating current and direct current is used for operating the furnace hoist, it is necessary to use transformers and converting apparatus, while when alternating current is used for operating the furnace hoist, transformers only are required, and under certain conditions even the transformers may be eliminated. Any form of converting apparatus requires a machine with rotating parts, necessitating attention and consequent expense of upkeep. The principal disadvantage occurring from the use of converting apparatus lies in the fact that a shut-down of this unit causes an interruption of the furnace-hoist service.

In addition the use of converting apparatus increases the initial cost as well as the power consumption. With the transformers delta connected, a breakdown of one unit may not cause a shut-down, as the remaining units may be operated to give at least temporary service with open-delta connections. If more than one transformer unit fails a shut-down will occur unless spares are available, regardless of whether the furnace hoist is operated by either direct or alternating current.

Comparison of Starting Systems

The second consideration in the comparison is the suitability of each system when starting the hoist. Where the conditions permit of starting and accelerating to full speed immediately, it may be stated that the alternating-current motor possesses certain disadvantages which result in greater power consumption at starting. In the first place, the efficiency of the alternating-current motor at starting is comparatively low, as it is practically equivalent to starting a direct-current motor without any increase in field strength during starting. In the second place, the kinetic energy of the alternating current motor, particularly when built for two speeds is considerably in excess of that of the direct-current motor. This comparison is made still more unfavorable if the fast speed of the alternating-current motor, exceeds that of the direct-current motor.

Alternating and Direct Current

On the other hand, where the conditions require a definite slow speed for a certain distance after starting the two-speed, alternating-current motor possesses distinct advantages, in that a definite slow speed irrespective of change in load conditions can be obtained, and the alternating-current motor can run on slow speed without resistance control. With the direct-current motor, a definite slow speed cannot be obtained because the slow speed is obtained by resistance control, and is subject to excessive variation with the variation of loads. During the time the hoist is running at full speed, neither direct nor alternating current possesses an advantage over the other, except that additional power is required to operate the converter set for direct current.

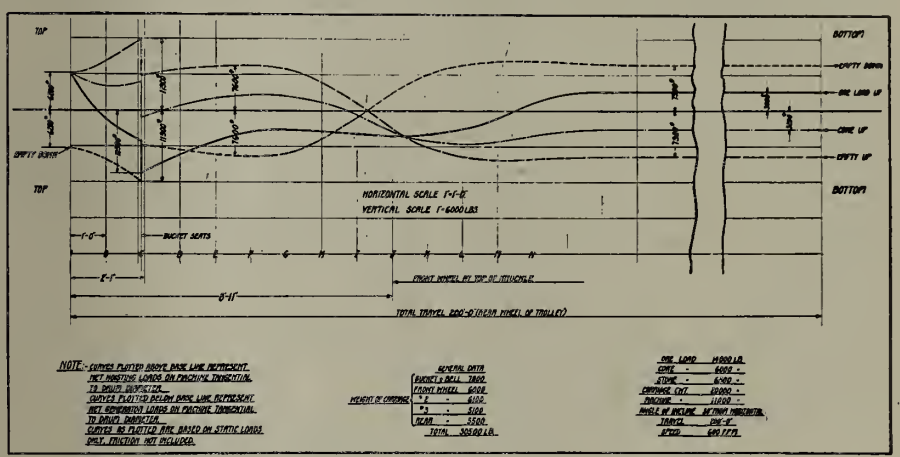


FIG. 6—MOTOR-LOAD DIAGRAM FOR A SINGLE-SKIP INSTALLATION

The third and probably the most important consideration in the comparison relates to the conditions and requirements to be met in the stopping zone. Mention has been made that accurate stopping is necessary for safe and uniform operation and this applies to all types of dumping arrangement. In the case of the double skip the bucket should stop at the same point and with the same dumping angle regardless of whether a 3000-pound coke load or a 15,000-

pound ore load is in the bucket, otherwise the delivery of the material into the furnace top will not be uniform. In addition the load on the motor may vary widely in the stopping zone, as for example, as shown on Fig. 6, the load conditions on some single skips change from a motor load, when the carriage is on the incline to a generator load when in the dumping zone and back to a motor load after the bucket has seated and the bell is being lowered to its final position. It is evident as mentioned before, that, regardless of type of hoist or dumping arrangement used, these conditions can be met by providing a definite slow speed in the stopping zone and thereby obtain, regardless of load, satisfactory operation and accurate stopping.

Slow down on the direct-current motor is obtained by the use of resistance control in addition to field control, and is applied automatically in the stopping zone by the stop-motion switch independent of the operator. With this method of speed control, it is practically impossible to obtain a definite slow speed and accurate stop with the wide variation of loads occurring in this zone. In addition it may be mentioned that resistance control consumes a large amount of power.

Method of Speed Control

Slow down of the alternating-current motor is obtained by the use of the slow-speed winding of the motor, and is applied automatically in the stopping zone by the stop motion switch independent of the operator. With this method of speed control, the alternating-current motor, when driven above synchronous speed, will develop a definite retarding torque or dynamic braking action, due to the fact that the motor will act as a generator when driven above synchronous speed; in other words, when changing from fast to slow speed. The fourth point to be considered is the effect of kinetic energy, and in comparing the direct and alternating-current machines it has been found that although at full speed the kinetic energy of the alternating-current motor is considerably greater than that of the direct-current motor, more accurate stopping is obtained with the alternating-current motor, due to the fact that the slow speed of this motor is lower and more definite than that of the direct-current motor.

Maintenance of service depends upon the relative reliability of the alternating-current motor, controller and brake as compared with the direct-current equipment. In comparing the relative reliability of the alternating and direct-current apparatus, it is necessary to consider not only normal but also abnormal operating conditions. In this connection comparison will be made of the principal points involved.

The first point to be considered is the effect of the failure of power supply. With direct current a complete absence of power occurs upon interruption of either or both supply lines; while with alternating current, complete absence of power occurs only when two or more lines are interrupted. With alternating current, the interruption of one or, under certain conditions, two of the supply lines, results in partial absence of power; but under these conditions

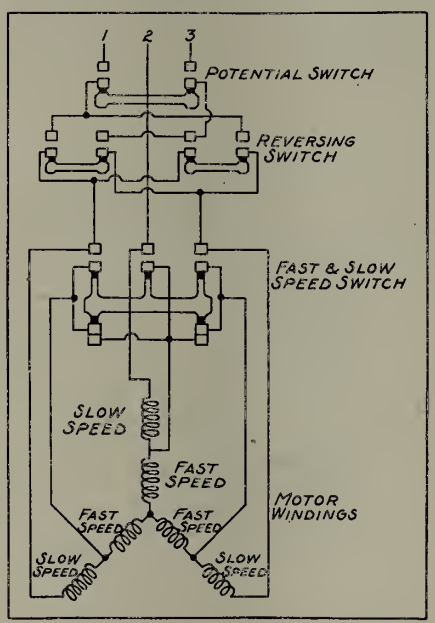


FIG. 7—WIRING DIAGRAM OF ALTERNATING-CURRENT, 2-SPEED, FURNACE HOIST CONTROLLER

sufficient power is available to keep the machine running, and also to provide sufficient dynamic retardation to enable the machine to be stopped without dangerous overtravel.

With direct current should the load be driving at the time of failure of power supply, the motor may be accelerated up to several times normal speed and act as a self-excited generator holding the brake off, unless certain means are provided, which will automatically apply the brake. As is well known, it is necessary with direct current to feed the motor and brake through separate controller contacts. If under this condition, the motor circuit should either fail to be made or be interrupted, without simultaneously opening of the brake circuit, a runaway condition would result.

With alternating current, however, no such runaway conditions can occur. The motor cannot act as a self-exciting generator in the same manner as a direct-current motor and as the motor and brake are connected in parallel and are fed from the same controller contacts, any failure of controller contacts or interruption of the supply circuit will cut off power from brake and motor simultaneously.

Regarding the action of the brake with direct current, it is well known that the residual magnetism is reduced to a negligible value usually by putting a spacer of nonmagnetic metal of sufficient thickness between the abutting cores. With alternating current it is not feasible for various reasons to make use of a spacer as with direct current. Here a reduction of the residual magnetism is obtained by splitting the magnetic circuit in several places, usually in the stationary portion. In addition to this when the power supply is cut off from motor and brake, the motor will act for an instant as an alternator, supplying the brake with an alternating current with a magnitude rapidly decreasing to zero. The effect of this action is the complete demagnetization of the brake magnet.

Dynamic Retardation

The second point to be considered is the complete or partial failure of dynamic retardation. Complete failure of dynamic retardation will cause excessive overtravel, which usually results in damage to the equipment. This applies to both alternating and direct current. With direct current, complete failure of dynamic retardation, is caused either by the interruption of the field circuits, or the armature circuit. It is improbable that two of the field circuits will fail simultaneously; whereas the single-armature circuit may be interrupted due to breakage of a grid, failure of a contactor to make, loose connections, etc.

With alternating current, complete failure of dynamic retardation is only possible when two or more of the stator circuits, or when two or all of the rotor circuits are interrupted and, although the rotor circuits contain grids, contacts, etc., which are subject to failure the same as with direct current, it is improbable that two of these circuits will fail at the same time.

The third point that may be considered is the relative possibility of breakdown of insulation and the facility with which repairs can be made. In regard to the motors, let us first consider the stationary windings. While it is true that a stator coil of the alternating-current motor is

not ordinarily as readily replaced as a field coil of the direct-current motor, there is less likelihood of breakdown of the stator coils, because they are not subject to high discharge voltage as is often the case with the field coils of a direct-current motor.

In addition, in case of a breakdown of a stator coil, it may be left in place but opened and bridged, without materially affecting the performance of the motor. It is obvious that this cannot be done with a field coil of a direct-current motor, as in case of failure of a field coil, it must be taken out and replaced.

When introducing the 2-speed alternating-current motor for elevators there was a feeling of uncertainty as to the reliability of this type of motor, compared with the direct-current motor. However, after a great number of 2-speed alternating-current motors have been in use for a considerable length of time under all conditions of elevator service, it has been found that the 2-speed alternating-current motor is as dependable for maintenance of service as the direct-current motor.

Control and Maintenance

The fourth point relates to the controllers, and here but little difference can be found between the two types. It might be mentioned, however, that the contacts on the alternating-current controller have longer life, as there is less tendency to arcing. This is particularly due to the series connection of the two motor windings, whereby the current is never broken when changing from fast to slow speed or vice versa.

The fifth point in the comparison of maintenance is the liability of breakage of mechanical parts of the machine. It may also be mentioned as an advantage of the 2-speed alternating-current motor, that in case a breakdown of one winding occurs, the motor can in emergency be operated on the other winding.

In conclusion it may be stated that, although the use of alternating-current apparatus for operating furnace and bell hoists is comparatively new, the application of alternating current for this purpose and for elevator service has demonstrated that the alternating-current equipment possesses a number of distinct advantages over that of the direct current installation.

Methods of Conserving Coal Supply

BY EDWIN LUDLOW

FOR the first time in our history it has become the duty of the coal operator not only to practice the conservation of his own resources, but to preach conservation in the utilization of coal, by obtaining its full heat value. Coal operators in the past have been more interested in trying to mine coal at a cost that would enable them to keep their balance on the right side of the ledger, than in studying the full extraction of their coal resources. If they had done so in the past, only in favorable situations would it have been possible to mine and sell the coal in the competitive markets at a price that would return the cost of production. With the advance of prices and the demand for coal in excess of production, which is liable to last for many years, operators can now study more intensive methods for the complete extraction of the contents of their coal seams, with the security that their additional outlay and their higher costs will still net them a fair return on their investment.

Increased Boiler Efficiency

With the higher cost of coal, it has also become a strong inducement for the manufacturer to pay closer attention to the results obtained from his boiler houses. In the past, coal has been so cheap that little attention has been paid to scientific methods of firing, and to the full utilization of the B.t.u. in the coal purchased. A large manufacturer not long ago assured me that he was very particular about the purchasing of his coal, and insisted that all coal must be up to a standard of 14,600 B.t.u. In looking over his steam results, I called his attention to the fact that his coal should show an evaporation of 11 pounds of water per pound of coal, but that he was actually obtaining only 9 pounds, and that by proper firing he would make a saving of at least 20 per cent in the quantity of coal he used.

In a large number of cases that I have had occasion to investigate, it has been found that the fireman is really the arbitrator of the quality and quantity of coal that is to be used, and that his methods of utilization are usually far from scientific. It becomes the duty of coal men, when the opportunity offers, to call the attention of their customers to the conditions in their boiler rooms and point out to them how their consumption of coal can be decreased by more economical methods of firing and better boiler practice.

Recent development of large power plants located at the mines, for the generation of electricity and its transmission to distant places, points to the most available method for the utilization of a great deal of inferior coal now thrown away at the mines, or not now mined, that could still be economically used under proper boilers if no transportation charges were added to the cost of this fuel. In this way large electric units could be established adjacent to the lignite fields of Texas that would generate power to supply the industries now using fuel oil, and also would probably lead to the electrification of the railroads in the South, which are still among the large consumers of crude oil.

This plan has already been put in practice in the anthracite region for the utilization of the finer sizes that have heretofore been considered too small to be economically used under boilers, and approximately three to four million tons of fine coal is being thrown away each year at the anthracite mines. Briquetting permits the transformation of this fine coal into a domestic fuel equal, for many purposes, to the best grades of anthracite.

Can Now Use Fine Coal

These large electric plants are now burning the finest size of buckwheat, which was formerly unsaleable, and are now able to obtain a 200 per cent rating on their boilers. They are sending out electricity at 110,000 volts to a radius of 75 miles. By doubling this voltage, it is estimated by electrical engineers that electricity can be sent at a less cost than fuel can be shipped to a radius of 200 miles, which would include Philadelphia and New York. The electric power required in these cities, instead of being manufactured at these points, could be manufactured more economically at a large central station located in the anthracite field. This development would relieve a tremendous congestion on the railroads in the handling of the fuel needed for these large electric plants in the cities, and would be utilizing a grade of fuel that has heretofore been largely thrown away at the mines. The accumulation of this class of material in the anthracite region amounts to at least 25,000,000 tons, and is being added to each year at the growing rate of 2,000,000 to 3,000,000 tons.

Abstracted from a discussion of the paper, "Review of the Coal Situation of the World," by G. S. Rice, presented at the recent New York meeting of the American Institute of Mining Engineers.

Power Trucks Meet Labor Shortage

The Pennsylvania Railroad Has Installed Light Tractors and Trailors for Handling Package Freight at One of Its New York Terminals—The Result is Satisfactory and a Substantial Reduction in Labor Cost is Effected

BY E. C. KREUTZBURG

ARCHAIC methods of accomplishing things are being abandoned in the industries upon which Uncle Sam most relies for the execution of his war program. Necessitated by the acute shortage of labor, and the simultaneous demands for speed, improvements are now being instituted almost overnight which are multiplying by many times the results obtained by methods formerly employed. The drive in all industries where volume of production now is the dominating consideration, is to enable one man to do the work that formerly required several.

One industry which perhaps above all others has been embarrassed and handicapped in the huge man hunt generated by the terrific pressure of war requirements, is that of transportation. At a time when the demands upon them have been greater than at any other time in their history, the railroads have lost thousands of their men to the shipyards and munitions plants and to the army and navy. The employment of female workers has served to replace only a portion of the men lost. Therefore, it has become a vital matter for the railroads to evolve methods entailing the use of fewer men.

Hand Trucking is Costly

Handling of package, or less than carload freight, has always required an extravagant use of labor, particularly at the large receiving and distributing points, such as New York, Chicago, Pittsburgh and other cities. For many decades no method was known which would satisfactorily replace the handling of these packages by men with hand trucks.

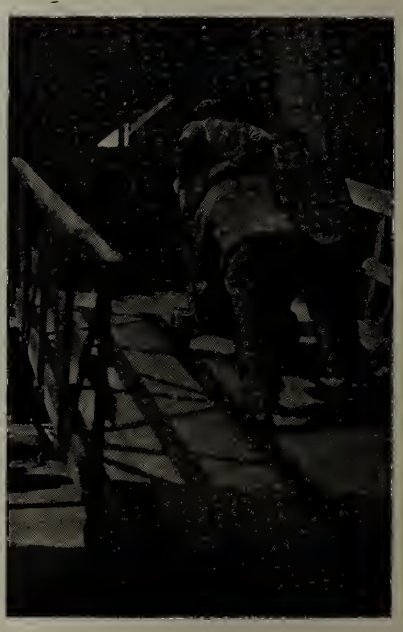
At the time when this country declared war upon Germany, some of the roads, in view of the scarcity of labor, were paying their hand truck men as high as $1 an hour. About that time representatives of the leading railroads, in an effort to combat the labor shortage by evolving labor saving methods, undertook seriously to determine whether it was possible successfully to replace hand trucking by mechanical handling. The results of these efforts, as exemplified by what has been accomplished at Piers 3, 4 and 5, North river, New York, by the Pennsylvania railroad, are revolutionary, and the methods now employed at this terminal undoubtedly will be copied at other large freight terminals.

The handling of package, or less than carload freight, at the Pennsylvania outgoing freight station in New York, is accomplished by a miniature railroad which is comprised of electric storage-battery tractors that pull trains of trucks. At the beginning of the experiment, the tractor was moved in and out among the hand truck operators in order to accustom them to its movements. Later one or two trucks were coupled to it. Now these trains are comprised, on the average, of 10 trailers. Prior to the institution of the new method, 165 men with hand trucks were required for moving the packages received at this terminal. Now every hand truck has been eliminated from the main floor and only a few are required for moving the packages from the street entrance as they are received. The classification of the packages at



How freight congestion has been relieved at a New York pier—In this instance package freight is handled quickly, one tractor truck pulling several loaded trailers—By this system, 22 men are doing the work that previously required 100 men.

The old way of trucking freight by hand—Three men to one truck.



this terminal, which handles only outgoing freight, begins with the receipt of the packages at the street entrance. By means of hand trucks, they are at once moved to a long line of trailers each of which is numbered in accordance with the destination of the packages placed upon it. Thus trailer No. 35 receives goods for Chicago, No. 61 for Pittsburgh, and there are numbers for all other destinations. As their loads accumulate, the trailers are pulled by a switch tractor to the freight yards, of which there are two on each pier. Here the loaded trailers are placed in accordance with their numbers, to be moved later to empty freight cars located on barges alongside the piers. Usually there are four barges alongside each pier, so that each of the two freight yards on a pier feeds two sets of barges. Each yard has space for two trains of trailers so that the two sets of empty railroad cars on the barges can be loaded simultaneously

Each tractor and accompanying train of trailers requires two men to operate it. Careful observation of the new method of handling as compared with the old, shows that the saving in workers is about 78 per cent. In other words, 22 men with tractors and trailers will do the work that requires 100 men with hand trucks. Railroads which now are installing the trailer system of handling less than carload freight include the New York Central, the New York, New Haven & Hartford, the Chicago, Burlington & Quincy and the Delaware, Lackawanna & Western.

Complete New Warehouse

The Miner-Morse Corp., dealers in iron and steel, Erie, Pa., has recently completed a new warehouse 150 feet long and 60 feet in width. It is constructed entirely of brick and steel. Special attention has been paid to the problem of economically handling materials and a 2½-ton electric crane has been installed together with an electric trolley equipped with an electric hoist. A number of storage-battery driven electric floor trucks also have been provided. The warehouse has a capacity of from 2500 to 3000 tons of steel which is stored in racks around the walls. The building is located on the main line of the New York Central railroad at the corner of Fifteenth and Ash streets, in Erie.

The Miner-Morse Corp. specializes on high speed steel, cold drawn material, strip steel, etc. The corporation is district sales agent for the National Drawn Steel Co., East Liverpool, Ohio. The stock carried at the Erie warehouse includes cold drawn shafting, screw stock, alloy steels, dental octagon rods, polished needle wire, cold drawn special shapes, drill rods, high speed steel, tool holder bits, carbon tool steel, machinery steel, black and blue annealed sheets, cold rolled strip steel and small shapes.

The officers of the company include Pierre A. Miner, president; Wm. C. Kramer, vice president; Henry L. Morse, treasurer, and Harry R. Davies, secretary.

Unique Clam-Shell Bucket

A unique single-line, clam-shell bucket which may be hooked on or off the sheave block of any crane or derrick leaving the latter free for other work



SINGLE-LINE CLAM-SHELL BUCKET

when the bucket is not required, is shown in the accompanying illustration. The bucket, which is built by the Blaw-Knox Co., Pittsburgh, may be operated from overhead cranes to load and unload cars of gravel, coal or sand, or to clean ash, mill-scale, or cinder pits, etc. It may also be attached to stiff-leg, guy or traveling derricks, or to portable cranes, steam shovels, and other single-drum rigs. The bucket is dumped by the rig operator by means of a tripping lever or by lowering the closed bucket until it touches the ground when it trips automatically. The bucket is made in 1 and 1½ cubic yard capacities and weighs 3500 and 4800 pounds respectively.

The Griffin Wheel Co., South Tacoma, Wash., has a contract to make 16,000 car wheels at an estimated cost of $240,000 for 2000 freight cars.

Natural Gas in 1916

The United States geological survey recently issued a bulletin entitled "Natural Gas in 1916". As the question of fuel is occupying considerable attention at this time the statistics contained in the bulletin are of especial interest. According to the report, the value of the natural gas marketed in this country has increased steadily since 1898, amounting in 1916 to $120,227,468, a sum nearly eight times as great as in 1898. This represents a gain of $18,915,087, or 18.6 per cent, over a market value of the output in 1915. The average price per 1000 cubic feet was 15.96 cents, a loss of 0.16 cent compared with 1915.

Natural gas valued at more than three times the value of the entire output in 1898 was produced and marketed in 1916 in West Virginia alone; the value of the gas marketed from wells in Pennsylvania in 1916 was more than one and one-half times the value of the output in the entire country in 1898; the gas marketed from Ohio sources in 1916 was approximately equivalent in value to the total output in 1898; and Oklahoma, not even listed as a producer of natural gas in 1898, was credited in 1916 with an output equivalent to more than three-fourths the value of all the natural gas marketed in this country in 1898.

Credit for the increased production in 1916 belongs, in the order given, to West Virgina, Oklahoma, Pennsylvania, California, Louisiana, Kansas, Texas and Arkansas, which together produced 132,000,000,000 cubic feet more gas in 1916 than in 1915. A significant increase, important locally, but unimportant as affecting the production of the entire country, was credited to Illinois, New York and Montana. In only two states was there a significant decrease in the production of natural gas in 1916. The rapid exhaustion of the prolific Cleveland field, Cuyahoga county, Ohio, resulted in a net loss of 9,600,000,000 cubic feet in the total volume of gas produced in Ohio, and the steady decline of the oil fields in Indiana caused a falling off of 600,000,000 cubic feet in the output of that state.

The general increase in the production of natural gas in the United States in 1916 is attributed principally to an enormous expansion of the natural-gas gasoline industry in all natural gas producing states and to a greatly augmented demand for natural gas as fuel by industries engaged in the manufacture of munitions of war. Natural gas to the value of $120,000,000 was utilized in the United States in 1916.

Study British Blast Furnace Practice

Replies to Questions Sent to British Blast-Furnace Superintendents Show That Ores Are Uniform—Limestone is Not Broken Below Eight Inches —Mechanical Condition of Coke is Important

Questions Sent to Blast-Furnace Superintendents in British Isles

STATE the number of furnaces in blast at your works, the class of pig iron made, the blast pressure and the average output per furnace for each grade of pig iron made. If you have more than one group of furnaces, please give this information separately in respect of each group.

Are your raw material supplies fairly uniform in respect of mechanical conditions, that is, size, density, etc? (a) ore, (b) coke, (c) fluxes?

Do you adopt any means for obtaining regularity in respect of these conditions? If so, what?

Have you found that variations in yield and efficiency can be directly traced to variations in the mechanical conditions of the burden?

Have you tried what effect the uniform grading of material has on the furnace working? If so, have the resulting advantages outweighed the increased cost of preparation of the burden?

Are your stocks exposed to the atmosphere or under cover?

Have you sufficient storage capacity to enable you to effect any useful mechanical grading in making up the charges?

Given that the (1) chemical composition and (2) the mechanical condition of the ores, fuel, and fluxes charged do not vary widely in your current practice, to which factors do you attach most importance in their effect on the regularity of working in each case?

Can it correctly be assumed that by securing uniformity in regard to chemical composition, mechanical condition, and moisture of the materials charged, the efficiency and yield of the furnaces would be increased? If so, will you kindly give any particulars of your experience which might be of value to the committee?

What in your experience is the influence on furnace working of the size of the bell in relation to the stock line? The height, bosh and well dimensions of the furnace in question to be given.

What is your experience of the comparative value of wet and dry methods of gas cleaning, and of the application of clean gas to stoves and boilers?

What in your experiences are the best thicknesses and other dimensions for lining bricks, and what methods do you recommend for preserving linings? Do any advantages accrue from varying the quality of the bricks used in different parts of the furnace?

What is your experience in regard to the utilization of waste gases for calcining ore? In replying to this question any particulars that you can give in regard to the design of roasters would be appreciated.

Is there, in your opinion, any advantage in using double bells for saving gas?

IN accordance with plans formulated last year, the committee on blast furnace practice which was appointed by the British Iron and Steel institute, decided that in beginning its work it would investigate certain problems which would be of principal importance to the blast furnace superintendent. With this in view several questions which are shown in the box on this page were sent out to blast furnace managers in the British Isles. The first nine questions were asked in order to elicit opinions on the effect of the mechanical and chemical condition of raw materials used in the blast furnace. Summaries of the replies to these questions are as follows:

The following remarks apply to furnaces in the South Wales and Monmouth districts working on foundry and one partly on foundry and partly an basic iron, with a weekly output of 650 to 700 tons and 1000 tons, respectively. The ores supplied to the works are said to be variable in size, density, moisture and quality. At one works measures have recently been taken to insure greater regularity in the mechanical condition of the ore; at another attempts have been made to break up large lumps of ore and stone by hand, but this method has proved unsatisfactory.

The coke is fairly uniform and of good mechanical condition. At one place where variations in the quality of the coke had been the rule, new plant has been put down, with quenching and screening arrangements. A screening plant for limestone has also been installed to insure cleaner stone and of greater regularity of size.

It is generally agreed in the district that substantial advantages would result from a proper grading of material. Experiments have been made in several cases, and the results showed that the advantages would decidedly outweigh the increased cost of preparing the burden. In one case when circumstances favored the careful selection of materials, the output of certain furnaces during a 14 days' run is said to have been increased by 10 per cent, and the fuel consumption reduced by 10 per cent.

The firms in the Midlands which replied are all makers of forge and foundry iron with furnaces making from 350 to 550 tons a week. Blast pressures of 5, 6 and 10 pounds are used, 6 pounds being the pressure in the case of most of the furnaces to which the following remarks relate.

At one place the ores are fairly uniform in respect of size and density. At others they vary greatly, being drawn from different mines, some of which send ore which is large and fairly free from smalls, while others send a large proportion of fine stone, but together they form a regular mixture. In another instance the ore

Abstract of paper presented at the annual meeting of the British Iron and Steel Institute.

varies from riddlings to blocks only broken to wedges.

The character of the coke differs according to the source from which it is drawn. Derbyshire coke is said to be used in several instances, and it is small and sometimes contains a large proportion of dust and breeze. The limestone is clean, and is usually broken and sized at the quarries.

Blast Pressure is Low

A Staffordshire firm has three furnaces in blast, working on forge and foundry iron. The blast pressure is 5½ pounds per square inch, and the average weekly output is 380 tons. The mechanical conditions of the raw materials are fairly uniform, and as far as these works are concerned, any advantage derived from grading material would be outweighed by the increased cost. All stocks are exposed to the atmosphere and the storage capacity is too limited to permit of grading.

Most of the irregularity in working can be attributed to the small ores, and coke or coal combined with irregularities in charging at intervals due to the human element. To get the best results, all fine material and moisture should be eliminated as far as possible from the fuel and ores, and the limestone should not exceed 5-inch cubes. One firm states that all low-grade ores, such as Northampton, should be calcined, and the resultant fine material briquetted. This, coupled with regular charging, uniform temperature, and constant pressure of blast, would reduce the likelihood of scaffolding, increase yields, and prolong the life of the lining.

Another firm in the Midlands has furnaces making foundry, forge and basic iron. One furnace has a blast pressure of 7 to 8 pounds and makes 700 to 800 tons a week, according to the class of iron. Smaller ones work at 5 pounds blast pressure, with a weekly output of 450 to 500 tons per furnace.

The ores are variable, with iron from 20 to 38 per cent; silica, 3.5 to 16 per cent; lime, 1 to 24 per cent. The size varies from large lumps to fine. The coke varies considerably in density and as to smalls and friability. The fluxes are generally uniform with some variation in winter, probably due to water.

Weekly Output is Small

Replies were received from seven large firms in the Cleveland district. The average output of the furnaces of which particulars have been given is from 900 to 1200 tons per week when working on hematite. Those producing Cleveland iron yield in some cases 700 to 750, and in others up to 1200 tons per week. Blast pressures range from 6 to 8½ pounds on the hematite furnaces and from 6½ to 8¼ pounds on the Cleveland furnaces.

In the last 20 years the quality of both hematite and Cleveland ores used is said to have deteriorated in all cases. The hematite ores vary considerably in size at all the works, and one manager remarks that they show great fluctuation, both in respect of mechanical condition and chemical composition, varying often from 3 to 22 per cent of silica, and 0 to 7 per cent of lime. Stock bins are installed at some furnaces, which facilitate the correct mixing of several classes of hematite ore, but in no case are they sized to uniformity.

The limestone is fairly uniform in most cases, though not all the works make a practice of sizing it. At one works some trials were made several years ago by breaking Cleveland ore and limestone into about 4-inch cubes. The furnace was run for three weeks on the graded material, but no saving in coke resulted, and the furnace did not drive so well with the available blast pressure of 7 to 8 pounds. It was not found that variations in the mechanical condition affected the yield and efficiency, except when the ores had an excessive amount of small in them. Otherwise the trials mentioned showed that no great advantage was gained by uniform sizing, though magnetite ores which are hard require to be broken into pieces of about 2 to 3-inch cubes.

All agree that the mechanical condition of the coke is an important factor. This undoubtedly governs the drving of a blast furnace, other conditions being equal, and it is stated that a most helpful object of research at the present time would be to find out how to make a uniformly hard and dense coke irrespective of its ash content. The make per furnace in the Cleveland district would be greatly increased as the result since the mechanical condition of the coke is said to be much below the average at the present time, and one works estimated that with coke of the proper qualtity as to hardness and density its output would be increased 25 per cent. At another works a furnace has actually produced 30 per cent more iron on the same ore and limestone burden by a change from poor coke to good coke. Coke of variable quality is difficult to deal with, first because of the difficulty of obtaining a reliable sample for analyzing, and secondly from the fact that stocks are not kept to pick and choose from.

When furnaces have been burdened on two kinds of ore of a fairly good composition the results will be regular, but when a furnace has to be burdened with as many as five different kinds of ore out of six barrows to a round, as sometimes happens, the same regularity cannot be obtained.

Coke Properties Important

In Cleveland practice the ore and limestone are calcined either separately or together, and the moisture in the coke need hardly be taken into account, being generally low. The mechanical condition of the coke is of the first importance, and if uniformly hard and dense the output would be increased. The higher the iron contents the more economical would be the working of the furnace, as if the percentage of iron is constantly altering it is impossible to alter the load on the furnace as frequently as the burden changes; also, in calcining, it is equally impossible to tell exactly at a given moment the iron contents of the charge, so that an average has to be made and worked to.

Some of the larger works in the Cleveland district possess considerable storage capacity for hematite ore. The Cleveland stocks of ore are small, as the close proximity to the mines insures a regular supply. All the ore is passed through calcining kilns, and is thus delivered dry to the furnace. Most of the works managers remark that their storage capacity for hematite ore is too limited to enable them to effect useful mechanical grading in making up the charges, should that become necessary.

The average weekly output of 10 furnaces in the Northwest district running on hematite is given as about 800 to 950 tons, the blast pressure at three different works is 5½, 6 and 7 pounds.

The ore supplies are drawn from different mines, varying in mechanical and chemical conditions from day to day, and are classified according to chemical analysis as far as possible, and there is a certain amount of mechanical grading, due to the ores being spread over a large number of stock bins.

Classify Mixture

Other than classifying the available supplies to give the best working mixture, and endeavoring to keep the same mixture on the furnace as long as possible, there has been no attempt to try the effect of uniform grading on the furnace working. The ores vary from fine to lumpy. With

a large percentage of fine ore on the burden the yield is poor, and as a rule the furnace drives irregularly. On the other hand, with a large percentage of lumpy, dense ore, extra fuel is required, and the output is lowered.

Increasing the Yield

The opinion is expressed by a maker of basic iron that by securing uniformity in regard to chemical composition, mechanical condition, and moisture in charge, that the yield and efficiency of the furnace would be greatly increased. Both regular composition and good mechanical conditions are essential to good working that it is difficult to say which has the greater effect. Varying chemical composition of the ores causes frequent changes of burden, which should be avoided as far as possible, as this greatly tends to disorganize the working of the furnace. Regularity is most essential for good uniform working. Bad mechanical conditions cause the furnace to work irregularly. If material is small and wet, it prevents regular flow of the reducing gases to the descending charges, with the result that the furnace hangs and works in heavy slips, necessitating working the stock line down much below its normal level. If the material is large or dense, it is probably melted at the expense of pure carbon near the tuyeres, with a resultant loss of heat to following charges, which, of course, affects output and quality.

Another firm has a furnace working on basic iron with an average output of 1000 tons per week on a 35 per cent burden. Both the size and specific gravity of the ore vary widely, but the size and density of the coke and fluxes are regular. The yield and efficiency are strongly affected if the percentage of fine ore is excessive. No mechanical grading of the materials is done, beyond using crushed limestone. The stocks are exposed to the air, and there is no storage capacity to enable any useful grading to be done at the works. Uniformity is clearly desirable, but no data exists to show how far the cost of obtaining uniformity may counterbalance or exceed the benefits to be derived therefrom, except in the case of dry blast, where the results of a three years' experience can best be described by saying that they would not warrant the repeating of the installation on another furnace.

The replies received from the Lincolnshire district relate to 14 furnaces working on basic iron. Two furnaces outside the district, but using Lincolnshire ores, make about 320 tons per furnace per week. The others average from 550 to 600 tons, 650 to 700 tons, 750, 800 and 900 tons, and 1100 tons per furnace per week. The blast is 5 pounds for the smaller furnaces, and from 6 to 8 pounds and from 10 to 12 pounds on the larger ones.

The raw materials are not at all uniform in size. The mixture of ores is self-fluxing, and they range from fines to large pieces; as the ore is irregular the fluxes are also irregular. The ore is obtained as regular as practicable from the mines as it is raised. At one works the different grades are filled separately into wagons at the mines, and the quality is clearly marked on the wagon labels. This ore is graded at the works so that by filling from different wagons a fairly uniform mixture is obtained. This is possible, owing to the fact that the filling is done direct from the wagons into barrows and not into bins. The stocks are exposed to the atmosphere, but the filling into barrows is done under cover.

At two other works the large ore is broken to about 4 to 5-inch cubes, and the large and small are tipped into separate bins. In the case of coke, various grades are mixed in cars, emptied into bins or unloaded direct into barrows. The advantages of this grading decidedly outweigh the increased cost. Three or four days' stocks are carried in bins, and these are not under cover. The chemical composition of the burden varies widely, and assuming the mixture is maintained to produce a correct slag, which can be done even with great variation in the chemical composition; great importance is attached to the mechanical condition.

Another firm mentions that the variation in the proportion of smalls both in the coke and ore has a marked effect on the yield and efficiency of the furnace. If the small material increased to too great a proportion the furnaces work irregularly, and if the proportion of large ore increases the furnace burden has to be reduced. No experiment in uniform grading has been tried. The stocks are exposed to the atmosphere, and the ore from the calcining kilns is held in wagons and not stocked for long periods.

The chemical composition and mechanical condition affect the furnace working in a far greater degree than the moisture. When conditions happen to be favorable for a period, better results are obtained from the furnaces. In the winter, when weather conditions do not allow the mines to be worked to obtain the same regularity, the results are worse, but owing to the difficulty of obtaining particulars of the amount of irregularity this can only be stated in general terms. About 60 per cent of the local ore is calcined at most of the works. The balance is used in a raw state.

Scotch Furnace Practice

The recorded average weekly output of a group of furnaces in the Scotland district making foundry iron is 650 tons. The ores vary considerably in size and density; the coke is uniform in size but varies in density, beehive and by-product coke being used. The limestone is regular in size. Hard Swedish ores are put through a breaker, and the limestone is broken by hand; improved efficiency has been obtained by breaking the ores, but uniform grading has not been tried. The stocks are exposed to the air, and the storage capacity near the furnaces is insufficient to enable grading to be done. Given that the mechanical conditions do not vary widely, the chemical composition of the raw material is of more importance to the regular working of the furnaces.

Trouble has been experienced through variation in the chemical composition of Spanish ore cargoes, presumably due to the ship being loaded with ore from more than one mine. In one case a difference of 4 per cent silica was found in samples from different parts of same cargo.

The following are representative of the replies received from blast furnace managers in most districts:

A bell about 5 feet to 6 feet less in diameter than the furnace stock line gives better results in coke consumption and better distribution of the burden than a smaller bell. But the diameter of the bell and stock line must bear a certain proportion to the diameter of the bosh—say a 13-foot diameter bell and 18-foot diameter stock line for a 26-foot diameter bosh for Cleveland.

For a 20-foot bosh, say a 9-foot diameter bell and 14-foot diameter stock line. Dimensions of furnaces as follows: For hematite iron—10½-foot diameter well, 20-foot diameter bosh, height 74 feet. For Cleveland iron—11½-foot diameter well, 26-foot diameter bosh, height 84 feet. A 28-foot diameter bosh for Cleveland is thought to be correct, and for this a 13-foot diameter bell would be put in.

As regards relation of bell to stock line, the area of the bell should be equal to the area of the annular space between the brickwork and the bell, when the bell is lowered. If this dis-

tance is smaller the large pieces will roll to the wall, and the small to the center of the furnace, causing the blast to work up the side, to the detriment of the lining.

The bell of the furnace must be in exact proportion to the diameter of the furnace throat, so that the material as it falls into the furnace shall be as nearly as possible evenly distributed, that is, an anular cone must be formed by the burden having its apex exactly half-way along each of the radii.

The diameter of the bell should be two-thirds of the diameter approximately of the throat of the furnace, and this gives a fairly good distribution of lumps and fine throughout the cross-sectioned area of the furnace. For a furnace 80 feet high, with a well of 12 feet and a bosh of 21 feet 8 inches diameter, and a height of bosh above the well 14½ feet and a throat diameter of 17½ feet, a bell of 11 feet diameter gives good results.

Generally speaking, the answers show that the area of the bell should be about half the area of the furnace throat at the stock line.

Inquiry was made as to the best thicknesses and other dimensions of lining bricks, and what methods could be recommended for the preservation of linings. Also, whether any advantages accrue from varying the quality of the bricks used in different parts of the furnace.

The size of lining bricks used in many furnaces in the Cleveland district is 4 to 4½ inches thick, from 1 foot 3 inches to 3 feet long, and 12 inches wide. In some cases blocks 18 x 30 inches are used. Thin bricks have the advantage of probably being better burnt; on the other hand, thick bricks can be made of greater length and are less liable to break before and after being placed into the furnace. Two firms in Lincolnshire have used bricks 2½ to 3 inches thick for 15 years, and are of opinion that thin bricks are better for furnace lining than large bricks, for the reason that they are better burnt.

Practice varies in the use of bricks of different quality in different parts of the furnace. Five firms consider that there is no advantage to be gained in varying the quality of the bricks, provided they are good well-burnt bricks made from a clay of average good analysis. The question is thought to be superfluous, as the best firebrick made cannot stand up to the temperature in the region of the tuyeres, and whatever money is spent in such refinements as dressing the hearth bricks is thrown away, as, the moment the stock starts to melt, it removes the surface of the bricks by fusion and replaces them by scar, which is infinitely more refractory.

Eleven other firms, however, use bricks of different quality for the upper and lower parts of the furnace. The hearth and bosh are lined with first-quality bricks on account of the higher temperatures, and a lower quality hard burnt brick is taken for the upper part, in order to resist the greater erosion, especially where the material drops off the bell.

The advantages accruing from varying the quality of the bricks in the lining may be summed up as follows: (1) Saving in cost. (2) Best quality bricks, which are most suitable where heat is greatest, are not so well fitted for the top part of the furnace, where a lower quality brick, but better mechanically, is more suitable where a certain amount of bumping takes place by the lowering of the charges.

Preserving the Lining

For preserving the lining at the top of the furnace, several firms find that a good method is to insert rolled steel wearing plates at a point immediately below the gas outlet; the plates being 25 feet long, 6 inches wide, and ¾-inch thick. They are bent a couple of feet at one end, and are inserted in the brickwork all round the furnace at the point mentioned, the plates hanging down close to the lining, and forming a shield at a point where damage is likely to be caused by the dropping of charges, especially if the stock is being worked low. The practice at another works is to place heavy tapered castings on the tops of and overlapping the brickwork, in order to meet the shock of materials leaving the bell.

Trial has also been made with cast iron plates built in between the courses at the part of the furnace where the material drops off the bell and strikes the lining, but carbon diffuses into the metal and swells the cast iron plates so that it raises the level of the platform plates.

Others have found no advantage from protective inner plates or other devices. They obtain specially hard burnt firebrick blocks for the lining at the top, and special mortar.

In the opinion of one the use of cooling plates above the tuyeres for protection of lining is unnecessary in a furnace making upwards of 1000 tons weekly, and, in fact, they should be used sparingly in any furnace, as instances have occurred where rows of blocks have had to be disconnected owing to the furnace taking water, and not being able to locate it; and, further, when a plate has been found to be leaking, it is often impossible to insert a new one, owing to the lining having settled.

In some cases, for the shaft, staggered rows of open-circular cast iron cooling plates about 3 feet apart, extending 30 feet above the bosh, are used. Four of these can be fed by a ¼-inch water pipe, little water being required. For the bosh, copper plates coolers from the tuyeres to top of bosh have been employed, the thickness of lining being 22½ inches. A better arrangement is to have copper plate coolers 3 feet above the tuyeres with a 27-inch lining, and water-jacketed to top of bosh with a 13½-inch lining. A continuous water spray is maintained on the jacket.

A firm in the northwestern district finds that the most suitable lining brick is 4 x 12 inches at the nose and about 18 inches long. To preserve brickwork both the cascade and a modified Sahlin bosh with bronze coolers are used.

The experience of others is that the linings from the hearth up to the bosh should be thin—say, from 12 to 15 inches thick—but with this a water casing must be applied. From the bosh upwards a lining 2 to 2½ inches is desirable, but water might be carried to the top, and in that case there is no reason why a thin lining should not work satisfactorily.

Another recommends a hearth lining not less than 3 feet plus 6 inches of coke and tar next to the jacket. For the bosh a thickness of 9 inches inside an inverted cone of steel plate. No regular water-cooling, but sprays arranged to meet emergencies. Furnace body, 24 inches, in two concentric circles of blocks 12 x 6 x 24 inches.

In reply to the questions as to experience in the utilization of waste gas for the purpose of calcining ore, 16 firms replied that they had had no experience in calcining by gas.

Of the remainder one found no gain owing to the increase in cost of repairs.

Another finds gas more effectual, fewer scars, more uniform results and better control of heat.

Another says result successful, but takes a large amount of gas, which might be used to greater advantages in other ways. Another tried producer gas, but cost was too high.

Another calcines 80 per cent of ore by blast furnace gas, and finds it quite successful. Kilns are of Gjers type, adapted at trifling cost to gas-firing. Gas forced in under 2 to 3 inches water pressure through suitable inlets. Small variable speed fan on each kiln controls calcination.

By-Product Industry Makes Progress

Derivatives Which Are Obtained from the Distillation of Coal in the By-Product Coke Oven Are Extensively Utilized in Manufacturing High-Explosive Shells and Artificial Dyes and Colors

BY WILLIAM H. BLAUVELT

FOR many years European economists have felt that it was a reproach to the United States that it should cling so long to the beehive oven for the manufacture of coke and deliberately throw away millions of dollars' worth annually of the many valuable by-products obtainable from the distillation of coal. Most fortunately for us in this great crisis through which we are now passing, this reproach is being rapidly removed.

Forty per cent of the coke made in 1917, or 22,600,000 tons, was by-product coke, and some time this year, when the new plants are placed in operation, the production of by-product coke will pass the beehive output. Ovens with a capacity of 13,500,000 tons of coke are in process of construction, and half as many more are contemplated. What did this great and rapidly growing industry mean to us as we entered the war a year ago and began our preparations for taking our place as active combatants in this greatest of all struggles?

From the side of fuel conservation, which last winter's experience showed us to be of the most vital importance, the by-product ovens now in operation have a capacity for producing 5,000,000 more tons of coke per annum than if the same coal had been coked in beehive ovens. Moreover, they have made possible the utilization for coking purposes of many deposits of coal that otherwise would not have been available.

Output of By-Products

Assuming all the plants were in full operation, they would produce 315,000,000 gallons of tar, which may be used for fuel, having the same efficiency as fuel oil, to say nothing of its other important uses in the arts. Assuming an average production of 4000 feet of surplus gas per ton of coal, including ovens of the older and newer types, the average annual production is 168,000,000 feet of gas, which would melt 12,000,000 tons of steel in the open-hearth furnace.

But it is in furnishing raw materials for high explosives that the by-product oven industry is most vitally essential to our prosecution of the war. Entirely aside from the economic importance of the conservation of our nation's resources, which is so vital at this time, if this industry had not been developed, we should have had to depend entirely upon the allies for almost every pound of high explosives, without a plentiful supply of which, this highly scientific warfare could not have been carried on by us for a single day, and, as we know, the allies have had to utilize every resource to obtain sufficient raw materials for producing their own explosives. Practically all the high-explosive shells used at the battle front are loaded with picric acid, T. N. T. and ammonia powders.

Explosives Produced

Picric acid is tri-nitro-phenol, which is produced by nitrating phenol or carbolic acid. Carbolic acid has been produced for many years from the distillation of coal tar, but under present conditions in this country much the larger production of carbolic acid is obtained by the synthetic process by the sulphonation and nitration of benzol. T. N. T., or tri-nitro-toluol, is produced from the direct nitration of toluol, and the ammonia powders have, of course, ammonia as their base. With the exception of a relatively small production from gas works, all our supply of these products is obtained from the distillation of coal in the by-product oven.

The ovens now in run have a capacity for carbonizing 42,000,000 tons of coal per year, and those building or planned will add 70 per cent to this amount. The present tonnage means an output of approximately 63,000,000 gallons of chemically pure benzol, 14,000,000 gallons of toluol and 100,000 tons of ammonia. I need only call your attention to these figures to demonstrate to you the importance of the by-product industry to our war requirements. It is not pleasing to contemplate what would have been our position if the large development of the by-product oven had been delayed only a few years.

This industry has done much more for America than the conservation of our fuel resources and furnishing a supply of raw materials for our high-explosive shells. It has taken an important part in the development on a sound basis of a wide line of chemical industries, in which our country was so far behind others until recent years. American manufacturers have had the money and will and American chemists have had the brains and the knowledge, but until the products of coal distillation were available as raw materials, we made little progress in some of the great branches of chemical manufacturing, which had been so highly developed in European countries. The great color and dye industry is a notable illustration of this fact. While this industry itself is represented by relatively small values, some of the most important industries in the country are vitally dependent upon it.

We learn from government reports that there are over 14,000 establishments in our country which are absolutely dependent upon dyes and colors. These establishments employ over $3,000,000,000 capital and it is estimated that over 2,000,000 working men and women are occupied in manufacturing plants which are directly dependent upon the use of artificial dyes and colors, and nearly all of these depend in whole or in part on the products of the distillation of coal for their raw materials. Naturally the color makers turn first to the colors which are consumed in the largest quantities, such as blacks and blues, but the list is being rapidly extended to cover the full line of dyes and colors used by the American trade.

Other Uses of By-Products

Printing inks, both black and colored, depend on the prussiates for their raw material, but it is doubtful whether it is realized in many of the thousands of printing offices in the country that the by-product oven is the basis of their supplies of ink. From the point of view of the chemical industries, many of the products of the distillation of coal are what are termed Keystone products. That is, while they are relatively unimportant in themselves, they are essential to other greater industries, and still others owe their development to the needs created by these Keystone industries. For example, aniline, which is made from benzol, and which is the base of a long list of colors, is also the raw material for indigo. In the production of indigo, it is necessary to have available a supply of the strongest sulphuric acid, which is entirely beyond

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This paper was presented at the annual meeting of the American Iron and Steel institute, New York, May 31. The author, William H. Blauvelt, is consulting engineer for the Semet-Solvay Co., Syracuse, N. Y.

the possibility of the old and well-known chamber process.

The contact process for producing these strong sulphuric acids was developed to meet this need, utilizing oxygen obtained from the air for the oxidation of the sulphur gases. With this process was developed the fixation of atmospheric nitrogen and the oxidation of ammonia for the production of nitric acid, thereby obtaining independence of the Chilian supplies of sodium nitrate. All of these processes have demanded more and more from the manufacturing chemists, and we have learned the way to be entirely independent of outside sources of raw material in so many lines of manufacturing which are essential to the best national life.

Progress Is Unusual

Manufacturing chemistry is peculiar in requiring ripe experience in detail by those in direct charge of operations, as well as scientific knowledge of the processes used by those in general control, and the foregoing brief reference will suggest to you the great chain of industries vital to the independent commercial success of our nation, which have been and are being built up in this country now that the supply of Keystone products has been made available by the by-product oven. After so many years of neglect, the progress we have made in the development of these closely interwoven industries is both remarkable and gratifying.

I have not time to go into the sanitary and medical supplies needed in the medical departments of our armed forces, but salicylate of soda and magnesia, asperin and salvarsan are illustrations of what our medical forces owe to coal distillation products. Perfumes may seem rather aside from preparations for war, but they are practically essential in the manufacture of soaps, pastes, ointments and salves as well as for less important use, and the base of many of these perfumes is chlorinated toluol and benzaldehyde.

While much of our attention is necessarily occupied in the actual conduct of the war and the production of the necessary supplies in a variety which we are only beginning to realize, we are also giving much thought to what is to come after the war. I have endeavored to suggest briefly the many lines of important industries that have grown directly or indirectly from the Keystone products of the distillation of coal, and others will occur to you. It is most satisfactory to note the courage and energy with which American manufacturers have entered these fields, and the sound commercial basis upon which many of these industries have been established.

Future Possibilities

When the military requirements are over and these manufactures have been adjusted on the basis of peace requirements, let us hope that our manufacturers, assisted by well-considered government aid, may be able to reach an even broader development of these industries than we have discussed and produce all of these hitherto somewhat unfamiliar products necessary for our national life. We have always excelled in mechanical products, although we have often permitted other nations to benefit more largely than we from our inventions, and this great emergency has shown that we are equally capable in chemical manufacturing, once we are assured of the raw materials and are aroused to the importance of these lines of industry. The present development should be only a preliminary state.

Steel Industry Helps Explosive Output

BY WILLIAM A. FORBES
Chairman, Benzol Committee, United States Steel Corp.

ON account of war conditions, the paper prepared by W. H. Blauvelt is of particular interest at the present time; there is no one I know more capable of presenting a paper on the subject in question than Mr. Blauvelt. The company with which Mr. Blauvelt is connected has been a pioneer in the development of the by-product coke oven in Europe and in this country, and is recognized as the prime leader here in improvements relating to the recovery of coal by-products and their further treatment in the manufacture of the more advanced products, many of which are specified in Mr. Blauvelt's paper.

It is gratifying to note that the by-product coke plants operating in this country, in conjunction with those now in course of construction, will result in a greater proportion of our country's coke being produced in by-product than in beehive ovens this year. In 1911, for instance, only 22 per cent of the total coke produced in this country was made in by-product ovens. This increase in by-product coke capacity has occurred in spite of the greatly increased cost of installation in recent years, entailing now practically three times the investment required for similar work in 1911. At present, there are 8173 by-product coke ovens in operation in the United States, having an annual capacity of 29,000,000 net tons of coke, while there are 2278 by-product coke ovens in course of construction, most of which are expected to be completed this year; these will have an annual capacity of 10,000,000 net tons of coke. The total number of by-product coke ovens in operation and in course of construction in this country, therefore, amounts to 10,451 ovens with a capacity of 39,000,000 net tons of coke.

Capacity is Enormous

Of the latter number of ovens the United States Steel Corp. has in operation and in construction, including 240 ovens operated for its account, 3112 by-product coke ovens which have a capacity of 12,850,000 net tons of furnace coke per annum. The United States Steel Corp., therefore, has 30 per cent of the total number of by-product coke ovens and 33 per cent of the total by-product coke capacity of this country.

So far as types of by-product coke ovens are concerned, the art has progressed to the point where there is practically no difference in results obtained from representative plants of the leading systems. As Mr. Blauvelt implies, this country would have been in desperate straits for the high-explosive bases, toluol, ammonia, benzol and certain other coal by-products had it not been for the by-product coke ovens. It is fortunate, as events proved, that the recovery of benzol products from by-product coke-oven gases had been thoroughly investigated, plans for installations formulated, and construction of plant started in this country prior to the outbreak of the European war. This allowed the recovery of the essential by-products early in the war.

Furthermore, the allies would have been severely handicapped in the earlier stages of the war, prior to the entry therein of this country, had it not been for the toluol and benzol produced from the by-product coke ovens of the United States, a large proportion of which was converted into tri-nitro-toluol and picric acid for their use. As is now well known, toluol is the base of tri-nitro-toluol, which is one of the most deadly explosives used in this war. Toluol, although utilized practically entirely for explosive purposes, is also the base of certain dyes, particularly the dye used for the cotton khaki worn by our sol-

diers; benzol is the base of picric acid, which is largely used as a high explosive and, as is also well known, benzol is the principal base of the so-called coal-tar or aniline dyes. The term "coal tar" originated when these products were recovered from coal tar. The latter was obtained from retort gas works before the extraction of benzol from by-product coke-oven gases was developed. The amount of benzol products in by-product coke-oven tar is negligible.

Other Derivatives

Another by-product of service as an explosive base in the present international emergency is naphthalene which is extracted with the benzol products. It is used successfully as the base of aniline dyes and ranks second to benzol for use in this respect. It is gratifying to know that naphthalene which used to be the bane of existence to coke oven operators before benzol plants were installed, has such great value as a dye base. Ammonia is used in the manufacture of ammonia nitrate for explosive purposes, and nitric acid, which is essential in the manufacture of ammonium nitrate, is also being recovered from by-product ammonia. As is well known, ammonia is extremely valuable in the form of ammonium sulphate for fertilizer purposes.

The United States is now able to maintain a commanding world position in the production of aniline dyes and it would appear that aniline oils, which are the intermediate products for the dyes, and probably the dyes themselves, can advantageously be manufactured at the by-product coke plants where the principal essential raw materials required for their manufacture are available. The development of processes whereby nitrogen, which is the ultimate base of all high explosives, is being extracted from the air is also of prime importance in connection with the present war. Germany was the first nation to insure an adequate supply of nitrogen by this means, and its present strong position can properly be attributed more to its scientific and commercial development of these processes than to any other one cause.

The yield of benzol products depends greatly upon the character of the coal used, the general rule being that the higher the volatile matter in the coal the greater the yield of by-products. It has been determined that the total yield of benzol light oils is not materially affected by reducing the coking period, but that in certain cases the proportion of toluol to benzol in these light oils decreases as the coking time is reduced, with a proportionate increase in benzol. The practice inaugurated some years ago, which is now followed at most by-product coke-oven plants, of pushing the coke from the oven while still dark in color, has a beneficial effect on the recovery of by-products.

The greater yield of by-products due to high-volatile matter in the coal is, however, at the expense of coke yield, and it is a matter of somewhat delicate calculation, based on local conditions, source of coal supply, etc., to determine to what extent high-volatile coal should be used. When all is said and done, coke is the prime product required from most by-product coke-oven plants, except in emergencies, and decrease in coke capacity, due to lower coke yield following the use of a larger proportion of high-volatile coal, results in shortage of coke for use in pig iron and, consequently, steel production. This, of course, does not apply to such a degree to by-product coke plants which have a greater coke capacity than company requirements.

Mr. Blauvelt refers to the fuel conservation in the manufacture of by-product coke as against beehive coke resulting from the use of the tar and surplus gas recovered and the greater coke yield. As an instance, the coal thus saved in the year 1917 at United States Steel Corp. plants amounted to 3,200,000 net tons or 64,000 carloads of 50 tons each, movement of this number of railroad cars thereby being saved for employment in other directions. When we consider last winter's conditions of transportation, it is easy to recognize that blast-furnace and steel-works operation would have been still more severely curtailed without by-product coke ovens.

While discussing the subject of transportation, we should not overlook the great advantage in certain localities of by-product coke ovens in allowing transportation of the coal to the coke plants by water from mines adjacent to navigable water. An example of this is the plant of the Carnegie Steel Co., Clairton, Pa., where, for the 768 by-product coke ovens being installed, 4,900,000 net tons of coal will be required annually, most, if not all, of which will be transported in 1000-ton barges on the Monongahela river. On the basis of this entire amount of coal being shipped by water, rail transportation amounting to 98,000 carloads of 50 tons each, would be saved per year.

Of all the ammonia, benzol and toluol produced in this country, about 80 per cent is the proportion derived from the by-product coke-oven plants of the steel and allied industries, now in operation or construction, the remaining 20 per cent being mostly obtained from gas works. It will thus be seen that the steel industry is largely responsible for the position maintained by our country today respecting production of the bases of high explosive products.

In conclusion, we hope that in view of the services rendered to our government and civilization by steel manufacturers in providing additional by-product coke-oven capacity at heavy expense, they may be assisted, by suitable legislation if it becomes necessary, in securing and retaining a fair share of the world trade in these coal by-products and their derivatives. In the four years of the present war we have become independent of Germany in the dye industry and there is no reason why we should not continue so under efficient tariff conditions.

Tests of Sheet Steel Used in Galvanizing

With the object of studying the relation between sheet steels of different types and the deposition of the proper kind of crystals in the galvanizing process, G. A. White, metallurgical engineer of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., recently made some exhaustive tests. The purposes and nature of his investigations and the interesting conclusions he draws, have been published in a book under the title: "A Metallurgical Study of the Steel Base as Related to Galvanizing."

In the introduction, Mr. White points out that the investigations were made to study the composition and finish of steel sheets from a microscopical, mechanical, chemical and physical point of view. It is also stated that the work was undertaken because some steel sheets failed as a steel base for galvanized products.

After examining a number of sheets that failed to meet requirements, Mr. White found that the failures could be traced to three principal causes: Segregation of material, due to wide variation in chemical composition; poor physical structure and low physical properties, due to improper heat treatment; and bad surface finish caused by defective steel, or poor finishing processes.

In his tests, Mr. White divided each heat of steel in the molten state into two parts. One part was treated in the ladle with 2 to 3 pounds of ferrocarbontitanium to a ton of steel while the other portion followed regular open-hearth practice. Ten heats each of two grades of steel were made in all.

After testing a number of sheets made under these conditions, Mr. White concludes that it is possible commercially to manufacture and treat sheet steel in such a way as to insure the deposition of zinc on the sheets in large spangles. These large spangles, Mr. White points out, give less liability to corrosion.

Extensive additions to its equipment and facilities are being made by the J. Lipsitz Co., Chelsea, Mass., scrap iron, steel and other metals.



War Turns Golden Gate Into Hive Of Industry

Shipyard Expansion Keeps at High Speed

(Special Correspondence.)

SAN FRANCISCO, June 15.—With steel for shipbuilding arriving at the rate of 65 carloads daily and with shipbuilding and fabrication work for the government amounting to about 70 per cent of the manufacturing done here in which steel is a factor, this district before Jan. 1 will have launched steel cargo carriers aggregating almost three times the tonnage of the merchant vessels constructed in Japan during the fiscal year ending April 1.

Contracts for 92 steel vessels with an aggregate tonnage of 1,000,000 tons, have been let to firms in San Francisco and vicinity at a contract price of $160,000,000, and delivery of all of them has been promised by Jan. 1. Twenty-six of these have been launched and 13 more, of from 8500 to 9600 tons burden, will be sent down the ways within the next six weeks.

Japan turned out 72 merchant vessels aggregating 332,617 tons during the fiscal year ending March 31, 1918, of which 13 vessels, representing 80,000 have been sold to the entente powers. This leaves 59 vessels added to the Japanese merchant service on which the Japanese government paid a subsidy of $2,740,000 to the owners.

20,000 *Men Employed*

The 92 vessels contracted for by the government here are divided among the following concerns: Union Iron works, Alameda plant, 18; Moore Shipbuilding Co., 28; Hanlon Shipbuilding Co., 8; Pacific Coast Shipbuilding Co., 10; Union Construction Co., 10; and Schaw-Batcher Shipbuilding Co., 18. The six plants employ 20,000 men and have 28 steel cargo carriers on the ways.

All of the construction is exclusive of that undertaken for the navy department and wooden and concrete ship construction under way here. The Union Iron works ranks fourth in the United States in the percentage of performance to expectancy in the building of naval destroyers. The percentages are:

Bath Iron works, 152; Newport News Shipbuilding & Dry Dock Co., 141; William Cramp Shipbuilding & Engine Co., 117; Bethlehem Shipbuilding Corp. (Union), 104; Bethlehem Shipbuilding Corp. (Fore River), 79; Bethlehem Shipbuilding Corp. (Squantum), 53; New York Shipbuilding Corp., 49; and Seattle Construction & Drydock Co., 26. Augmented by naval vessels, 18 steel craft will be launched here July 4.

Make Wagers On Records

Interest of the men engaged in shipbuilding has been sustained by several wagers of considerable magnitude. The sum of $20,000 has been posted by the men of the Union and Fore River plants of the Bethlehem Shipbuilding Corp., on a record for efficiency in destroyer construction during 1918, and J. J. Tynan, general manager of the Union plant, has a wager of $5000 with Vice President Powell of the Bethlehem that his unit will win. Mr. Tynan also promptly accepted the wager of the employes of the Moore Shipbuilding Co., who offered $10,000 to prove that a team from any department in the company's organization can defeat any similar unit from any plant in the country. Two world records in riveting have been established at the Union plant. One riveting gang of four drove 6075 rivets as a day's work, shattering another record previously made in Oakland, when 5620 rivets were driven. One workman reamed 5667 rivet holes.

With three ways now in operation, four nearly completed and 10 new ones to be built as soon as a definite contract is allotted by the United States shipping board for ship construction large enough to justify a large increase in the plant, the Moore Shipbuilding Co. of Oakland, Cal., promises to become the largest individual shipbuilding unit in the west. This is the announcement of George A. Armes, president and general manager of the company. The enlarged plant will give employment to 20,000 men, instead of 8000 as at present. With 17 ways the plant will have a capacity of more than 200,000 tons of hulls under simultaneous construction. As some of the ways will accommodate 20,000-ton vessels, it will be possible to construct vessels totaling more than 1,000,000 in a year, it is said. When definite word of the signing of the contracts is received from Washington, an option from the Western Pacific railroad covering the waterfront properties to the west of the Moore plant will be exercised and the present shops and fabricating units will be extended. The wharves between each of the ways will be extended far enough to provide mooring space for each vessel as it is launched.

Will Employ 50,000 *Men*

When the plants of the Moore Co., Bethlehem Shipbuilding Corp., Union Construction Co., the Hanlon Co., the new government concrete shipbuilding plant and a few smaller yards are in full operation, it is estimated that more than 50,000 men will be employed directly in ship construction on the Oak-

land estuary. This presents the problem of housing perhaps 250,000 persons and the city officials of Oakland and Alameda are co-operating with the members of the chambers of commerce and other civic organizations in perfecting plans to meet the emergency.

The immediate erection of 10 new shipbuilding berths, each with a capacity for 20,000-ton vessels which involves the early employment of at least 20,000 additional men and the expenditure of $18,000,000 to $20,000,000 in the construction of an immense addition to the Alameda plant of the Union Iron works unit of the Bethlehem Shipbuilding Corp. has been announced. The addition is more than equal in capacity to both the present plants of the Union unit. One hundred and sixty acres adjoining the Alameda properties of the corporation have been acquired and work is to be rushed. It is calculated that keels will be laid for new ships by November and the entire work completed by January 1, 1919. Coupled with the extension of berthing ways for ship construction will be the enlargement on an equal scale of mechanical shop capacity incident to steel ship construction.

Plan More Concrete Ships

Although the amount of wooden ship construction done here is not as great as at other shipbuilding centers there are three plants engaged in this work in the San Francisco bay district. The new yards of the Barnes-Tibbett Co. at Alameda recently started upon this class of construction and is also preparing to do an extensive business in fitting out hulls built in the northern part of the state. In the wake of the successful FAITH, the pioneer concrete ship, several firms are figuring on taking contracts for concrete vessels as soon as the government decides on the location of its concrete shipbuilding plant in San Francisco bay. The large production of cement on the Pacific coast and the location of steel mills in coast states make possible the economical construction of concrete ships on a large scale. Another company is soon to undertake the building of concrete harbor barges up to 2000 tons at Martinez, Cal.

Believing that nothing short of a conclusive demonstration will convince official Washington that the concrete ship is not an experiment, the FAITH is to leave this coast about June 15 for Atlantic waters. It is expected that the vessel will be put in the sugar trade out of Cuba where the rate for a 500-mile run is about the same as for the 2000-mile service between here and Honolulu. Keen opposition to the government's concrete shipbuilding program has developed in Washington due to the exertions of the large steel shipbuilding interests, according to W. Leslie Comyn, president of the company which built the FAITH. The prime reason for sending the FAITH into the Atlantic coastwise service is to combat this opposition.

How Industry is Financed

With steel shipbuilding leading all other industries and launchings almost a weekly occurrence, the securing of money to build these vessels is the most active form of financing here. Some idea of how this is done is obtainable from a consideration of the permit recently issued by the corporation commissioner of the state to the Pacific Coast Shipbuilding Co., which has a contract to build 10 steel freighters at Bay Point, Cal., for the Emergency Fleet corporation. The shipbuilding company is authorized to sell $1,000,000 of preferred stock to net not less than 75 per cent of par, and to issue to R. N. Burgess $3,000,000 common stock in exchange for services rendered and liabilities incurred in obtaining the shipbuilding contract and the site for the plant, together with a deed to the 250 acre site on which the plant is located, subject to a mortgage not to exceed $250,000. The permit further provides that Burgess is to retransfer to the company as trustee one-half of the stock issued to him, of which 5000 shares are to be used as a bonus to the purchasers of the 5000 shares of preferred first sold by the company, and 10,000 shares are to be held by the company and disposed of at such time and on such terms as the company may determine with the sanction of the "blue sky" commissioner. The shipbuilding company is also preparing a note issue from the proceeds of which a loan not to exceed $375,000 to the Clyde Co., to assist in housing construction is contemplated. This Clyde Co. is a subsidiary of the Pacific Coast Shipbuilding Co., which is to take over a 1934 acre tract owned by the latter and build a town to provide housing.

Will Issue Shares

The Union Industrial works, formed to carry out a contract recently secured by the Union Construction Co., a partnership, for the building of 10 steel vessels for the shipping board, has secured permission from the corporation commissioner to issue shares for financing. The company is authorized to issue 2750 shares of preferred and 10,000 shares of common stock to Walter W. Johnson and H. G. Peake for $225,000 and the lease on the Oakland waterfront together with the contract for the building of the ships. The company is permitted to sell the remaining preferred shares to the amount of $525,000 to net not less than 90 per cent of par. Subscriptions for $375,000 of this stock have already been secured in accordance with the terms of the contract with the Emergency Fleet corporation.

The San Francisco district shipbuilding program has passed the preparatory stage and is now entering upon the second phase, that of actual accomplishment. Of the 1900 steel ships being built in the United States, 200 of them are being, or will be built in California, according to Captain A. F. Pillsbury of the Emergency Fleet corporation. These 200 vessels represent about 14 per cent of the total tonnage being constructed in this country. At present $15,000,000 a month is being spent here in shipbuilding. The 92 steel steamers being built here represent one-sixth of the shipping board's 1918 program.

Scrap iron profiteering has caused the California Foundrymen's association of San Francisco to petition the federal subcommittee on scrap iron and steel for the appointment of a commissioner for the western territory. The material is being bought and held by a number of individuals who visit the mines and other sources of scrap, it is said. Offers of the government price for scrap are said to be insufficient to bring the metal into the market. The foundrymen are abiding by the government price limits and they now want authority to commandeer the metal.

Shows Decided Improvement

Although there was a slight decrease in the value of the exports from the port of San Francisco during April, in comparison with March, there was a gain of $4,273,592 over the April, 1917. During the latter month the exports were valued at $10,723,592, in April, 1918, at $15,097,428, and March, 1918, $15,312,762.

With the exception of steel plates, shipment of which dropped from approximately 13,000 tons to about 750 tons, iron and steel shipments in April showed a decided improvement over April, 1917. While the shipments of bar iron, steel bars, hoop steel and iron, rails and steel plates show a gain over April a year ago there is a noticeable decrease over March, 1918. An exception is structural steel, of which 1934 tons left the port during this April, consigned chiefly to Japan as compared with 1263 tons in March and 776 tons in April, 1917.

A comparison of the steel and iron April, 1918, and April, 1917, gives the following:

	March, 1918	April, 1918	April, 1917
Pig iron	20	51	.....
Scrap	199	.....	543
Bar iron	669	645	317
Steel wire rods	274	724	.....
Steel bars	6,743	7,121	7,450
Bolts, nuts, rivets	155	219	42
Hoops	966	237	293
Cast pipe fittings	1,257	181	.....
Wrought pipe, fittings	956	316	1,661
Steel rails	1,851	1,463	1,119
Galvanized sheets	522	466	112
Iron sheets and plates	187	160	.....
Steel plates	764	1,838	12,950
Steel sheets	2,100	1,239	247
Structural	1,263	1,934	776
Tin plate	3,418	2,190	537
Lead pig	345	130	.....
Zinc sheets	101	17	19
Zinc pig	.....	15	.....

Labor and Material Needed

Shortage of 50,000 Men and Difficulty in Obtaining Steel and Coal Delay Production Among Detroit Industries.

DETROIT, June 18.—A shortage of 45,000 to 50,000 men, and difficulty in obtaining shipments of steel and coal are the principal factors in holding up production among the manufacturing industries of Detroit. It has been said by competent government authorities that Detroit, despite these obstacles, rapidly is becoming the center of ordnance production in this country. With another year of war Detroit plants will have $1,500,000,000 of war orders.

Banking authorities state more than 90 per cent of the Liberty motors for aircraft engines is being manufactured in plants here and that 19,000 of them will be delivered to the government on contract time, by Sept. 1, 1918. Plants also are beginning volume production of battle planes which will reach a total of 50 a day within the next four months.

Charles M. Schwab, director general of the Emergency Fleet corporation, while in the city recently declared after inspecting the shipbuilding industry that the work was well in hand and left orders for increased production that will enable the Detroit Shipbuilding Co., and the Great Lakes Engineering Works to double their facilities.

Michigan manufacturers are pleased with the ordnance department's efforts to speed up payments on contracts. All payments now are being made through Michigan headquarters in Detroit, in charge of Fred J. Robinson, district director of production.

Allan A. Templeton, president of the Detroit Seamless Steel Tubes Co., has been appointed regional director at Detroit of the resources and conversion section of the war industries board to supervise the production of war materials. In the metropolitan area of Detroit he will direct the completion of $1,000,000,000 worth of products contracted for by the government. Mr. Templeton also is chairman of the Wayne county war preparedness board.

The board of commerce and other organizations have taken action to have the government establish a fuel administration district in this city, apart from that of the state. This step is deemed necessary to obtain coal sufficient for next winter's needs.

War Expansion Rapid

Expansion of Detroit factories to meet war conditions continues. The Flower-Stephens Manufacturing Co., has had plans prepared by Esselstyn, Murphy & Hanford for an addition to its factory. The Michigan Stamping Co., will build an addition to its factory. The Otto Misch Co., has the contract. The Anderson Electric Car Co., has let a contract to the H. G. Christman Co., for an addition. Albert Kahn, contractor, will build an addition to the plant of the Anderson Forge & Machine Co. The General Motors Corp. will build a drop forge plant as an addition to its plant. Smith, Hinchman & Grylls are the architects. The Timken-Detroit Axle Co., which operates the largest motor axle plant in the world, has authorized an issue of $2,000,000 of short term notes, part of which will be used to provide capacity for increased production of government work. The Flower-Stephens Co., will build an addition to its foundry. The Burroughs Adding Machine Co., is having plans prepared for a 5-story machine shop. The Murphy Iron Works has let a contract for a craneway building to the Cooper-Widemann Co. Peninsular Milled Screw Co., has purchased 10 acres, adjacent to Dodge Bros. ordnance plant, on Mt. Elliott avenue on which will be erected a factory. The Paige-Detroit Motor Car Co., is completing four new units at a cost of $100,000. Each of the units has an area of 15,000 square feet and will be ready soon for the installation of machinery.

The Packard Motor Car Co. and Republic Motor Truck Co., of Alma, Mich., share in a government order for 8000 three-ton and five-ton motor trucks for the war department. This is in addition to 10,000 similar trucks being delivered by 15 manufacturers.

The first six electric smelting furnaces of a new type which is said to reduce the cost of making brass for munitions are being installed in Detroit. The furnace is the invention of H. W. Gillett, government chemist.

The Maxwell Motor Co., which is operating the plant of the Chalmers Motor Co., in addition working on war contracts for $25,000,000 will turn out 60,000 passenger cars this year.

The Power Truck & Tractor Co., has been organized to produce two to five-ton trucks and two tractor models in a plant to be built at Detroit. Leslie R. Acton is president and L. P. Helm, vice president and engineer.

Orders for quantity production of 6000 tractors of the caterpillar type have been received from the government by the Reo Motor Car Co., Lansing, and the Maxwell Motor Co., Detroit, which are working on a joint contract. Capt. V. R. McBride, Lansing, is supervising production.

The new plant of the Charles B. Bohn Foundry Co., is nearing completion. The plant which is on the Detroit Terminal railroad at Hart avenue is 1 story high, covers a ground area of 300 x 300 feet and will have capacity for 50,000 pounds of brass, bronze and aluminum castings daily. The company has $300,000 capital stock paid in. Charles B. Bohn, the founder, is a pioneer in the aluminum industry in this country having been one of the incorporators of the Central Brass Foundry Co., Cleveland, later the Allyne Brass Foundry Co. Other officers are W. N. Krug, vice president; H. W. Holt, secretary-treasurer, and O. F. Flumerfelt, manager.

Ship Work Causes Growth

Two open-hearth furnaces with a capacity of about 4000 tons monthly and two bar-rolling mills are to be constructed for the Pacific Coast Steel Co., Portland, Ore., according to a recent announcement, made by T. S. Clingan, manager and C. P. Burgess, superintendent of northern properties, both of Seattle who will direct the work. This project involves the expenditure of about $500,000. An 11-acre tract on Linnton road near Willbridge, about three miles from Portland will be utilized and the North Bank railway will provide transportation facilities. The tentative date for completion of the work is Jan. 1, 1919.

This expansion is made necessary by increasing demands for the company's product from the steel and wooden shipyards which now receive their supplies of angles, channels, steel and iron bars from the company's San Francisco and Seattle mills. A blast furnace is operated at Irondale, Wash., and one at Oswego, Ore., purchased from the Oregon Iron & Steel Co., about a year ago, likely will be operated when the Willbridge plant is completed.

Sales offices for the company have been maintained at 608 Northwestern Bank building, Portland, for some time. Officers are as follows: E. M. Wilson, president; William Pigott, first vice president and D. E. McLaughlin, second vice president. W. S. Burt, Seattle, is secretary for northern properties. W. C. Eshelman is engineer in charge of construction work at Seattle.

Making Ferroalloys

The Canadian Ferro-Alloys, Ltd., Shawinigan Falls, Que., is building a plant for the production of ferroalloys. Among other products, the company will be able to ship 17 tons of 50 per cent ferrosilicon daily, beginning July 1. F. A. Raven is general manager.

Warns Industries

Must Reorganize for War Work or Quit, Says C. A. Otis

Everything in industry must be subordinated to the winning of the war. As the war progresses the government will be the only buyer, and it behooves all manufacturers to reorganize their resources with such a prospect close at hand or discontinue business.

These points were emphasized by Charles A. Otis, Cleveland, chief of the resources and conversion section of the war industries board, speaking at the meeting of the American manufacturers in Atlantic City, June 11. At this meeting plans were laid for a federation of all the industries of the United States to aid the government in the war and to protect the interests of big business in the solution of tax and tariff problems after victory is won. Mr. Otis described the work being done by the government to help the industries. He said:

"It is obvious that as we progress the government will be to a great extent the only buyer. It is facing us now that many industries must immediately develop their organization along the line of war requirements or be put out of business. To save this very serious situation is the work of the resources and conversion section, and its work is dependent upon the hearty support of every business man of the country.

"Helpfulness between districts will be accepted. Where an organization is doing a certain work well and another must be started to keep up the volume, the successful man will be expected to give all possible information to the one starting in to increase this production. A study must be made of the fuel and power situations so that districts loaded with work will not increase beyond the limit of the power and transportation facilities of the country, but others be developed for the work."

The proposal for an industrial federation received the endorsement of representatives of 30,000 plants, approximately a tenth of all those upon which the government depends for supplies. If the plans succeed the federation will include 300,000 large and small industries, employing 10,000,000 workers and having a combined capitalization runing into tens of billions of dollars. The broad principles and aims of the organization were agreed on by manufacturers of Pennsylvania, New York, Delaware, Connecticut, Massachusetts and New Jersey. The meeting was arranged by the manufacturers' council of New Jersey and was recognized by the government of the United States as well as the allied governments. The spirit of the organization was summed up by Col. Austen Colgatt, Jersey City, vice president of the New Jersey council:

"Give us such an organization and there will be no problem during the war or after the war that it cannot solve."

Will Hold Joint Meeting

Drop forgings furnish the common interest back of two national associations which will hold a joint convention at the Hotel Iroquois, Buffalo, June 20 to 22. Technical papers and discussions will be presented treating of the business and manufacturing problems of drop forging production. Welfare work, costs, labor and production, shop construction, fuel, heat treatment processes, and sales problems will be among the subjects presented for consideration. The question of priority rulings, which takes added importance under the new government control of steel and iron, will be presented by a member of the priorities board from Washington, and a general discussion will follow.

The officers of the American Drop Forge association are R. T. Herdegen, president, Dominion Forging & Stamping Co., Walkerville, Ont.; S. H. Carpenter, vice president, Atlas Drop Forge Co., Lansing, Mich; E. B. Horne, secretary-treasurer, Packard Motor Car Co., Detroit. The Drop Forge Supply association is headed by H. N. Taylor, president, N. & G. Taylor Co., Philadelphia; Charles Harmon Jr., vice president, National Machinery Co., Tiffin, O.; and A. L. Wurster, secretary-treasurer, Heppenstall Forge & Knife Co., Philadelphia. The Buffalo local committee in charge of the joint convention includes Guy A. Hager, chairman, Lackawanna Steel Co.; Ray Baldwin, J. H. Williams & Co., and David Bell, Buffalo Foundry & Machine Co.

Pig iron now is being made from an electrically-operated furnace in British Columbia. The first run was recently made at Port Moody, B. C., at a plant installed by the Aetna Iron & Steel Co. and amounted to 12 tons of foundry iron. The Aetna Steel Co. has been operating a rolling mill at Port Moody for a year. It recently decided to enter into the manufacture of pig iron from scrap and contracted for a 6-ton electric furnace which was installed by Messrs. Turnbull and Tudhope, of Orillia, Ont.

Round Up Scrap

Questionnaires Sent Out by Committee to Increase Supplies

In an effort to round up all available supplies of scrap iron and avert a threatened shortage, the scrap committee of the American Iron and Steel institute has sent out questionnaires through the American Board of Scrap Iron dealers to all members of that organization. In a letter to the board the committee appeals for cooperation with the government for the purpose of locating and reporting all lots of unprepared scrap, which are being withheld from the market principally in the form of obsolete railways, old mine heads and tipples, which are not being operated; unused bridges or similar structures; old manufacturing plants not in operation; contractors' equipment and similar material which should be shipped to the scrap yards for preparation."

The questionnaire is as follows:

How much scrap of all sorts have you on hand at the present time, irrespective of the amount sold and now enroute. Make separate report for each yard.

How much scrap had you on hand June 1, 1917. Figures should represent as nearly as possible the total tonnage of all grades of iron and steel, irrespective of the amount sold, and should not include any material enroute.

Are you operating your plant to its fullest capacity?

RECLAMATION

Location of material.....
Estimated tonnage .....
Form and character of material.....
Name of owners, trustees, or such information as you can procure.....
Availability of shipment. State whether on railroad or if necessary to use other means of transportation .....
Name of nearest railroad.....
Distance from nearest scrap yard.....
Name of nearest scrap yard.....
Other information .....

Grinding Wheel Men Meet

Composed of about 30 leading grinding wheel companies of the United States and Canada, the Grinding Wheel Manufacturers' association will hold its quarterly meeting at the Bancroft hotel, Worcester, Mass., Thursday and Friday, June 20 and 21. This is the first time the association has met in Worcester and the gathering is in the nature of a war conference. The organization aims to inaugurate a more basic system of standards in order that the government may secure greater efficiency and quicker service in the placing of orders for its products. Thursday will be devoted to committee hearings on matters of great importance which have been under consideration for some time.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

I. LAMONT HUGHES, formerly bar mill superintendent in the Youngstown district for the Carnegie Steel Co., who for the past two years has been general superintendent of the Canadian Steel Corp., Ltd., at Ojibway, Ont., has been named general superintendent of the



I. LAMONT HUGHES

proposed ordnance plant to be erected by the Steel corporation at Neville Island, near Pittsburgh. He will assume his new duties at once. Fred Hubbard, construction superintendent and efficiency engineer of the Carnegie Steel Co., in the Youngstown district since June 1 and previous to that time chief civil engineer, has been named chief civil engineer of the Neville Island project. He was in charge of the civil engineering aspects of the McDonald mill and town site projects. Lloyd M. Applegate has been appointed to succeed Mr. Hubbard as district civil engineer of the Carnegie company here.

O. G. Jenner, who for eight years has been mechanical engineer of the Chicago Heights plant of the Inland Steel Co., Chicago, has resigned.

William A. Mahoney has resigned his position with the Worcester Mfg. Co., Worcester, Mass. He has entered government service in the ordnance department and will go to a government arsenal in the central west where he will supervise the construction of a long-range gun which he has invented.

Kenneth D. Myers, advertising manager of the Sharon Steel Hoop Co., Sharon, Pa., has joined the naval aviation flying corps.

James Kelley Jr., formerly a foreman for the Brown Machine Co., Winsted, Conn., has been accepted for Y. M. C. A. work in France.

J. H. Hull vice president of the William Cramp & Sons Ship & Engine Building Co., was recently elected president to succeed Harry W. Hand, resigned.

Philip M. Guba has assumed his duties as New York district sales manager at 120 Broadway, of the Donner Steel Co., Buffalo. He recently resigned his position under Roland Gerry, manager of sales in the cold-rolled department of the Jones & Laughlin Steel Co.

Forrest E. Alexander, who had charge of the foreign sales department of the Graton & Knight Mfg. Co., Worcester, Mass., before he entered government service, has received a commission as second lieutenant in the quartermaster corps, O. R. C., of the national army. At present he is at Camp Johnston, Jacksonville, Fla., awaiting orders.

Charles M. Schwab, director of shipbuilding; Edward N. Hurley, chairman of the United States shipping board, and Charles Piez, vice president of the Emergency Fleet corporation, will be guests at a luncheon given by the Illinois Manufacturers' association in Chicago, June 28. Enlargement of Great Lakes shipbuilding efforts will be the main topic of discussion.

Col. Henry P. Bope, formerly vice president and general manager of sales of the Carnegie Steel Co., was recently elected vice president of G. G. Gynson & Co., 149 Broadway, New York.

Eugene W. Lewis recently resigned as vice president and director of the Timken-Detroit Axle Co., Detroit, to engage in work for the government at Washington. He is an assistant to Edward R. Stettinius.

J. R. McWane, president of the American Cast Iron Pipe Co., Birmingham, Ala., has been appointed chief of the operating standardization



J. R. McWANE,

staff of the Emergency Fleet corporation with headquarters in Philadelphia, and has assumed his duties. Mr. McWane has been most successful in the pipe business, the plant of the American Cast Iron Pipe Co. being one of the largest in the country. Some time ago Mr. McWane was considering entering the government's service in the ordnance department and went to Washington to make preparations.

Andrew Carnegie, the aged iron master, arrived recently at his Berkshire place, Shadowbrook, near Lenox, Mass., where he will spend the summer.

A. B. Cole has been appointed assistant to the manager of the department of publicity, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to succeed M. C. Turpin, who has accepted a position in the ordnance department at Washington.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

FRANK O. HOAGLAND, who since the middle of 1917 has been manager of the Pratt & Whitney Mfg. Co., Hartford, Conn., resigned recently to become vice president and works manager of the Bilton Machine Tool Works, Bridgeport, Conn. For a while, however, he will act in an advisory and consulting capacity for the Pratt & Whitney Co. The Bilton Machine Tool Works in ordinary times manufactures special machine tools and special machinery. It now largely is occupied with munition orders, etc., from the government. Prior to 1896, when Mr. Hoagland located in Hartford, he was affiliated with the Waltham Watch Works, Waltham, Mass. In 1908 he moved from Hartford to Bridgeport to accept a position with the Remington Arms Mfg. Co. He returned to Hartford in 1915. Mr. Hoagland will be succeeded in the Pratt & Whitney plant by William R. Tomlinson, who has been affiliated with the Billings & Spencer Co., for about 20 years. He started in as assistant foreman of the small tools department, was later made factory manager and has been second vice president for several years. For five years prior to his affiliation with the Billings & Spencer Co., Mr. Tomlinson was connected with the Pratt & Whitney Co., going there from Hawleyville, Pa. J. B. Sehl, who during the past year has been assistant treasurer of the Billings & Spencer Co., Hartford, Conn., succeeds Mr. Tomlinson. Prior to becoming affiliated with the Billings & Spencer Co., about six years ago, Mr. Sehl was manager and treasurer of the Precision Die Casting Co., Syracuse, N. Y.

W. J. Perry, general superintendent of the American & British Mfg. Co., Bridgeport, Conn., has been elected president of the Bridgeport Piston Ring Co.

Knox Taylor, president of the Taylor-Wharton Iron & Steel Co., Easton, Pa., has been elected chairman of the Manganese Track society, succeeding A. H. Mulliken, president of the Pettibone-Mulliken Co., Chicago, O. de G. Vanderbilt, president of the Weir Frog Co., Cincinnati, was made vice chairman, and Henry Elliot, president of the Elliot Frog & Switch Co., East St. Louis, Ill., treasurer. B. M. Fosgate, Chicago, was reelected secretary.

Lindsay Wallace, Cleveland, who for a number of years was manager of the American Shipbuilding Co., at Cleveland and who later established and managed the plant of the Western Drydock & Shipbuilding Co., Ltd., at Port Arthur, Ont., which was controlled by the American company, has been named director of the fifth district for the Emergency Fleet corporation. In his new position he succeeds K. A. Veit, who has been made field officer with headquarters at the Fleet corporation's Philadelphia offices.

Harold Davey and F. Austin Davey of the Mansfield Sheet & Tin Plate Co., Mansfield, O., have joined the list of young steel executives engaged in war work. They have entered the navy ordnance department and have been detailed to Detroit for the inspection of steel. Harold Davey has been hot mill superintendent of the south plant of the Mansfield company, while F. Austin Davey has been chief engineer. In this position he had charge of the reconstruction of the north plant and of the construction of the new south plant.

Comfort A. Adams, who is Abbott and James Larence professor of engineering at Harvard university and the Massachusetts Institute of Technology, has been nominated as president of the American Institute of Electrical Engineers for the year beginning Aug. 1, 1918. Nomination is practically equivalent to election. He received his bachelor of science degree at Case School of Applied Science, Cleveland, in 1890 and the degree of electrical engineer in 1895. A year later he became instructor in engineering at Harvard and after 10 years of service became full professor.

Lawrence Fitch, president of the Western Malleables Co., Beaver Dam. Wis., and treasurer of the Globe Seamless Steel Tubes Co., Milwaukee, has been made president of the Independent Harvester Co. Ltd., which is the new name of the recently reorganized Independent Harvester Co., Plano, Ill. Other officers follow: Albert J. Earling, chairman of the board, Chicago, Milwaukee & St. Paul railway, vice president; A. W. Wilbrand, secretary. Western Malleables Co., Beaver Dam, secretary and Grant Fitch, vice president, the National Exchange bank, Milwaukee.

Thomas C. Mendenhall, Sc.D., LL.D., emeritus professor of physics of the Ohio State university, has been awarded the Franklin medal by the Franklin institute, Philadelphia. This is one of the most prized symbols of American scientific achievement. In receiving the medal, Dr. Mendenhall made an address on "Some Meterorological Memories". This medal was likewise awarded to Signor Guglielmo Marconi, inventor of wireless telegraphy. Owing to his activity in the war, the medal was received by the Italian ambassador, acting by proxy.

T. B. Funk, formerly chief engineer and designer in the tractor works of the Moline Plow Co., Moline, Ill., was recently promoted to the position of general manager and W. L. Carver was appointed his assistant. R. R. Keith, formerly with the Sheffield Car Co., Three Rivers, Mich., and the Holt Mfg. Co., Peoria, Ill., was made general superintendent to succeed E. L. C. Clark. W. McClellan, who has been affiliated with the company for several years, becomes foundry superintendent to succeed Paul Ramp, who is serving Deere & Co., Moline, Ill., in an advisory capacity covering foundry operations.

C. H. Vom Baur, who has been active in the electric furnace field for the past eight years, has been elected vice president of the T. W. Price Engineering Co., New York City, engineers and designers of steel plants, foundries, etc. Mr. Vom Baur has designed, installed and operated over 30 electric furnaces in this country and is joint author of a book on "Electric Furnaces in the Iron and Steel Industry". The T. W. Price Engineering Co. is devoting much attention to electric furnace installations. Standardized designs of the Vom Baur furnace in sizes from 1 to 15 tons have been developed for melting and refining iron and steel, melting ferromanganese and making ferroalloys.

Iron and Steel Men in War Machine

Charles Piez, Vice President, Emergency Fleet Corporation

CHARLES PIEZ, when called to accept the vice presidency of the Emergency Fleet corporation was expected to inculcate business methods in the shipping program. Anyone familiar with the accomplishments of the United States shipping board, since Mr. Piez was given entire charge of the construction program, knows that this is just what he has been able to bring about. It now is universally known that it was Mr. Piez who himself found the remedy for the condition he named late in 1917 when he was appointed by Edward N. Hurley, chairman of the shipping board to serve on the committee on production. In his survey, he reported that lack of the application of sound business principles was the cause of the delay which then existed in the carrying out of the merchant shipbuilding program. He applied the remedy. The situation immediately was improved.

At the time Mr. Piez went to Washington some bitter criticism was made of the appointment, because he had never built a ship. He was appointed, however, not for his shipping experience, but because he was an executive who knew how to organize and how to get things done. It was his suggestion originally that Charles M. Schwab be appointed director general of shipping. The placing of the Bethlehem steelmaster at the head of yard work followed many other suggestions made by him, looking toward more efficiency and greater speed in the Emergency Fleet corporation plans.

Indicative of the executive ability which has carried him so far is the fact that exactly 17 years after entering in 1889 the employ of the Link-Belt Engineering Co., Philadelphia, as a draftsman, he was made president of the Link-Belt Co. This company represented the merger of the engineering company, the Link-Belt Machinery Co., Chicago, and the Ewarts Mfg. Co., Indianapolis. In the interval, he held successively the positions of chief engineer, general superintendent, general manager and vice president. Under his able leadership, the company's success and expansion has been continuous. Its manufacturing and accounting methods have been largely developed by Mr. Piez. He is also president of the Electric Steel Co., Chicago. He has a comprehensive grasps of underlying principles governing efficiency and intensified production. He is a great believer in advertising. He obtained his first position by answering a liner advertisement.



CHARLES PIEZ

He was born Sept. 24, 1866, and entered Columbia school of mines in the class of 1888. Financial reverses met by his father caused him to leave school for a year to earn a living. He re-entered college and was graduated with the class of 1889, having taught in night schools during two years of his course. This experience probably has served him well in inspiring enthusiasm as well as imparting knowledge to his associates in his career as a manufacturer, and subsequently as one of the leaders in the greatest shipbuilding enterprise the world has ever seen. Mr. Piez is a director of the Illinois Manufacturers, association.

New Factors Influence Price Fixing

Freight Rate Advance June 25 and New Cost Data Compiled by Federal Trade Commission—Price Meeting is Called for Next Friday—Regulation is Outlined for Iron and Steel Jobbers

WASHINGTON, June 18.—Still trying to assimilate the full effect of the government having taken over the responsibility for the distribution of the industry's products, iron and steel manufacturers and consumers will wait with more than passing interest the developments of a meeting Friday, June 21, of the committee on steel and steel products of the American Iron and Steel institute and the price-fixing committee of the war industries board. This conference primarily is to give the steel men an opportunity to express the views of the trade and to hear the price committee's proposed course relative to establishing prices on pig iron, scrap and steel products for the quarter beginning July 1.

The price-fixing question this time is an intricate one. On top of production costs which have mounted because of wage increases and labor and material shortages, there now is to be considered the McAdoo freight rate advance of 25 per cent which becomes effective June 25, four days after the price conference and five days before the new prices become effective, and the government's proposal to raise $8,000,000,000 by additional heavy taxation. Interlocking these important phases is the fact the government, together with the various allied governments, now are practically the one and only customer of steel.

Steel Costs Tabulated

Steel production costs, including data on iron ore, pig iron, coke, labor, etc., since the first of the year, have been tabulated by the federal trade commission and are now before Chairman Brookings and other members of the price-fixing committee, one of whom is Chairman Colver of the trade commission. What these figures purport to show is a closely guarded secret of the commission and the committee. Attendants at the price conference Friday probably will be let in on it sufficiently to ascertain what the commission has discovered. Its findings will be used to check up any statements the steel men may make.

What Chairman Brookings told the ways and means committee of the house of representatives, which is trying to frame the $8,000,000,000 taxation bill, relative to price fixing and its effect on taxes, is another but vaguely guarded bit of confidential information. It is said Mr. Brookings told the committee the present price-fixing policy means prohibitive taxation. This implies that otherwise the policy must be changed. Whether he intimated there is to be a change of policy by his committee could not be learned, but iron and steel manufacturers may be sure the matter is receiving attention. Developments Friday may give some important disclosures.

Another phase of the steel situation which developed last week is the extension of government control of

Name of Dealer _____

Address _____

Location of Warehouse _____

Month of _____ 191

WAR INDUSTRIES BOARD, OFFICE OF DIRECTOR OF STEEL SUPPLY

WASHINGTON, D. C.

STEEL PRODUCTS

REPORT OF DEALERS AND WAREHOUSES

State All Tonnages in Net Tons of 2,000 Pounds

STEEL SHIPPED OR DELIVERED DURING MONTH		PLATES	SHEETS	BARS AND SHAPES Under 3"	STRUCTURAL SHAPES	TUBULAR PRODUCTS Other than Seamless	SEAMLESS TUBES	WIRE and WIRE PRODUCTS	TIN PLATE	MISCELLANEOUS	GRAND TOTAL
CLASS A PRIORITY CERTIFICATES											
CLASS B PRIORITY CERTIFICATES											
PREFERENCE LIST	SHIPS										
	AIRCRAFT										
	MUNITIONS, MILITARY AND NAVAL SUPPLIES AND OPERATIONS										
	FUEL										
	FOOD AND COLLATERAL INDUSTRIES										
	CLOTHING										
	RAILROAD										
	PUBLIC UTILITIES										
UNDER PERMIT OF DIRECTOR OF STEEL SUPPLY											
GRAND TOTAL											

REMARKS _____

NOTE. - Mail in duplicate NOT LATER THAN THE FIFTH OF EACH MONTH to

J. LEONARD REPLOGLE,
Director of Steel Supply,
War Industries Board,
Washington, D. C.

I hereby certify the above to be correct to the best of my knowledge and belief;

Dealer _____

Per _____

Obverse Side of Proposed Form For Reports From Iron and Steel Jobbers

steel distribution to dealers and warehouse jobbers. The plan under consideration is to guarantee replenishment of stock to dealers and jobbers only when their disposed-of wares have gone to direct or indirect war consumption. Dealers monthly will have to report to J. L. Replogle, director of steel supply, of the tonnages delivered and of replacement tonnages ordered. From these figures, the corresponding totals of which must agree identically the steel director will determine whether the former total stock tonnage may be retained. The report forms to be used are shown in the accompanying reproductions.

This is an important phase of the government's regulation of steel, and last week it was given wide consideration at a meeting of representatives of the board and of the jobbers. The dealers and jobbers are to make suggestions to the steel director and these will be used to determine the definite course to be pursued. It is said the forms already prepared will go through as drawn with few if any changes and those minor ones.

The meeting at which the control of warehouse stocks was discussed was followed by one with a view to conservation of iron and steel going into such heavy hardware, tools, machinery, etc., as are carried by jobbing houses. Again no definite action was taken, but the trade is to submit to the conservation division of the board its suggestions as to curtailment in styles, sizes, quantities, etc., of stock carried. This conference was similar to a previous one with stove and heating furnace manufacturers and another with refrigerator makers, all intended to devise plans by which the iron and steel manufactures going into their products may be curtailed in order to permit freer movement of pig iron into lines of direct war work.

In this connection it may be mentioned that when Fuel Administrator Garfield last week called attention to the absolute necessity of curtailing consumption of coal by 60,000,000 tons, he stated that an agreement has been reached with the war industries board whereby if either orders a curtailment in an industry greater than that proposed by the other, the two will get together and work out a plan to meet the larger saving. This means that if Director Replogle will give a certain industry 50 per cent of its steel requirements and Administrator Garfield will allow only 25 per cent coal, then the two bureaus will determine a joint policy with the steel curtailment being larger than at first proposed.

That the automobile industry, which is in for a 75 per cent cut in fuel supply, is not to willingly submit to an even greater slicing in its steel allotment, may be evidenced by the fact that advertisements and "readers" in the newspapers are appearing intended to swerve public opinion to the side of the automobile men. One advertisement last week said 50,000 cars and 1025 locomotives require approximately 1,438,000 tons of steel; that 200,000 motor trucks, of the same ton-mile freight-carrying capacity, will require only 300,000 tons of steel. No statement was given, however, comparing the lives of freight cars and motor trucks.

Among those attending the first warehouse jobbers conference were: B. C. Milner Jr., the Allied Machinery Corp., New York; O. B. Barker, the Barker Jennings Hardware Co., Lynchburg, Va.; W. L. Rodgers, the Pittsburgh Gage & Supply Co., Pittsburgh; Alvin M. Smith, secretary, the Southern Supply & Machinery Dealers association and president, the Smith-Courtney Co., Richmond, Va.; Thomas G. Hyman, president, the Hyman Supply Co., Wilmington and New Berne, N. C., also representing the Southern Supply & Machinery Dealers association; A. J. Bihler, the James C. Lindsay Hardware Co., Pittsburgh; Charles Bond, the Charles Bond Co., Philadelphia; Charles H. rIeland, president, the Odell Hardware Co., Greensboro, N. C.; John Dorman, secretary-treasurer, Southern Hardware Jobbers association, Richmond, Va.; Charles D. Golding, vice president, the Peden Iron & Steel Co., Houston, Tex.; William T. Todd, the Somers, Fitler & Todd Co., Pittsburgh; George K. McMullen, the

STEEL ORDERED FROM MANUFACTURERS TO REPLACE STOCK SHIPPED OR DELIVERED

(Name of Company Ordered from and Number of Net Tons)

NAME OF COMPANY	PLATES	SHEETS	BARS AND SHAPES Under 3"	STRUCTURAL SHAPES	TUBULAR PRODUCTS Other than Seamless	SEAMLESS TUBES	WIRE AND WIRE PRODUCTS	TIN PLATE	MISCELLANEOUS	GRAND TOTAL
GRAND TOTAL										

Reverse Side of Proposed Form For Iron and Steel Jobbers

McMullen Machinery Co., Grand Rapids; W. M. Pattison, the W. M. Pattison Supply Co., Cleveland; Frank J. McNeive, W. F. Potts, Son & Co., Inc., Philadelphia; J. D. Nicklis, of Manning, Naxwell & Moore; A. C. Pieper, Bruce & Cook, New York; W. S. Simpson, president, the C. T. Patterson Co., Ltd., New Orleans; William W. French, vice president and general manager, the Moore-Handley Hardware Co., Birmingham, Ala.; Richard W. Shapleigh, president, the Shapleigh Hardware Co., St. Louis; Herbert W. Strong, secretary, the Strong, Carlisle & Hammond Co., Cleveland; Henry E. Nickerson, secretary, the Congdon Carpenter Co., Providence, R. I.; Eugene McK. Froment, Froment & Co., New York; Charles H. Watkins, president, the Watkins-Gottrell Co., Richmond, Va.; John B. Carse, Ogden & Wallace, New York; Thomas A. Fernley, secretary-treasurer, the National Supply & Machinery Dealers association, Philadelphia; J. G. Belding, secretary, the Lombard Iron Works & Supply Co., Augusta, Ga.; Matthew B. Barkley, vice president, the Cameron & Barkley Co., Charleston, S. C., and Jacksonville, Tampa and Miami, Fla.; George D. McIlvaine, secretary-treasurer, the National Pipe & Supply association; George V. Denny, vice president and manager, the Georgia Supply Co., Savannah and Jacksonville, also president, the South Atlantic Supply Co., Savannah; Paul E. Kruger, vice president, the San Antonio Machine & Supply Co., San Antonio; A. H. Chamberlain, secretary, the American Iron & Steel Heavy Hardware association, New York, and E. P. Sanderson, president, the E. P. Sanderson Co., Boston, also representing the American Iron & Steel Heavy Hardware association.

Attendants of the hardware conservation conference included: Charles D. Golding, H. W. Strong, J. G. Belding, M. B. Barkley, W. W. French, W. P. Simpson, T. G. Hyman and W. L. Rodgers.

Car Specialty Orders Are Distributed

WASHINGTON, June 18.—Further definite idea of the part iron and steel are to play in the railroad administration's program came to light last week with the announcement of the itemized budget of nearly $950,000,000 and in the allocation of specialties and axles for the 100,000 freight cars and of specialties for the original order of 1025 locomotives. These are aside from the placing of contracts for 390 additional engines, the report of a contemplated order for another 100,000 cars and important rate developments.

The budget shows an actual total of $946,293,828, of which $482,417,179 is for equipment, $445,639,828 for improvements other than extensions and equipment, and $18,237,424 for extensions. The various items and the amounts making up the entire budget are:

Freight cars, $206,994,914; locomotives, $199,075,420; passenger cars, $28,340,446; all other equipment, $12,963,109; repairs to equipment, $35,043,290; additional yard, siding and industrial tracks, $98,661,553; new main line tracks, $47,450,000; rails, spikes, switches and other track material, $31,556,115; new bridges, trestles and culverts, $38,035,762; shop machinery and tools, $10,544,138; road machinery and tools, $954,869; shop buildings, engine houses and appurtances, $61,979,476; electric power plants, substations, transmission lines, etc., $10,771,256; ore and coal wharves, $7,024,937; other wharves and docks, $3,236,167; water stations and appurtances, $13,447,816; freight and passenger stations, office buildings, etc., $22,940,636; fuel stations and appurtenances, $6,164,839; grain elevators and warehouses, $2,954,202; signals and interlocking plants, $11,147,726; telephone and telegraph lines, $5,031,297; section houses and other roadway buildings, $1,510,546; snowsheds and fences, $817,641; hotels and restaurants, $199,282; real estate, $3,357,070; assessments for public improvements, $1,171,490; widening cuts, fills, etc., $3,969,818; ballasting, $9,524,589; tunnel and subway improvements, $2,195,242; track elevations and depressions, $6,691,178; elimination of grade crossings, $7,784,728; grade crossings and crossing signals, $640,291; changes of grade or alignment, $6,363,527; and all other improvements, $28,491,978.

In making its awards of specialties, the administration has given the Pittsburgh Steel Foundry Co. the contract for the tender truck bolsters for all of the locomotives; the Franklin Railway Supply Co., brake shakers, radial buffers, unit safety drawbars and driving box lubricators for all the engines; the American Steel Foundries and the Buckeye Steel Castings Co., side frames for all freight engine tenders; and the American Brake Shoe & Foundry Co., the brake shoes for all of the engines. The Westinghouse Air Brake Co. is to make the airbrakes for 775 locomotives and the New York Air Brake Co. for 250. The builders are to purchase all their boiler tubes, journal boxes for tenders, boiler coverings, pilot bumpers, brick arches and cradle castings. Other companies participating in the locomotive specialty awards include the Imperial Appliance Co., the Nathan Mfg. Co., the Locomotive Stoker Co., the Standard Stoker Co., the Hanna Locomotive Stoker Co., the Ashton Valve Co., the Ashcroft Mfg. Co., the Sargent Co., the Consolidated Safety Valve Co., the Coale Safety Valve Co., William Sellers & Co., the Hancock Inspirator Co., Harry Vissering & Co., the United States Metallic Packing Co., the Paxton-Mitchell Co., the Ohio Injector Co. the Detroit Lubricator Co., the Pyle National Electric Headlight Co., and the Southern Locomotive Gear Co.

For the freight cars, the American Steel Foundries are to supply truck bolsters for 46,000; the Buckeye Steel Castings Co. for 21,000; the Scullin Steel Co., for 21,500, the Gould Coupler Co. for 8000; and the Bettendorf Co., 3000. The coupler awards for the respective number of cars were as follows: American Steel Foundries, 23,000; the Buckeye Steel Castings Co., 15,500; the Gould Coupler Co., 7500; the McConway & Torley Co., 8000; and the National Malleable Castings Co., 46,000. Cast steel side frame awards were: American Steel Foundries, 35,000; Buckeye Steel Castings Co., 14,500; Scullin Steel Co., 16,000; Gould Coupler Co., 6500; and the Bettendorf Co., 28,000. The Buckeye Steel Castings Co. is also to supply drawbar yokes for 50,000 cars, the remaining 50,000 going to the Union Draft Gear Co. This latter company is to furnish 19,000 cars with Caldwell friction draft gears; the Standard Coupler Co., 50,000 with Sessions; the Westinghouse Air Brake Co., 25,000, and the Keyoke Railway Equipment Co., 6000 with Murray. The American Brake Shoe & Foundry Co. is to make the brake shoes for the entire car order, the Imperial Appliance Co. all the uncoupling devices for both cars and locomotives; William N. Thornburgh Co. all the dust guards and the Pressed Steel Mfg. Co. the pressed steel ends for 50,000 cars.

The 400,000 axles, whose total weight aggregates approximately 180,000 tons of steel, were allocated as follows: Carnegie Steel Co., 95,000; Illinois Steel Co., 84,000; Pollak Steel Co., 151,000; Laclede Steel Co., 16,000; Donner Steel Co., 2000; Midvale Steel & Ordnance Co., 34,000; and Pittsburgh Forge & Iron Co., 18,000.

Large orders for forgings have been placed with the Standard Steel Works Co., the Carnegie Steel Co., the Midvale Steel & Ordnance Co. and the Edgewater steel Co.

Duluth Fails to Win Basing Point

General Committee of American Iron and Steel Institute Points Out Practical Obstacles to City's Claim at Conference and Public Meeting—City's Representatives Bring Proposed Ore Tonnage Tax Into Discussion

DULUTH is not to be made a basing point for iron and steel prices as sought by the commercial organizations of that city. This was settled after a trip to that city last week by the committee on steel and steel products of the American Iron and Steel institute, headed by Judge E. H. Gary and after a conference with representatives of the Duluth chamber of commerce. This conference was followed by a public meeting in the Hotel Spaulding.

The institute members held that such a basing point is out of the question now and is of doubtful propriety at any time, as other centers would also seek the same privilege and the whole fabric of the present quotation system would be destroyed. With a base at Pittsburgh, Duluth, Chicago, Cleveland, Birmingham and other centers, confusion would result and benefits expected would be lost.

What Duluth asks is that products of its mills be sold at Duluth at the same price as the same products from Pittsburgh mills are sold at Pittsburgh instead of the present method of making the Duluth price the Pittsburgh base plus the freight from Pittsburgh. The Duluth argument is that under such circumstances industries using steel products would locate there and build up a great industrial center.

Ore Tonnage Tax Creeps In

Duluth speakers intimated that a promise had been made in years gone by that a great plant for the manufacture of steel would be located there by the Steel Corporation, which has been done, and secondly, that a basing price the same as Pittsburgh's would be established. It was also intimated that in consideration for these favors to Duluth that city had defeated the proposed tax on tonnage of ore taken out of the state when it might have been passed without such opposition.

Judge E. H. Gary, chairman of the board of the United States Steel Corp., made the principal reply to the arguments of the Duluth speakers. Figures opposing the Duluth base were also presented by E. A. S. Clarke, president of the Lackawanna Steel Co.; John A. Topping, chairman of the Republic Iron & Steel Co.; Joseph G. Butler Jr., vice president of the Brier Hill Steel Co., and Willis L. King, vice president of the Jones & Laughlin Steel Co.

In these talks operating costs, transportation and other factors were presented to show that no other concern than the Steel Corporation was fitted to operate in Duluth without loss. The "Pittsburgh plus" plan, it was argued, is a real protection to Duluth and its business interests.

Duluth's Contentions

OUR contention is that Duluth should be made a basing point for steel billets, and all primary steel products, not less favorable to Duluth than the Pittsburgh price is to Pittsburgh. The location of Duluth entitles this city to grow to be one of the chief of American steel cities. Pittsburgh plus takes from us our birthright and gives it to others.

Duluth's loyalty to the steel interests is a record of staunchness undeviating. We want Duluth to hold to that record. We desire to continue the partnership. But it is well at times to take stock. We should see that all obligations as well as benefits are shared. The benefits the city of Duluth has conferred upon the Steel Corporation deserved recognition. But it seems to us that the officials of the United States Steel Corp. have forgotten us. A great amount—some $119,000,000— *was spent last year erecting new plants, but not one cent of that amount was spent in Duluth. We believe that at the bottom of this neglect is Pittsburgh plus. It seems to us that Pittsburgh plus is not even in their interest. If economic principles were recognized such a state of affairs could not exist. It seems a moral wrong if not a serious invasion of the law. The Pittsburgh plus policy seems to be a most effective way of throttling the iron industry of Minnesota.—Chairman Craig.*

Judge Gary presented the case as follows:

"I fear that if this were an oratorical contest I would be the loser," the speaker began, smilingly. "It has has given me great pleasure to note the enthusiastic support you have given Mr. Craig. It is partly due, no doubt, to your admiration for him and partly due to a belief in his case. We steel men have come to your city at a difficult time. For the last year we have devoted our entire time, dedicated our countless mills and furnaces to the services of the government. Nearly 100 per cent of our properties are engaged in turning out those things which are essential to the winning of the war.

"Mr. Craig is in error when he says that we control the entire steel situation. We do not fix the price of our product. That is being done by the United States government. As to basing points, they should not be changed during the period of the war, it has been decided by the war industries board.

"We came here as your friends. We came because we realized it was your sincere hope that we would do so. We came to take the stalwart men of your city by the hand and give them our assurances of good faith. As head of the United States Steel Corp., and knowing what takes place there, insofar as decisive authorization is concerned, I can state that the United States Steel Corp. has never made a promise which it has not fulfilled. Somewhere there has been a misunderstanding.

"Certain gentlemen have no doubt expressed opinions as to what might be done here. These opinions may have been accepted as promises. But the Corporation itself knew nothing whatever of this.

Promise Has Been Kept

"I made one single statement as to what the Steel Corporation intended to do in Duluth. A $6,000,000 plant was promised you, but no specified time was fixed for its completion. Even if we had promised a $10,000,000 or $12,000,000 plant here our promise would have been more than twice fulfilled. But we need not discuss that. When we voluntarily do anything that matter is closed forever. We did not come here to build a plant because we believed we could make money by doing so. On the contrary, had this been considered, Duluth would never have been chosen

as a site. We came simply because it was the desire of Duluthians that we do so.

"Duluth is a city of great promise. I want to congratulate you upon it. If it is well managed it is certain to have a place some day among cities of the first rank. I want to congratulate you on the fact that you have within the city limits one of the finest steel plants in the entire world. All auxiliaries and accessories are there, all devoted exclusively to turning out the finest work in the world.

"That plant is working in the service of the government. Its products are not made here and shipped to Pittsburgh. They are converted into shell steel here.

"If the governor of your state were here tonight, I would congratulate him upon having within the boundaries of this great commonwealth the finest bed of ore I know of anywhere. Not only is the ore we are mining of the finest quality, but there are millions of tons there which are considered valueless at present, but which will in the future be worth millions of dollars. Hundreds of years will pass before the ore of Minnesota is exhausted.

State Gets Great Ore Taxes

"But I wish also to congratulate the state upon the fact that there was capital from other states to utilize and develop these ore fields. Last year 22,000,000 tons of ore was taken from Minnesota. In the ground its value was not more than 50 cents per ton; some of it was worth no more than 25 cents. Last year the state of Minnesota received $8,472,404.70 in taxes because it possessed great ore beds. The United States Steel Corp. last year paid $4,000,000 to people working in Duluth. For other things $3,000,000 more was expended here. Is it quite just to say that we are doing nothing in return for the benefits we have enjoyed? If I came to Duluth and talked to a man who had 1000 horses which I considered worth $1,000,000, and which sum he was willing to accept for them, and I paid him the cash, would it be fair to say I had left nothing here? But for the development of mines, the investment of capital, how much would Minnesota's ore beds be worth? Here is a mutual business. We came here because we believed you have the best ore. You were very glad to have the money which we paid, and are paying you for it. Neither party has a right to make the claim that one or the other is entitled to anything more—to any extraordinary consideration.

"I would like to submit for your consideration this proposition—that while this matter is looked upon as one between the producer and the consumer, it in reality lies between the producer and the community. Industries are started at the request of and in behalf of a community, for the purpose of building up a city, that population and property values may be increased. How many buyers of steel are there here? They are a small proportion of the general public. How many of you men here are interested in the upbuilding of Duluth? All of you. The rights and interests of the majority must be considered when there is no legal objection.

"The Minnesota Steel Co. has come here and built a great plant at a cost of $25,000,000. Thousands of men are employed here. Their families have been brought to Duluth. Your merchants are enjoying their trade. Many of them have built homes. Your population has been increased by 20,000 people. All the workmen are receiving good pay. The community has lent encouragement to all this. 'If you cannot induce capital to come here on any other basis, bring the plant here anyway', is the attitude of the community, even though some individual steel purchaser will suffer somewhat.

"The point in this whole argument has been lost sight of. It is not a question of prices between the producer and the consumer, but a question of benefits between the producer and the community.

Duluth Costs are Higher

"Mr. Craig doubtless wishes to see real estate rise in value. It is the presence of plants like that of the Minnesota Steel Co. that will insure that rise. Similar plants would help in the same way, but will they come here unless guaranteed protection? Protection has been afforded by other communities which have seen the advantages of bringing great plants to within their limits. Population and wealth have grown rapidly. None of these cities has made a complaint. Some few individuals may have suffered somewhat, I repeat, but the communities have been benefited. Why did the Steel Corporation build a plant on a sandy desert along the southern shores of Lake Michigan? Because of a love for Indiana? Oh no, none of us have any particular interest in that state. It was purely a business proposition. We would much rather have spent the money expended in Gary right here in Duluth. Our friends are here. But the proposition would have been a failure from a business point of view. There fuel was easily obtainable, as were other things which are necessary to the making of steel. There was a market. For the manufacture of pig iron Duluth is well suited, perhaps nearly as well as almost any other city. But Birmingham can manufacture pig iron $3.05 more cheaply per ton than can Duluth. As to steel products, Duluth is behind Gary by 38 per cent, Pittsburgh by 13 per cent. Pittsburgh costs could be greatly reduced if we had modern coke ovens there. It would have paid us to invest in those ovens rather than in the Duluth plant, but we felt an interest in Duluth and you have the plant.

"Steel companies cannot afford to come here," asserted Mr. Gary, and quoted figures to prove his contention. Lack of market, adverse climatic conditions, closing of mills by reason of cold, etc., were among his criticisms

Ore Base Necessary

I HAVE heard much of Pittsburgh being a basing point, and that because of that fact, and the fact that Duluth is not, have heard it said that the latter city is being discriminated against. I doubt if you are all familiar with the practical side of this question. How did Pittsburgh become a basing point? Why was it preferred to any other city? Business was started there because it was regarded as the best location. Mills are always built where fuel and other necessities are most easily procurable. It was not because any particular man lived in Pittsburgh. Pittsburgh was made the basing point because it was the selling point. As time went on other localities developed and when they saw the prosperity the steel industry had brought Pittsburgh they decided that they, too, wanted to become basing points. Cleveland, Chicago, Newcastle, Birmingham wanted this. The officials of these cities investigated thoroughly and found that they could not compete with Pittsburgh in any case. They saw that it is just as desirable to have one basing point as to have a gold standard. Those cities wished to be protected. How could they determine the competition they would be thrown into should every city be made a basing point? They would not risk building plants when they could not determine in advance with whom and under what conditions they would have to enter into competition.—Judge Gary.

of the city as regarded from the point of view of a steel manufacturer.

"Now what would happen were Duluth made a basing point? Chicago, Cleveland and countless other cities would immediately want to become basing points," he continued. "This would mean that all material would sold f.o.b. works. There would be no stability. Every mill would be taking care of itself, without thought of the others. How would Duluth bear up under such competition, with all its disadvantages?

"Imagine a little pilot boat steaming out to sea with 15,000,000 to 20,000,000 tons of ore a year!" he said in refutation of Mr. Craig's assertion. "Remember that it costs much more to ship finished steel products than it does the ore. No mills would sell goods here when they could dispose of their products at nearby markets, if there were other Pittsburgh base points. What would be the result for the customers of Duluth. Why, they'd simply get no steel. Duluth needs the protection of Pittsburgh plus, gentlemen. A place where costs are as high as they are here cannot afford to be without that protection. It is true that the Steel Corporation has made considerable money in the past few years, but not an unreasonable amount considering the size of its investments. Up to the past four years the Corporation barely averaged 7 per cent on its capital. We are constantly investing in new enterprises, constantly raising wages, so the money goes right back into the business.

"It is my opinion, but it is not a promise, that if patience is exercised by Duluth, if you wait for the development of this country, the time may come when these mills and more like them may be utilized to the further advantage of this community. Do you think we shall throw away money which can be used for our benefit? That means your benefit as well."

Tells History of Effort

L. P. Harris, who presided at the public meeting, explained how the discussion had come about. He stated that the Duluth Basing Price for Steel committee had been formed some time ago from civic and community organizations to exert its efforts toward making Duluth a basing point. Recently this committee visited New York and requested the presence of officials of the Steel Corporation and independent companies for a conference in Duluth.

C. P. Craig, chairman of the steel committee, presented the claims of the city for greater iron and steel manufacturing importance. He said:

"I think I am making a perfectly frank statement. This committee desires to be frank. And in being frank I must acknowledge that we have viewed with regret the progress of steel construction here. When this plant was promised us it was specified that we should never labor under the disadvantages of Pittsburgh plus. The situation is disappointing, we cannot banish that feeling. We do not want to see this situation develop into a contest between the people of the Steel Corporation in removing their ore in as short time as possible and the people of Minnesota in delaying the removal as long as may be that they may reap all the profits they can. But no one in this hall can prevent such a state of affairs if Duluth does not soon receive what is rightfully hers. This should be the subject of careful study for the mutual benefit of each of the parties concerned."

Francis W. Sullivan also spoke for the city. He said that "55 per cent of the range is worked by independent interests and but 45 is controlled by the Corporation. The Steel Corporation can point to something tangible worked in the interest of Duluth. To what can the independent concerns point? It is very gratifying to hear expressions of well wishes. It would be even more gratifying if the independent companies would show by work performed that our interests are of some consideration to them."

To Enlist Trade Commission

The conclusion of the meeting was a declaration by the Duluth steel committee, through Mr. Sullivan that "in view of the frank and open stand taken by our friends of the steel industry, their citation of figures to prove their contention that Duluth cannot profitably become a great steel manufacturing center and that 'Pittsburgh plus' is working a benefit to the city rather than proving an impediment to its development, we feel certain that the steel officials will cooperate with us in laying this matter before the federal trade commission. Although we are absolutely certain of the sincerity and honesty of purpose of Judge Gary and his associates, it is always well to have a disinterested third party review any question under discussion. There may be some features of the case which Judge Gary and his compatriots have overlooked and which may tend to support Duluth's contentions. With this idea in view the Duluth basic price for steel committee requests that you may lend your aid in placing the matter before the proper authorities."

Obituaries

John McKechnie, president of the Vulcan Iron Works, Winnipeg, Man., aged 73, one of the pioneers of that city, died at Minneapolis recently on his way home from California. Born in Scotland, he located in Canada when a boy. In 1874 he established himself in business in Winnipeg, and 10 years later a company was organized to take it over as the Vulcan Iron Works, Ltd. For several years he had been in poor health.

The late Frank H. Buhl, Sharon, Pa., in his will left $2,000,000 to be given to aid the people of Belgium and France whose homes have been devastated by the Germans.

Henry R. Hinckley, treasurer of the Northampton Cutlery Co., Northampton, Mass., for many years, died at his home in that city, June 9, aged 80. He was a veteran of the Civil war.

Hon. Dwight Olmstead Gilmore, Springfield, Mass., aged 80, president of the Maxf Grinding Co., Westfield, Mass., and a director of the Chapman Valve Co., Indian Orchard, Mass., died at his Springfield home, June 10, after an illness of 10 weeks. He was a former mayor of Springfield and its largest taxpayer.

Harry K. Myers, expert mining engineer, who at one time was consulting engineer with the D. J. Kennedy Co., and who latterly held a similar position with the Kittanning Iron & Steel Co., Kittanning, Pa., died recently in Cowanshannoc, Pa., where he was operating the Kittanning Iron & Steel Co.'s Cowanshannoc mine. He was a graduate of Lehigh university.

John A. Connolly, pioneer shipbuilder, died at his home in Brooklyn, N. Y., aged 88. He served his apprenticeship with the firm of Bishop & Simonson, Manhattan, N. Y., and in 1852 he organized his own business at Greenpoint. He was the designer of the United States gunboats Seneca and Chenango in the civil war and the steamboats Grand Republic, General Slocum, Columbia and many others.

Lieut. Henry Ware Clarke, Boston, who secured his commission as second lieutenant in the first Plattsburg training camp, was reported June 7, as killed in action. He was with a machine gun company of the sixteenth infantry. Before going to Plattsburg he was in business with his father, Charles A. Clarke in the Universal Boring Machine Co., Huston, Mass. He was born in Chicago, 25 years ago and was graduated from Harvard with the class of 1916.

Fathers Question Labor's Loyalty

Workmen Who Have Sons in Service Grow Impatient With Labor Leaders Who Curtail Production by Calling Wartime Strikes Simultaneous With A. F. of L. Protestations of a "Win-the-War" Policy

RENEWED protestations of loyalty were made and fresh resolutions to the effect that labor's only policy is a "win the war" one, were passed at the thirty-eighth annual convention of the American Federation of Labor in St. Paul last week. President Samuel Gompers, the mouthpiece of American labor, said: "Working men of the United States will be satisfied only with a peace brought about by a complete overthrow of the German military machine." In a report, the federation's executive council stated: "Workers in war production are practically a part of the fighting force. No action should be taken in the shops or on the field not in harmony with the purposes of the war. No strike should be inaugurated which cannot be justified to the man risking his life on the firing line in France."

Coincident with this come reports of several strikes which do not harmonize with the proclaimed principles of the St. Paul meeting. This is particularly true in the Cincinnati district. Fathers of soldiers are becoming impatient with union leaders who urge strikes. This impatience has been engendered by the feeling that some leaders are not backing the boys in the trenches nor are they encouraging such backing among workmen. In Hamilton, O., 288 machinists, employed by the Hamilton Machine Tool Co., at work on large government contracts, were advised to strike for increased wages by General Executive Board Member Nicholson despite the war labor board's recommendation that there be no strikes in war time. A sympathetic strike was called in Cincinnati.

Labor shortages continue to be the greatest difficulty with which employers have to contend and plants that are able to employ woman operatives are considered fortunate.

IN CINCINNATI territory from Saturday, June 8, until the following Tuesday, 288 machinists employed by the Hamilton Machine Tool Co., Hamilton, O., which has a number of government contracts were on strike. Their wages had been 52 to 55 cents an hour and they demanded 10 cents an hour increase. General Executive Board member Nicholson advised the men to quit despite the recommendation of the war labor board that there should be no strikes. The company is behind on its deliveries. The men returned to work under the old conditions on orders from Lieut. George W. Burns of the ordnance department. Fathers of soldiers are becoming exceedingly impatient with union leaders, since they feel there is not sufficient backing of the miliary army by the workmen army which should be encouraged by the leaders of organized labor.

Limitation of output was caused at the plant of the Ruttman Machine Co., Cincinnati, by a sympathetic strike by 16 of its machinists. This strike is still pending. Department store owners employing 60 drivers and chauffers who struck recently for increased pay, accepted the decision of a government mediator, but the drivers rejected it. This matter is still pending. In Louisville, Ky., the services of F. L. Feick, government conciliator, were required in a strike of 500 men at the plant of the Henry Vogt Machine Co.

SCARCITY of labor both skilled and unskilled prevails in Columbus and surrounding territory. Conditions otherwise are comparatively quiet, despite the activities of organized labor and the agitated condition of the country in general.

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WHILE Cleveland is one of the chief industrial centers of the country, at present it is a singularly free from labor disturbances. A controversy involving 30,000 men of the building trade was recently conciliated by A. L. Faulkner, government agent. At the plant of the Brierley Machine Co., a labor disturbance has turned out for the company's benefit. At the start of the trouble about 47 men were employed. Over 60 now are on the payroll and production is up to maximim despite the fact that those workmen who desired a closed shop still remain out on strike. Workmen on the whole are satisfied with the high rate of wages paid and the conditions under which they work.

* * *

SLIGHTLY different conditions exist in the eastern territory. A threatened strike of 250 transportation workers employed on the Bethlehem Steel Co.'s railroad at Sparrows Point, Md., the Patapsco & Black River, was stopped by the effort of J. B. Colpoys, government conciliator. A controvesy was satisfactorily adjusted by James Purcell of the department of labor at the American Locomotive Works, Dunkirk, N. Y., in which 70 crane men were involved and which affected 3500 workmen. About 120 machinists recently returned to work at the Hospital Supply Co., New York, after C. Reeves served as the government's mediator. More than 3000 machinists, boilermakers and other employes of the Readville, Mass., shops of the New York, New Haven & Hartford railroad, struck June 10, demanding a maximum wage scale of 75 cents an hour, and a minimum wage scale of 60 to 65 cents an hour. The maximum wage scale has been 42½ cents an hour and the minimum 37 cents. The employes of the Howe Scale Co., Rutland, Vt., have voted to strike unless the ultimatum demanding a raise in wages of $1 a day and time and a half for overtime, is complied with. The company employs 650 hands on government work. About 300 employes of the Taunton-New Bedford Copper Co., Taunton, Mass., wolked out June 14, when their request for a nine-hour day and a 15 per cent increase in wages was refused. The company offered an increase of 2 cents an hour. The strike has closed the plant, which was working on war orders.

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WHILE a normal conditions exists in Muskegon, Mich., outside of a shortage of skilled workmen such as machinists, tool and die makers, etc., as well as common laborers for

foundry work, in Bay City, and Saginaw, Mich., several labor controversies have required the efforts of government conciliators. About 125 blacksmiths and helpers and 100 boilerbakers and helpers were affected directly in controversies at the plant of the Industrial Works, Bay City. Approximately 5000 workmen were indirectly involved. J. J. Barrett served as mediator there as well as in Saginaw were 90 machinists at Wickes Bros. Machine Works recently went on strike affecting over 500 men indirectly. He was called in also to settle a controvery between the Saginaw Ship Building Co. and its employes numbering 1000.

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AT the plant of the Hercules Gas Engine Co., Evansville, Ind., a controversy between 300 workmen and their employer was settled by F. L. Feick, who likewise settled a controversy between the Sterling Products Co., that city, and 200 of its molders.

* * *

ONE man brought about a controversy at the plant of the Middletown Car Works, Harrisburg, Pa., which indirectly affected 300 workmen. It was finally settled by the efforts of J. Smyth, conciliator. Over 600 workmen employed by the Wilmington & Philadelphia Traction Co., Wilmington, Del., and Chester, Pa., went on a strike recently but returned to work following the efforts of J. J. S. Rodgers as mediator. At the plant of the Scranton Bolt & Nut Works, Scranton, Pa., 150 men went on a strike involving 850 other workmen. This was finally settled by J. J. Casey, government labor conciliator.

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SINCE labor shortages are on the increase in the Chicago district, plants able to employ women operatives are considered fortunate. Adjusted by the national war labor board, the settlement with the union molders employed in jobbing foundries gave them two-thirds of the increase they demanded. A rate of $5.50 per day of 8 hours has been granted as against $4.50, the former wage. Because about 1000 men were on strike and the award dates back to May 13, the back wage totals approximately $25,000. This same board has been called into session by strikers from the plant of the Mark Mfg. Co., Evanston, Ill. The company has been instructed to appear and present its case. About 600 men employed by the Aurora, Elgin & Chicago railway threatened to strike recently and Conciliator O. F. Nelson satisfactorily settled the difficulty. Wage agreements with building trades workmen have been signed for the next three years, with the exception of iron workers. These last receive 70 cents an hour and refuse a 10-cent increase, demanding 87½ cents. Engineers were increased from 75 cents to 87½ cents; stonecutters, bricklayers, sheet metal workers, plumbers and steam fitters from 75 to 81¼ cents; carpenters and ornamental iron settlers from 70 to 80 cents; roofers 67½ to 77½ cents; lathers 71⅞ to 81¼ cents, and electrical workers from 78⅛ to 81¼ cents.

Large Increase Shown in Iron and Steel Wages

Washington, June 18.—Statistics compiled of labor give the number of workmen engaged and the wages paid in various manufacturing industries, among which are included those of iron and steel production, car building and repairing and automobile manufacturing.

The statement indicates that in 108 iron and steel plants, 209,404 persons were employed, compared with 207,130 in March a year ago. These employes, according to the increase in their number were paid $9,021,952 and $11,154,095 respectively. One hundred and seven plants reported 208,544 employed in March as against 204,972 in February, with the payrolls aggregating $11,007,962 and $10,123,423 respectively.

Thirty-one establishments in the carbuilding and repairing industry reported 30,150 employed in March this year, drawing $1,279,783, as against 30,226 employed a year ago and earning $1,062,792. Thirty establishments indicated 29,966 employed in February and 29,778 employed in March, with payrolls reaching $1,160,831 and $1,263,236 respectively.

Fifty employers in the automobile industry stated the number of men on the payrolls in March this year was 125,277 or 8.6 per cent less than in March, 1917. Earnings also decreased, but only 3 per cent, collectively, the payrolls being $3,073,893 and $2,981,051. Forty-nine manufacturers, comparing February and March, gave 118,225 and 122,998, respectively, as the number of men employed, and $2,642,126 and $2,933,676 as their respective monthly wage totals.

Pleas for Americanization

Americanization as a factor, is entering more and more into the consideration of industrial heads as they endeavor to solve the labor problems which confront them. They are beginning to realize that the 100 per cent American workman is the best producer. This subject was introduced at the recent general meeting of the American Iron and Steel institute, held in New York City, by H. H. Wheaton, representative of the department of the interior. He made a plea that the iron and steel industry lend its organized force to a nation-wide plan for the Americanization of aliens. He said there are in this country 5,000,000 persons unable to speak the English language and of these 57 per cent are in the iron and steel industry. He outlined the provisions of a new bill about to be introduced in congress by Senator Hoke Smith which is designed to render federal aid to the carrying on of this work. The federal government will appropriate $5,000,000 the first year for the work to be distributed among the states in accordance with their industrial population. After the first year, the government appropriation gradually will be reduced and the states more and more will carry the cost. On motion, the matter was referred, in the usual way to the directors of the institute with powers to take action.

Americanization is Defined

An Americanization registration card has been mailed by the committee on public information to industrial plants employing foreign-born workmen and to other agencies reaching foreign language peoples in the United States. It defines Americanization as:

The use of a common language for the entire nation.

The desire of all peoples in America to unite in a common citizenship under one flag.

The combating of anti-American propaganda, activities and schemes, and the stamping out of sedition and disloyalty wherever found.

The interpretation of American ideals, traditions, standards and institutions to foreign-born peoples.

The elimination of causes of disorder and unrest, which make fruitful soil for the propaganda of enemies of America.

The abolition of racial prejudices, barriers, and discriminations, and of immigrant colonies and sections, which keep peoples in America apart.

The maintenance of an American standard of living through the proper use of American foods, care of children, and new world homes

The discontinuance of discriminations in the housing, care, protection, and treatment of aliens.

The telling to the foreign-born why America is at war and why we must all stand together to win it.

The creation of an understanding of and love for America, and of the desire of immigrants to remain in America, to have a home here and to support American institutions and laws.

With 65 per cent of the contributions coming from the workmen of its plant, the Warren Steel Casting Co., St. Louis, recently terminated a successful Red Cross campaign in which $6500 was raised by 100 per cent of its employes. A patriotic demonstration including a flag raising and an address by C. F. Hayden, president, contributed much to the success of the effort.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Would Abolish Tax on Invested Capital

HEARINGS on the proposed new revenue legislation continue to be held before the house ways and means committee at Washington. Chairman Kitchin has given assurance that the present tax laws will be repealed and an entirely new measure substituted. Members of the committee seemed more impressed by the testimony of E. L. Howe, of New York, and Maurice Wrigley, of Boston, than by that of any other witnesses. These men urged that the basis of the present excess profit tax "invested capital" be climinated and that prewar profits should be exempted from special taxation at present, except as to the normal tax. They proposed that the average prewar profits for five years, 1909 to 1913, inclusive, be used as a basis; that provisions be made for proper exemption allowance for capital increase in taxable year over the prewar period, not to be in excess of the average return of the invested capital in the prewar period and in no case to exceed 10 per cent; and that the excess of profits in the taxable year over the prewar average be taxed as a war profit. This policy the witnesses contended, would simplify the figuring of taxes, would elimintae inequalities between corporations and partnerships because of invested surplus and would also eliminate an unsound feature of the present bill, which is the encouragement of the increase in capital and the consequent decrease of capital turnover.

Sound Measure is Advocated

Some realization of the vast importance of the task before them and how much the prosperity of the country depends on a sound and equitable measure, seems to have found lodgment in the minds of the members of the house ways and means committee. An indication of this is to be seen in the announcement of Mr. Kitchin that the new law will provide for installment payment of taxes. This is a sensible and necessary provision for the business of the country confronted with the necessity of meeting an $8,000,000,000 tax bill in a lump sum might well be excused for faltering. The hearings, however, have contributed very little to the drafting of a scientific tax law from which the government may raise one-third of its expenditures next year. It is true that until the committee has before it definite estimates on the probable income of industry little can be done in laying out a just schedule. The treasury department is working on just such an estimate gleaned from searching scrutiny of tax returns. When this is completed and in the hands of the committee it is understood it will go into executive session and get down to business. Another factor in the tax situation which will likely have an important bearing on the new law is the series of detailed recommendations being drafted by a group of volunteer treasury department experts on the new revenue bill. Both the house and the senate will have the use of these recommendations when the bill comes to be written, and it is probable that the administration will be inclined to back them up, as representing the best tax views of a number of the country's highest authorities on taxation. This board, it is understood, is giving especial attention to the problem of levying the taxes where bank credit will not be injured or the purchasing power of the American people impaired—with the result of diminished Liberty bond sales.

Cost-Plus War Contract Officially Defended

Washington, June 17.—Complaints that the cost-plus form of contract adopted by the government paves the way for fraud receive energetic denial on the part of government officials. Details of the contract which are said to have led to erroneous conclusions are explained in statements by Col. R. C. Marshall Jr., in charge of national army construction work, and the report of the commission appointed by the government to decide on the best form of contract. The cost-plus system is held to be the fairest plan devised for protecting interests of both the government and contractors.

Its principal features are:

Compensation of the contractor is graduated by a sliding scale; the higher the cost of the work the lower his percentage of profit.

A maximum sum is specified beyond which no money can be received by the contractor.

The government may cancel the contract at any time, the contractor receiving profit only on actual work and expenditures up to the date of cancellation.

The government has an absolute check on the distribution of money; it may push or delay the work as it desires, and may alter its scope to meet new requirements.

The contract provides that the contractor shall receive a sum equal to the cost of the work plus a certain percentage, which, in the case of the cantonments is said to have been less than 3 per cent.

The contract guarantees the 8-hour workday for employes.

Following is the sliding scale:

If the cost of the work is $100,000 or under, a fee of 7 per cent of such cost; over $100,000 and under $125,000, a fee of $7,000; over $125,000 and under $450,000, a fee of 6½ per cent; over $450,000 and under $500,000, a fee of $29,250; over $500,000 and under $1,000,000, a fee of 6 per cent; over $1,000,000 and under $1,100,000, a fee of $60,000; over $1,100,000 and under $1,500,000, a fee of 5½ per cent; over $1,500,000 and under $1,650,000, a fee of $82,500; over $1,650,000 and under $2,200,000, a fee of 5 per cent; over $2,200,000 and under $2,450,000, a fee of $110,000; over $2,450,000 and under $2,850,000, a fee of 4½ per cent; over $2,850,000 and under $3,250,000, a fee of $128,250; over $3,250,000 and under $4,000,000, a fee of 4

per cent; over $4,000,000, and under $4,250,000, a fee of $160,000; over $4,250,000 and under $4,775,000, a fee of 3¾ per cent; over $4,775,000 and under $5,175,000, a fee of $179,062.50; over $5,175,000 and under $5,725,000, a fee of 3½ per cent; over $5,725,000 and under $6,225,000, a fee of $200,375; over $6,225,000 and under $6,825,000, a fee of 3¼ per cent; over $6,825,000 and under $7,400,000, a fee of $221,812.50; over $7,400,000 and under $7,750,000, a fee of 3 per cent; over $7,750,000 and under $8,350,000, a fee of $235,500; over $8,350,000 and under $8,800,000, a fee of 2¾ per cent; over $8,800,000 and under $9,650,000, a fee of 242,000; over $9,650,000 and under $10,000,000, a fee of 2½ per cent; over $10,000,000, a fee of $250,000.

Steel Corporation Settles Gigantic Tax Bill

The largest tax bill ever paid by an American corporation, perhaps the greatest in history, was settled by the United States Steel Corp. last week and amounted to $233,465,000. Payment was actually made the second week in April, when treasury certificates of indebtedness for an estimated total of $230,000,000 were turned in to the various collectors of internal revenue. The balance was paid in cash. Anticipating the due date two months and taking advantage of the discount of 3 per cent per year from date of payment to June 15, the Corporation saved $1,172,325.

Treasury certificates were purchased by the Corporation at various times last year. Only a small portion, however, was held by the various subsidiaries, the great bulk being accumulated by the parent corporation in New York. When it was decided to deposit them, Richard Trimble, treasurer of the Steel Corporation, hesitated about mailing millions of dollars worth of government paper to over 30 of its subsidiaries, because of the danger of loss in transit. He obtained from the treasury department permission to deposit the certificates with the New York district federal reserve bank, which will allocate the payments due to the internal revenue districts in each case, acting through other federal reserve banks.

The Corporation had the choice of securing the 3 per cent discount by immediate payment or of holding the treasury certificates until the last moment for the sake of the 4 per cent interest which they carried. The interest on the certificates was taxable, however, and would have been put in the highest graduated class of earnings, subject to a 60 per cent impost, in the cases of a number of the subsidiary companies at least. It therefore proved to be of substantial advantage to discount the tax.

Discounts War Bills and Makes Large Saving

Signal economies have been effected by the finance division of the general engineer depot of the United States army by discounting its bills. In the six months ended April 30, the saving was approximately $166,250. In the first 15 days of May the net from this source totaled $34,144, or at the rate of $68,000 a month. Monthly disbursements by the general engineer depot mounted from $49,746 in May, 1917, to $21,990,752 in April, 1918. Effected savings compared with operating expenses for the six months ending April 30, 1918, are as follows:

Month	Cash discounts	Operating expenses
November, 1917	$15,302.04	$2,970.00
December, 1917	14,872.49	3,645.00
January, 1918	17,012.04	5,125.00
February, 1918	20,008.51	3,735.80
March, 1918	46,522.05	3,881.84
April, 1918	52,538.90	3,608.39
Totals	$166,256.03	$22,966.03
Amount expended Nov. 1, 1917, to May 1, 1918		$125,315,821.26

Delays Are Eliminated

Invoices for the general engineer depot are accompanied by a report of the government inspector who has received the goods for shipment. If at any time the bill has been delayed in the manufacturer's office, the date of the postmarked envelope is considered as the date from which the discount period should be figured, so that the saving may be effected for the government.

Records are also kept in the finance division of the entire procedure of handling invoices and of any discounts which may be lost. The financial officer of the depot takes up each of these cases, and makes special efforts to see that payments are not delayed for the same causes again.

The notice to bidders which is sent out with the proposal to all manufacturers of articles desired contains this paragraph: "We will make payment within 30 days from date of invoice and also take advantage of cash discounts offered for earlier payment."

A voluntary increase of 15 per cent in its employes wages has been granted by the W. W. Carey Co., Lowell, Mass., manufacturer of machinery and pulleys. The raise became effective June 10.

Government Buying

In Coal Tar Products Restricts Market to Spot Sales

New York, June 15.—The principal coal tar products are less obtainable owing to the extent of government buying. The entire output of toluol, excepting quantities released for essential domestic consumption, is going to the government. In recent weeks government contracts have been let calling for most of the solvent naphtha to be produced in the future. It is considered only a matter of a few weeks before the government will contract for a large part of the output of benzol. It also is considered likely that the ordnance department shortly may place orders for large quantities of phenol. All naphthalin continues to go into the manufacture of high explosives for the allies.

Deliveries of solvent naphtha recently ordered by the navy have not yet been called for, but are awaited soon. Hence neither producers nor consumers are willing to make contracts. Spot sales are being made at 18 to 25 cents per gallon. Much business in benzol has been done this week at 25 to 30 cents per gallon, all for spot. Large sales of phenol also were made, all for spot delivery, at 48 to 52 cents per pound. Toluol for essential domestic requirements continues to be released cautiously by the war industries board.

Much concern is felt with respect to future requirements of sulphate of ammonia for fertilizer manufacturers.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.25 to .30
Toluol (on sales sanctioned by government) (tank cars)	1.50
Toluol (on sales sanctioned by government) drums	1.55
Toluol (for government)	1.50
Solvent naphtha	.18 to .25
Per Pound at Producers Plant	
Phenol	$0.48 to .52
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia (nom.)	$5.65 to 5.75

Contract

Pure benzol	nominal
Toluol	no market
Solvent naphtha	nominal
Per Pound at Producers Plant	
Phenol	nominal
Per 100 Pounds at Seaboard	
Sulphate of ammonia (for commercial use)	no market
Sulphate of ammonia (for government)	$4.50

Repeat Machinery Orders Prevail

Plant Extensions and the Purchase of Duplicate Tools for Munitions Continue to Furnish a Good Bulk of Inquiries—Shipyards are Heavy Buyers of Equipment—Crane Inquiries Mount Steadily

EACH succeeding day marks the appearance of additional inquiries for tools for railway shops. Buying, however, is deferred. It is stated that under the system of buying adopted for the railroads, it is necessary to tabulate all items on the lists issued, stating in which shop each machine is to be placed. The information is then referred to the directing organization, and the government sanctions the purchases to be made. This procedure is required, possibly, with a view to checking shop equipment, should the roads be returned to private ownership. Additional large requirements are expected before the railroad buying is at an end, as it is stated the present lists do not begin to cover the needs. Shellmaking machinery during the past few weeks has formed a most important class of machine tool inquiry. Larger contracts entailing a tremendous tonnage of shells and thousands of guns, are in a formative stage, and anticipatory inquiries are prevalent in all districts. It is stated that in addition to the $6,500,000 ordnance plant which is to be constructed in Chicago, existing plants for the manufacture of certain favored sizes of shells are being instructed to expand their facilities. One manufacturer in the Middle West is at the present time doubling his capacity, while from all localities, continued inquiries for duplicate tools are appearing. This new equipment is being purchased in many cases by calling in a few dealers, ascertaining if they have the machines desired, and placing the orders at once. Inquiries, followed by a close comparison of prices, and other details of trade are fast being dispensed with. The prime consideration is to get delivery. Shipbuilding continues to furnish an active demand for shop equipment, as well as cranes of practically all classes. Inquiries for shipyard tools are coming steadily from both coasts and also the Great Lakes region, which under present plans will assume increasing importance in shipbuilding lines. Larger steel vessels, to be taken to the sea in sections, will be constructed.

New Railroad Lists Presage Larger Requirements

RAILROAD inquiries continue to flow into the eastern machinery market from all sections of the country. These are represented by lists ranging for the most part from 25 to 50 tools. One of the latest inquiries to come out from the railroads is that of Union Pacific, involving about 70 tools of miscellaneous descriptions. While the lists now before the market aggregate a good total, the trade is still inclined to believe that the present inquiries in no way represent the volume of business to be placed by the railroads within the next month or so, despite the tendency on the part of the railroad administration to keep purchases down to a minimum.

Shipbuilding Still Prime Market Factor

As has been the case for the past several weeks, the shipbuilders now are absorbing the chief interest of the trade. Trading in view of business pending, however, is relatively small. During the past week the New York Shipbuilding Co. has purchased considerable additional equipment for its boiler shop and is expected to start shortly on the purchase of tools for its proposed extension, which will run up close to $1,000,000. The Bethlehem Shipbuilding Corp., as stated in the preceding issue, has given up the construction of a new yard on the Atlantic coast, but will build a yard at Alameda, Cal., which will be known as the Liberty yard. The company now is figuring on a large list of machine tools and other equipment, although the requirements have been considerably reduced. It is understood that the Sparrow's Point plant of the Bethlehem Shipbuilding Corp. will be enlarged shortly by the construction of four new ways and shop additions. The Newport News Shipbuilding & Drydock Co. is understood to be still awaiting final government approval before acting on requirements for its proposed turbine plant at Richmond, Va. The Skinner & Eddy Corp., Seattle, continues to negotiate in the eastern market on a large list of tools.

The Symington interests, Rochester, N. Y., have a large list for a shell plant to be established in Chicago. This business, however, has not been placed so far as can be learned. The Malleable Iron & Fittings Co., Bridgeport, Conn., has closed on a few miscellaneous tools. The General Electric Co. has purchased several lathes and power presses for its plant at Schenectady, N. Y. The Remington Arms Union Metallic Cartridge Co., New York, has covered on a small list. The McClintic-Marshall Construction Co. is planning the construction of an addition to its plant at Pottstown, Pa., which it is expected will cost approximately $2,500,000. A large extension to the structural plant of L. F. Shoemaker & Co., also in Pottstown, is contemplated.

Wide Demand for Cranes Continues

The Midvale Steel & Ordnance Co. has issued an inquiry for 27 electric cranes for its plant at Nicetown, Pa. The list involves five 100-ton, one 75-ton, eight 50-ton, one 30-ton, three 25-ton and seven 10-ton overhead travelers; one 10-ton jib and one 5-ton special crane. The Bethlehem Shipbuilding Corp. has issued a revised list, which calls for 29 overhead cranes, ranging from 5 to 50 tons capacity; 30 tower cranes of 10 tons capacity; eight double legged gantry cranes, 5 and 10 tons; three 15-ton and two 10-ton single legged gantry



THE SIGN OF A *Super Steel*

The Greek Circle, itself a symbol of superlative excellence, is well chosen as the designating mark of AGATHON SUPER-STEELS, for by their super-quality, super-strength and super-service, they uphold every tradition associated with that ancient symbol.

Agathon Alloy Steels will serve your purpose BEST.

THE CENTRAL STEEL COMPANY
MASSILLON, OHIO, *Agathon City*

Sales Offices:

Detroit Office—326-327-28 Ford Bldg. F. Walter Guibert, District Representative.

Cleveland Office—Hickox Bldg. The Hamill-Hickox Co., District Representatives.

Chicago Office—1370 People's Gas Bldg., 122 S. Mich. Blvd. C. H. Beach, District Representative.

Philadelphia Office—603 Widener Bldg. Frank Wallace, District Sales Manager.

Syracuse Office — 621 University Block. T. B. Davies, District Sales Manager.

J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.

AGATHON
Alloy STEELS

cranes, and 12 or more locomotive cranes. The American Car & Foundry Co. is in the market for two 10-ton electric cranes for its plant in St. Louis and two 5-ton cranes, one for Chicago and the other for Madison, Ill. The General Electric Co. is inquiring for a 25-ton gantry and a 20-ton standard overhead crane for West Lynn, Mass. It is understood the latter is to replace the 30-ton crane recently inquired for. Westinghouse, Church, Kerr & Co. are to buy a 15-ton electric crane for the Rutland railroad shops at Rutland, Vt.

Business Continues Brisk in Cleveland District

RAILROAD buying has not yet materialized, contrary to expectation in some quarters. The New York Central list now comprises about 180 items, which are being tabulated for submission to the governmental agencies for final approval. It is stated that accurate information is required by the government's railway officers relative to not only the machine desired, but also the correct location, where it is desired to use each machine. The Nickel Plate is expected to issue a list shortly, through its Cleveland office. The Toledo, St. Louis & Western railway has issued a small list through its office in Toledo, O. Buying still continues on the equipment for the new Findlay plant of the Grant Motor Car Corp., most of the tools being placed with two large dealers in Cleveland. The Templars Motor Corp., Cleveland, has purchased about 15 lathes and a number of grinders for plant extension work in connection with shell contracts. The Firestone Metal Products Co., Akron, O., is buying drills, die sinking machinery and special tools for a large plant addition. The Kelly-Springfield Tire Co. is buying some machinery for its plant at Akron, and also is building a complete new plant at Charleston, S. C. The Studebaker Corp., South Bend, Ind., is buying additional shellmaking machinery. The Ford Motor Car Co., Detroit, is steadily purchasing miscellaneous light machinery. The Petroleum Iron Works, Sharon, Pa., is inquiring for a Hillis-Jones shear. The United Engineering & Foundry Co., Youngstown, O., is inquiring for a precision horizontal boring mill and a used 38-inch x 27-foot heavy duty engine lathe. The Knight Mfg. Co., Canton, O., is in the market for a 6-foot radial drill, a 24-inch shaper and a large planer. The Fulton Cutlery Co., Canal Fulton, O., will purchase a 100 to 150-pound belt drop hammer and two small power presses. The Pennsylvania Furnace & Stove Co., Warren, Pa., is in the market for a No. 97 Toledo squaring shear, 8 or 10-foot power rolls for ¼-inch plate, 18-inch throat, for a power punch, and an 8 to 10-foot power press. The Detroit Metal Products Co., Detroit, Mich., is inquiring for a 4-inch radial drill. The Simpson Foundry Co., Newark, O., will purchase a 42-inch lathe.

Crane Builders Filled Up to November

Northern Ohio crane builders report that their plants are working 100 per cent on direct or indirect government business. All railroads have inquiries out for cranes in lots of one to four. Several have placed orders recently and these bookings with the filling of shipyard demands have so filled up the plants that deliveries are not promised this side of November, 1918. Builders say if the present rate of order-placing is continued, they will be into 1919 delivery before many weeks. The Brown Hoisting Machinery Co., Cleveland, continues to receive orders from the French government for cranes to join those erected at the ports of La Rochelle and Cherbourg, as well as at the two American ports in France. All crane orders, of course, go through the crane committee at Washington, which determines, from data filed at the time the order is placed, which orders are most urgent. The large inquiry from the Bethlehem Shipbuilding Corp. is still pending. Several inquiries are extant for used cranes. Among these is an inquiry for two used 20-ton cranes from the United Engineering & Foundry Co., Youngstown, O.

Builders of heavy machinery state they never were more busy. Their chief difficulty is in receiving inquiries for equipment from manufacturers who knew six or seven months ago they would require the machines to enable them to produce the material for which they had contracts. Order-placing was postponed and now they are unable to obtain satisfactory deliveries. The Wellman-Seaver-Morgan Co., Cleveland, has an inquiry from Syracuse, N. Y., for a $20,000 manipulator, required for handling forgings. Six months delivery is promised.

Scattered Inquiries in Chicago District

MOST demand for machine tools in the Chicago district is scattered and for single tools rather than in lots. The aggregate continues to be large and dealers are doing a heavy business in spite of lack of large lists. Matters of priority are pressing harder continually and it is increasingly difficult to place orders with manufacturers, unless the order is accompanied by the priority certificate. This is to protect builders against depletion of their raw material supplies. A new regulation of shipments by express is adding some difficulty to rapid delivery by refusing acceptance of any shipment over 300 pounds, except on a special order from the government. It is a matter of interest to machine tool sellers that western railroads appear to have been given less money for buying tools than eastern companies. This indicates less buying in this territory. Although there is considerable talk about the projected munition plant in Chicago to cost about $6,500,000, no definite inquiry has resulted up to this time. The Chicago, Rock Island & Pacific railroad is inquiring on a list containing eight machines. Representatives of Chicago dealers were present at an auction of about 70 machines at the plant of the Brenbunfers Engineering Co., at South Lorain, O., June 13. This concern was engaged in the manufacture of munitions for foreign governments, but had discontinued operation. The equipment was well scattered, with the largest single lots going to Chicago. David A. Wright, manufacturer of gun boring and turning lathes and other machine tools, has bought the former plant of the Allis-Chalmers Co., in Chicago, and will equip it to produce his line. The H. Mueller Mfg. Co., Decatur, Ill., is preparing to erect several additions to provide additional space for munition manufacture. The Pennsylvania Lines, West, is building extensive repair shops at Logansport, Ind.

Canada Needs Machinery

THERE is a good demand throughout Ontario and Quebec, Canada, for machine tools, used in shipbuilding and munition plants. The placing of additional shell contracts by the United States government with Canadian firms, is making it necessary for the majority of the munition plants to enlarge their facilities, and in many cases to renew their equipment. The demand for all classes of equipment of munitions plants is good, and Canadian tool manufacturers are hard pressed to handle the orders. Owing to the abnormal requirements for machine tools of every description, shipments from the United States are indefinite and few Canadian dealers are able to give a reliable date for delivery from American tool builders. A feature of the present market is the demand for used machinery. Owing to changes which are contemplated by many Canadian firms from steam to electricity, the inquiry for electrical equipment has developed and a large demand is expected.

SPEEDING with ROLLING MILL JIM





Say Fellows! you remember the first of March I told you the "Hubbard" broke ground for a new foundry? Well here's a picture of her, she started with a BANG, June 3rd. Just 93 days! She has ***some*** up-to-date equipment in her, installed by ***some speed artists,*** I'll say: electric furnace, open hearth furnace and all that swell stuff. Pike her off for yourself!

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Business Changes of Recent Occurrence

THE Sullivan Machinery Co., Chicago, has established a branch office in the Union Trust building, Washington, in charge of Ralph T. Stone, formerly affiliated with the New York office of this company.

The Simmons Machine Co., Inc., has moved its New York office to 801 Singer building. A. W. Richards is in charge.

The Conway Stove Co., Bellevue, O., has adopted a new firm name and in future will be known as The Bellevue Manufacturing Co. No change in ownership nor management will be made.

The Curtain Supply Co. has leased the building at 350 W. Ontario street, Chicago. The new quarters, which were occupied June 1, will effect a 50 per cent increase in space.

The Erie, Pa., plant of the National Forge & Tool Co., will be moved to Irvine, (Warren county) Pa. The general offices also will be established there.

The Miami Metals Co. has removed its offices to rooms 937 to 949 Peoples Gas Building, 122 South Michigan avenue, Chicago.

The Kirk Supply Co., Pittsburgh, announces that it has been appointed Pittsburgh representative for the Weber Chimney Co., McCormick Building, Chicago, builder of reinforced concrete chimneys.

The James Clark Jr. Electric Co., Inc., Oscar P. Wodack, district manager, has removed to 23-27 South Jefferson street, Chicago. The Electric Tool Repair & Maintenance Co. has taken quarters at the same address.

The firm name of the Inland Steel Castings Co., Terre Haute, Ind., has been changed to that of the Inland Malleable Iron & Steel Co., since the bulk of the tonnage of this plant consists of malleable iron castings.

J. Alex Gordon, Michigan, Indiana and northern Ohio representative of the Automatic Transportation Co., of Buffalo, manufacturers of automatic electric industrial power trucks, has moved his offices from 544 David Whitney building, to 1116-20 in the same building.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—A $20,000 boiler room extension will be built at the plant of the Robert Gair Co., 50 Washington stret.

BROOKLYN, N. Y.—The contract for the proposed $25,000 extension to the Atlantic Basin Iron Works has been awarded to William F. Henry, 316 Flatbush avenue.

BROOKLYN, N. Y.—Work will be started soon on the $40,000,000 government warehouses and piers in South Brooklyn. Cass Gilbert, 242 Madison avenue, New York, is in charge.

BUFFALO.—Cousins & Son, this city, will build machinery works, to cost $25,000.

BUFFALO.—The National Aniline & Chemical Co. will build a machine shop to cost $85,000.

BUFFALO.—The Acme Steel & Malleable Iron Works is contemplating the erection of a 1-story, 100 x 175-foot addition.

BUFFALO.—The Buffalo Dry Dock Co. will build a 2-story machine shop to cost $8500,

FREDONIA, N. Y.—A $100,000 improvement at the filtration plant is contemplated by this village.

KINGSTON, N. Y.—A $30,000 factory building will be erected by Charles Michaud for the Herbert Brush Mfg. Co.

LONG ISLAND CITY, N. Y.—Plans for a $60,000 silk mill, 2 stories, 73 x 212 feet, are being drawn by Dwight Seabury, Pawtucket, L. I., for Aaron Cohen, 212 Fifth avenue, New York.

ROCHESTER, N. Y.—The Monroe Iron Metal Cooperage Co. will build a 1-story addiation, 50 x 100 feet.

ROCHESTER, N. Y. — The Cochranbly Co. will build an addition, 48 x 70 feet, to its machine shop.

BLAIRSVILLE, PA. — The Pennsylvania railroad is considering building a roundhouse and engine house here.

FORD CITY, PA.—Pittsburgh Plate Glass Co. will build a large addition to its No. 2 gas hall here.

GREENVILLE, PA. — Bessemer & Lake Erie railroad will make extensive improvements to its shops soon.

HAMILTON, PA. — It is reported the Aetna Explosives Co. has purchased the David Walls farm and will build a plant for the manufacture of chemicals.

LEBANON, PA.—Bids are being received by the Lebanon Steel Foundry Co. on a 1-story, 112 x 176-foot foundry addition.

MILTON, PA.—The Milton Mfg. Co. will build a forge shop to replace one recently damaged by fire.

PHILADELPHIA.—The bureau of yards and docks, Washington, has awarded to Thomas Reilly & Co. the contract for the construction of a $130,000 power and transformer house.

PITTSBURGH.—The state water supply commission recently granted the Central Iron & Steel Co. permission to build two bridges across Paxton creek.

SHARON, PA.—Architect E. E. Clepper is preparing plans for a boiler house, 1-story, 40 x 70 feet, to cost $25,000.

SHARON, PA.—An addition to a power house for the Savage Arms Co., of New York, is being prepared by Engineer Griggs & Myers.

SHARON, PA.—Ben R. Allen has been commissioned to build an $8,000,000 picric acid plant for the Butterworth-Judson Co. at Brunswick, Ga.

WAYENSBORO, PA.—The H. T. Shearer Machine Co. has bought the shops vacated by the Victor Tool Co. and will make repairs and additions.

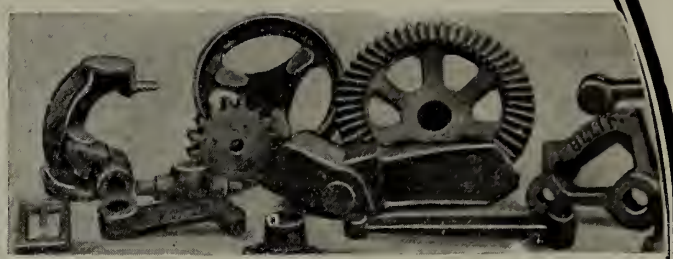
WHEATLAND, PA. — The Pennsylvania railroad is building a roundhouse and turntable here.

CAMDEN, N. J.—Emergency Fleet Director Charles M. Schwab recently announced that a shipbuilding plant to cost $10,000,000 will be built along the Delaware river.

EAST NEWARK, N. J. — The Gleason Wire Works recently was badly damaged by fire. Machinery suffered the greatest damage.







Small Castings that Aid in a Big Way—
"FARRELL-CHEEK" Steel Castings

And it matters but very little whether the castings are required for motor truck, tractor, motor car or any other purpose; if they are Farrell-Cheek Castings they will give lasting and dependable service for all time.

All who have used Farrell-Cheek Castings have invariably been delighted with the results obtained, and the service given—especially where the castings had to withstand unusual strains or vibrations.

Send us your specifications and let us submit a Farrell-Cheek Quality estimate and delivery date. We specialize on Blank Gears, Carbonizing and Case Hardening Boxes.

FARRELL-CHEEK STEEL FOUNDRY CO.
SANDUSKY, OHIO



Say you saw it in THE IRON TRADE REVIEW

Among New England Factories

AMHERST, MASS. — A $55,000 turbine house and coal handling plant will be erected by the Massachusetts Agricultural college.

CANTON, MASS.—The Springdale Finishing Co. will build a 2-story, 45 x 50-foot mill, to cost $25,000.

CHELSEA, MASS.—Hyman Cutler & Co. will build a brick, 3-story, 48 x 78-foot factory.

EAST WALPOLE, MASS.—C. S. Bird & Son have let the contract for a 1-story, 68 x 310-foot addition.

EVERETT, MASS.—The Carpenter-Morton Co., Boston, will build a 4-story, 61 x 39-foot addition.

NEW BEDFORD, MASS.—The Nashawena Mills will build a 2-story, 145 x 264-foot weave shed and a 3-story, 136 x 412-foot mill, to cost $450,000.

NEW BEDFORD, MASS. — The Nashawena Mills is said to be contemplating erecting a large addition. Plans have been drawn calling for a 2-story, 145 x 264-foot weave shed and a 3-story, 136 x 412-foot spinning mill. The improvements will cost about $450,000.

STOUGHTON, MASS. — The Perfection Cooler Co. will build a brick, mill construction, 3-story, 58 x 108-foot factory.

WORCESTER, MASS.—The Harwood & Quincey Machine Co. has awarded contracts for a 1-story addition.

WORCESTER, MASS.—The Fiber Finishing Co. has let the contract for a 1-story, 44 x 88-foot addition.

PAWTUCKET, R. I. — The Potter & Johnson Machine Co. has let the contract for a 20 x 200-foot freight shed.

BRANFORD, CONN.—A $50,000 foundry, 1-story, 135 x 200 feet, will be constructed by the Malleable Iron Fittings Co.

BRIDGEPORT, CONN.—Plans have been completed for a brick and steel, 4-story, 22 x 80-foot loft building for Harvey & Lewis, Hartford, Conn.

BRIDGEPORT, CONN. — The Susman Feuer Co. will build a brick and concrete, 4-story, 53 x 75-foot warehouse, to cost $50,000.

HARTFORD, CONN.—The Colt's Patent Fire Arms Mfg. Co. has let the contract for a concrete, 1-story, 45 x 90-foot mill building, to cost $16,000.

NEW BRITAIN, CONN.—A $20,000 warehouse, 1-story, 64 x 89 feet, will be constructed by Barney Miller.

NEW BRITAIN, CONN.—The Turat & Hine Mfg. Co. has let the contract for a 2-story, 40 x 100-foot storage building. It also is building an additional branch factory in Collinsville, Conn.

TORRINGTON, CONN.—Bids close June 17 for a brick, mill construction, 2-story, 53 x 307-foot, with 50 x 61-foot and 13 x 32-foot ells, addition to the plant of the Fitzgerald Mfg. Co.

WATERBURY, CONN. — The American Mills Co. will awarded contracts for construction of a $10,000 plant addition.

WATERBURY, CONN.—Plans have been drawn for a brick and steel, 8-story, 90 x 176-foot hotel to cost $600,000, for the Connecticut Owning Co.

Activities in the Central States

CEDARBURG, WIS.—An addition is being built to the plant of the Western Rope Mfg. Co. The addition will house a large crane when completed.

ELROY, WIS.—O. F. Miller, clerk of the board of education, is taking bids for the erection of a high school building.

FOND DU LAC, WIS.—The Wright Bros. Box Co. has engaged Architect J. E. Hennen to prepare plans for a 2-story factory addition, 50 x 125 feet, costing about $25,000, including new equipment, motors, etc.

JANESVILLE, WIS. — The city council has ordered plans and specifications for a bridge of reinforced concrete and steel over Rock river.

LAKE MILLS, WIS.—The board of public works awarded the general contract for the construction of a sewage disposal system to L. B. Brogan & Burns, Green Bay, Wis. Reichardt & Pierce, Watertown, Wis., are consulting engineers.

MANITOWOC, WIS.—Walter C. Staeffler, city clerk, is taking bids for furnishing the municipal water and light commission one 1500-kilowatt turbo-generator unit.

MILWAUKEE.—The Filer & Stowell Co. has started work on the erection of a new forge shop, 60 x 155 feet.

MILWAUKEE.—A 10-story banking house and office building, 65 x 120 feet, will be erected by the American Exchange bank.

MILWAUKEE.—A new iron foundry and core building costing about $75,000 will be erected by the National Brake & Electric Co., Milwaukee.

MILWAUKEE.—The Crucible Steel Casting Co. is building an addition to cost $10,000.

MILWAUKEE. — The National Brake & Electric Co. will build an iron foundry to cost $75,000.

MILWAUKEE.—National Steel Foundries is planning an addition, 80 x 140 feet. H. J. Esser, 402 Camp building, is architect.

MILWAUKEE. — A 1-story brick, steel and concrete garage and service shop, 32 x 100 feet, will be erected by the Wadhams Oil Co.

MILWAUKEE.—John H. Fowles, secretary of the sewerage commission, is taking sealed bids for furnishing the suction piping for an 18 and a 24-inch centrifugal pump.

MILWAUKEE.—Albert Dix, 215 Graham street, will erect a double garage, 110 x 150 feet, to include a machine shop. Bids are being taken by Architect Stanley F. Kadow, 988 Kinnickinnic avenue.

MILWAUKEE.—Tentative plans and estimates for a new steel foundry costing about $80,000, prepared for the Pelton Steel Co., will not be carried out. Instead the company will make several additions to the present foundry.

MORRISONVILLE, WIS.—Architect Edward Tough, Madison, Wis., is preparing plans for a three-room addition to the high school at Morrisonville.

NEENAH, WIS. — Architects Robert A. Messmer & Bros., Majestic building, Milwaukee, are preparing plans for a $40,000 addition, 40 x 100 feet, to Theda Clark Memorial hospital.

PARK FALLS, WIS.—Architects R. A. Messmer & Bro., Majestic building, Milwaukee, are preparing plans for a new city hall, auditorium and community building, to cost $50,000.

SHEBOYGAN, WIS. — The necessity of erecting a new high school building has come before the common council and immediate action on an appropriation of about $200,000 will be taken.

SOUTH MILWAUKEE, WIS.—The Bucyrus Co. will build a two-story addition to its administration building. Architect A. C. Eschweiler, Milwaukee, is preparing plans.

SUPERIOR, WIS.—Fred W. Dort recently obtained a permit to erect a foundry, 66 x 80 feet, to cost $6000.

SUPERIOR, WIS.—S. A. Riches is contemplating the erection of a foundry, to cost $3000.

SUPERIOR, WIS.—Architect F. E. Johnson is preparing plans for a $150,000 school building, 117 x 135 feet, for the board of education. L. A. Nichols is secretary.

SUPERIOR, WIS.—The Enterprise Foundry Co. is contemplating erection of a 1-story, 85 x 90 foot foundry building, in which to manufacture gray iron castings for shipbuilding purposes.

WAUPUN, WIS.—The C. A. Shaler Co. will build an addition.

WAUSAU, WIS.—C. R. Meyer & Sons Co., Oshkosh, Wis., has taken the general contract at $69,940, for constructing the first unit of the new high school building, 106 x 200 feet, 2-story and basement.

WEST ALLIS, WIS.—The Universal Machinery Co. is letting contracts for a foundry, 90 x 160 feet, and core room, 60 x 66 feet, to cost $50,000.

WEST BEND, WIS. — The West Bend Heating & Lighting Co. will increase its coal storage capacity to 750 tons and install new automatic coal and ash handling equipment.

WEST ALLIS, WIS.—The board of public works is advertising for sealed bids for water main extensions requiring 3000 feet of 6-inch cast iron pipe, 10 hydrants, and miscellaneous fittings, to be furnished by the contractor. Bids close June 22, at 2 p. m.

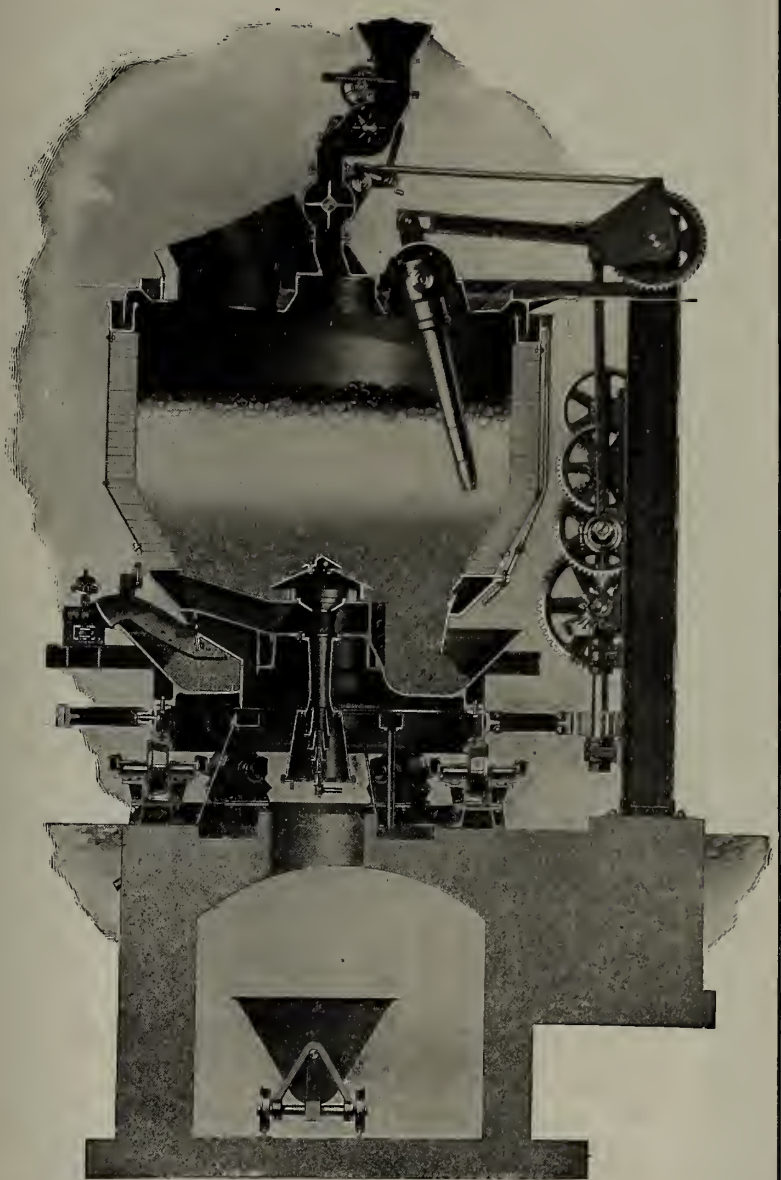
The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron & Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use



Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U. S. A.

WEST DE PERE, WIS.—A. J. Beauregard has the contract erecting two shop additions for the DePere Mfg. Co.

WHITEWATER, WIS.—J. N. Humphrey, proprietor of the Century Pen Co., is contemplating erection of a new plant.

ANN ARBOR, MICH.—The J. Goff Sheet Metal Stamping Co. will build a 1-story addition, 60 x 80 feet.

DETROIT.—The Long Mfg. Co. is building a 2-story addition 66 x 125 feet.

DETROIT.—The Murchey Machine Tool Co. is building a 3-story addition.

DETROIT.—The Long Mfg. Co. is building a 2-story addition.

DETROIT.—The Anderson Forge & Machine Co. will erect an addition to its heat-treating building and pickling department.

DETROIT.—A 3-story addition 60 x 153 feet, to the twist drill department of the Arthur Colton Co. is being erected.

DETROIT.—The Detroit Automatic Scale Co. will build a 5-story addition, 113 x 121 feet.

DETROIT. — The General Motors Co., Standish Backus, secretary, Boyer building, will build a 1-story drop forging shop, 60 x 300 feet, to cost $350,000.

GRAND RAPIDS, MICH.—The Michigan Boiler & Iron Works has bought the plant of the Central Boiler & Supply Co.

GRAND RAPIDS, MICH. — The Tannewitz Works is building a 2-story addition, 98 x 160 feet.

HASTINGS, MICH. — The Consolidated Press Co. will build a 1-story foundry.

HASTINGS, MICH. — The Consolidated Press Co. is building an addition 160 x 422 feet, to contain a foundry, pattern shop and storage room.

LANSING, MICH. — The Eaton Rapids Woolen Mills is constructing a 3-story dormitory 40 x 150 feet.

LEPEER, MICH. — The Lepeer Tractor Truck Co., W. H. Tucker, president, will build a 1-story plant, 60 x 200 feet, to cost $30,000.

MT. CLEMENS, MICH. — Henry Englebrecht, R. F. D. No. 1, highway commissioner, will let a contract shortly for a 60-foot span steel bridge with 16-foot roadway.

MUSKEGON, MICH. — The Campbell, Wyant & Cannon Foundry Co. recently purchased a site for an addition.

ABINGDON, ILL. — The Sanitary Mfg. Co. will build a 3-story factory, 33 x 110 feet, to cost $20,000.

BLOOMINGTON, ILL.—The Bloomington consistory, Ancient Accepted Scottish Rite Masons, plan a $150,000 building.

CHICAGO. — The Haggard & Marcusson Co. is building an addition, 50 x 70 feet.

CHICAGO.—Hardinge Bros. are building a 1-story building, 40 x 100 feet.

CHICAGO.—L. Heinerman is building a 1-story machine shop, 24 x 125 feet.

CHICAGO.—The Concrete Steel Co. will build a warehouse, 225 x 350 feet, to cost $75,00.

CHICAGO.—Armour & Co. have let a contract to J. L. Carnegie & Co., 189 West Madison street, for a 1-story machine shop, to cost $40,000.

CHICAGO.—C. A. Brown is building a 1-story plant 75 x 125 feet, at Thirty-fifth street and Shields avenue, to manufacture truck bodies.

CHICAGO.—The former plant of the Allis Chalmers Co., at Twelfth street and Washtenaw avenue, has been bought by David A. Wright, 568 Washington boulevard, who will equip it to manufacture lathes, gun-boring and turning lathes and a composite lathe and planer.

DECATUR, ILL.—The H. Mueller Mfg. Co. is planning several additions.

JACKSONVILLE, ILL.—Board of education plans a $75,000 high school building, boiler house, metal shop and smoke shop.

QUINCY, ILL.—The Hunzinger Construction Co. has the contract for a new warehouse 2-stories, 150 x 160 feet, for the Moorman Mfg. Co.

Up and Down the Pacific Coast

EVERETT, WASH.—M. H. Tholme has closed a contract for the purchase of a site for permanent shipbuilding plant and drydock.

HOQUIAM, WASH. — The Northwest Lumber Co. will immediately begin construction of a lumber mill here.

NORTH BEND, WASH. — Commissioners of King county will build a 96-foot steel span over Snoqualmie river.

OLYMPIA, WASH.—Sealed bids will be taken by the state highway board up to June 24 at 2 p. m. for constructing a steel bridge, consisting of two 100-foot spans, across the Naches river.

ROZA, WASH. — Improvements to cost about $50,000, including a new mill equipped with modern machinery have been decided upon by the Great Western Silicate Co. near here.

SEATTLE.—Architect S. E. Sonnichsen is taking figures for construction of the $400,000 plant of the Gulowsen-Grei Engine Co.

SEATTLE. — The Heffernan Engineering Co. has acquired a strip of waterfront which will be converted into a ship repairing plant.

SEATTLE.—William Todd, Todd Shipbuilding Co. announces his company will construct a large ship repair plant to cost $2,500,000.

SEATTLE.—The American Concrete Pipe & Shipbuilding Co. has bought a site which will be cleared at once and two shipbuilding ways constructed for building concrete vessels.

SEATTLE.—City council has passed a bill authorizing issuance of $5,500,000 in bonds for construction and development of a hydro-electric power plant on the Skagit river.

SPOKANE.—The Armstead Mines; Henry H. Armstead, contemplates constructing a $150,000 mill.

SPOKANE.—The Western Iron Works has taken over the plant of the Mack Machinery Co. for the manufacture of gasoline locomotives. Equipment to cost $15,000 is being installed.

TACOMA, WASH.—The Star Iron Works will erect a building, 60 x 200 feet.

ASTORIA, OREG. — It is reported the Crown - Willamette Paper Co. contemplates constructing a pulp mill.

PORTLAND, OREG.—The Bay City Shipbuilding Co. will establish a four-way shipyard.

PORTLAND, OREG. — The Northwest Steel Co. plans to double the capacity of its present plant.

PORTLAND, OREG.—Construction will be started at once at the plant of the Columbia River Shiphuilding Corp. on two additional ways.

PORTLAND, OREG. — Samuel Glasgow, Spokane, Wash., has purchased the Jobes Milling Co. plant and plans have been made for enlarging its capacity.

SALEM, OREG.—Director General McAdoo may order an extension of the Oregon & Eastern railroad from Crane to Burns.

SALEM, OREG.—Applications of Portland Railway Light & Power Co. for permission to construct a reservoir have been approved by State Engineer Lewis. Construction of the dam will cost about $300,000. It is to be 80 feet high and 442 feet long.

LOS ANGELES. — The American Trona Corp. will build a 1-story forge and pattern shop.

LOS ANGELES.—Flood control bonds of Los Angeles county to the amount of $1,000,000, of which $165,000 is for bridges, have been approved by the capital issues committee at Washington.

LOS ANGELES.—The General Petroleum Co. will build a 1-story machine shop, 40 x 100 feet.

LOS ANGELES. — The Pacific Electric Railway Co. has given a contract to the Wurster Construction Co. for shops at Torrance, including a car shop 180 x 400 feet, machine shop 180 x 450 feet, erecting shop 180 x 450 feet, forge shop 150 x 200 feet, paint shop 180 x 450 feet, and power plant 60 x 120 feet, at an estimated cost of $1,000,000.

MARE ISLAND, CAL.—The bureau of yards and docks, navy department, Washington, is making plans for a machine shop addition to cost $350,000.

SACRAMENTO, CAL. — The California highway commission will receive bids until June 24 for construction of several bridges.

SAN FRANCISCO.—The Pacific Foundry Co. is building a one-story steel factory building.

SAN FRANCISCO.—Bruff & Labarthe are preparing plans for a concentrating plant for a copper mine near Princeton, B. C.

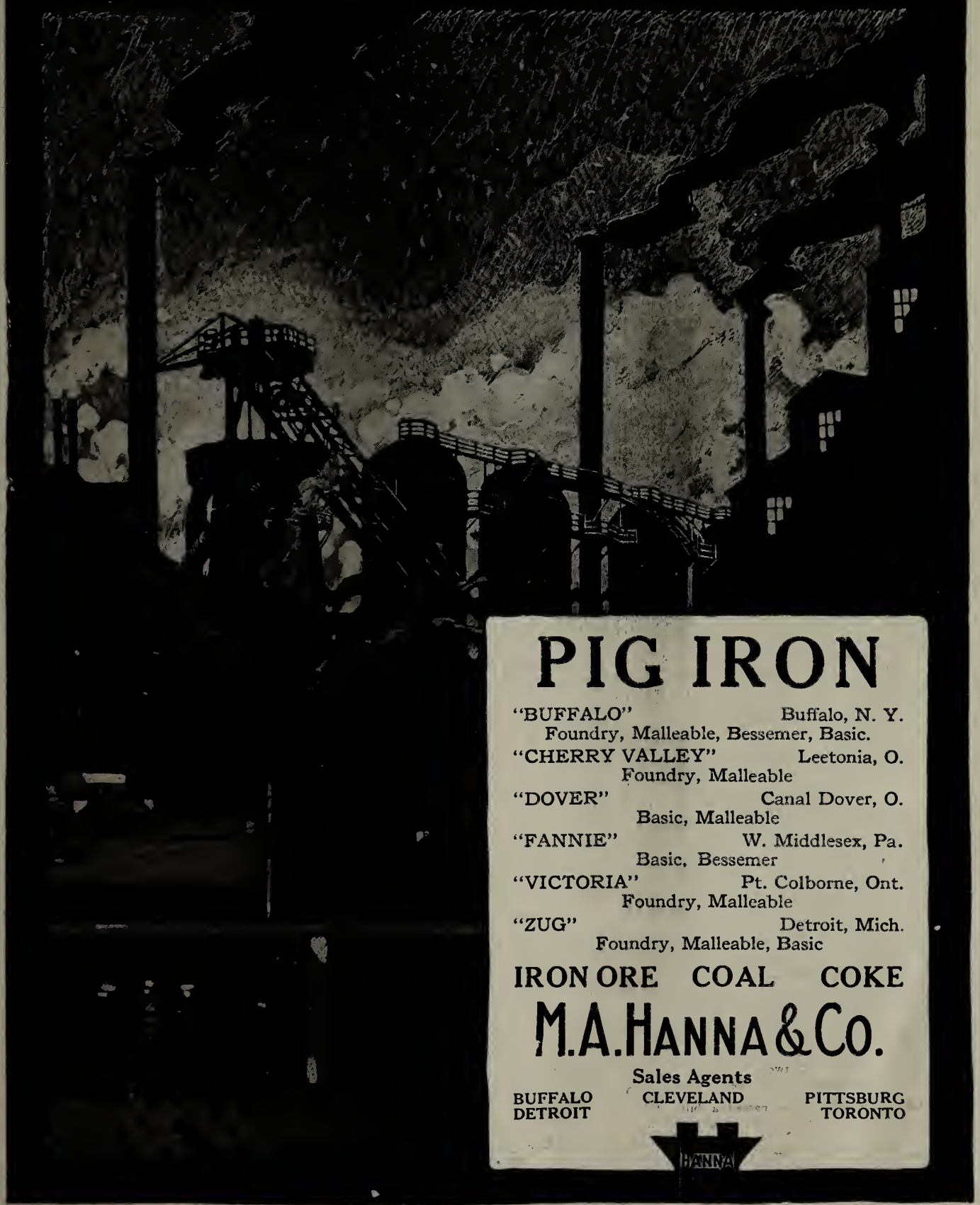
SAN FRANCISCO.—Howard C. Holmes is preparing plans for a drydock to be erected for the Moore Shipbuilding Co., Oakland, Cal.

SAN FRANCISCO.—Maurice Couchot and Joseph Losekann, Stockton, Cal., are preparing plans for a 3-story factory for the Sperry flour mills, to cost $80,000.

SAN FRANCISCO.—The Golden Gate Iron Works has been awarded the contract by the board of public works for the iron work for the San Francisco hospital.

SAN FRANCISCO.—C. W. Hansen, 180 Jessie street, has been awarded a contract by the Fleischmann Co. for a 2-story concrete, steel and galvanized iron factory addition, to cost $20,000.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic.

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M. A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

HANNA

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.085c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	28.00 to 28.50
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melt'g steel, Birming.	24.00 to 26.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. guaranteed E. Pa.	36.50
Shoveling steel, Chicago	29.00
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	21.50 to 22.00
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 21.50
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.10
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	1.10
St. Louis	3.70
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.40
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Minneapolis, St. Paul	2.00
Milwaukee	.50
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$3.00
Cincinnati	1.40
Cleveland	1.90
Detroit	2.10
Indianapolis	1.80
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	17.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	18.5 cents
Chicago	21.5 cents
Detroit	18.5 cents
Minneapolis and St. Paul	39.5 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.7 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.50 to 30.50
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	45.50 to 46.50
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Bushcling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Bushcling, No. 1, Chgo.	29.00 to 29.50
Busheling, No. 2, Chgo.	19.00 to 20.00
Busheling, No. 1, St. Louis	28.00 to 28.50
Cast borings, New York	16.50 to 17.50
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast, borings, Cleveland	18.25 to 18.50
Cast borings, Cincinnati	16.50 to 17.00
Cast borings, Pittsburgh	19.00
Cast horings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	18.50 to 19.00
Cast borings, St. Louis	16.50 to 17.00
City wrought, long, N. Y.	31.50
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	37.00 to 37.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.50 to 17.00
Machine turnings, Cleve.	17.00 to 17.75
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	19.00
Machine turnings, Birming.	16.50 to 17.00
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wrgt., No. 2, Chgo.	31.00 to 31.50
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	24.00 to 25.50
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	33.00 to 35.50
Railroad wrgt., No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	33.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	24.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	36.50 to 37.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 26.50
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.50 to 24.00
Cast, No. 1, Birmingham	24.00 to 26.00
Cast, No. 1, cupola east. Pa.	34.00
Cast No. 1, Cleveland	31.00 to 31.50
Cast, No. 1, Cincinnati	32.00 to 32.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	30.50 to 31.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	26.75 to 27.25
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	33.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	31.75 to 32.25
Malleable railroad, St. Louis	28.50 to 29.00
Malleable agricultural, St. L.	27.25 to 27.75

MISCELLANEOUS USES

Boiler punchings, Chgo.	35.00 to 35.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	43.00 to 44.00
Locomotive tires, St. Louis	40.50 to 41.00

THE IRON TRADE REVIEW

Vol. LXII Cleveland, June 27, 1918 *No. 26*

Freight Rates Main Price Factor

Advance of 45 Cents Allowed on Ore Covers Only Increased Rail Charge to Operators—Zone Price Plan in Pig Iron Continues to Receive Consideration—Single Finished Steel Base Helps Mills

ADVANCING operating costs for mills and furnaces yet have failed to convince the government that higher prices on iron and steel products are neccesary. The 45 cents added to the iron ore price dating from July 1, it proves, largely is an adjustment growing out of the general elevation of freight rates effective this week. Practically all of this price advance will be absorbed by the additional freight charge which the ore producers will be obliged to assume in its entirety. In Superior ore, the rail advance of 34 to 36.5 cents will go to the roads in the mining region and will be incuded in the sale price of ore at lower lake ports. About 8,000,000 tons of ore on dock and in transit prior to June 25 will go forward at the old rates. Pig iron producers consequently will not be affected by the general increase of freight rates as severely as had been believed. They will, however, be subjected to increases on coke and other supplies from this source, and also to the higher price on lake ore. These additions to costs show a wide disparity among different producing districts. This is lending increasing weight to the proposal to establish a price zone system in pig iron. Some opinion is expressed among producers in the industry that the government may be persuaded to adopt this plan in the near future.

Clearing Up Priorities

The war industries board continues its efforts to clarify the workings of the priority system. Different policies pursued by individual producers have continued to puzzle consumers. It is officially announced that no blanket priorities are to be issued, nor are priority certificates needed on orders which already are ranked as essential in the government classification of preferred purposes unless satisfactory delivery cannot be had otherwise.

The adoption of the single basing point of Pittsburgh on plates, shapes and bars represents a substantial concession to some producers east of Chicago. These mills when previously allotted tonnage for delivery in Chicago and vicinity have been obliged to accept these orders on a Chicago base, necessitating their absorbing considerable freight. This disadvantage would have been materially increased by the general advance in freight rate.

Adopt Semi-Steel Shells

A development of great importance taken in connection with the announcement of the gigantic ordnance program of the government is the decision to adopt the use of cast semisteel shells on a large scale. The orders in prospect will call for 12,000,000 projectiles of 6 to 8-inch caliber. This will require approximately 1,200,000 tons of foundry iron and scrap. Specifications covering these semisteel shells have been approved and announced by the ordnance department. These orders will materially enlarge the field of war work for the foundry industry. The government also has distributed among various steel foundries heavy orders for cast steel shell blanks aggregating 80,000 to 85,000 tons. At the same time, additional distribution of 135,000 to 140,000 tons of shell rounds among various mills is announced.

Iron Survey Near Finish

The survey of present iron consumption to determine its war rating is close to completion. Less than 10 per cent of the furnaces have failed to report and these are expected shortly. Heavy allocations continue to receive attention, including some large lots of steelmaking metal for export. The temper of the government authorities handling pig iron distribution is shown by the seizure of 20,000 tons of basic in the yard of a steelmaker in the Pittsburgh district. This consumer had refused to return a questionnaire. This plant is to be denied outside shipments of iron until it furnishes the required data.

JUNE 27, 1918

THE IRON TRADE REVIEW

A weekly publication devoted to the Iron, Steel, Foundry and Metalworking Industries.

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The New Price Announcement

THE advance of 45 cents per ton in iron ore allowed by the government, effective July 1, proves to be of much less advantage to the producer than appears on the face of the announcement. Instead of granting this advance to cover increased costs of production arising from higher labor, material and operating changes, etc., it turns out that the government is no more than compensating the ore operators for the greater freight bill which the railroad administration has imposed upon them. It develops that the freight advance of 30 cents per net ton, or 33.6 cents per gross ton on ore, effective June 25, is to be turned entirely into the treasuries of the roads hauling the ore from the mines to the upper lake ports. This advance actually is 36.5 cents from the Mesabi, Cuyuna and Vermillion ranges and 34 cents from the other mining districts. This means that the whole charge must come out of the ore producer since his sales are made on a delivered basis at lower lake ports and his contracts contain no provision for increased freight allowance. The furnaces consequently are spared the increased cost on their delivered ore arising from the freight advance, though, of course, they will be obliged to pay 45 cents per ton more in the price of all ore brought down after July 1.

In addition to the direct advance on ore haul charges, the indirect effect of the general freight advance applying to all operating supplies and materials will be considerable. Some of the independent producers estimate this item at 10 cents per ton. Therefore, the ore producer, with 45 cents added to his lower lake selling price but with increased freight costs, is no better off than with a lower selling price and the old level of freight rates. It is apparent that in this case the new government price is not an advance after all and that the war industries board yet is to allow a higher price on a major commodity over the levels originally fixed.

Since iron ore never has profited equally with mill and furnace lines, from the high market conditions in recent years, because of its long-term contracts, the position of the ore operator remains little benefited. His higher freight bill has been taken care of by the government, but he still has his increased labor and miscellaneous items to be absorbed.

The action of the war industries board in making Pittsburgh the one base for plates, shapes and bars, was an equitable proceeding which long has been fully warranted by the facts. Producers located west of Pittsburgh have been called upon to furnish much tonnage for delivery into the Chicago and surrounding districts and to bill it at the fixed Chicago basis. This has meant that they have been obliged to absorb several dollars per ton covering the rail haul between their plants and Chicago. This situation, especially was unfair to those mills which under the government schedule were compelled to buy their slabs or billets on a Pittsburgh or Youngstown base plus the freight. The adoption of a Pittsburgh base for these three leading products suggests that the government looks with favor upon a single basing point as the fairest and best for all concerned. This is interesting in view of the repeated attempts made by various cities from time to time to have themselves adjudged a basing point, an example of which recently has been given in the case of Duluth.

The Power of the Automatic

AUTOMATIC machine tools, or manufacturing automatics as they are generally termed, are a distinct American innovation; a gradual outgrowth of the first hand-operated screw machine developed during the early days of the civil war for making screws and other small parts for the Springfield markets used by the Union army. From that time until the present, the development of automatic machine tools has been steady, in spite of the tremendous opposition from the ranks of organized labor, so that today the United States stands supreme as the premier producer of those tools that make for greater efficiency in producing modern machinery.

What the enemy attempts to accomplish through slow and costly hand operations, the American manufacturer achieves with a manufacturing automatic. In Germany one workman toils over an engine lathe content to turn out a few dozen finished pieces a day. The American shop superintendent takes an identical piece, looks at it, passes it to the boss of the automatics and an hour later, perhaps a little longer, a machine has been set up which turns out the pieces desired, silently and steadily, thousands in a day.

American genius has brought about this mechanical marvel. American skill developed in a free country, wherein no restraint is put on ambition, has developed the wonder-working machinery which is making possible the nation's stupendous present-day production. In the short space of two years, the United States has achieved results in production that would require scores of years had we labored under "one-man-at-a-machines methods."

That the American-designed manufacturing automatic is one of the prime factors that will win the war for the allies, no competent authority will doubt, because these tools play an important part in turning out practically all the necessities of modern warfare.

When the war is over and all those who have helped to bring success to American arms are receiving the deserved plaudits and gratitude of their fellow-countrymen, it will be well to reserve a high place in national gratitude for the patient and persevering inventor who toiled silently and incessantly, often against heavy odds, to perfect the tools of victory.

Spelter Shutdown Proposed

FIXING of commodity prices when first proposed was a much mooted question. There were many sagacious business men who were firm in the belief that such a revolutionary step could not be taken, and that if it were attempted it would lead to industrial chaos. "Do not interfere with the law of supply and demand," they urged, "for demand and supply will adjust themselves naturally." Time has shown that after all price fixing was the best solution of adjusting industry to war time demand. Various leading iron and steel company officials have stated their approval of the fixing of prices through the policy of agreement between producers with government authorities. Not only has the price fixing kept commodity prices within reach, restrained the advancing cost of living with accompanying influence on the labor situation, but is easing the way for after war readjustment. Advocates of the policy letting economic laws work out the price question might well heed the lesson now being read to spelter industry. In 1915-1916, the demand for spelter for war purposes caused a shortage of the metal and a runaway market ensued. Prices rose from around 5 cents a pound during the autumn of 1914, to around 25 cents in March, 1915. These prices stimulated production on a broad scale—and discouraged consumption. The use of galvanized sheets received a setback from which it has never recovered, for when spelter prices again approached normal, steel prices in turn had advanced sharply. The spelter industry for months has been running on a small margin of profit. Many producers have gone out of business, selling their stocks of metal for what they could get. Prices only recently were lower than the average cost of production.

Accordingly, one of the foremost authorities on spelter, C. E. Siebenthal, of the United States geological survey, has sent a letter to spelter producers, in which he suggests that smelters suspend production of Grades C and D spelter until present stocks are absorbed. He quotes the secretary of interior as saying that the cause of the unsatisfactory condition in the spelter industry was excess production due to overstimulation of mining and smelting capacity by the extreme high prices of three years ago. The only effective remedy, Mr. Siebenthal said, is to get rid of the stock of surplus spelter by closing the smelters until stocks are consumed, adding that the Joplin zinc ore miners also are agitating a shutdown of several weeks. A fixed price on spelter in 1915 which allowed a reasonable profit might have prevented the development of a number of high cost properties and kept the industry on a fairly profitable basis through to the present day. But the fixing of prices is an economic adventure which is only possible in wartime.

Help Labor to be Efficient

EVIDENCE points to the saloon as being partly responsible for the unsatisfactory production of coke in the Connellsville region. Reports are heard that government agents who are investigating the labor situation there may recommend that, as a military measure, the saloons in that section be closed.

No doubt indifferent labor, which sees fit to idle away a great amount of time, has a strong tendency to spend its surplus earnings for liquor. Many Connellsville coke workmen appear to be afflicted this way and it is perhaps the attitude of the majority of men informed on the subject that the tendency will have to be removed by cutting out the means to intemperance. Appeals to the laborers as to the extreme importance of their working hard and consistently, then will bear much more fruit than may be expected under existing circumstances.

At all events a maximum output of coke must be brought about, no matter what measures may be taken to curtail the workers' supply of liquor.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1644

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.50
Basic, Pittsburgh	33.40
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.90
Malleable, Chicago	33.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	34.40
No. 2 foundry, Cleveland	34.10
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	37.10
No. 2 southern, Chicago	38.50
No. 2 southern, Phila.	40.10
No. 2 southern, Cleveland	38.50
No. 2 southern, Boston	41.00
No. 2 southern, St. Louis	39.75
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	37.60
Virginia, No. 2X, Jersey City	37.90
Virginia, No. 2X, Boston	38.20
Gray forge, Pittsburgh	33.40
Silveries, 8 per cent, furnace	45.50
Silveries, 8 per cent, Chicago	48.50
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon, furnace	50.00 to 52.00
Low phos., Pittsburgh standard	54.40
Charcoal, Superior, Chicago.	37.25 to 37.50
Charcoal, Superior, Buffalo	37.50
Charcoal, southern to 2 per cent silicon	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot.	75.00
Spiegel, contracts, furnace.	75.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	150.00 to 160.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	150.00 to 160.00
Bessemer ferrosilicon, 10 per cent	55.00
Bessemer ferrosilicon, 11 per cent	58.30
Bessemer ferrosilicon, 12 per cent	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown.	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.50c to 3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh.	3.95
Polished staples, Pittsburgh.	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, 1 in. proof coil, Pitts.	7.50c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base, Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Class A pipe is $1 higher than Class B.	
Four-inch, Chicago	65.05
Six-inch and over, Chicago	62.05
Four-inch, New York	64.35
Six-inch and over, N. Y.	61.35
Four-inch, Birmingham	58.60
Six-in. and over, Birmingham	55.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Shafting, Pitts., carloads	17 off to list
Cotton ties, June, per bundle	$1.92

RIVETS

Structural rivets, Pittsburgh.	4.40c
Boiler rivets, Pittsburgh.	4.50c
Rivets ⅞ in. & small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation, on leading products June 26, average for May, 1918, average for March, 1918, and average for June, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices June 26, 1918	Average prices May, 1918	March, 1918	June, 1917
Bessemer pig iron, Pittsburgh	$36.60	$36.15	$37.25	$55.20
Basic pig iron, Pittsburgh	33.40	32.95	33.95	50.20
*No. 2 Foundry pig iron, Pitts.	34.40	33.95	33.95	51.02
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	51.00
Lake Superior charcoal, Chicago	37.50	37.50	37.50	51.80
Malleable, valley	33.50	33.50	33.50	50.07
Malleable, Chicago	33.50	33.50	33.50	50.50
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.75
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.	32.00	32.00	33.00	46.37
**No. 2X Virginia, furnace	33.50	33.50	33.50	46.50
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	47.50
Ferromanganese, 70%, delivered	250.00	250.00	250.00	431.25
Bessemer billets, Pittsburgh	47.50	47.50	47.50	93.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	101.25
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	101.25
Open-hearth billets, Pitts.	47.50	47.50	47.50	93.75
Steel bars, Pittsburgh	2.90	2.90	2.90	3.62
Steel bars, Chicago	2.90	2.90	2.90	4.50
Iron bars, Philadelphia	3.50	3.50	3.50	4.26

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices June 26, 1918	Average prices May, 1918	March, 1918	June, 1917
Iron bars, Cleveland	$3.64	3.64	3.64	3.50
Iron bars, Chicago mill	3.50	3.50	3.50	4.00
Beams, Chicago	3.00	3.00	3.00	4.63
Beams, Pittsburgh	3.00	3.00	3.00	4.00
Beams, Philadelphia	3.185	3.18	3.18	4.66
Tank plates, Pittsburgh	3.25	3.25	3.25	4.50
Tank plates, Chicago	3.25	3.25	3.25	7.92
Tank plates, Philadelphia	3.435	3.43	3.43	9.66
Sheets, blk., No. 28, Pitts.	5.00	5.00	5.00	8.13
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	7.57
Sheets, galv., No. 28, Pitts.	6.25	6.25	6.25	9.95
Wire nails, Pittsburgh	3.50	3.50	3.50	3.62
Connellsville furnace coke	6.00	6.00	6.00	11.12
Connellsville foundry coke	7.00	7.00	7.00	11.18
Heavy melting steel, Pitts.	29.00	29.00	30.00	40.00
Heavy melting steel, eastern Pa.	28.50	28.50	29.50	36.62
Heavy melting steel, Chicago	29.00	28.90	30.00	37.00
No. 1 wrought, eastern Pa.	34.00	34.00	35.00	47.87
No. 1 wrought, Chicago	33.50	33.50	35.00	46.75
Rerolling rails, Chicago	34.00	34.00	35.00	46.00

(For Additional Prices See Page 1644.)

Varied Costs Boost Iron Zone Plan

Increase of Ore Price and Freight Rates Present More Pressing Problem For Different Producers—Government May Recognize Disparity—Survey of Consumption About Completed—Heavy Tonnage Up For Allocation

Pittsburgh, June 25.—With increased freight rates on iron ore and pig iron becoming operative today, and the allowance by the war industries board of an advance of 45 cents a ton in the price of ore, effective July 1, producers and consumers of these two commodities face a new situation. On pig iron the advance from the valleys to Pittsburgh is from $1.10 to $1.40. The higher freight rates on pig iron will have to be borne by consumers inasmuch as ore prices are fixed f.o.b. furnace. At a meeting of the American Pig Iron association held in Cleveland on Monday of the current week at the call of President C. D. Dyer, pig iron men of the country expressed the feeling that the advance in ore was justified, especially for operators of underground mines. It was considered, however, that eastern Pennsylvania furnaces will be placed in an unfavorable position because of this advance, together with the added freight rates and the higher costs of labor. The Virginia furnaces, it is also claimed, are placed in about the same position as those of eastern Pennsylvania. Tennessee furnaces, it was held, are not disturbed by the lake ore advance, but producing costs have been greatly affected by competitive labor conditions due to the nearby location of army cantonments and government plants. It was stated that the costs of manufacture for these furnaces exceed the government prices on pig iron. Furnaces in the central district, including those in the valleys, Pittsburgh and on the lake front, it was found, still will be able to make a profit, except in isolated cases. It was because of this wide difference in producing cost that the zone system of ore prices has been fixed. Information along this line was conveyed to the war industries board by Mr. Dyer. It was the position of the war industries board that no increases should be granted now, except in the case of iron ore, and that advance is intended to cover the added freight and switching charges. It is probable that ore contracts next winter will provide for changes in freight rates. Questionnaires sent out by the furnaces have been returned in all but a few instances. Some consumers who had refused to fill out the blanks were notified that they would be absolutely denied further shipments of iron. This had the required effect. One large consumer, engaged in a vast amount of government work of the greatest importance, returned the questionnaire with the statement that no one but himself was concerned with the use he made of the iron. He was immediately informed that orders had been given to shut off further shipments to him. About 24 hours later he was in Washington and turned over the questionnaire, properly filled out, to the war industries board.

Big Allocations Are Up

New York, June 24.—Some heavy tonnages of basic and bessemer iron largely for shipment abroad continue to receive attention of the allocating officials. The subcommittee on pig iron, iron ore and lake transportation has allocated the second half foundry requirements of the Eddystone plant of the Baldwin Locomotive Works. A Tennessee and Alabama furnace divided 4000 tons, and a Virginia fur-

nace will furnish 700 tons. The ordnance department has placed an order with a western Pennsylvania furnace for 500 tons of bessemer for July shipment to the Washington Steel & Ordnance Co. Otherwise, the pig iron market in this district is without feature. A strong effort is being made to clean up the questionnaires from consumers and few of these now are outstanding.

Expect Zoning System

Philadelphia, June 25.—Much interest is shown here in the proposal that a zone system on pig iron prices be established to account for increases in producing costs. The understanding is that such a system will be put into effect shortly by the government. Much difficulty is being experienced by the committee on pig iron, iron ore and lake transportation in allocating pig iron since the furnaces, in many cases, say they cannot make the analysis wanted. This is leading to considerable delay in the distribution of allotments. Allocations this week include 600 tons of Virginia foundry iron for the second half for a Baltimore consumer and 2100 tons of Virginia foundry iron for the Washington navy yard for last half and first quarter delivery. It is understood two Lehigh Valley furnaces divided the second half foundry iron for delivery to the Westinghouse Electric & Mfg. Co. at Essington, Pa., amounting to 2575 tons. The Bethlehem Steel Co. has been allocated foundry iron for delivery to its own shipyards. Outside of these tonnages sales have been few, including only off iron, some of which was from the south.

Survey About Complete

Cleveland, June 25.—Only about 15 producers representing less than 10 per cent of the total number yet are to make returns to the steel director and the committee on pig iron, iron ore and lake transportation, classifying the manner in which their output is being consumed. A strong effort is being made to clean up the outstanding furnaces within the current week. The complete compilation of some producers showing how their tonnage is divided by grade among essential lines of demand, is interesting. One northern Ohio interest reports 98 per cent of its basic, 75 per cent of its malleable and 70 per cent of its foundry iron is going into direct and indirect war requirements. A western Pennsylvania producer shows 95 per cent of basic, 84 per cent of malleable and 78 per cent of foundry is being applied along essential lines. Requests for allocations are very numerous. The pig iron committee in recent weeks has had 56 individual requirements put up to it for action and has been advised 16 more are on the way. Orders allocated this week have been small, including about 3500 tons of foundry, 3500 tons of basic and 1000 tons of bessemer iron. A heavy tonnage estimated at 75,000 to 100,000 tons made up of various grades for domestic use, is receiving attention. In addition, some heavy tonnages of basic and bessemer for export are being secured. The consent of large buyers to take foundry iron with manganese to 0.20 considerably increases the latitude of the committee for making allocations among different producing districts.

Look for Increased Price

Buffalo, June 25.—Furnace interests here are digesting the two new developments in the industry of recent date—the priorities system and the increase of 45 cents allowed in the price of iron ore. The increase in the price of ore has little opposition but there is a feeling that the government should now do something toward increasing the price of iron, particularly in view of the further fact that the freight rates have been increased. Now that the costs have been raised, the industry believes it is justified in looking for a little further consideration from the federal authorities. Producers are hopeful of a revision upward later in the pig iron schedule. Deliveries are heavy but contracting is nil. If any contracting is done in the near future it will bear the clause to the effect that any change the government may make in the price, will affect the transaction.

Chicago Market Stagnant

Chicago, June 25.—No definite or official instruction has been received by sellers of pig iron in the Chicago district relative to their method of distributing tonnage under the preference order of the war industries board. Producers are using their best judgment and are serving melters where iron seems to be most needed for essential purposes. It has been stated on good authority but somewhat indirectly that it is not the intention of the authorities in charge of pig iron distribution to issue priorities except for such tonnages as are refused by producers from melters. If this proves true the market will be left undisturbed until demand exceeds supply and priorities begin to pinch and make it necessary to cover entire production by preferential listing. Producers will make reports regularly of all shipments and it will be easy to correct wrong disposition if any is found. Some light inquiry is being received for first half of 1919. Such contracts are being booked by the leading producer without regard to the essential nature of the melter's product, leaving that for adjustment at the time of delivery. Increased freight rates averaging 25 per cent go into effect today and will have a tendency to localize pig iron buying when the next movement appears. The rate from Birmingham to Chicago territory is increased from $4 to $5 per ton, which adds considerably to the freight barrier against southern iron. This will have little effect under present conditions. Furnaces are being pushed to their utmost and shipments are being made steadily. Practically all melters are being well supplied. One factor being kept in mind by producers is the possibility of one or more stacks being blown out for relining during the last half, as most furnaces have been in active operation for several years without general repairs. It is expected the new stack at Indiana Harbor will become active within the next few weeks and thus release some iron now being used for steelmaking, to be applied to the merchant market.

Week of Record Dullness

Cincinnati, June 24.—It is a matter of speculation as to how freight rates will be collected after tomorrow. The advance of 25 per cent is understood to apply on all districts and rumors that this would not apply concerning shipments from certain districts are unconfirmed.

Some confusion exists as to whether the usual freight differentials will be maintained on shipments from Tennessee furnaces but the latest information is that these will be kept in effect. The past week will probably go in the history of the pig iron business here as being the dullest in a number of years, as far as new business is concerned. A few cars of off-grade southern iron were bought by users who were badly in need of the metal. Some disappointment was expressed that prices were not advanced, and it is openly stated that a few furnaces in Tennessee may have to close down unless given some relief. Freight increases on both coke and ore are said to increase costs beyond what they can stand. So far no strenuous complaints have been received from the Ironton district.

Consumers More Encouraged

St. Louis, June 22.—Consumers of foundry iron in this district who have been sizing up the situation and ascertaining just how they stand since the advent of the licensing system are taking a decidedly more hopeful view

of things. They believe that unless the government sees fit to abrogate existing contracts, they will not be so badly off. Most of the important users are well fixed in the matter of contracts, and during recent weeks have been getting fairly satisfactory deliveries. To date they have not felt the effects of the new regulations to any appreciable extent. Considerably less confidence, however, is felt by plants working on nonwar products.

Government Control Complete

Birmingham, Ala., June 25.—Everything is government control so far as the pig iron market in the south is concerned, and furnace interests have very little to say as to metal available during the last half of the year. Reports to the effect that the southern furnace companies are likely to have a good quantity of iron to offer during the last half of the year cannot be verified readily. Inquiry elicits the information that but little of the probable make still is to be offered unless there is a material improvement in the production. Estimates are made that Alabama will show a larger output at furnaces this month than last. Coal and coke supplies are easier and the greater attention being given to furnace operations is having an effect. Shipments of pig iron from southern territory are going along steadily and the reduction of furnace stocks has gone further. Consumers of a nonessential character are urging delivery of iron on old contracts as well as other users.

Great Orders

For Wire Nails Being Allocated—300,000 Kegs Are Wanted

Pittsburgh, June 25.—Allocation of 300,000 kegs of nails is being made among mills of the country by the subcommittee on wire of the American Iron and Steel institute. These nails are being taken by the war department for shipment to France. This is said to be the largest requirement for nails made at one time since the United States went to war. Delivery is to be made over an extended period, and despite the fact that production has been cut on account of shortage of steel and mills have large orders on their books, shipments are expected to be made within schedule time. The United States government also is after large tonnages of barbed wire. One inquiry out calls for 10,000 tons to be shipped at the rate of 2000 tons a month. This tonnage has not been allocated and difficulty may be experienced in placing it owing to the fact that manufacturers are filled up with orders for the third quarter.

Giant Coke Plant Started

First of 640 Oven Unit at Clairton Fired—Will be Factor in Increasing Supply and Relieving Car Congestion

Pittsburgh, June 25.—Several batteries of the big by-product coke plant of the Carnegie Steel Co. at Clairton, Pa., were charged today and will begin producing tomorrow. Each battery consists of 64 ovens. The entire plant will consist of 22 batteries, or 1408 ovens, when completed, the company deciding recently to add 128 ovens to the 1280, which original plans called for. The first 640 ovens have been completed and all that remains to be done before this entire unit is producing is to dry them out. It is probable that all of the first 640 ovens will be making coke within two months. It is believed that it will be another year before the remaining 768 ovens are lighted. The ovens are of the Koppers type. Work on the Clairton by-product plant was begun two years ago, but various delays were encountered in getting it into operation. The coal will be transported down the Monongahela river from the mines of the H. C. Frick Co., the average haul being 47 miles. Approximately 4,200,000 net tons of coal will be consumer annually by the 640 ovens which, roughly, will produce about 3,000,000 tons of furnace coke, 250,000 tons of coke breeze, 43,000 tons of sulphate of ammonia, 36,000,000 gallons of tar, 10,000,000 gallons of oils in that period and between 50,000,000 and 60,000,000 cubic feet of surplus oven gas daily. The government, it is reported, will use a portion of the by-products from the plant. The company will use a portion of the by-products from the plant. The company will use by-products, like coke itself, from the plant for its Clairton, Edgar Thomson, Homestead and Duquesne works. With the ovens in operation a large number of cars which have been necessary to carry coke for the company from the Connellsville region will be automatically released and this is looked forward to as an item in relieving the car congestion next winter. Consumers of coke now face higher freight rates which were effective June 25. Important increases include the following: Connellsville to Pittsburgh, from 90c to $1.20; Connellsville to the valleys and Wheeling, $1.35 to $1.80; Connellsville to Cleveland, $1.75 to $2.20; Connellsville to Chicago, $2.65 to $3.30; Connellsvile to Buffalo, $2 to $2.60. The advance to $2.20 to Cleveland also takes in lake front furnaces in Ohio generally. Some blast furnace interests will more than have the increased offset by the fact that their present coke contracts at $8.50 to $9 will expire June 30 and tonnages they secure subsequent to that date will be at the government price of $6, ovens. The supply of coke is apparently sufficient to meet practically all demands. There is almost an entire absence of contracting. The car supply still is being maintained at approximately 100 per cent, and exceeds the leading capacity. Production for the week ended June 15 totaled 342,970 tons as compared with 341,020 tons for the preceding week, according to *The Connellsville Courier*.

Foundry Contracts Closed

New York June 24.—New contracts for about 10,000 tons of foundry coke for forward delivery have been placed in this district. This tonnage included both by-product and beehive coke. Current buying is of a spasmodic character, since the greater part of the consuming trade some time ago closed for forward requirements 12 to 18 months ahead.

Supplies Main Problem

Cincinnati, June 24.—The advance in freight rates does not concern coke consumers as much as their ability to get sufficient fuel to carry them along. The foundries lately have had little trouble in getting shipments through but they are unable to accumulate any stocks.

Renew Second Half Contracts

St. Louis, June 22.—Dealers and producers of coke have been deluged with telegrams and letters urging expedition of shipments. The demand for all grades continues unabated, especially from the southwest where melters are apparently in dire straits. So far as could be learned not a ton of foundry coke has come on the market, and heavy demands are being turned down daily by dealers. Eastern ovens are not offering anything in this territory, and in addition are way behind in deliveries on contracts. On the whole, however, shipments during the second quarter have been vastly more satisfactory than during the first three months of the year. Representatives of Connellsville and Virginia oven interests report a fair volume of recontracting for the second half, but only with customers of long standing, and on a basis of first half tonnage.

Pinch in Scrap Being Felt

Buyers Find Difficulty in Locating Desired Tonnage—Greatest Shortage in History Predicted This Winter

FOR COMPLETE SCRAP PRICES SEE PAGE 1644

Philadelphia, June 25.—The greatest scrap shortage in history is expected next fall and winter by well informed men in the trade. This is because so much steel is going into projectiles and forms on which there is practically no return as scrap. The subcommittee on scrap hopes to offset this condition to some extent by bringing all possible material to the market. Its general request for information as to scrap available in different parts of the country is bringing many replies. Among the important lots discovered is an elevated railroad which has been idle for 15 years. This is to be dismantled. A large tonnage of heavy melting steel purchased by the Italian government and long awaiting shipment at Baltimore has been distributed among leading eastern consumers. Foreseeing the approaching shortage, the Midvale Steel & Ordnance Co., the Lukens Steel Co., the Worth Steel Co., the Eastern Steel Co. and others are exerting active efforts to buy steel scrap. The Alan Wood Iron & Steel Co. is urging deliveries against the recent purchase of this grade. Similar efforts to buy are being made by consumers of wrought scrap. The International Arms & Fuse Co., Bloomfield, N. J., has disposed of 20,000 tons of shell turnings. The subcommittee on scrap is receiving reports showing to what extent the mills are provided with old material.

Push Shipments Ahead

Boston, June 24.—The scrap market has been marked during the week by intense activity to get shipments away before the new freight rates went into effect. The freight to eastern Pennsylvania of $2.80 will be advanced to $3.50 and rate to Pittsburgh of $3.60 will be increased to $4.50. Labor is an increasing problem which local dealers will be forced to solve shortly.

Supply Limits Trading

New York, June 24.—Trading in the majority of descriptions of iron and steel scrap in this district is limited only by the volume of supplies coming into the market. Cast scrap continues in especially heavy demand, with stocks being consumed as rapidly as dealers can handle them. The announcement that prices for the next three months would be unchanged has affected trading but little, as such a decision was expected generally. The shortage of labor presents one of the biggest difficulties now having to be contended with by dealers. A number of the yards in this district, formerly employing a dozen or more men, are now operating with only three or four, who in many instances are inexperienced. This situation, dealers state, is retarding the movement of scrap considerably. Prices during the past week continued firm.

Open-Hearth Scrap in Demand

Pittsburgh, June 25.—Demand for all of the principal grades of iron and steel scrap is heavy and according to dealers it greatly exceeds the supply. Consumers of old material for open-hearth use are in especial need of supplies, the demand being unusually heavy owing to the shortage of pig iron. It is evident that a great amount of scrap is moving. It also is apparent that supplies available are inadequate. Considerable direct dealing between consumers and producers continues to take place. Business being done through dealers almost without exception moves at maximum prices and calls for the payment of the commission of 3½ per cent. The subcommittee on scrap iron and steel of the American Iron and Steel institute recommended that no changes in base prices for the third quarter be made, and naturally it was no surprise that the war industries board has left levels unchanged for that period. It would not occasion any surprise, however, if a few readjustments are made, including the placing of cast iron scrap more nearly on a level with No. 2 foundry pig iron.

Large Cast Orders Due

Buffalo, June 25.—The scrap market continues just as strong with a heavy demand for all grades. If the government continues its present course without making any changes in scrap prices, it is believed there will be a tendency toward an increased demand. In particular, some large orders of cast scrap which have been held back will be placed immediately. Four lists from eastern railroads are due to come out next week; they are blind lists. Urgent inquiries from the Youngstown and Pittsburgh districts would indicate that some of the big consumers in that district are in sore need of heavy melting steel.

Relief is Shown

Cleveland, June 25.—Marked relief is noted in the scrap iron and steel trade here over the reaffirmation of second quarter scrap prices for the third quarter. This, it is contended, obviates the confusion a new price list would cause and permits the trade to continue undisturbed. The feeling here is that unless some unforeseen development arises, prices for the fourth quarter stand a good chance of being revised downward. All that staved this off this time was the freight rate rise, it is believed. Some activity in turnings and borings is evidenced. Round tonnages still are things of the past and the best-posted dealers do not look for real activity before October. Yards are sending out scrap as fast as it can be put through. Heavy melting steel continues scarce, with buyers plentiful.

Chicago Feels Pinch

Chicago, June 25.—There is an undeniable shortage of scrap supplies in the Chicago district and dealers with short sales to be filled are meeting difficulty in obtaining sufficient of some grades to meet their obligations. An important steelmaker who recently bought considerable tonnages and is open for further supplies as a reserve for winter needs, has not been obtaining as much as might be expected. Apparently the same situation obtains in the east and permission is being given for shipments of heavy melting steel from Chicago to consumers in Ohio. In these cases the consumer pays the government maximum price with commission and freight charges from Chicago to his works. A sale of 2000 tons is known and this indicates scarcity of heavy melting steel in the middle west. Quotations remain at about the same level as has been the case for the past 10 days, with a few cases of higher prices on some grades which are ranging below the maximum. Railroads are marketing slightly more freely than has been the case recently. The Chicago, Rock Island & Pacific offers 3300 tons, including 500 tons of steel rails; the Chicago, Burlington & Quincy, 2600 tons; the Chicago, Milwaukee & St. Paul, 1525 tons; the Santa Fe, 1400 tons; the Chicago Great Western, 425 tons; the St. Joseph & Grand Island, 100 tons, and the Kansas City Terminal, 60 tons of cast scrap. The Michigan Central has issued a list without the tonnages being noted.

Try to Uncover Supplies

Cincinnati, June 24.—Dealers are using every endeavor to locate scrap

that has not yet come to light. Those in the smaller industrial towns are importuned to gather up all the agricultural scrap possible as well as that available from manufacturing plants. The change in freight rates has been somewhat confusing and it will be several days before anything like a definite market can be reported. A difference of opinion exists among scrap iron merchants as to the effect of the new freight rates. A few believe that it will cause the market to sag but others are of the opinion that it may act the other way. The government's maximum prices on scrap have not yet been reached here as yet, although the growing scarcity of the metal should insure an advance in quotations on many grades. Very few sales are reported to consumers.

Demand is Livelier

St. Louis, June 22.—The general demand for scrap has picked up and a fair business has been done during the past few days. Dealers say they are able to sell readily about everything they are able to obtain but that extremely little scrap is coming out. The railroads are offering little and the country has been worked to the limit. Carriers have been urged to assist in helping along the movement to this market but at the moment are too busily occupied with preparations for handling the bumper wheat crop and war essentials to respond with much enthusiasm. Rolling mill grades are in particularly good demand, the inquiry having been stimulated by the placing of the government's car order. No. 2 wrought is wanted and is slightly higher. All grades of steel also have enjoyed a fair market. Price revisions during the week have been slight. Inquiries for relayers continue, but the market is entirely barren. Railroad offerings this week were insignificant. The St. Louis Terminal association offered 1800 tons, the Wabash 2200 tons, and Mobile & Ohio 900 tons. In addition the Frisco railroad disposed of 1200 tons at private sale. Much satisfaction is expressed here at the postponement of the prepayment of freight bills.

Southern Uncertainty Continues

Birmingham, Ala., June 25.—The uncertainty in the scrap iron and steel market in the south still obtains. The consumers are not willing to pay the maximum prices fixed by the government and as a consequence gatherers of country scrap cannot be paid what they expect. Then again, the increased freight rates and other regulations loom up. Dealers expect to finish at an early date a large proportion of shipments on old contracts.

Nonwar Projects Denied

Financial Backing Refused to Structural Jobs in Order to Conserve Capital and Steel—Chicago Plans Bridge

New York, June 24.—Several building projects not connected with the war program, have been referred during the past couple of weeks to the War Finance Corp. and been disapproved by the latter on the ground that the borrowing and expenditure of money for these undertakings is not justified at this time, and because the steel is required for more urgent purposes. These cases, it is thought, clearly indicate the attitude of the government with respect to nonwar construction, and definitely show that construction, at least with borrowed capital, will be curtailed to essential purposes for the period of the war.

Bethlehem Wants Tonnage

Philadelphia, June 25.—Several tonnages of structural shapes for government purposes were distributed to eastern makers during the past week, but none of these were exceptionally large. New fabricated work consists entirely of that of an essential character. The Bethlehem Shipbuilding Corp. is seeking a portion of the fabricated steel required at Sparrows Point.

Large Orders Being Placed

Pittsburgh, June 25.—Large orders are being placed regularly with fabricating shops, and still greater ones are in prospect, especially in connection with the shipbuilding program. Because of the speeding up of this program, the present fabricating capacity has been heavily taxed, and this prompted the Emergency Fleet corporation recently to arrange for largely increasing the output through the erection by the McClintic-Marshall Construction Co. of two shops with a monthly capacity of 10,000 tons each and by utilizing certain car shops in this district, as previously outlined.

Bridge Work Planned

Chicago, June 25.—In accordance with the severe restrictions put on building by the government, only occasional tonnages of structurals are placed for building purposes. Preparations are proceeding for construction of the Michigan boulevard link over the Chicago river in Chicago.

CONTRACTS AWARDED

Buildings for quartermaster's department at Aberdeen, Md., 800 tons to American Bridge Co.

Buildings for Gulf Sulphur Co., Texas, 550 tons to American Bridge Co.

Bridges for Pennsylvania railroad, 200 tons to American Bridge Co.

Double tracking viaducts for the Virginian railroad, 1750 tons to McClintic-Marshall Co.

Buildings at Camp Perry, O., 2000 tons to McClintic-Marshall Co.

Bridge work for Virginian railroad, 1300 tons, to McClintic-Marshall Co.

Extension to charhouse for the California Hawaiian Sugar Co., Crockett, Cal., 500 tons, to the California Steel Co.

Power house for the Northwestern Electric Co., Portland, Oreg., 255 tons, to Kansas City Structural Steel Co.

Building for the Central Furnace Co., Cleveland, 600 tons to the American Bridge Co.

Locomotive shop for the New York Central at Collinwood, O., 200 tons to the King Bridge Co., Cleveland.

CONTRACTS PENDING

Buildings at San Antonio, Tex., for quartermaster's department, 1500 to 1600 tons, bids being taken.

Building for Bessemer Motor Truck Co., Holmesburg, Pa., 200 tons, bids being taken

Spot Spiegel

Shows an Easier Tone—Ferroalloy Market is Quiet

New York, June 24.—Due to the falling off in demand for spiegeleisen of late, the market on this metal is somewhat easier for spot shipment. It now is unnecessary to pay higher than $75, furnace, for 16 per cent metal for any position. Metal containing 18 per cent manganese continues to be quoted at $82, furnace.

Other ferroalloys are quiet, but strong. Seventy per cent ferromanganese continues to be quoted at $250, delivered, for all positions. Fifty per cent ferrosilicon may be had at $150 to $160, delivered, depending upon the quantity. Sixty to 70 per cent ferrochrome, containing 4 to 6 per cent carbon, may be quoted at 40 to 42 cents at the furnace, while metal containing 6 to 8 per cent carbon may be had at 35 cents. The ferrotungsten market continues unchanged. Seventy per cent ferrotungsten may be quoted at $2.25 to $2.35 per pound, furnace, while the minimum on 80 per cent metal is $2.40.

Spiegeleisen is Wanted

Pittsburgh, June 25.—Limited inquiry is being made for 16 per cent spiegeleisen. One consumer in this district is seeking 300 tons for prompt delivery. The market for both spot and contract tonnages is quoted in this district at $75, furnace.

Bar Operations Uncertain

Iron Mills Still Have Considerable Unused Capacity—Rerolling Plants Find Increased Difficulty to Get Rail Stock

Chicago, June 25.—Considerable tonnages of shell rounds for munitions manufacture have been placed in this district recently, both interests having participated fairly heavily in this allocation. This steel is for second half delivery and most of it is to be delivered to shell manufacturers in or near Chicago. Manufacturers of hard steel bars rerolled from rails are being offered far more business than they can accommodate, especially in view of the shortage of rerolling rails. Railroads are using much steel now which formerly was scrapped and is letting nothing go out as scrap until it has passed its period of usefulness, in side tracks or elsewhere. This condition may result in closing of rerolling mills, as they are now running only part time. Reinforced concrete builders are unable to obtain as much material as they desire and a number of projects in Chicago are being held up for lack of reinforcing material. Steel mills have been forced to cease rolling shell discards into reinforced bars and are devoting them to more essential purposes. Bar iron makers find demand increasing and more tonnage is being booked steadily. Some demand is coming from railroads, but nothing yet has been sold to go into the government's carbuilding program. Even with this increase of inquiry mills are far from being assured of sufficient tonnage to keep up their operations steadily.

Engaged on Essential Work

Pittsburgh, June 25.—Makers of iron and steel bars are engaged altogether on direct and indirect government business. Producers of iron bars are operating at a high rate, about 90 per cent of capacity, but the output of steel bars is considerably less. Tonnages of both kinds of bars are understood to have been distributed among makers for the 100,000 cars recently placed with builders by the railroad administration.

Warehouses Buy Tonnage

New York, June 24.—Makers of steel bars booked a fair amount of business from warehouses in this district during the past week. In most cases, these sales involved high carbon bars rolled from shell discards. The orders of the warehouses now are being filled only when it is shown that these interests want the material to replace stocks that had been shipped to preference list consumers. Orders for mild steel bars are being received only when they are distinctly in the priority class and in all cases consumers must obtain priority certificates before the bars will be shipped.

To Revise Rivet Price?

Pittsburgh, June 25.—While the existing prices for nuts, bolts and rivets were left unchanged by the war industries board, it is reported that the prices of rivets may be readjusted within the next 30 or 60 days to the levels that prevailed when they were reduced about $5 a ton. This matter, it is reported, will be discussed at the next meeting of the Belt, Nut and Rivet institute, which will be held at Thousand Islands on July 9 instead of at Pittsburgh on July 17, as had been proposed. Makers of nuts, bolts and rivets are engaged altogether on direct and indirect government work and are able to obtain adequate tonnages of steel bars. Good-sized orders are being placed regularly.

Hoop Steel in Demand

Pittsburgh, June 25.—Demand from makers of oil and rosin barrels for hoop steel still is fairly active and mills are making bookings for these consumers whose products are being taken by the government. The output of bands has been curtailed on account of the shortage of steel. Inquiry is not active. Makers wherever possible are taking orders and are more willing to do so since bands were removed from the steel bar card, carrying a price of 2.90c, Pittsburgh, and placed in the hoop steel list, with a price of 3.50c, Pittsburgh.

Bolt Demand Strong

Chicago, June 25.—Buying of bolts and nuts by the regular trade is proceeding in comparatively heavy volume, but manufacturers are holding back somewhat, not desiring to load up with more business than they can accommodate. The government has not yet placed orders for the heavy quantities asked for several weeks ago.

Plate Allotments Heavy

Government Distributes 150,000 Tons Additional Including Export Orders—Adoption of Single Basing Point Helps Certain Mills

Philadelphia, June 25.—About 150,000 tons of plates were allocated to various mills during the past week for government purposes. The largest single tonnage was 20,000 tons to the Illinois Steel Co. Round tonnages for England and Italy were included. Although the large tonnage for Japan was released two weeks ago, the mills so far had been unable to do anything with this. This is because up to date their efforts to obtain export licenses, railroad permits and priority certificates have failed.

Car Steel Being Delivered

Pittsburgh, June 25.—Steelmakers in this district are giving remarkable service in supplying carbuilders with tonnages required in connection with cars they have been allotted by the railroad administration. Some steel tonnages already have been shipped to the plants of carmakers, among them being plates. Actual work of construction at car plants for the government will begin in this district in about two weeks and this quick work is not only due to the preparedness of carmakers, but also to the speeding up of shipments of steel. No plate tonnages are being booked except for government business.

Pleased Over One Base

Cleveland, June 25.—Local producers of plates are much gratified over the action of the war industries board in putting plates on the single price basis of Pittsburgh, instead of Pittsburgh and Chicago, as previously. These producers in recent months have been allocated much tonnage for delivery in Chicago and adjoining territory and this has been designated to take the 3.25c, Chicago, base. This has put the mills to the disadvantage of being obliged to absorb the freight from Cleveland to Chicago, although they were buying their slabs on a Youngstown and Pittsburgh base plus the freight. One of these mills only recently has received about 20,000 tons of government car plates at 3.25c, Chicago. Additional orders for 37,000 tons of steel covering the remaining 22 vessels recently awarded the American Shipbuilding Co. by the Emergency Fleet corporation have been distributed among the Illinois and

Lackawanna Steel companies with a small further tonnage going to the Carnegie. About 5000 tons of boiler steel is yet to be awarded.

Bookings Piling Up

Chicago, June 25.—Government allocations for shipbuilding material, mostly plates, continue heavy and plate mills are being operated at their utmost capacity. The government is placing each week tonnage much in excess of the ability of the mills to ship and bookings are piling up tremendously. The leading interest probably has more orders now on books than it will be able to roll by Jan. 1. Somewhat less demand is being made on mills for material to be fabricated in bridge shops for the Emergency Fleet corporation, indicating that sufficient material is now on hand with these fabricators to care for their immediate needs. It is believed that all steel for the government's freight cars has now been allocated. The leading interest has recently booked about 4000 tons for the Liberty Car Mfg. Co. and 6000 tons for the St. Louis Car Co.

Shell Steel Orders Large

New Distribution of Rounds About 140,000 Tons—Cast Shell Orders Total 80,000 to 85,000 Tons—Specifications Again Changed

Philadelphia, June 25.—Rolled shell steel orders for last half delivery aggregating approximately 135,000 to 140,000 tons have been placed with various mills. A considerable part of the tonnage is for the British. There has also been distributed allocations of 75,000 to 80,000 tons of cast steel shells. The rolled steel orders include 57,750 tons to the Inland Steel Co.; 31,750 tons to the Brier Hill Steel Co.; 19,000 tons to the Allegheny Steel Co.; 17,500 tons to the Republic Iron & Steel Co.; 3550 tons to the Kokomo Steel & Iron Co.; 2000 tons to the Laclede Steel Co., and 5400 tons to the United Alloy Steel Corp. The cast steel orders include 13,500 tons to the Scullin Steel Co.; 8000 tons to the Fahnestock Mfg. Co.; 12,000 tons to the Cleveland Steel Castings Co.; 20,000 tons to the Page Steel & Iron Co.; 7500 tons to the Hewitt Steel Corp.; 3600 tons to the Detroit Steel Casting Co.; 4000 tons to the Sterling Steel Co.; 3600 tons to the Marion Steel Shovel Co.; 1700 tons to the American Steel Foundries, and 1500 tons to the Penn Seaboard Steel Corp.

No Relief From Shortage

Pittsburgh, June 25.—No relief from the shortage of semifinished steel is in sight. The entire output is going to mills engaged in essential war work. Great quantities of billets, sheet bars, slabs and skelp could be sold if there were any available tonnages, but no offerings are being made and inquiries have fallen off because consumers appreciate that it is not possible to cover their requirements. It is not yet known what may be done, if anything, with regard to the pooling of sheet bars. This plan has been suggested as a relief for some sheet producers. It is the idea of some that the tonnages should be distributed among sheet mills in proportion to their capacity and the kind of work they are engaged on, although it is recognized that other considerations would be involved, such as the character of the sheet mills themselves. Some of them are not as modern and as well equipped as others, and perhaps would not be given the same rating as those capable of the greatest output. Platemakers appear to be fairly well supplied with slabs and some of them are being furnished ingots from open-hearth furnaces other than their own. Wire rods are in active demand, but only small tonnages are being sold by producers whose output is greatly restricted. Shipments are being made only to consumers engaged in essential manufacture.

Stripmakers Handicapped

Pittsburgh, June 25.—Makers of cold-rolled strip steel have had to curtail their output somewhat on account of a shortage of steel. Their stocks also are low but so far the supplies appear to have been sufficient to meet the demands. Because of the restriction in the output of pleasure automobiles inquiries from makers of cars are extremely limited. Some automobile makers still have fair-sized stocks on hand, according to reports.

The New York Shipbuilding Corp., Camden, N. J., has begun work on the construction of seven new wooden shipways, at Gloucester city, across Newton Creek from its present plant.

Sheet Output Insufficient

Quick Relief Needed to Meet Demands From Essential Consumers—Pooling of Tonnage Proposed

Pittsburgh, June 25.—Production of sheets is insufficient to meet the demands from essential consumers. The situation calls for quick relief in order that the mills may be able to meet direct and indirect war demands and plans to this end have been taken up. Pooling of tonnages of sheet bars is one proposal that is being discussed, although there are some in the trade who doubt that this will solve the problem. The difficulty is the shortage of steel, and while pooling is held to offer advantages, it may be necessary to divert tonnages from other sources to increase the supply for sheet mills. Operations are estimated at about 70 per cent, but some big mills are operating at a considerably smaller rate and other plants have had to suspend temporarily.

Production Still Crippled

Youngstown, O., June 26.—Sheetmakers here are still noticing the shortage of sheet bars. The majority of the mills are operating at 70 per cent and makers do not expect any improvement in the supply of bars. Steel remains scarce here, due to a shortage of pig iron, and as long as valley mills continue to furnish the government directly with 90 per cent of their production of various commodities, little hope is held out toward an improvement in the sheet bar situation.

Sheet Production Slack

Chicago, June 25.—Sheet mills are being operated at about 75 per cent of capacity, and while demand from consumers is not insistent, it is believed this is largely because the latter appreciate their inability to place tonnages. The government has not taken large tonnages of sheets, but at present some of the heavier gages are being allocated for use in construction of freight cars.

Must Obtain Priority

Philadelphia, June 25.—Third quarter requirements from regular customers are being booked as usual by the leading eastern maker of blue annealed sheets, but these are being taken with the understanding that the buyers must obtain priority certificates before shipments are made. Sheet allocations of the past week included 400 tons of the Liberty Steel Co.

Independent Ore Producers' Case

Brief Which Won Price Advance Shows Losses Which Mining Companies Were Meeting Under Old Scale—Need for Encouraging Underground Properties is Set Forth in Detail

IN their brief filed with the war industries board at Washington, the independent ore producers marshalled an array of facts and figures to support their claim for higher prices. The brief follows:

The producers of Lake Superior iron ore seek an increased base price for their output. In 1917 they shipped 64,500,000 gross tons to American and Canadian furnaces from which approximately 34,000,000 gross tons of pig iron might be made, equivalent to 85 per cent of the total pig iron output. The present rapid growth in pig iron capacity in both countries involves Lake Superior ore in much greater proportion than ore from other districts. Owing to these ore deposits being near Lake Superior, they have great transportation facilities both as to volume and cost, and their continued healthy development is of great national importance.

Of this 64,500,000, 48 per cent comes from underground mines, 52 per cent from open pits, where steam shovels load ore directly onto railroad cars. In this appeal for higher prices we assert that if our only method of mining were open pit no relief would be sought at this time.

A Big Labor Problem

The 48 per cent that comes from the underground mines faces an entirely different situation. Notwithstanding the development of electricity and machinery, underground mining is still purely a manual labor proposition. Practically no progress away from this has developed, despite much experimentation. Consequently for the past year the cost of mining underground ore has steadily increased. Labor costs have doubled or trebled and about two-thirds of the purely operating cost is labor. The other third is made up of these items, and we show their increases in per cent since Jan. 1, 1917.

	Per cent	
Explosives	35	
Coal	120	
Drill steel	50	
Lumber	100	
Timber and lagging	40	
Lubricants	30	
Steel rails	75	
Miner's rubber boots, hats, coats, etc.	100	
Machinery	50	plus
Carbide	40	

The fact is, that the average miner now works from 15 to 20 shifts per month because that gives him ample income. Our miners are largely Austrians and Finns, and a large output of an important military commodity does not interest them. Therefore, with this lessened production our fixed charges, which include our very heavy state taxes, have increased step by step with labor.

Independents Mine Big Tonnage

Of the total estimated present annual underground production of 32,000,000 tons, approximately 20,000,000 tons is mined and sold by independent operators, whose entire income arises from the sale of iron ore. Profits derived from converting this ore into iron and steel are profits in which they do not participate and it is true that but few of these operators have open pits to help them out. We further submit the suggestion that even a large prosperous steel company should not long be allowed to absorb a loss on so important an investment as an underground mine. While their present costs are not different from the underground costs of the large steel companies, these independent operators present here only their own costs covering about 30 per cent of the total output. Using the cost sheets of all these mines for January, February and March, 1918, as a basis, we arrive at our present average cost f. o. b. Lake Erie ports of:

$5.51 on bessemer ore vs.
selling price of $5.71

$5.015 on nonbessemer ore vs.
selling price of $4.75

This indicates a profit as at today, of 20 cents per ton on about 5,000,000 tons annual production of bessemer ore, and a loss of 26½ cents per ton on about 15,000,000 tons of nonbessemer ore, or an average loss of 17½ per ton on about 20,000,000 tons.

How Costs Were Checked

The selling prices per ton here used are the present base prices less the standard penalties suffered on account of the chemical analysis of the ore, and they also include a number of term contracts, in which a fixed tonnage per year for 5 or 10 years was sold at a concession. These term contracts were all made before this war began, and their makers did not then contemplate that ore prices would be regulated save by the customary market conditions of supply and demand.

These figures are the result of the most painstaking work by able mining accountants and have been carefully scrutinized by experienced managers and operators. We invite their closest inspection by the expert accountants you have available for such work.

On June 25 a flat railroad rate increase of 33½ cents per gross ton goes into effect, as shown. Although the previous rates, especially those in Minnesota, on about two-thirds of the entire Lake Superior output were admittedly generous, we do not here raise any question as to the propriety of this increase, except that you will please note that it will still further increase our cost by 33½ cents.

What Open Pits Could Do

If tonnage were the only factor, careful study shows there could be mined from Mesabi open pits (largely the properties of the large steel companies) 10,000,000 tons more annually than they now produce, and do it for possibly three years. This notion would be important if we could now set a date for the ending of the war. But the railroads now handling the Mesabi range are already overtaxed, one of them especially. So such a theory is largely disposed of without bringing in the fact that the none too large lake fleet would thereby face a new problem in longer hauls.

Without dwelling on the broad rights of prosperous underground mining cities and towns like Ishpeming, Negaunee, Crystal Falls, Iron River, Ironwood, Hurley, Ely, Eveleth, Buhl, Chisholm and others, and the large interests of the states of Michigan and Minnesota involved therewith, we will turn to the metallurgical and economic reason why these underground mines should be given back their financial health.

In the first place, this 48 per cent of underground ore is much more important than at first appears. It is superior in chemical and physical qualities to the open pit ores and it is the basis of all blast furnace practice. A serious curtailment in underground production means radical changes in furnace operation, now especially troublesome, due to poor coke. For these reasons we state our belief that this 48 per cent is potentially much more than 48 per cent in metallurgical importance and therefore it is absolutely

(*Concluded on page* 1602)

How Ore Advance Affects Industry

Increase in Price of Principal Raw Material Exerts Influence on Pig Iron and Steelmaking Costs—Independents Will Turn Over All of Increase to Railroads

IN the closing months of its first year of governmental price control, the iron and steel industry faces a new factor. Independent iron ore producers, entering the arena for the first time as an active participant, carried away the only price advance permitted by the government for the third quarter. This advance, while a victory for the ore producers, is mainly a compromise. Further investigation of the iron ore cost fabric is promised for the next few months. Upon this investigation by the federal trade commission rests the future of iron ore prices and the whole delicate framework of fixed quotations for iron and steel and their products.

Realignment of costs and profits is now under way throughout the iron and steel industry. Beginning June 25 with the railroad freight increase and ending July 1 when the third-quarter price agreement becomes operative, this shift in profits and losses affects all of the closely interlaced components of the industry. The freight increase has a universal effect on all producers and consumers of iron and steel; the ore advance is a matter of bookkeeping to self-contained ore and pig iron producers, but is a direct gain or loss to ore and pig iron producers who operate independently of the furnaces or mines respectively; the change from a Pittsburgh-Chicago base to a Pittsburgh base only affects many producers and consumers of finished steel.

INCREASES in freight rates won the day for the independent iron ore producers. The official announcement of the war industries board draws specific attention to the increase being based on advance in rail freight rates. Any addition or subtraction in either rail or lake rates is to be matched by a corresponding change in ore quotations.

The advance of 45 cents per gross ton carries old range bessemer ore to $6.40 a ton; Mesabi bessemer to $6.15; old range nonbessemer to $5.65, and Mesabi nonbessemer to $5.50.

As an offset to this increase is the direct raise in freight rates on iron ore. This advance goes to railroads leading from mines to docks and producers must pay the new rates. The general increase is 33.6 cents per gross ton, but the application of the fractional rule brings a boost in the case of the Mesabi, Vermillion and Cuyuna ranges of 36.5 cents; of the Menominee and Gogebic ranges of 34 cents and of the Marquette of 36 cents. The new rates are $1 from Mesabi, Vermillion and Cuyuna mines to docks; Menominee and Gogebic mines to docks, 85 cents; Marquette mines (Ishpeming district) 70 cents; Marquette mines (other districts) 75 cents. Proportionately, the freight increase is less drastic, of course, on Minnesota than on old range producers.

The remainder of the 45-cent increase in ore prices given by one governmental agency will also be absorbed by the federal-controlled railroads, according the independent producers. The general 25 per cent increase affects all commodities used at the mines and will be passed on to the producers. These higher rates are figured out as adding 10 cents a ton to ore costs.

Independents feel that the increase in prices merely covers freight advances and takes no account of mounting costs of labor anl supplies. The 15 per cent increase paid labor since the preceding price conference added about 20 cents a ton to costs. Cost figures presented by the independent producers showed a loss, prior to the freight advance, of 28 cents a ton on 1918 nonbessemer business; a profit of 3 cents a ton on bessemer, or a net loss to all independent producers of 17.5 cents. It is known that independents sought an increase of 85 cents a ton but that the war industries board was unwilling to alter pig iron and steel prices and compromised on 45 cents as approximately the maximum advance possible without disturbance to other quotations.

Dock Ore at Old Price

Increased freight rates go entirely to railroads in the upper lake district. This means that ore on dock at lower lake ports, regardless of the date of reaching or leaving the dock, pays no increase provided it was shipped from the mines prior to June 25. Ore originating in Canada is to pay the higher rate to lower lake railroads, but since the Canadian Northern has already added the same increase to its rates, other Canadian railroads are expected to follow, and the advance to lower lake American railroads probably will be ordered discontinued.

Practically all of the ore at lower lake ports, which, of course, escapes the new freight advance, will not be sold at the higher price. This ore, while nominally owned by the producers, has been paid for by the consumers, who also pay the small storage charge. Title, according to a trade custom, remains with the producer until the ore leaves the dock. Formerly producers tried to pile up tonnage at lower lake docks where it could be disposed of during the winter season or in boom years. Assessment of storage charges and levying of taxes on such ore, has modified this custom so that the bulk of the ore on dock has been paid for by consumers. Some dock ore is unsold but generally this is lower grade. The blast furnace revival of the fall of 1915 cleaned up most of the unsold dock ore.

Adjustment of the new prices is one problem which remains unsettled. Ore is sold on the basis of 12 equal monthly payments beginning on May 25 each year and ending on April 25 of the following year. These payments have always been met irrespective of how deliveries were made. Some consumers have already received the bulk of their 1918 contract ore, while others have taken little or none. Both classes of consumers have been making the regular monthly payments. An effort will be made within the next few days to meet this condition by adopting an equitable policy. Consumers who already have their ore may benefit by making payment at the old prices, while consumers with ore still to be received may be forced to meet the raise.

From June 25 to July 1, ore producers are shipping ore at the old price and paying the increased freight. This will be a direct test of the degree of loss which would have been met under the old quotations and will

be disclosed by the investigation of the federal trade commission.

Independents operating underground mines and whose sole source of revenue is their mining properties are stated in their brief as handling 20,000,000 tons or one-third of the season's movement. At this figure, the 45-cent boost adds $9,000,000 to the consumers' ore bill. The remaining two-thirds, and probably some of the estimated 20,000,000 tons, goes, however, to consumers interested directly or indirectly in the ore properties. In these cases, the increase means merely a readjustment of profits between the mining and the pig iron or steel-producing organizations. To blast furnaces without ore affiliations the boost means an additional cost of 85 to 90 cents per ton of pig iron.

What Took Place at Washington

Official Announcement of Third Quarter Agreement

THE war industries board authorizes the following announcement: "The President has approved the agreement made by the price-fixing committee of the war industries board with the representatives of the iron ore, pig iron and steel interests, that the maximum prices now prevailing on iron ore, pig iron and iron and steel products be continued in effect for the three months ending Sept. 30, 1918, with the following exceptions:

"1.—Lake Superior iron ore: Base prices of Lake Superior iron ore delivered to lower lake ports are increased 45 cents per gross ton on and after July 1, 1918, subject to the following condition: These increased prices are based on the advances in rail freight rates effected June 25, 1918, and on the present lake rates, and in the event of any increase or decrease in either rail or lake rates said prices shall be increased or decreased accordingly on all deliveries made during the continuance of such increased or decreased freight rates.

"2.—On and after July 1, 1918, the basing point for steel bars, shapes and plates will be Pittsburgh, Pa.

"No new contracts calling for delivery of any of the above commodities or articles on or after Oct. 1, 1918, are to specify a price unless coupled with a clause making the price subject to revision by any authorized United States government agency, so that all deliveries after that date shall not exceed the maximum price then in force, although ordered or contracted for in the meantime. It is expected that all manufacturers and producers will observe the maximum prices now fixed."

WASHINGTON, June 25.—Because the steel requirements of fabricators in the Chicago district and of shipbuilders on the Pacific coast are rapidly outstripping the capacity of mills selling on a Chicago basis, and because heavily increased cost of mining iron ore in the Lake Superior region might mean a falling off in ore production, the war industries board has made, and the President has approved, two important changes in the list of maximum prices on coke, ore, pig iron and steel products. Aside from these vital modifications, the present prices are to be continued for the quarter beginning July 1.

These two changes, which were announced last Saturday following a meeting here Friday of the steel and steel products committee of the American Iron and Steel institute, pig iron producers and ore interests, with the price-fixing committee of the war industries board, are the elimination of Chicago as a basing point on plates, shapes and bars and the increasing by 45 cents of the base price per gross ton on Lake Superior ore, f.o.b. lower lake ports. While not the only factor, increased freight rates contributed largely to these revisions in the price list. The elimination of the Chicago base was reached with little difficulty compared to the troubles the ore men experienced in winning an advanced price.

What Was Wanted

Steel manufacturers came to Washington last Friday armed only with the request that Pittsburgh be made the sole basing point for plates, shapes and bars. The independent ore representatives were prepared to wage a hard battle for a higher quotation on their product while the pig iron producers, already feeling the pinch of the earlier cut of $1 per ton on all grades of iron except foundry, were anxious to prevent further additions to their costs. Neither the ore or pig iron producers would comment on the question, but it is known that the ore advance is less than had been asked for.

The ore producers, who were headed by John A. Savage, president of John A. Savage & Co., presented a brief before the price-fixing committee, which previously had been submitted to the iron and steel manufacturers, showing losses, based on the increased freight rates which became effective today, averaging 51.48 cents per ton for the five principal ranges. Upon that basis, the 45-cent advance in ore prices will reduce the loss to the operators on the Mesabi range to 25.6 cents, on the Gogebic to 52.6, on the Marquette to 5.6 and on the Menominee to 4 cents. Cuyuna producers will operate at a profit of 5.4 cents.

With Mr. Savage were W. G. Mather, of the Cleveland-Cliffs Iron Co.; C. B. Warren, of the Mace Mining Co.; T. D. Heed, of the Judson Mining Co., and G. A. St. Clair, of the Section 30 Mining Co. Other mining interests represented included M. A. Hanna & Co., through J. D. Ireland; the Newport Mining Co., C. N. Turner and M. Andrews; the Lake Superior Iron Ore association, W. L. Tinker; Pickands, Mather & Co., H. G. Dalton; and Rogers, Brown & Co., A. A. Fowler. Also in Washington in behalf of an ore increase were J. A. O. Preuss, state auditor of Minnesota; B. F. Burtless, secretary of the Michigan state tax commission; R. C. Allen, Michigan state geologist, and other officials of the states benefiting from ore leases .

For some time past, in fact, ever since Sept. 22, last year, when the Chicago base was established, there has been dissatisfaction with Chicago as a basing point, even on the part of both eastern and western manufacturers who earlier had believed there would be an advantage in the arrangement. Actual practice, however, has

demonstrated that the old recognized custom of basing sales on a Pittsburgh base was more satisfactory. The action last Friday was simply undoing what was done at the first price meeting, as far as the three products are concerned. The prices now are steel bars 2.9 cents, shapes 3 cents, and plates 3.25 cents, all considered f.o.b., Pittsburgh.

While dissatisfaction has long been felt, it really took the McAdoo 25 per cent freight rate advance to bring action on the elimination of the Chicago base, according to opinions here. The maintenance of a single base is believed to work to the advantage of both eastern and western mills. At any rate, the fact that plate and shapemakers in the Chicago district have been unable to meet the demands of the western shipyards and the middle western fabricators, and that this excess tonnage has been allotted through the east, showed the unfairness of forcing eastern makers to sell on a western basis.

Freight rates also played an important part in the ore advance. The McAdoo order of 30 cents per net ton increase in rates from mines to upper lake ports added 33.6 cents per gross ton to the costs of the mine operators who sell f.o.b lower lake docks. The industries board's agreement to an increase at all was with the understanding embodied in the announcement that in case of further increase or decrease in rail or lake rates, the ore prices will be modified accordingly. The increase of 45 cents a ton now means an advance of 90 cents per ton in the cost of making pig iron. This is additional to other increases in pig iron costs and to the reduction of the basic pig iron base price from $33 to $32 on April 1.

Who Was There

E. H. Gary, chairman of the steel committee, was chief spokesman for the steel men. With him were James A. Farrell, president, United States Steel Corp.; W. J. Filbert, treasurer, Steel corporation; E. A. S. Clarke, president, Lackawanna Steel Co.; A. F. Huston, president, Lukens Steel Co.; J. A. Campbell, president, Youngstown Sheet & Tube Co.; James A. Burden, president, Burden Iron Co.; Willis L. King, vice president, Jones & Laughlin Steel Co.; L. E. Block, vice president, Inland Steel Co.; A. C. Dinkey, president, Midvale Steel & Ordnance Co.; Eugene G. Grace, president, Bethlehem Steel Co.; H. G. Dalton, Pickands, Mather & Co.; James B. Bonner, vice chairman of the institute's subcommittee on distribution; A. A. Fowler, Rogers, Brown & Co.; F. J. Hall, vice president, Central Iron & Steel Co.; H. G. Moore, Keystone Steel & Wire Co.; Clarence H. Howard, Commonwealth Steel Co.; Thomas K. Glenn, Atlantic Steel Co.; C. D. Dyer, W. P. Snyder & Co.; E. W. Mudge, E. W. Mudge & Co.; H. L. Rownd, Republic Iron & Steel Co.; J. V. W. Reynders, American Tube & Stamping Co.; W. Vernon Phillips, chairman of the subcommittee on scrap; W. H. Smith, of the Tennessee Pig Iron association, and Roy A. Rainey and Scott Stewart, of the W. J. Rainey estate.

Robert S. Brookings, chairman of the price-fixing committee, was spokesman of the government group which was composed of J. Leonard Replogle, steel director; Paul Mackall, assistant to Mr. Replogle; J. C. McLauchlan, chief of the pig iron section; George N. Armsby, of the tin section; P. F. Taussig, of the federal tariff commission; W. B. Colver, of the federal trade commission; Lieut. Col. R. H. Montgomery and Capt. W. L. McCleary, of the war department; Commander John Hancock and Lieut. Commander S. R. Fuller, of the navy department; W. S. Blauvelt, coke director, and F. J. Herman, his assistant; Alexander Legge and Hugh Frayne, of the war industries board; Francis Walker and W. W. Wooster, steel cost accountants of the federal trade commission, and others.

Furnaces Escape Ore Freight Increase

PIG IRON producers under the application of the 25 per cent general freight advance, effective June 25, will be spared any increase in costs arising from the higher rate on iron ore. It has been decreed by the railroad administration that the entire advance of 30 cents per net ton or 33.6 cents per gross ton shall be paid in the case of Lake Superior ore to the steam roads operating between the mines and the head of the lakes. This advance, covering ore from the Mesabi, Cuyuna and Vermillion ranges, actually will amount to 36.5 cents, since instead of the present 63.5-cent rate, a flat basis of $1 per ton has been established under the general rule that all rates shall be in the nearest multiple of 10. The rates from the Gogebic, Menominee and Marquette ranges are raised from 51 to 85 cents.

Since lake ore is sold by the producer on the basis of delivered lower lake ports, the latter will be obliged to stand the entire increased rail freight charges. The advance of 45 cents per ton in the price of ore, effective July 1, just allowed by the war industries board, apparently was designed mainly to cover the new increase to the costs of the ore producers growing out of the freight advance.

Furnaces Pay on Canadian Ore

The only exception to the situation where the furnaces will not be obliged to stand the freight increase on iron ore will be in the case of ore coming in from Canada. The railroad administration has ruled that the 33.6-cent advance per gross ton shall apply on the rail haul from the lake port to destination. In other words, it will be confined to the railroads in this country.

Ore on dock or in transit on June 25 will continue to go forward at the old rate of freight. The new rate on ore will apply only to shipments originating at the mines on June 25 or later.

In figuring the 25 per cent advance on rates per ton including pig iron, the odd cents are dropped and the full rate is put in multiples of 10. Where the amount is less than 5 cents, it takes the lower multiple, such as $1.10 per ton, where the rate would figure $1.13. Where the amount is 5 cents or more, the higher multiple is taken, as for instance the figure of $1.18 would take the $1.20 per ton rate. In rates per 100 pounds, including finished iron and steel, fractions of less than ¼-cent are omitted; fractions of ¼-cent and less than ¾-cent take a ½-cent rate; fractions of ¾-cent or greater increase to the next whole figure.

Comparisons of the new and old rates on pig iron from various producing districts to leading destinations are as follows:

FREIGHT RATES, PIG IRON

	New rate	Old rate
Mahoning and Shenango valleys to:		
Cleveland	$1.40	$1.10
Newark, N. J.	4.40	3.50
Boston	4.60	3.70
Philadelphia	4.10	3.30
Pittsburgh	1.40	1.10
St. Louis	4.60	3.70
Minneapolis, St. Paul	5.70	4.54
Buffalo to:		
Albany, N. Y.	$1.75	$1.40

New England (rail)	3.90	3.10
New York and Brooklyn (rail)	3.90	3.10
Virginia furnaces to:		
Philadelphia	$4.10	$3.27
New England	4.70	3.77
Brooklyn, Jersey City, Newark	4.40	3.52
Birmingham, Ala., to:		
Boston	$7.50	$6.00
Cincinnati	3.60	2.90
Chicago	5.00	4.00
Cleveland	5.00	4.00
Louisville, Ky.	3.30	2.65
Minneapolis, St. Paul	7.30	5.85
New York (r. and w.)	7.50	6.00
Philadelphia (r. and w.)	6.60	5.25
Pittsburgh	6.10	4.90
Savannah, Ga.	3.40	2.75
St. Louis	4.25	3.40
Chicago to:		
Des Moines	$3.50	$2.80
Minneapolis, St. Paul	2.50	2.00
Milwaukee	.60	.50
Moline, Ill.	1.40	1.15
Omaha	4.50	3.58
St. Louis	1.90	1.58
Ironton and Jackson, O., to:		
Chicago	$3.75	$3.00
Cincinnati	1.75	1.40
Cleveland	2.40	1.90
Detroit	2.60	2.10
Indianapolis	2.30	1.80
Minneapolis, St. Paul	5.70	4.54
Duluth, Minn., to:		
Minneapolis, St. Paul	$1.60	$1.25
Mayville, Wis., to:		
Minneapolis, St. Paul	$2.20	$1.75

Comparisons of the new and old rates on finished steel per 100 pounds from Pittsburgh to various destinations are as follows:

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 pounds, to:

	New rate	Old rate
New York	24.5c	19.5c
Philadelphia	23.0c	18.5c
Boston	27.0c	21.5c
Buffalo	21.5c	17.0c
Baltimore	22.5c	18.0c
Cleveland	17.0c	13.5c
Cincinnati	23.0c	18.5c
Chicago	27.0c	21.5c
Detroit	23.0c	18.5c
Minneapolis and St. Paul	49.5c	39.5c
Denver	$1.09	82.5c
St. Louis	33.5c	27.0c
New Orleans	38.5c	30.7c
Birmingham	56.5c	45.0c
Pacific coast (all rail)	$1.25	$1.00
Pacific coast (tin plate)	1.25	1.00

Coke rate increases range from 15 to 75 cents per net ton. Where the old rates were 45 cents per ton or less, the increase is 15 cents; where the old rates were 50 to 99 cents, the increase is 25 cents; where the old rates were $1 to $1.99, the increase is 40 cents; where the old rates were from $2 to $2.99, the increase is 60 cents. On all former rates of $3 and over, the increase is 75 cents.

Switching charges generally are affected by the higher tariffs. Where the former switching charge was 15 cents, it is now 20 cents; where it was 20 cents, it is now 30 cents; and where it was 30 cents, it is now 40 cents. This applies to all kinds of freight except coke, coal and iron ore.

Independent Ore Producers' Case

(*Concluded from page* 1598)

essential to the iron and steel industry.

The production by steam shovel is now at its crest. Since the Mesabi range got to its feet 20 years ago, it has naturally produced its cheapest ores in quantity much faster than a proper conservation board would have permitted. Further, this period has seen the rapid growth of steel and iron companies with their financial problems, and these have naturally dipped into their open pits quite heavily, so today the underground operators face the necessity of keeping abreast with the growing consumption of ore. This will require labor, i. e., underground miners. These have come from Finland, Austria, Servia, Italy—not very hopeful future sources. So steps should now be taken to conserve what we have by giving us income sufficient to compete for and to retain the skilled labor we now have. Moreover, these independent concerns should be kept healthy for it is out of their intermittent prosperity that they get the funds they expend in exploration and development. It should be clearly understood that it is these people, many of them residents of the mining districts, who almost monopolize the pioneering work, the most hazardous feature of our industry, in which big losses occur with certain regularity. They find the ore bodies and even entire new districts. The tonnage of known ore is not large if you view the consumption and concede it the same rate of increase shown in the last 10 years. Surely a sane constructive program for the iron and steel industry from the very point of view that is so essentially and vitally your own, will involve the granting of this relief.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	§Aluminum	Spot antimony
June 19	23.50	.....	7.82½	7.75	33.00	13.12½
June 20	23.50	.....	7.82½	8.00	33.00	13.12½
June 21	23.50	.....	7.82½	8.12½	33.00	13.12½
June 24	23.50	.....	7.82½	8.25	33.00	13.12½
June 25	23.50	.....	7.82½	8.25	33.00	13.12½

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 24.67½c.

†No spot Straits tin offering.

‡Outside market, prompt shipment.

§Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 33.10c; one to 15 tons, 33.20c.

New York, June 25.—The lead producers met last week and came to an understanding regarding lead prices which has created something of a precedent in the present price fixing period. They agreed to a fixed quotation of 7.82½c, New York, and 7.75c, St. Louis, which later was raised to 7.90c, New York. Also they agreed not to sell to speculators. This agreement was similar to those entered into by other industries at Washington, but differed in that it was voluntary and that it was not held in conjunction with the war industries board. This action was taken because supplies temporarily are short, owing to larger government requirements and to a desire on the part of consumers to get material stocked before winter. By the fixing of a maximum price producers will have nothing to gain by holding on to stocks at smelters as they might in an uncontrolled market. With the agreement not to sell to speculators, the so-called "outside" lead market is abolished.

The government last Friday closed for a large tonnage of grade C spelter, for the army and navy. Details of prices and awards have not yet been announced. The spelter situation is much more cheerful, with inquiry fair and producers not pressing sales. The market has advanced from around 7.25c to about 8.25c a pound for prompt shipment within about a week.

The tin situation shows little change. No spot Straits is offered on the market, consumers covering their requirements through purchases of future shipments. There is little spot tin of any kind in the east, but some Banca tin and No. 1 Chinese tin on Pacific coast are offered at about 90c to 91c. There is a scarcity of Chinese tin in the Far East and prices of this metal are as high or higher than on Banca, which is a higher grade. July shipment Banca is offered at 88c, while Chinese for the same position is offered at 88c to 89c.

There is no change in the copper situation. Producers will meet with the war industries board Aug. 7 to discuss prices. It is expected some advance will be made at the termination of the present agreement Aug. 15, over the present quotations of 23.50c for carloads and 24.67½c for less than carloads.

The antimony market is somewhat firmer. Much metal has been taken out of the market in recent weeks, Canada being a larger factor than for some time previously, owing to a renewal of lettings of shrapnel contracts in the Dominion. Importers are asking 11.87½c, in bond, for Chinese and Japanese brands for early shipment, with buyers subject to increase in freight rate, while spot metal is offered at 13.12½c to 13.25c, duty paid ex-warehouse, New York.

New Plate Mill Now Rolling Steel

Unit Entirely Electrically Driven—All Power Lines Embedded in Concrete Floor —Chain-Type Conveyors and New Style of Turnover Mechanism Employed—Heavy Tonnage Expected

PATRIOTISM nowdays compels sacrifice. The spirit with which the sacrifice is made is the true measure of patriotic worth. The Youngstown Sheet & Tube Co. did not need a new plate mill, but Uncle Sam did. Patriotism of the highest order dictated the policy which caused this company to construct an 84-inch tandem plate mill even under present high prices. The mill was placed in operation June 17, 1918. It is designed to finish a sheared plate 74 inches wide in lengths up to 50 feet.

The distinctive features of the mill are the absence of hydraulic and steam machinery, the elimination of all exposed wiring, the grouping of controlling apparatus at a minimum number of points and the double line of cooling tables. The buildings are of steel construction and were furnished and erected by the Blaw-Knox Co., Pittsburgh, much study being spent on the lighting and ventilation. The total floor space occupied by the plate mill buildings is approximately 210,000 square feet.

All of the buildings except the slab yard are built with the Pond-type inverted monitor roof and equipped with Lupton top hung sash which operates in the monitor, and with united steel sash, furnished by the Trussed Concrete Steel Co., Youngstown, O., for the side walls. The side wall sash consists of two runs of continuous sliding sash, each 5 feet high around all buildings except the motor room, which building, having brick walls is provided with ample pivoted ventilating sash.

Capacity of Mill

The mill is designed to roll plates from slabs and will produce approximately 15,000 tons of plates per month. It is housed in a 80 x 300-foot building and is served by a 40-ton crane equipped with a 15-ton auxiliary hoist. This crane was furnished by the Cleveland Crane & Engineering Co., Cleveland.

Parallel to the mill building is the slab-storage building. The latter is 80 feet wide and 340 feet long. The required sizes of slabs are loaded into railroad cars at the company's blooming mills and transferred to the slab-storage building. Here they are unloaded by magnets and assorted into piles, two 10-ton, single-hook, magnet-drum cranes being used for this purpose. The cranes were furnished by the V. R. Browning Co., Cleveland. Narrow-gage tracks are installed in this department and are used in connection with trucks for transporting the slabs.

The latter previous to being sent through the mill are heated. Four gravity discharge continuous heating furnaces are provided, each being 12 feet wide and 45 feet long overall. The furnaces were built by the Alexander Laughlin Co., Pittsburgh, and are fired with coke-oven gas which is piped from the coke-oven plant a short distance away. The slabs are placed on a feed table in front of the charging doors. By means of an electrically-driven pusher which was built by the United Engineering & Foundry Co., Pittsburgh, the slabs are pushed into the furnace.

Enough slabs are kept inside the heating furnaces so that when the roughing-mill whistle blows for slabs, both the charging and discharging doors of the heating furnace are raised and a cold slab pushed inside. This slab pushes against the one in front and so on until the slab at the further end is pushed onto the water-cooled skid plates which guide it onto a motor-driven table below. The furnace and slab table is shown in Fig. 5. The latter was built by the Morgan Engineering Co., Worcester, Mass., and delivers the heated slabs to the roughing mill approach tables. In order to eliminate steel and wooden platforms such as are usually built around heating furnaces, the floor is supported at a convenient height by means of concrete retaining walls and paved with brick.

The roughing and finishing stands are duplicates except for a difference of 1 foot in the length of the rolls. They are of the 3-high type and together



FIG. 1—APPROACH TABLES OF 3-HIGH FINISHING MILL. OPERATOR'S PULPIT TO THE RIGHT AND PINION HOUSING TO THE LEFT OF THE FINISHING STAND



FIG. 2—APPROACH TABLES WHICH DELIVERS SLAB TO ROUGHING MILL. TOP ROLL IS BALANCED BY A HYDRAULIC CONSTANT-PRESSURE CYLINDER

with the tilting tables and pinions, were built by the Mesta Machine Co., Pittsburgh, Pa. The top and bottom rolls are 32 inches diameter and the middle roll 22 inches diameter. The top roll is balanced hydraulically by means of a constant-pressure cylinder. The vertical position of the middle roll is changed by means of electrically-driven screw downs.

Each mill is driven by a 6600-volt, 2000-horsepower, 25-cycle, 3-phase, induction motor which was built by the Allis Chalmers Mfg. Co., Milwaukee, and operates at 81 revolutions per minute. The electric power for operating the mill is supplied by the main power plant and delivered by underground high-tension wires to the No. 7 substation near the plate mill. This substation is equipped with three 6600 to 240-volt generator sets which were built by the General Electric Co., Schenectady, N. Y. These generators provide direct current for operating the auxiliary plate-mill machinery.

Mill Drive

Both of the 2000-horsepower main mill motors are driven directly from the 6600-volt system. The motors and controlling apparatus are housed in a building 80 x 160 feet which is parallel to the mill building. The building is served



FIG. 3—BY MEANS OF THESE TURNOVERS A PLATE MAY BE LIFTED TO A POSITION CONVENIENT FOR INSPECTION OF UNDERSIDE OR IT MAY BE TURNED OVER COMPLETELY

by a 20-ton single-hook crane and a standard-gage railroad track. The motors are connected by spindles to the middle pinion in the pinion housing. The speed reduction in the pinion housing is as 14 to 20, therefore the speed of the mill rolls is 56 revolutions per minute. The mills are of massive construction and of the very latest design in plate mill practice.

Four Stations Furnish Power

All control apparatus for these large motors is contained in the motor room. This control apparatus was furnished by Cutler-Hammer Mfg. Co., Milwaukee, and the entire electric system in the motor room is of bus bar construction. The power for the direct-current motors used on the mill machinery is delivered from the substation to four centralized stations in which all of the control apparatus for the entire mill is grouped. These four main leads comprise all of the exposed-power wiring in the plant, as all of the wiring from the control houses to the machinery and to the pulpit is carried in underground conduit imbedded in the concrete. This system eliminates all unsightly wiring and is vastly superior to any other from a safety viewpoint. Control apparatus was designed and furnished by the Electric Control & Mfg. Co., Cleveland.



FIG. 5—GRAVITY-DISCHARGE, CONTINUOUS-HEATING FURNACE AND MOTOR DRIVEN SLAB TABLE. EACH FURNACE EQUIPPED WITH SLAB PUSHER



FIG. 4—CHAIN CONVEYOR WHICH DELIVERS PLATE ONTO SHEAR APPROACH TABLE. DOUBLE-ROTARY, SIDE-TRIMMING SHEARS ARE LOCATED IN FRONT OF END CUT SHEAR

The roll stands are located tandem 88 feet 4 inches apart and the intervening space is occupied by an intermediate table which also acts as a receiving end for a chain transfer for moving the plates for the second line of tables which run parallel to the mill tables and at a distance of 28 feet 6 inches apart. These tables were also built by Mesta Machine Co., Pittsburgh.

Unequal Cooling is Prevented

The plates are straightened on machines which were built by Hilles & Jones, Wilmington, Del. Two machines are provided, one on each line of the tables. The straightener tables were furnished by the Treadwell Engineering Co. and are equipped with collared rollers which permits of an air space under the plates to prevent unequal cooling.

The chain conveyors were built by Heyl & Patterson Co., Pittsburgh, and are located in front of and beyond the plate turnovers, the conveyors in front of the turnovers being used as cooling tables and those beyond as marking tables. These conveyors are of the roller-chain type, of four strands each. The two transfers in the conveyor building are of the chain-pullover type, each pullover being equipped with two dogs, and were furnished by the Treadwell Engineering Co. The first transfer is located 105 feet 5 inches from the center of the 84-inch mill and the second one 448 feet 5 inches from the same point.

The conveyor building is 80 feet wide and 520 feet long and is in line with the mill and furnace building. It houses the conveying machinery, straighteners, turnovers, rotary shear, and end-cut shear and is equipped with a 10-ton single hook crane.

The two plate turnovers are unique in many respects, being designed to eliminate the inherent defects in the ordinary type. These machines are of a type patented by Mr. William Forsstrom, chief engineer of the Youngstown Sheet & Tube Co., and were built by the Treadwell Engineering Co., Easton, Pa.

With these machines any width of plate may be turned over and will retain its relative position on the tables, thereby eliminating the pullovers which are necessary with the ordinary type. A plate may also be lifted to a position convenient for examining the under side and then returned to the table without being turned over. They are much faster than the ordinary type, due to the fact that they make one complete turning operation with the forward stroke and one also with the return.

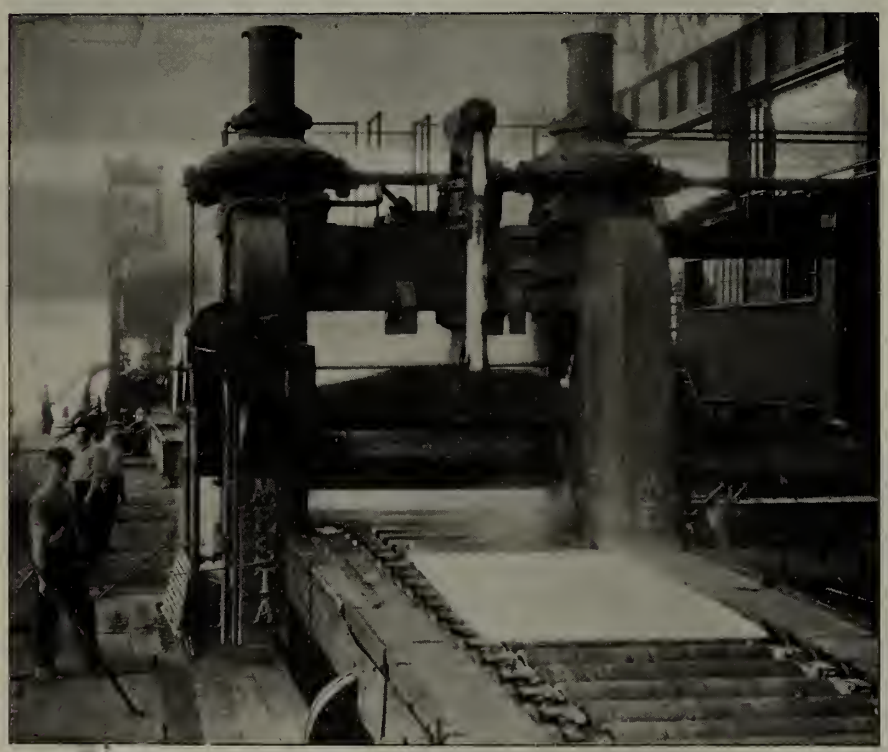


FIG. 6—DELIVERY SIDE OF 3-HIGH ROUGHING MILL WHICH IS EQUIPPED WITH ELECTRICALLY-DRIVEN SCREW DOWNS

Method of Operation

The plate is turned by a series of forks or cradles which are located between the rollers of the turnover tables. The bottom of the fork is carried in a moving pivot which travels in a parallel line across the table, the upper end of the forks are connected by flexible links to stationary posts on either side of the table, one to each side. The turning action is accomplished by moving the pivot which carries the bottom of the fork in a direct line across the table, the travel of the upper ends of the forks being restricted by the links, the fork will turn itself over in its own length, thereby turning the plate which is held therein. This mechanism is moved by rack beams actuated by pinions mounted on a common driving shaft which in turn are driven by a 40-horsepower electric motor.

There has been provided ample facilities for handling the finished product in the shear and shipping end. All parallel plates up to and including 1 inch thickness will be side trimmed on a Newbold double rotary trimming shear which is located 480 feet from the 84-inch mill and 60 feet in front of the end-cut shear. The table in front of the end-cut shear is provided with a straight edge to facilitate the squaring of all plates which have been side trimmed. The end-cut shear was built by the Hilles & Jones Co. and is 112 inches between housings.

It is provided with a back-shear table which was built by the Mesta Machine Co. and which is a combined shear runout and scale table. A 40-foot double-beam Fairbanks scale is located under this table, with lifting arms which can be raised at will to lift the plates from the table and weigh them. The plates may then be discharged by these same arms onto a plate rack which is located beside the table, or it may be pulled off onto the castor floor.

Circle Cutting Machine is Provided

All sketch plates and plates over ¾ inch thickness will be trimmed on two 146-inch gate shears which are located one on either side of the castor floor. A circle cutting machine built by the R. S. Newbold & Son Co., Norristown, Pa., is provided to cut circle and radius plates.

The warehouse is equipped with ample castor floor and two additional plate scales. It is also provided with three depressed shipping tracks, and all plates are handled by high-speed 10-ton cranes provided with equalizer bars on which magnets or hooks may be used. The warehouse is 93 feet wide and 320 feet long and is placed at the end of, and at right angles to the conveyor building. It houses the trimming shears, circle shear, castor floor, and shipping tracks and is equipped with two 10-ton cranes with magnet drum.

A well-equipped mill office and millwrights and electricians shops have been built adjacent to the mill buildings, and all sanitary equipment, wash rooms and locker rooms are of ample size, well equipped and conveniently located. All engineering work on this installation was planned and executed by the engineering department of the Youngstown Sheet & Tube Co.

Small Industry Democracy's Hope

Ideals for Which World is Fighting to be Fulfilled in Organizations Where Human Factor Dominates—Will They Develop Efficiency Equal to Autocratic Management?—Question Raised at Mechanical Engineers' Meeting

BY PROFESSOR GEORGE H. HAYNES

When Our Armies Return—Democracy Uber Alles!

I BELIEVE that it is an accurate forecast that in the future the historian will find the chief significance of this world war not in the dynastic and territorial changes which at present seem to us to be of such prodigious moment but rather in the world-wide social and economic upheaval and revolution for which the war is now preparing the way and of which Russia affords a portentious warning. The coming of peace will bring a period of tremendous readjustment. Back from the front will come scores of thousands of young officers and millions of young soldiers with an utterly changed outlook upon life. Men who before the war had been plodding wage-earners, with no suspicion that life had anything else in store for them, have had a great illumination. They have taken part in the greatest enterprise in the history of the human race. They have learned team-play and the immense effectiveness of disciplined co-operation. They have found within themselves unsuspected power to dare and to do and to lead. Let no one fancy that the return to the ranks of industry of these hosts of young crusaders, who have gone through hell to make the world a decent place to live in, will not add a tremendous ferment to the social and economic unrest. They are going to demand that democracy in government find its counterpart in democracy in industry, that life yield them something more than the day's wage, that it give them something of the zest of adventure, of opportunity for advancement, of chance for independent leadership. Where shall these ambitions and restless energies find an outlet?

"THE world must be made safe for democracy." "That thrilling phrase," as the French premier called it, has gripped the imagination and nerved the will of the allies as has no other watchword of the war. The proof is found in the anxious zeal with which the men who control the destinies of the most diverse peoples have tried to make their professed aims and their actions meet the acid test presented by that phrase.

Self-determination was the cardinal feature of the Bolsheviki program, even though it involved recognition of Finland and the Ukraine. Government by consent of the governed was the principle which the German chancellor felt he must cite when he announced that the kaiser would graciously take into consideration the request of Courland and Esthonia for union with the Prussian crown. At present the terriffic strain in Flanders and Picardy is giving the British war cabinet hardly more anxiety than the necessity of proving that within the empire the long standing inconsistency is to be removed and that at last the people of Ireland are to be ruled by a government of their own choosing, if they have but the will to make a choice.

The purpose of this paper is to raise a question as to some of the industrial implications of democracy, democracy in government which is set up before us as the goal worth all this outpouring of blood and treasure, this world anguish.

A generation ago Gen. Francis A. Walker, then the dominating figure among American economists, declared:

> For one, though believing thoroughly so far as politics are concerned, in a government of the people, by the people, for the people, I see nothing which indicates that within any near future industry is to become less despotic than it now is. The power of the master in production, "the captain of industry", has steadily increased throughout the present century.

New Era in Industry

Though describing industry as having become "despotic", in his "Political Economy", which for a decade became the standard text for American college students, General Walker did not think it essential to give a single paragraph to the corporation as a form of business organization, nor a page to the modern monopoly problem, and he made no mention of such a thing as a "trust".

In the 30 years that have since passed, concentration and consolidation have gone forward at an unprecedented rate. The new era in industry may be admirably illustrated by examples found in the city of Worcester, Mass. Thus, the enterprise started by Ichabod Washburn becomes the Washburn & Moen Co. It next is absorbed by the American Steel & Wire Co., with many plants in Worcester and elsewhere. And presently that company becomes one of the many concerns, aggregating nearly 150 plants, consolidated into the United States Steel Corp., with an authorized capital stock of $1,100,000,000 and $304,000,000 in bonds. The net earnings of this greatest of American industrial corporations were $295,000,000 for the past calendar year, and it carries on its payroll some 200,000 employes.

There are those who see nothing of challenging inconsistency presented by the development of such an *imperium in imperio,* of such an autocratically controlled industrial army, the largest among many in America, the leader of the world toward democracy in government. They see no incongruity in the fact that we compel the children of this host of workers to attend our public schools and that we urge the newcomers to become American citizens. At any rate, we are going to urge them to do so from now on! And we thrust the ballot

From paper read at meeting of American Society of Mechanical Engineers, Worcester, Mass., June 5. The author, George H. Haynes, is professor of economics, Worcester Polytechnic institute, Worcester, Mass.

into their hands so that in our accepted democratic theory the vote of the new naturalized Syrian or Polander or Croatian counts for as much as does the vote of Judge Gary in determining who shall be the chief executive of Gary, Ind., the chief executive of Pennsylvania, or the chief executive of the United States. Yet that workman's vote or voice is not to be counted at all in determining matters as intimately concerning his own life as the conditions of his daily work or the amount of his daily wage. These matters are determined for him by the management constituted by the control of 51 per cent of the stock of the New Jersey corporation. Stock ownership by the workmen is encouraged by the United States Steel Corp., as by many another farsighted and progressive concern, yet it is safe to say that in not one large corporation in 100 does the stock vote of the workman amount to enough to qualify at all the essentially autocratic management of the enterprise.

Autocracy Tempered by Fear

Nor is the situation greatly bettered, so far as consistency with political democracy is concerned, if the workmen be organized so that collectively they may drive a hard bargain to enforce their own demands. It used to be said that Russia was governed by a despotism tempered by fear of assassination. In democratic America today there is many a great industry which is controlled by an autocracy tempered by fear of revolution among its workmen in the form of a strike or sabotage. To be sure, there are those still with us who pull a long face and, in George F. Baer's pious phrase of years ago, tell us that "God in His infinite wisdom has committed to the presidents and boards of directors the control of the workers' interests".

Since parliament passed the Act of Settlement more than 200 years ago, no king of England has ventured to prate of the divine rights of kings. That tone and that phrase are left to the German kaiser. It is coming to be recognized that a stock vote of 51 per cent may hardly afford warrant for claiming title to industrial kingship as of divine right.

And yet how many of us have reached the point where we believe that democracy in industry is coming and ought to come? A striking forecast has recently come from the man who was the first president of the United States Steel Corp., who later became the head of the company operating the largest armament plant in the world, yet who at present, his willing service commandeered by the government, is at the head of our Emergency Fleet corporation. Charles M. Schwab is reported as saying:

The time is near at hand when the men of the working class the man without property, will control the destinies of the world. The Bolsheviki sentiment must be taken into consideration and in the very near future we must look to the worker for a solution of the great economic questions now being considered. I am not one carelessly to turn over my belongings for the uplift of the nation, but I am one who has come to a belief that the worker will rule, and the sooner we realize this the better it will be for our country and the world at large.

Labor Problem Simplified

At present the "help" question is one of the most disheartening elements in the manufacturer's problem. It seems a valid charge that American organized labor has no vision of industry as anything else than a war or at best, an armed neutrality the terms of which at almost any time are likely to become "a scrap of paper". Organized labor is content to let the employer bear all the risks of the enterprise and make from it what profits he can when reluctant labor, its interest confined to getting shorter hours and higher wages, has exacted its toll. The I. W. W., on the other hand, have a vision or, as it seems to most of us, a nightmare. Thoroughly and bitterly class-conscious, they announce as the first step in their program the driving of the employer from his place. They are utterly vague in how his tasks are to be performed, how his weighty responsibilities are to be carried.

The great corporations of the present day are striving earnestly to solve this problem of the human element. But no scientific organization for "hiring and firing" and no wholesale welfare work can duplicate the results in efficiency and esprit de corps of the working team which can be achieved by the employer in the small industry who has some knowledge of and human interest in every man on his force and who watches his workman's progress and shifts his task with the same zest and tact that a football captain shows in building up his team."

The essence of democracy in its industrial implications is not to be found in equality of size or wealth or strength. Such equality is neither desirable nor possible. The motto of democracy in industry should be that of Carnot's army of the French revolution: "*Carriere ouverte aux talents.*"

We recognize that in a democracy the individual, however humble his station, has a right to life, liberty and the pursuit of happiness, a right to the protection of his health and safety and to educational opportunities which shall give him fair chance to develop according to his ability. And the war is teaching us more plainly than we ever saw it before that on the other side in a democracy the state has a right to expect from its citizens equality of sacrifice in the sense that sacrifice shall be gaged according to their several abilities to bear burdens.

In a democracy the industry has its rights entitled to careful safeguarding, and it has its duties and special services upon the rendering of which the very destiny of the state may depend.

Democracy is best held sane and secure against attack if the field of enterprise is kept open for men with capacity for leadership. At present in the United States there is little to be feared from the I. W. W. or Bolsheviki. But there is grave danger for the future if no heed is now paid to the causes which have produced these movements and if the field of enterprise shall seem closed to all but those of wealth or "pull".

In the field of industry as in the field of government and on the field of battle democracy is on trial. Every man looking forward anticipates that the industrial testing of democracy after this war will be more severe than ever before. In its relations to industry, democracy must develop efficiency equal to that of autocracy else it is doomed to defeat.

Efficiency Depends on Morale

Efficiency in industry as in war is not alone a matter of training or equipment or centralized control, it is a matter of the spirit or morale. Whatever conduces to better morale in industry may more than counterbalance some other highly valued elements of efficiency. In two respects the small industry distinctively and strongly does conduce to better morale in the enthusiasm which it evokes in the ambitious young employer who is managing an enterprise which is his own and in the teamplay which is worked out between employer and workman. Democracy must find methods not inconsistent with its own spirit to get the greatest industrial enterprises accomplished. Democracy does not imply that in the twentieth century the dial is to be turned back

and that giant industries are to be split into small units or that a limit is to be prescribed beyond which an industry must not expand.

Democracy does imply that industries great and small shall be given scope to develop their capabilities up to the point where their further expansion would hamper that of others or would prove injurious to the public interest. A generation of fumbling efforts to work out the state's proper relation to industrial control has brought into recognition some things which 40 years ago were strangely blurred. In the first place, we recognize far more clearly than when the Sherman antitrust law and the interstate commerce law were enacted that many industries are inherently monopolistic, and that any effort to force competition in them is doomed to failure and can result only in increased cost and lessened efficiency of service. In this broad field public interest is best to be subserved either by private operation under thorough regulation or by government ownership and operation. Right now under stress of war weighty experiments are being tried out which will throw much light on the monopoly problem. It is now recognized that in the so-called trust movement, where no element of genuine monopoly has been present, a large factor has been the desire to secure the economies of large production. This is a sound and constructive motive and democracy is concerned to have such economies attained to the extent that does not interfere with some higher or more essential purpose. It is obvious that certain enterprises must be conducted on a gigantic scale. A copper smelting plant, a sugar refinery, a powder plant, locomotive works, as such enterprises are now conducted, may well involve an initial investment running well into the millions. The scale most conducive to economical production is not to be predetermined by any rigid or general rule. It must be worked out in each industry and in each community according to the conditions which conduce to greatest efficiency. Each enterprise should have a fair chance for a start and for normal growth, according to the effectiveness which it develops.

Small Industry Needed

Democracy craves variety and individuality in industrial development. It needs the small industry not less than the large. The point which I wish to emphasize is not so much that in a democracy the individual enterprise needs the help and protection of the state as that the state needs the widely distributed initiative and enthusiasm of ambitious young enterprises. In the intellectual field a similar need is recognized.

Democracy needs to avail itself of the varied industrial talent and aptitudes of the many and not merely of the genius of the few. There is another and a more important concern here involved that that of getting a maximum output produced at minimum cost. It is the calling forth of widely diffused and varied industrial leadership. "The magic of private property turns sand into gold." It means much for the strength and stability of a democracy if the man with capacity for industrial leadership finds scope for developing his aptitudes as his own master in the enterprise of his own starting, and not as a foreman or as a member of the staff of some giant corporation. Right here lies a cardinal difference between industrial democracy as we would see it develop in the United States and the type of socialism which many fear. Is it not possible to keep open the door of opportunity and enable the young man to discover and develop his own aptitude without making him the servant of the state, subject to a repression no less galling because imposed at the behest of a majority?

Leadership "carries" better in the small industry. The proprietor's personality and enthusiasm can lay hold upon 25 or 50 men, whereas to a force of 500 he would be simply "the boss". *Esprit de corps and morale* are natural growths in the small shop. They are hard to develop and maintain where there is no human contact between the employer and the workman and where the workmen are not personally known to one another. In the small shop there can be brought home to the individual workman the direct interest which he has in maintaining both the quantity and the quality of the product. He can be brought to see clearly how his own work is discredited and his own wage lowered in consequence of the soldiering or waste of material by any member of the working force. It goes without saying that the mutual understanding between employer and employes in a small industry is a strong influence in lessening the frequency and the seriousness of labor controversies.

Distinct Advantages Offered

If it be granted that the small industry in many fields of production has distinct advantages and that the easy and natural progress from able and ambitious workmen to proprietor is accordant with the spirit of democracy and tends to safeguard it from developing industrial Bourbonism on the one hand or industrial Bolshevikism on the other, the question presents itself: What chance has the small industry in the democracy of today? Is it getting a better or a poorer chance than a generation ago? To what extent and in what ways should a democracy, in its own interest, seek to ensure that chance?

If, as I believe, it is essential to the safety and stability of democracy itself that its life be constantly renewed by the upgrowth of small industries, then what steps should a democracy take to remove obstacles to such progress and to ensure to the small industry a reasonable chance to work out its own salvation?

"Paternalism!" some one exclaims at the mere raising of that question. But to my mind "paternalism" conveys the idea of coddling a weakling. It seems misapplied when used with reference to government action for the assuring of equitable industrial conditions essential to the safety of democracy. Nevertheless, it must be acknowledged that that way danger lies. The history of the protective tariff affords enough illustrations of the possibility that government action ostensibly in the public interest may be so designed and carried into effect as in some instances to benefit the few at great cost to the many.

The obvious implication of democracy, though it has secured but tardy recognition, is that nature's sources of power should be made generally serviceable to the community as a whole, and should not be exploited primarily for the profit of the favored few. This idea underlies the recent movement by the government and by several of the states for the

Industry's Opportunity

IN the strain to which our institutions are sure to be subjected in the years that lie immediately before us the small industry may render service of incalculable importance to American democracy.

It offers scope for ambitious young men to rise from the ranks to positions of leadership. It keeps relations human between employer and workman. It gives the lie to the class-conscious radical's assertion that America is divided into two hostile camps, the bourgeois and the proletariat. When the allies shall have succeeded in making the world safe for democracy the small industry may have no small part in making democracy safe for the world.

survey of water-powers and for their conservation in the interest of all the people.

Some modification of co-operative banking, as worked out in Germany and Switzerland, may enable men of character and enterprise to borrow upon their pooled credit for the starting of promising industries.

The land problem has changed greatly in the past 50 years. Not only has the major part of the public domain which is of productive importance been distributed in private ownership, but most of the sites advantageous in any special degree for business development have long since been occupied. If the landlord's exactions prove a discouraging handicap to industry, the obvious remedy is the progressive taxation of land values.

In one respect the small industry has been at an unnecessarily great disadvantage. The day of hit-or-miss or rule-of-thumb methods is clearly past. Yet the small industry cannot conduct scientific investigations in elaborately equipped and expensively manned research laboratories of its own. Here is a field where government, federal or state, may provide co-operation along lines similar to those of the United States department of agriculture and of the state experiment stations. The bureau of standards is already doing something in the way of research work for private concerns.

Safety First Electrical Equipment

Safety measures, desirable in peace time, become imperative under war-time labor-shortage conditions. In steel mills, factories and mines fool-proof devices have an added value at this time owing to the presence of

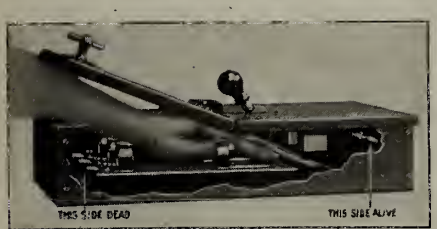


FIG. 1—SAFETY SWITCH WITH THE FUSE BOX OPENED

unskilled workmen in all industries. Two electrical units recently have been placed on the market designed to fulfill the conditions of safety.

The first, an automatically locked switch, is shown in Figs. 1 and 3. The switching parts and fuses are enclosed in a steel box, the cover of which is in two parts. The one part is screwed down and forms a permanent covering for the switch, while the other is hinged so that it may be swung back to renew fuses. The latching mechanism makes it impossible to open the cover without first throwing the switch to the off position. As long as the door of the fuse case is open the switch contacts cannot be closed. Padlocks may be used to provide against the removal of fuses, and to fix the switch in the off position. These switches are provided for 250, 500 and 600 volts for either alternating or direct current service, and in capacities up to 2000 amperes.

Fig. 2 shows the second of the electrical safety devices. This is a relay

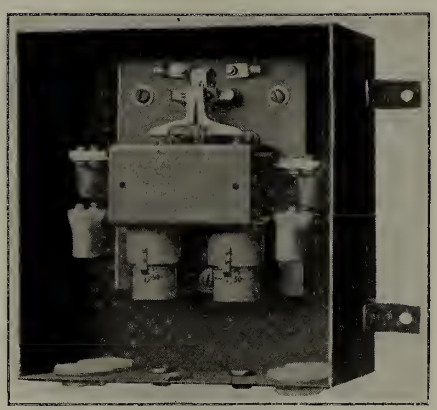


FIG. 2—SAFETY RELAY IS AUTOMATICALLY TRIPPED WHEN THE COVER IS REMOVED

designed to supply overload protection for alternating-current installations equipped with starters or switches having low-voltage protection. The relay is enclosed in a sheet steel case to prevent the admission of dust. The cover of this case is screwed down and a safety device trips the relay when the cover is removed, rendering all parts of the relay "dead". In this manner inspection and repairs may be made without danger to the workman.

The relay operates by means of magnet coils, which are inactive at loads less than that for which they are set. When the current reaches or exceeds this setting, the coils lift plungers which breat the control circuit and operate the low-voltage relay to open the line circuit. With no current flowing in the line, the coils are de-energized and the relay is reset automatically. This is effected by the compression spring pressing the bridge against the contacts. The plungers operate in dash-pots, providing a time element which allows the relay to carry an overload of short duration. This time limit is adjustable through a small perforated disc, accessible by unscrewing the dash-pot which holds it. Uncovering more perforations lessens the time of overload. Adjustment may be provided for a wide range of current values by raising or lowering the dash-pot. This adjustment is calibrated and an indicator shows the tripping value. The relay is mounted on a base which insulates it from the case. Wall fastenings are provided. These two devices for making electricity safe for the workman, are manufactured by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Arm Protector

In handling sheets, plates and similar material care must be exercised continually to avoid dangerous cuts on the wrists caused by contact with the sharp edges. The hickory Steel-Grip Glove Co., Chicago, has developed an arm protector to prevent such accidents. The protector is made of leather of extra thickness which is interwoven with flexible steel ribbon. The protectors strap loosely around the workman's wrists and, it is said, ample protection is afforded without hindering quick movements of the arms.

Rocking Brass Furnace

H. W. Gillett and E. A. Rhodes of the bureau of mines, Washington, D. C., have written an exhaustive paper describing the practical application of a rocking type electric furnace to brass melting. The authors point out that with the huge tonnage of brass required for war purposes, the use of small units, averaging 200 pounds per charge, is an anachronism. The furnace described by the authors is designed to melt brass in fairly large quantities and to handle successive heats of alloys differing widely in composition including both alloys free from zinc and those high in zinc. To obtain good results under these

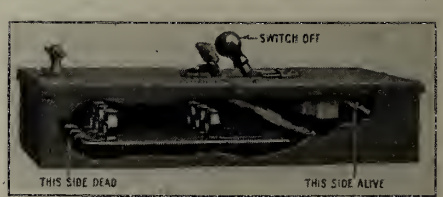


FIG. 3 — SWITCH LEVER AND FUSE BOX MAY BE LOCKED INDEPENDENTLY

conditions it is necessary to stir the melt so vigorously that the temperature is practically uniform and superheating of the surface prevented. The most practical way to stir the melt, the authors state, is by the principle of the cement mixer, that is by turning the furnace bodily so as to stir the contents thoroughly while being heated.

How Properly to Utilize Man Power

Intensive Study of the Human Factor by Industrial Engineers Absolutely Essential if National Efficiency During and After the War is to be Maintained and the Labor Problem Solved

BY J. PARKE CHANNING

WE ARE accustomed to think that we are efficient in the United States, particularly in connection with mining and manufacturing. The conduct of the war has demanded in England and in France a complete readjustment of manufacturing methods and plans, and today England is probably as efficient as any country in the world, not excepting Germany. This is remarkable since for years England has been inefficient in her manufacturing and the country has been flooded with material stamped "Made in Germany". Today England is almost a socialistic community. The state practically does everything. In England almost everyone is engaged in industry necessary for the conduct of the war, and this has been accomplished by increasing the efficiency both of her tools and of her man power.

Man Power Must be Efficient

In the United States we certainly have been efficient so far as machines and perhaps so far as methods have been concerned, but there has been no efficient utilization of man power. Before the war, labor was undoubtedly far more efficient here than in England, but it was not so highly efficient as it should have been, and the problem that now confronts and will confront us in greater measure after the war is to make our man power efficient. England has had a taste of what may be termed state socialism, and labor will not be content to return to the old order of things. One feature of the labor problem in England which has permitted her to reach this condition of state socialism with comparative rapidity is that practically all of her laborers are English; she has little or no foreign population. While an Englishman may be a strong union man and ready to fight his employer tooth and nail, at heart he is a British subject. When his country was in danger he rose to the occasion.

In the United States we have such an admixture of unassimilated foreigners the problem is rendered more difficult. As yet we have not been brought to that point of stress which arrived in England. But if the war is to be successfully concluded, and if we are to increase our efficiency after the war, methods must be introduced which will Americanize these foreigners and change their viewpoint. This country has been called the melting pot, but it is a question whether the melting process is efficient, and whether at the top of the crucible there does not accumulate too much dross and at the bottom not enough clear alloy.

The so-called reconstruction program of the British labor party will, of course, be subject to a great many modifications before it is finally adopted, and no doubt still further modifications will be made before any or all of it is accomplished, but it has for its basis four principles. These are:

1.—The universal enforcement of the national minimum wage.
2.—The democratic control of industry.
3.—The revolution in national finance.
4.—Use of surplus wealth for the common good.

The Laborer's Viewpoint

If this program is carried out, then England's socialistic state will be assured. It serves, however, to show the trend of thought of the laboring man in England. He has seen his wages increased in keeping with the growing cost of living, he has seen the profiteer discouraged and he is more than ever convinced that in the past he has not been getting his fair share of the product of his toil; and at the same time is realizing that in the past he has not done his proper share to increase the wealth of the country. Nor can he be blamed for this, because, seeing large fortunes grow up before his eyes, while he gets but a small proportion of it, the incentive to increased efficiency has not been great. He realizes that when the war is over, unless the greatest care is used in the reorganization of the regular industries, there will be an immense amount of unemployment; that is, if unchecked or uncared for, will result in an oversupply of labor, and, if the old standard is maintained, a corresponding diminution in wages. This he feels should not be; hence his insistence of the first principle of a minimum wage which is not high, being 30s, or $7.50 a week.

In demanding democratic control of industry he has observed such good results attained in war work that he sees no reason why this control of industry should not be just as efficient under after-war conditions.

In the third principle, the revolution in national finance, he demands that taxation shall be so adjusted

The Man Problem Again

EXPERIENCE gained as a large employer of labor and in handling large bodies of men fits Mr. Channing peculiarly well to discuss the man power problem. No more important question confronts American industry today. In addition to being consulting engineer for the General Development Co., New York, and is identified with the Miami Copper Co. and other prominent mining concerns. In his paper Mr. Channing points out the possibility of the existing British socialistic tendency spreading in greater measure over the United States, bringing about the necessity for a campaign of education to Americanize the foreign labor element and to make the laborer see the benefits that will accrue to himself from efficient and maximum production. It is Mr. Channing's contention that the time for this intensive study is the present. Upon the shoulders of the country's engineers, he claims, must fall the duty not alone of changing the foreign workman's viewpoint, but likewise of educating the employer to the fact that his best interests lie in increased wages and reduced hours, as well as in improved living conditions for his men, in return for their efficient work.

This article is an abstract of a paper by J. Parke Channing, consulting engineer, Lewisohn Bros., New York, to be presented at the Colorado meeting of the American Institute of Mining Engineers, to be held Sept. 2 to 7, 1918.

that it will yield the necessary revenue to the government without encroaching upon the prescribed national minimum standard of life of any family; without hampering production or discouraging any useful personal effort, and with the nearest approximation to equality of sacrifice. Apparently he is not a protectionist and repudiates all proposals for a protective tariff; however, this may be disguised.

The fourth principle of the English laborite's program is that the surplus wealth shall be used for the common good. He says that the riches of the mines, the rental value of the land superior to the margin of cultivation, the extra profits of the fortunate capitalists, and even the material outcome of scientific discoveries, has been absorbed by individual profiteers, and he demands that in the future a large proportion of this surplus shall be applied to the common good.

The English labor party is not like the Bolsheviki of Russia. It is not carried away with the beliefs of Lenine and Trotzky, that the proletariat are the men to manage the country. The English laborer frankly realizes the importance of brains and education, and admits that the highest success of the country cannot be obtained without the aid of those who plan, manage and invent, nor would he object to allowing these men to get their fair share of the profits. Evidently the class against which his program is aimed is comprised of those more or less sharp and shrewd men who, without anything more than commercial ability, of themselves reap the advantages of the brains and muscles of others.

This program as outlined has certain merits, and is referred to since the same thing is liable to come up in the United States. The trouble will be that the pendulum will likely swing too far if the employers in the United States do not give more attention to the laborer and see that his condition is improved. Engineers are in the position to act as instruments to carry out this necessary work. Whether it be in a mine or a manufacturing plant, a large proportion of the managers and executives are engineers, and the proportion is constantly increasing.

Study of Human Nature Emphasized

The question to be clearly faced is, are engineers properly trained to bring about this improvement in social conditions, to improve the living conditions of laborers and at the same time improve their efficiency? A great many are not. Good technical men are not always sociologists not psychologists. We understand production of kilowatt-hours from coal or from water power, we understand the machine by which it is utilized, but we do not understand the machine which produces man power.

At a recent conference at Columbia university, the question of giving the engineering students a course in human engineering was discussed. Apparently the authorities are beginning to realize that this is a factor of paramount importance and that such training must be given the engineering student before he can be turned out as a man capable of eventually holding a high executive position. Many of the students have the ambition to hold high positions, but at the same time announce that they have no desire to have anything to do with the workingmen themselves. There never was a time when it was so necessary to impress upon engineers and engineering students the importance of the human side of engineering.

Can any who have had to deal with unions and have had strikes define trade unionism? The fact is, none can tell what trade unionism is because it is not an entity but a term of broad generalization covering a great many distinct aspects of the labor problem. Railroad superintendents, whose knowledge of trade unionism is based upon contact with the brotherhood of locomotive engineers, would give one definition, while those who manage mines in the Rocky mountains, who have been identified with the western federation of miners, would give another definition Specifically each would be right from his own point of viey, but neither of the definitions would cover trade unionism as a whole. A few weeks ago I might have been rash enough to attempt a definition, but in the meantime I have read Professor Hoxie's work on "Trade Unionism in the United States", and my ideas on the subject have been much clarified. I would advise every one who has anything to do with trade unionism to get this work and not merely read it but study it as you would study a book on electric motors.

Trade Unionism Classified

He states that trade unionism can be classified under two broad general heads, one based on structural varieties, and one on functional varieties. Professor Hoxie points out that there are four divisions under each head and anyone of the structural varieties may function in any one of four different ways. You will learn that while to you decreased output on the part of the laborer seems inexcusable, yet for him it has an intense and immediate value. You will find he has most excellent reasons for insisting that the good and the poor workman shall each turn out the same amount every day. He explains why the locomotive engineers of the United States can have one strong central national union, and why this is impossible with the men who dig ditches. You will discover why the Knights of Labor movement failed and why the American Federation of Labor succeeded. One basic and most important factor must be realized, namely, that, talk as you may, the interests of the laborer and employer are diametrically opposed, just as the interests of buyer and seller are opposed, that from the very nature of things they can never be identical, and that the best that can ever be reached is a compromise. Who is better qualified to bring about this compromise than the well-trained engineering manager who, with his broad knowledge and experience with both capitalist and laborer, is enabled to act as an arbiter or a judge and arrive at a decision at least fairly equitable?

Engineers to Solve Labor Problem

The engineers of this country are in a position to solve the labor problem, or at least produce a solution as nearly ideal as possible. They are to convince the employer that, in the long run, he is going to be better off by increasing the wages of his men, reducing their hours of work and improving their living conditions. Likewise, the engineer must convince the laborer that it is to his interest to work as efficiently as he can and to produce as large an output as is possible. This can only be accomplished by education. It is difficult to convince a laborer that by increasing his efficiency and his output he helps himself, because he only looks to immediate results, but because the laboring man upholds an economic fallacy is no assurance that he cannot be convinced of his error.

About 10 years ago I started to develop a low-grade copper mine in Arizona. As mine superintenent I had N. Oliver Lawton, whose experience at Lake Superior has made him familiar with what is known as the one-man air drill. This is a light machine weighing about 125 pounds, which can be readily set up and operated by one man. We started to use these in Arizona where previously nothing but the larger and heavier machine, requiring two men, was in use. An immediate opposition came from the men and we were accused of trying to throw half the normal number of miners out of work. Whenever I went through the mine I took

the opportunity to tell the men that this orebody, up to that time, had not been considered ore, that it was rock, and that nobody thought it was worth exploiting; that, far from throwing one man out of work, we were giving two men jobs, that if two men had to work on a drill the cost of mining would be so high that the material would not be ore, but that if we gave each man a drill and put him to work in a separate drift, then the rock would become ore, that these men would have employment and that a new industry would be started. About three months of this propaganda convinced the men of the truth of our claim, and that in a short time it would have been impossible to get the men to go back to the old two-man drill because each man felt that he stood on his own feet and received credit for the whole distance he drifted. This is only one example, but it indicates what can be done by education. The old-time manager or old-time superintendent would simply have said, take the job or leave it; but this is not the attitude for the modern engineer.

Scarcity Prevails in Man-Power Experts

The assertion is made in Washington that it is difficult to get executives for war work, particularly executives who understand the handling of man power. I am told that some of the new plants for war industries have been most carefully laid out, taking into consideration the routes by which material is to arrive at the plant, its progress through the works, and its method of removal, the supply of water, coal and other material, but in a great many cases no thought has been given to the handling of the men, to their housing, or, if they are to be brought from an adjacent town, of the method of transporting them to and from the plant. These have been left to a hit or miss adjustment after the plants are erected.

For several years the industrial department of the Young Men's Christion association has had a secretary who has devoted himself almost entirely to impressing upon engineering schools the necessity for having a course in human engineering, and in 1916, under that organization's aupices, the first convention to discuss the human side of engineering was held in Ohio. Great stress was laid upon the advantages which would accrue to engineering students if they had an insight into the mental operations of the laboring man, and this has been fostered by getting the engineering students to volunteer one or more hours of the week for instruction to laborers employed in adjacent plants. This instruction is either in the English language, in citizenship or in athletics. A man who has volunteered for this work for a year or more, on going out into active life is a much more capable foreman than one who graduates from an engineering school and meets his first laborer somewhere on his new job.

Propaganda Receives Circulation

Lately the national Americanization committee of New York, of which Frank Trumbull, of the Chesapeake & Ohio railroad, is chairman, has been conducting similar propaganda, sending to the various educational institutions of the country a proposed basis of a course on industrial engineering. The committee realized the importance of this in preparing engineering graduates for the problem of properly utilizing the man power of the country. This proposed course goes into the scope of industrial engineering, describes the problem and the field; it takes up the question of the engineering insight of the work in reference to plant building, its location and the fundamental considerations in its construction; it takes up the management and division of the work, the analysis of the costs, and the machinery, and the materials, and the efficiency methods. It goes into the question of employment, management, and the methods for hiring, promoting and transferring men. It also takes up industrial welfare with the various incentives to the workman and the provisions for his health and recreation, and for the vocational training of either himself or his children. It also gives instruction in that branch which is so often neglected, and that is conditions outside of the plant, the housing of the men, the planning of the town and the health, recreation and education of their families. It takes up the problem of Americanization and what shall be done to make our melting pot efficient, without dross, and finally it gives him instruction as to what has been done and what should be done in future legislation.

Engineers who are college graduates should use their influence to see that courses in human engineering are introduced in their alma maters, if they are not already there.

Do you mining engineers realize that your training and your experience, touching as it does on all branches of engineering, fits you better for broad and important work than those in almost any other profession? How many of you have been confronted by the necessity of developing a large mining property in some out-of-the-way place, when everything came before you and nothing could be left to chance, where you had to see that your own town was built and provided with waterworks and sewers, lighting plant and schools? You had to develop a property in a place where nothing existed and you did not have a well-organized community to fall back upon with all these adjuncts provided. Only recently one of my former superintendents came into the office to tell me that he had given up a $12,000 a year position to take one with the government for $3600. He did not hunt this government job. It came after him. They asked him to go on to Washington and take a job in the ordnance department. They said that they had found that a mining engineer has had such varied experience, and has driven so little in ruts that at a minute's notice he can jump from 6-inch projectiles to baled hay.

British Replace Losses

The unexpected forward move of the Germans in March had important results in the loss of guns, ammunitions, tanks, etc. Fortunately the consequences have not been so serious to Great Britain as they might have been if the development of production had been less thorough.

The question of the losses was dealt with by F. Kellaway, parliamentary secretary to the minister of munitions, in an address recently, when the following particulars were given: The increase in the output of guns and munitions for the first two months of the year, compared with the first two months of 1917 was as follows: Light guns 30 per cent, medium guns 57 per cent, heavy guns 30 per cent, machine guns 96 per cent, shells 83 per cent, tanks 39 per cent, airplanes 223 per cent, airplane engines 245 per cent. The average weekly production of airplanes for this year equalled the average production for two months in 1915, while in the case of machine guns one week's production equalled that of five months in 1915. Over 100,000 men were released for the army during 1917 and the drain upon labor had been met largely because of the way in which women had rallied to the help of the men. Rather than that the country should ever submit to a German peace Mr. Kellaway stated that the women, no less than the old men and boys, would take their places by the side of the fighting men.

The army was as well equipped after the drive in all the appliances of warfare as when the German attack broke upon them.

Germany Aims to Rob Italy of Steel

Vast Industries, the Basis of Latin Nation's Modern Development, to Swell Huns' Treasure Chest if New Drive Succeeds—Remarkable Progress and Prosperity Shown in Mining and Manufacturing Enterprises

WHEN Germany made the drive at Paris in the first days of the war, and pretended that it was necessary to overrun Belgium as a military measure, the plain purpose of robbery was immediately evident when it was seen that the busiest industrial sections of northern France and Belgium had been seized, and one did not even have to read what German writers had been saying for years about the advantages of the sea-approaches via Antwerp. The coal and iron region of both countries was captured—the region where the most modern development of manufacturing had located itself.

When Germany drives into Italian territory, it is not only military and political purposes that are served but cupidity, for the industries of Lombardy are without any doubt in the mind of the imperial government—and a successful raid into northern Italy, if the land could be held, would mean the annexation to the coveted economic region of the "Central Empire" of a rich industrial region resembling that in northern France.

The industrial growth of all Italy in the decade before the war, and in war industry since 1914, has been one that will be a surprise to anybody who has not seen it. In Lombardy, around the city of Milan, one rides by rail through a region of manufactories with a skyline of typical factory structures and tall smokestacks. Great steel plants that cover a square mile of ground are there, also elsewhere in Italy, and the construction of the buildings and equipment is of the most imposing modern type. We know what refinement of excellent mechanical engineering and mechanical workmanship is shown in the Italian automobile output. In Lombardy, the most concentrated growth of Italy's wonderful recent industrial expansion has taken place. It is a region rich in natural favor.

The plain of Lombardia, comprising an area of some 10,000 square miles, is surrounded by the Alps, the Lakes Como and Maggiore, and by the Rivers Adda, Ticino and Po. Milan occupies the center of this plain, where a few small rivers meet, such as the Seveso, descending from the hills of Como, the Olona, from the foothills above Varese, and the Lambro from the hills of Brianza.

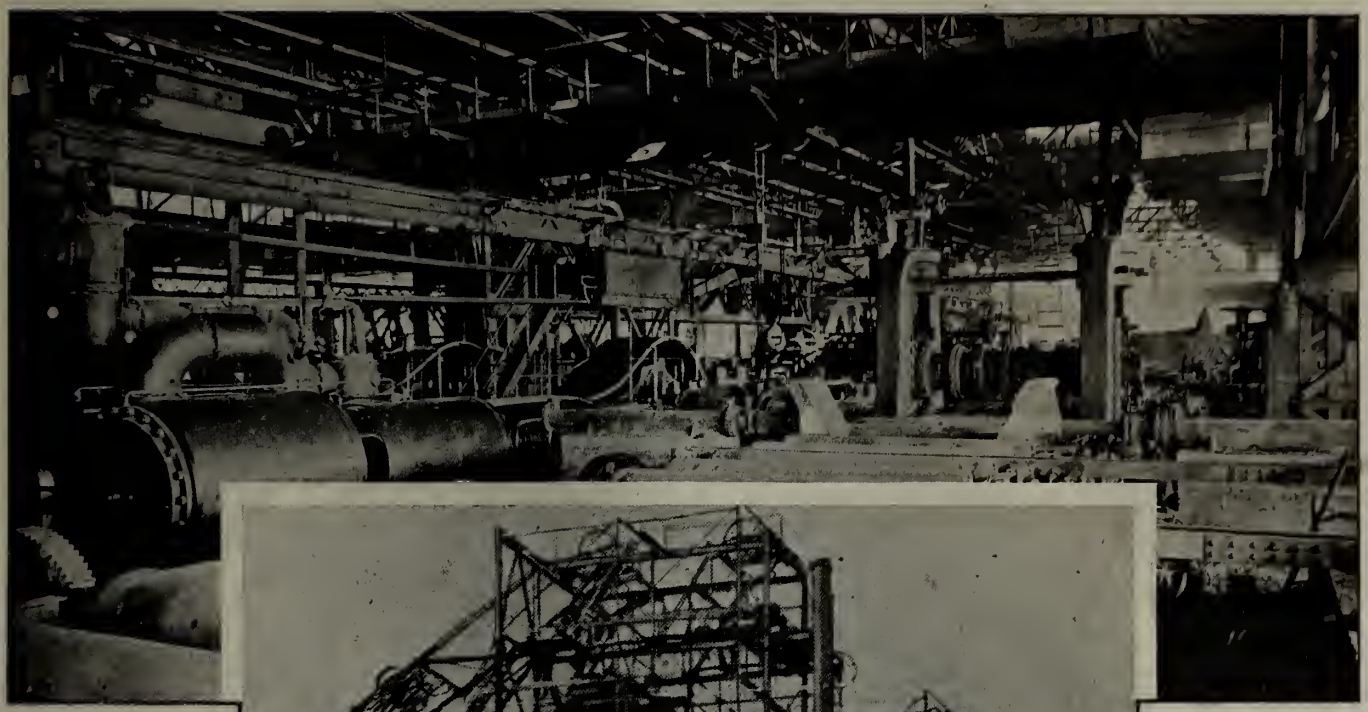
This important geographical position is coupled with excellent hydrographic conditions as the continuous and abundant flow of water rising from the Alps accumulates in great quantity in the three basins of the Lakes Maggiore, Como and Lugano, and these form regulating depositories of the waters intended for the irrigation of the plain. Also there are abundant subterranean waters, freely spouting forth in many places, and at other points nearly at the surface, so that they can be easily adapted for domestic, agricultural and industrial purposes. By these natural advantages Milan was primarily supported.

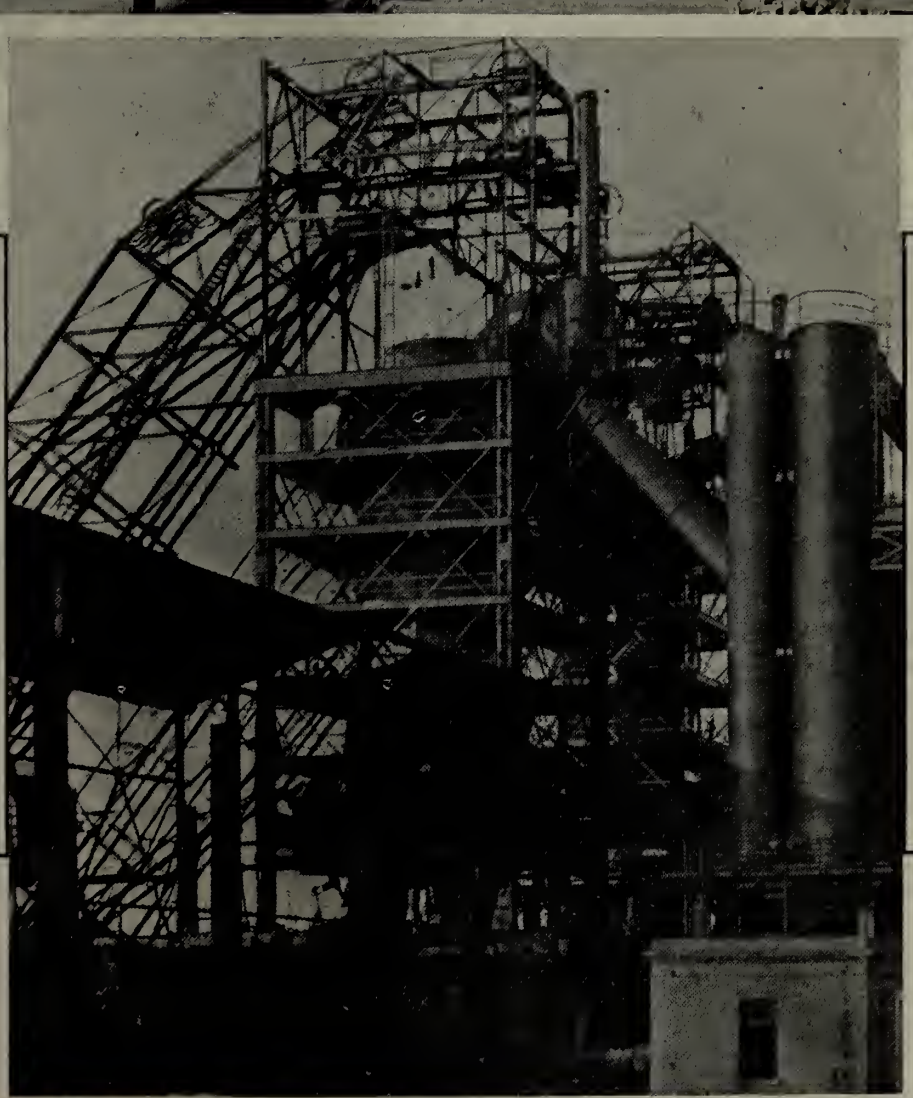
The position of Milan, at the gateway to the north and the heart of a rich section, naturally led to her being the assembling *entrepot* and distributing point of Italy for her products needed in the northern countries. For this reason the transportation facilities naturally grew which in normal times enabled Milan to send out the products of Italy swiftly to the north and south. Milan felt the need of an Alpine tunnel like the Mont Cenis tunnel uniting Piedmont to France, and the St. Gothard tunnel was constructed which united Lombardy to Switzerland. But this additional communication was soon insufficient for the expanding commerce and consequent increasing traf-

From an article published in *The Americas*.



FIG. 1—A TYPICAL MINING PROPERTY IN ELBA, THE SOURCE OF GREAT QUANTITIES OF ITALY'S IRON ORE





Upper — View of Italian rolling mill showing 2-high mill for rolling oval shapes. The mill is driven by a horizontal steam engine and is equipped with electrically driven screw downs.

Lower — Ore storage yards.

Center — View showing top arrangement of Italian blast furnaces. Note the structural material around the shell. The furnace is equipped with only one downcomer. Tower washers are used for cleaning the gas.



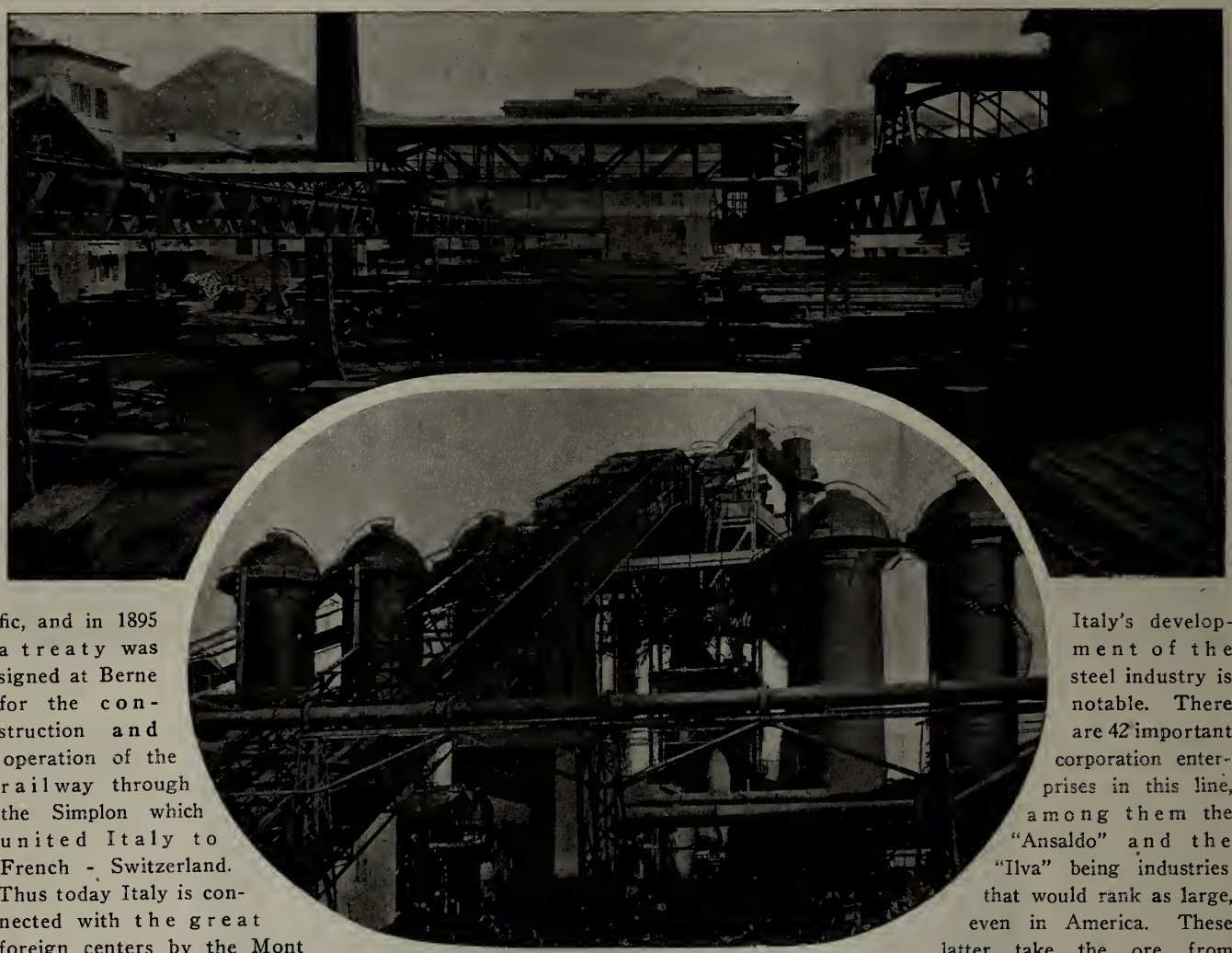


FIG. 5—STORAGE YARD FOR SEMIFINISHED MATERIAL. ROOF AFFORDS PROTECTION FOR CRANE. FIG. 6—MODERN ITALIAN BLAST FURNACE. NOTE GRADUAL SLOPE OF SKIP BRIDGE

fic, and in 1895 a treaty was signed at Berne for the construction and operation of the railway through the Simplon which united Italy to French - Switzerland. Thus today Italy is connected with the great foreign centers by the Mont Cenis, which unites Italy to France, the St. Gothard uniting Italy with Switzerland, the Simplon which joins Italy with French-Switzerland, and the Pontebba connecting Italy with Austria. All the commercial movement of the two slopes of the Apennines concentrate in Milan and the two railway lines, Milan-Brindisi, and Milan-Genoa-Rome-Naples-Reggio are the two principal lines that from the south ascend to the Simplon, St. Gothard, Spluga and to the Brenner. At present Milan forms the terminus for 11 lines of railways all belonging to the state, besides four railways carried on by private societies and 15 steam and electric tramways. Some 15,000,000 passengers arrive and depart from Milan and environments annually.

Milan has shown the greatest growth of any city of Italy. In 1715 the population was only 115,082 while in 1911 it was 609,099 and in 1915 reached the figure of 690,945 and it is still growing rapidly. Naturally this increase is largely due to immigration attracted by the increasing business and labor opportunities of Milan, 83 per cent of the whole increase being due to that cause.

The number of mechanical and other industries in Lombardy tributary to Milan is stated in the last census as 51,000, employing nearly 660,000 hands. The value of the output is not obtainable even approximately from statistical reports. These industries in the order of their importance based upon number of hands employed, before the war, were:

Agricultural industry	120,000
Metal working	100,000
Textiles industry	80,000
Construction quarrying	73,000
Chemical industry	15,000
Mining industry	5,000

The agricultural industry is chiefly made up of the cultivation of mulberry trees for food for the silk worms, grapes, wines and oils, wheat, barley, corn, vegetables and dairy products and forestry. The principal textile industries are based on cotton, silk and wool.

All these industries center in Milan, the offices and salesrooms for metals, textiles, etc., being established there. The corn, grain and agricultural market has been in Milan for centuries.

Italy's development of the steel industry is notable. There are 42 important corporation enterprises in this line, among them the "Ansaldo" and the "Ilva" being industries that would rank as large, even in America. These latter take the ore from their own mining properties (Elba being a source of iron in quantity) and carry it through not only to finished shapes, but in vast workshops of some of their plants now build locomotives, ships, machinery, cannon and great quantity of heavy ammunition. One mining property at Elba is shown in Fig. 1. The "Ilva" corporation, part of whose property is shown in the lower view, page 1615, has iron mines, lignite mines, railroads, steamship lines, a port and several subsidiary plants to its great factory at Bagnoli, which covers nearly a mile of space. It employs 47,000 men, digs and uses 1,100,000 tons of lignite which it turns into coke, and produces 650,000 tons of steel a year. It owns its manganese ore supply.

These magnificent properties now represent purely Italian industry. German capital helped develop the Italian industries in general, and Italian engineers were to a great extent educated in Germany, but they have developed Italian engineering, Italian management and Italian labor forces, while the capital is now being supplied by Italy. It is said that the working forces of these big industries are not to any appreciable ex-

tent recruited from the millions of Italians who have migrated to America, worked in our shops and returned to Italy. The northern Italians have had experience in the Teutonic industries. But the great mass of "labor" in Italy is said to have developed under Italian direction.

Italian Workman Intelligent

The Italian industrial workman is intelligent and quickly learns a new trade. Experience with the Italian workman in the automobile industry furnished a typical example of the readiness with which a new idea and work is learned. At Turin, the center of this industry, raw, untrained hands were taken from anywhere and quickly became skilled mechanics. Their work, at first imperfect, soon resulted in such perfection that Italy quickly reached its important position in the automobile industry enabling her to export her products of this industry foreign-wise. The Italian workman in addition to being intelligent has good personal habits. Drunkenness is practically unknown; he is sober and industrious and uses his spare time for self-improvement. When he leaves his work he goes home and in the evening attends the municipal night schools where he learns applied mechanics and educates himself by listening to lectures and study.

Italy lacks coal, and so electricity is now being used progressively and is expected to come into still greater use later. In 1913, 10,459,800 tons of coal were imported into Italy 9,386,000 from England. Quantities of lignite are now being used for industrial purposes. Italy has a future source of coal, possibly, in the Black Sea region. But her railroads may shortly go to electric power, and electric drive is common in the general factories. It is extensively used in the great steel works. Hydraulic power is easily available, and is one of the resources of coming industry in Lombardy. It is plain to see what Germany covets in northern Italy.

Book Review

The Science of Management, by Frederic A. Parkhurst; cloth; 203 pages; 6 x 9 inches; published by Case School of Applied Science and furnished by the publisher for $3, net.

The volume under discussion is a text book designed to accompany a course of lectures on scientific management as applied to foundry work. Looking forward to the time when the war will be finished and trade competition will take its natural course once more, the author sees a necessity for the immediate adoption in this country of the most efficient business methods possible. He asserts that Great Britain and France are preparing for the struggle and so must we also.

The Taylor system of scientific management being productive of the best results, he strongly urges its adoption. Mr. Taylor's definition of scientific management is given and explained. The definition combines five different elements which he lists as follows: Science, not rule of thumb; harmony, not discord; co-operation, not individualism; maximum output in place of restricted output; development of each man to his greatest efficiency and prosperity.

The installation of a system of scientific management requires considerable time. Certain things are requisite if the attempt is to prove successful. This is thoroughly taken up in a chapter entitled, "Put Your House in Order." Succeeding chapters are devoted to discussions of the various factors influencing the finding of true costs, the computation of estimates, and the figuring of profits. The final chapters deal with the question of time studies and with the application of the bonus system.

The book is issued as a complementary to the author's volume, "Applied Methods of Scientific Management." Phases of the question which are not discussed in the one can be found in the other. In addition, "The Science of Management" contains a very full bibliography covering works by men who have gone deeply into this subject and who are, therefore, without a doubt, authorities.

Combination Tool for Structural Shops

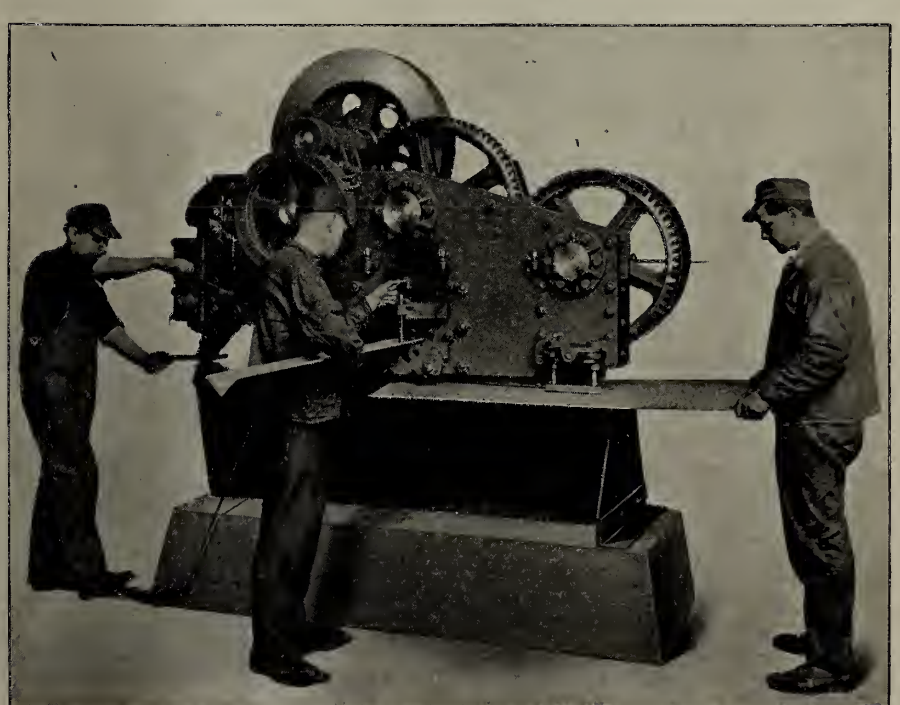
Among the many tools that have been developed to meet the demands of modern warfare are to be found designs that are distinct departures from the beaten path. A machine in this category is shown in the accompanying illustration. This tool is a product of the Buffalo Forge Co., Buffalo, and is a combined slitting shear, punch and bar cutter.

The design is a European one wherein sheet steel, to a large extent, takes the place of heavy cast iron construction. It is said that these tools have been subjected to severe duty in the munition plants of France and England with entire success. It is also claimed that these tools weigh but one-sixth as much as similar machines with cast iron frames.

The three functions of the machine are entirely independent of each other and, as the illustration shows, three men can be engaged on different operations at the same time.

The machine is built either for belt or motor drive and all gears are steel. The pinions are manganese steel. All bearings are bronze bushed and lubricated by ring oiling systems.

The machine will shear plates ⅝-inch thick and flats, 3 x ¾ inches. The bar cutter wil cut square angles 4 x 4½ inches, mitered angles 2½ x 5/16 inches, T-iron 3½ x⅜ inches, rounds 1½ inches, squares 1¼ inches, I-beams 6 x 12¼ inches and channels 6 x 10½ inches. The punch has a capacity up to holes 1



COMBINED PUNCH, SHEAR AND BAR CUTTER



PORTABLE AIR COMPRESSOR FOR MINE SERVICE

inch diameter through a ⅝-inch plate.

The machine makes 25 strokes a minute, and when motor driven requires five brake horsepower for operation, although a 7½-horsepower motor is recommended by the manufacturers.

Small Turbo-Generator for Direct Current

Today it is the duty of everyone to do his utmost to help win the war, and every effort should be strained to obtain a greater production with the same number of men or the same production with less men. To aid in furthering work in many lines, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently produced a small turbo-generator unit for direct-current service. The unit is designed for 10 kilowatts output, although a temporary load of approximately 12.5 kilowatts may be obtained. A smaller unit of 8.5 kilowatts gives a range of capacity suitable not only for lighting work, but also for the majority of electromagnet work.

Among the fields of service for which the unit is adaptable, some of the more prominent include open-pit mining, where flood lighting for night work has come into general use, oil refineries and locomotive cranes. The generator has a range of from 80 to 235 pounds inlet and from zero to 10 pounds back pressure.

Construction is Simple

In building this unit the designers recognized the fact that it must operate under trying conditions, and therefore it was constructed as simply as possible. The turbo-generator is equipped with a hand and automatic throttle valve and an emergency overspeed governor. This latter apparatus is placed on the generator end of the unit and automatically closes the throttle valve of the turbine if the unit shows a disposition to overspeed. The device consists of a small weight placed in the shaft of the unit, which at a predetermined speed engages a trip lever connected to the throttle valve in such a way that it automatically closes, causing the unit to stop.

Attached to the outside of the turbine rotor is a row of blades. The latter are of the impulse type and although there is but one row, by means of a reversing chamber the same steam passes through the blades a second time. This permits a complete expansion of the steam. The unit as a whole is designed to occupy the least possible space. It is 3 feet 8½ inches long, 23 inches wide and 18¾ inches high. The generator is equipped with ball bearings, but no bearings are required on the turbine, and consequently there is a saving in bearing friction and a decrease in the length and weight of the unit.

Portable Air Compressor

A small portable compressor for mine service, serving either as an auxiliary to the main compressed-air system or for development work in mines without compressed-air service, has been found to be useful. It can be used for operating drills, coal cutters, air lifts and for many other purposes. The outfit is mounted on a truck with flanged wheels of a gage to suit the mine track and can be hauled wherever needed.

This type of compressor is made in capacities up to 415 cubic feet of air per minute and for pressures up to 100 pounds. The motor is designed to operate on either direct or alternating current, and is furnished in sizes ranging from 12 to 56 horsepower. A large air receiver forms part of the apparatus and into this the air is pumped and the pressure automatically maintained constant. The machine is manufactured by the Ingersoll-Rand Co., New York City.

Book Review

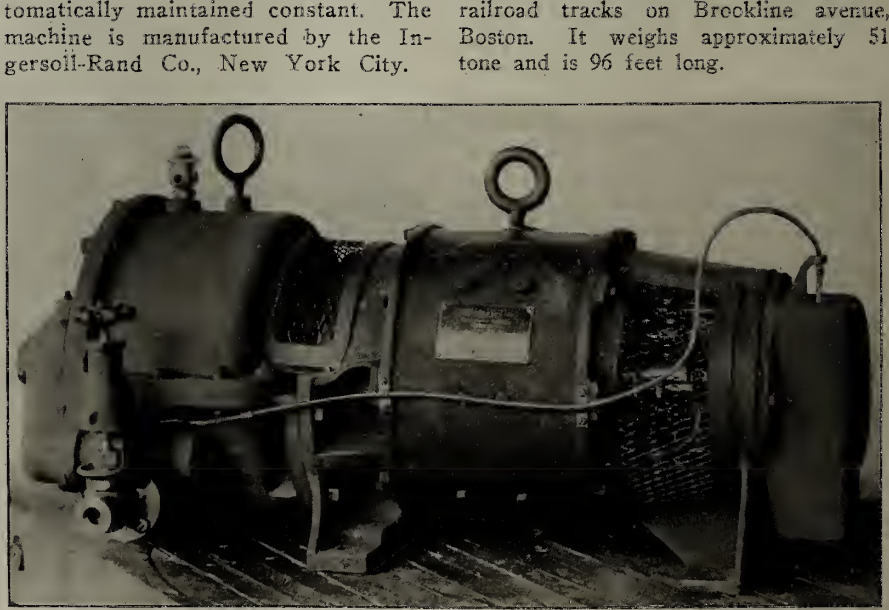
The Chemical Analysis of Iron, by A. A. Blair; cloth; 318 pages, 6 x 9 inches; published by J. B. Lippincott Co. and furnished by THE IRON TRADE REVIEW for $5.00 net.

"The Chemical Analysis of Iron" has a field ready and waiting for it. The present volume is the eighth edition of this work brought out by its author, the first having appeared in 1888. The most recent edition is, therefore, the result of a gradual remolding which has gone on for years and which has kept the material used by the author always up to date.

The book starts with a consideration of apparatus and reagents. The various types of apparatus necessary for the work are described under two heads, apparatus for the preparation of samples, and general laboratory apparatus. These sections are accompanied by excellent diagrammatic illustrations. In the discussion of reagents, the physical properties of the various reagents are given where that seems advisable, as are also directions for their preparation for use.

Practically the entire remainder of the book is devoted to the methods for analyzing pig iron, bar iron, steel, the alloy steels, iron ores, and the various ferroalloys. In addition methods are given for the analysis of limestone clay, fire sands, coal and coke. The book is brought to a close by a description of the apparatus used in the determination of metals by electrolysis, followed by a table of atomic weights and one of factors.

What is said to be the largest bridge girder in New England will soon be placed in position in the new bridge to be built across the Boston & Albany railroad tracks on Brookline avenue, Boston. It weighs approximately 51 tons and is 96 feet long.



SMALL TURBO-GENERATOR UNIT FOR DIRECT CURRENT SERVICE

Specifications for Cast Shells

Ordnance Department Prepares to Order Large Quantity of Semisteel Projectiles —Drop Test is Severe—Shells Also Must Stand Hydraulic Test and Soap Bubble Test

AFTER considerable experimenting, the ordnance department has finally decided to make use of cast semisteel shells in large quantities, particularly for 6 and 8-inch guns. It is not known at present how many shells of this character will be required, but preliminary estimates place the total at 12,000,000. This would involve practically 1,200,000 tons of pig iron.

Detailed specifications for the new shells already have been issued. These specifications are based on the ordnance department's experimental and research work, backed up by data procured from actual experience on the battlefield in France where large quantities of these shells have been used. Cast shells were first employed in the present war by the Germans in 1915. The theory of the cast-iron shell is that when used against earth works only a small part of the explosive force is expended in bursting the walls of the shell and the effect, therefore, is similar to that obtained by detonating an equivalent quantity of explosive in the earthwork. Also it is stated that when used in the open, the greater fragmentation of cast iron will allow the shell to burst into a far greater number of pieces than a steel shell. A cast shell, therefore, covers the zone of dispersion very closely. These shells are made either in permanent molds or in dry sand. Most of the French shells are made in dry sand. The complete specifications which have just been issued by the ordnance department follow.

PROJECTILES will be cast from semisteel, with a riser having a volume sufficient to insure sound metal free from segregation and porosity.

PHYSICAL TESTS

Test bars shall be taken from the pouring ladle at each cast and each test bar shall be cast in a vertical baked sand mold from which it shall not be removed until it no longer shows the color of heat.

The physical tests shall consist of a tensile strength test and an impact test, and in each test if the first test specimen meets the requirements the test shall be considered to have been passed. If the first specimen tested fails to pass the test, two substitute specimens may be submitted, both of which must meet the specified requirements in order to pass the test.

In case a test specimen fails on account of the presence of physical defects, such as blow holes, cold-shuts, or the like, a new test bar may be submitted in its place, and the specimen so failing shall not be considered as a test.

(a) Tensile Strength Test

The test bar shall be cast 1¼ inches in diameter, with a length of 8 inches and a riser of 4 inches. After removal of the riser the test specimen will be machined to a diameter of 1.128 inch for a minimum length of 4 inches. The tensile strength of the specimen must be at least 32,000 pounds.

(b) Impact Test

The test specimen, 1½ inches square and not exceeding 1.52 inch on any side, shall be cast with a length of 8 inches and a riser of 4 inches. After removal of the riser the bar will be placed on two knife edge supports 6 inches apart, which in turn are supported by an anvil weighing at least 1750 pounds. A weight of 25 pounds will be caused to fall exactly on the middle of the test bar. The test will begin with the weight at a height of 12 inches and the test will be repeated with the height of the weight increased by ½ inch intervals until the bar breaks. The height of fall for causing rupture will be not less than 18 inches, this height being measured from the upper surface of the bar to the lowest part of the testing weight.

Test bars may be machined for a width of ¼ inch at the lines of bearing on the knife edge supports.

The impact testing machine shall be made in accordance with drawings of the ordnance department and must be approved by the government inspector.

INSPECTION

Certified copies of physical tests shall be supplied to the government inspector, and all physical tests shall be conducted in his presence. In case the casting and machining operations are conducted by different manufacturers, both the castings and machined projectiles will be inspected by a government inspector. When the casting and machining operations are performed by the same manufacturer, the government inspection of castings may be waived.

Certified copies of chemical analyses shall be supplied to the government inspector for such casts as he may specify.

(a) Inspection of Castings

Castings must be free from blisters, blow holes, and cracks, except that slight imperfections may be allowed on the outside of the casting in front of the position to be occupied by the rotating band, provided that they do not extend to a depth more than one-fourth of the thickness of the wall and do not exceed ⅛ inch in diameter. The castings shall be free from sand, both inside and outside, before being submitted for inspection. The inside of castings shall be smooth and in the case of castings for high explosive shell shall be sand- or shot-blasted or rumbled in a manner satisfactory to the government inspector.

Each casting on being struck with a hammer must give a clear metallic ring; those giving a dull sound will be rejected.

The castings shall be capable of being readily chipped, filed, and machined.

Risers shall be removed from the castings before submitting them for inspection.

At the option of the inspector, an occasional casting may be fractured to determine the soundness of the metal. Castings so fractured shall not exceed 1 per cent of the total.

(b) Inspection of Machined Projectiles

Projectiles shall conform to the dimensions shown on the drawing. The inspection for blow holes and other imperfections in the machined projectiles shall be the same as prescribed above for castings. If, in the process of machining, blow holes or other imperfections are developed, the government inspector shall be notified immediately and work shall be continued only by his authorization.

Projectiles to be used for gas shells shall be coated with a soap solution and subjected to an air pressure of 100 pounds per square inch for 30 seconds. There must be no evidence of the formation of soap bubbles during this test.

All projectiles shall be subjected to a hydraulic test for 15 seconds. Projectiles of 6 inches caliber and less shall be tested at 4500 pounds per square inch, and projectiles of caliber larger than 6 inches shall be tested at 3000 pounds per square inch. All projectiles showing any leakage or permanent expansion of more than 0.001 inch per inch of caliber, approximately ½ inch in rear of the bourrelet, shall be rejected and mutilated in such manner as to prevent them from being resubmitted.

The air test and hydraulic test shall be performed before banding, and, in the case of gas shells, the air test shall precede the hydraulic test.

All shells shall be thoroughly dried after the hydraulic test.

No white or red lead shall be used in any operation in the manufacture of high explosive shells.

BANDING

The copper band will be pressed into its seat in such manner as to be securely fastened to the projectile, and this will be tested by tapping with a small hammer and the occasional removal of a band for examination. The finished band must be tough and in uniform condition. A removed band must be capable of being bent around a round bar of a diameter equal to the thickness of the band without showing cracks. Replacement of new bands for those failing on the test shall be at the expense of the contractor, and for those meeting the test, at the expense of the government.

REJECTED PROJECTILES

In case the casting and machining opera-

(*Concluded on Page* 1630)

War Work Inspires Testing Experts

Critical Exactions in Government's Tasks Enhances Interest in Annual Meeting of American Society for Testing Materials—New Standards for Aircraft Material Indicated—Bixby Praises Work, Opposes Merger

ATLANTIC CITY, N. J., June 25.—Enhanced interest in testing brought about by the critical inspection of materials for war purposes, is reflected by the large attendance of engineers, manufacturers and metallurgists at the opening sessions of the twenty-first annual meeting of the American Society for Testing Materials which convened at the hotel Traymore today. That standard specifications for materials for aircraft probably will be presented for the consideration of the society in the not distant future was indicated by two papers on airplane subjects, one by G. B. Havens, entitled, "Effect of Moisture on the Strength of Aircraft Fabrics", and the other by I. H. Cowdrey, entitled "Transverse Testing Under Non-uniformly Distributed Load as Applied to Airplane Wing Ribs". A large number of committee reports were presented, including that of the committee on the revision of pipe threads, by H. V. Wille, chairman; magnification scales for micrographs, by W. H. Bassett, chairman; wrought iron, by H. E. Smith, chairman and cast iron, by Richard Moldenke.

The report of the committee on wrought iron proposed numerous revisions in existing and tentative standards and the committee has under consideration an investigation of bushelled steel, the defination of terms applied to various grades of wrought iron, further study of the vibratory test and specifications for hollow staybolt iron. The specifications for charcoal iron boiler tubes were revised to harmonize with those for steel boiler tubes and the change in the standard minimum weights was designed to express the weights corresponding to the Birmingham wire gage as standard, changing the decimal gage to conform, which is in line with the recommendations of the committee on steel with respect to the specifications for steel boiler tubes. Tentative specifications, which have been in use for one year, for staybolt iron, wrought iron pipe and wrought iron blooms and forgings were referred to letter ballot for adoption.

Suggests New Test For Cast Iron

Richard Moldenke, chairman of the committee on cast iron, suggested the desirability of introducing a hardness test for this material and for the study of its behavior under superheated steam. The tentative specifications for soil pipe and fittings and for railroad malleable castings submitted last year, were referred to letter ballot for adoption. Last year the committee recommended as tentative that the maximum sulphur limit in light castings in the standard specifications for gray iron castings be increased from 0.08 to 0.10 per cent. This change likewise was adopted and referred to letter ballot for ratification.

The committee on methods of testing through its chairman, Guitano Lanzo, reported that as the result of careful investigations, it has found no good reason for recommending changes in the design of the present tension-test specimens. However, it has been found that it is frequently inconvenient and sometimes impossible to obtain specimens from forgings and castings as large as the standard, namely, ½ x 2-inch round as required at present. It may be necessary not only to modify these dimensions, but in some cases owing to the peculiar shape or thin walls of the object tested, rectangular specimens may be required.

Officers for the ensuing year were elected as follows: President, Guilliam H. Clamer, Ajax Metal Co., Philadelphia; vice president, George S. Webster, director, department of wharves, docks and ferries, Philadelphia; members of the executive committee, Guilliam Aertsen, Midvale Steel Co., Philadelphia; George K. Burgess, chief of department of metallurgy, bureau of standards, Washington; G. B. Heckel, editor, *Drugs, Oils and Paints*, Philadelphia and K. W. Zimmerschied, metallurgical engineer, General Motors Co., Detroit.

Brig. Gen. William H. Bixby, retiring president, opposed merging the society with any other engineering organization. His answer to the suggestion was given in his annual address in which he praised the society's work and said its best efforts could be maintained only by its present methods and as a separate organization. He said:

"It is somewhat to be regretted that more uniformity has not been followed in the titles given to technical societies. The various organizations have received, according to circumstances, names varying from club, society, association, institute, institution, foundation and academy. In many cases, the title has been fairly indicative of the object of the organization, but at other times the title is somewhat confusing. The variety in names is probably largely due to the fact that not only is engineering a new profession but the United States is a comparatively new country and both profession and country are still rapidly growing. It probably will be many years before engineering will be fully organized as a profession and before the rank and titles of its associations will be agreed upon.

"The engineering society is more and more valuable each day in regard to the opportunity it offers to members to become acquainted with each other individually at annual and other meetings of the society, and it is becoming still more valuable each day because of the discussion which takes place between members at such meetings and because of the opportunities which it offers through its various committees and sub-committees to arrive at the best method of overcoming engineering difficulties.

"The discussions of engineering questions, and their conversions into formulas, specifications or other standards, through the work of committees, are becoming today more and more the most important features of engineering societies. The engineering society of today which is the most important, and most useful, is the one which gives the most beneficial results to the public rather than to the individual member. If the work of any particular society is beneficial to the entire engineering profession and the public it will have earned its right to the title 'society' or 'institute', but if it is looking only after benefit to its individual members, the title of 'club' is more expressive and honest. Not until its work is beneficial to the entire engineering fraternity of the United States has it any right to call itself a 'national' society or association.

Committees' Work Important

One of the most important functions of a society of today, if not the most important, is the work of its committees to influence uniformity of ideas and standardization of methods and constructions. It is because of the predominance of this committee idea in its work that the American Society for Testing Materials has been so successful as a technical society, and is being so recognized by the public and the

Guilliam H. Clamer

Who Will Serve as President of the American Society for Testing Materials in the Ensuing Year

GUILLIAM H. CLAMER was elected president of the American Society for Testing Materials at its twenty-first annual meeting. While he is still a young man, he ranks among the foremost metallurgists in the nonferrous casting industry. Of signal importance and numerous, his accomplishments in this special field have received well-merited recognition throughout the scientific world. Mr. Clamer was born in Philadelphia 43 years ago, where he now is located as first vice-president and secretary of the Ajax Metal Co. For two years after he was graduated from the public and manual training high schools of Philadelphia, he worked in the private chemical laboratory of Dr. F. A. Genth. During that period he served likewise as substitute teacher in the chemistry, electricity and mechanical drawing departments of the manual training school. He then entered the University of Pennsylvania as a special student in chemistry and finally worked into the regular course, from which he was graduated in 1897. He immediately became affiliated with the Ajax Metal Co., in the capacity of chemist. Frequent promotions marked the company's appreciation of his efficient work, until he finally was appointed first vice president and secretary. It is believed that Mr. Clamer is the first chemist regularly employed in the brass and bronze business. Two decades ago, the value of chemical analysis was little appreciated in the nonferrous casting industry. Even the brass rolling mills questioned whether such service would be valuable. Not many years after Mr. Clamer demonstrated his usefulness, a chemist was considered indispensible in the conduct of a brass foundry. In 1898 he began the study of metallography, being one of the pioneers in the metallographic study of nonferrous metals. As a direct result of his investigations, Ajax plastic bronze, a tin, copper and lead alloy, was developed. It contains a high percentage of lead and is employed extensively for railroad bearings. It was Mr. Clamer who developed a process for eliminating zinc, aluminum and iron and other metals electropositive to copper, tin and lead from alloys containing all of these metals. For this investigation he was presented with the Eliott-Cresson gold medal, the highest award of the Franklin institute. He has been likewise associated with Dr. Carl Hering, James Wyatt and Dr. Edwin F. Northrup of Princeton university in the development of electric furnaces, particularly of the induction type, using both low and high frequency currents, alternating and oscillatory. As a result of this work, several types of electric furnaces have been developed which have proved commercially successful for brass melting.



GUILLIAM H. CLAMER

Mr. Clamer is affiliated with practically all the leading technical societies of the United States and England and has held important executive offices in many of them. He is a past president of the American Institute of Metals, now the metals division of the American Institute of Mining Engineers and of the Mining and Metallurgical section and Committee on Science and Arts of the Franklin institute. He is a member of the board of the Franklin institute and of its committee on science and arts. He likewise is chairman of the committee of the Institute of Metals appointed to co-operate with the U. S. bureau of standards.

federal government. We have 39 main committees and over 130 sub-committees, all busied with important studies and decisions. Few other engineering societies in the country, if any, show as many committees and as good work therefrom. I consider a large part of the success of our committee work is due to the unflagging industry, unusual enthusiasm, and good judgment of our secretary.

Have Government's Confidence

"The acceptance of many of our standards by the federal government indicates that we have the confidence of the public and of the federal congress.

"I have several times been asked what need there is of any new technical societies, and I have even been asked the very pertinent question of why our society should not give up its independent existence and become a section of one of the other four or five principal engineering societies of the United States. My answer was several-fold. Whenever there is important work to be done which no existing society or combination of societies is willing to undertake a new society must be started unless we are willing to stand still or go backward. When the American Society for Testing Materials was started, no other society realized the importance of the work sufficiently to be willing to take it up fully and enthusiastically. We broke away from international societies for testing materials for somewhat the same reason, our national interests demanded more time and attention than the international society was willing to devote to one country, that is to one of its members.

"Perhaps, when the four or five large engineering organizations have reached the time when they are willing to be sub-sections of the Engineering Foundation and have arranged to work in thorough harmony with each other, we may be be willing to become a subsection and do good work as such, but that date is still several years ahead of us. For the present, we can be of greater value with our present organization than with any other, and it will remain so as long as we continue to work, not so much for each individual member, as for the general public and the entire engineering profession."

General Bixby's address was read as he was unable to attend because he is now in active service. He is stationed at St. Louis. Edgar Marburg, secretary-treasurer of the society, also was unable to attend, being confined by serious illness to a hospital in Philadelphia. In his address, General Bixby referred sympathetically to Mr. Marburg and paid him a generous tribute for his work.

Want More Shells

The imperial munitions board has been urged by the British ministry to provide an increased supply of 18-pounder shrapnel shells from Canada. The British authorities desire that the present supply be increased to 220,000 shells per week at the earliest possible date, and the imperial munitions board has vigorously revived the shrapnel plants of the Dominion and new capacity has been created, both by increasing the existing facilities and by the equipment of entirely new units. Some plants which were engaged turning out 4.5 shells are being changed over to enable them to produce the 18-pounder shrapnel asked for. A year ago Canadian manufacturers were producing 375,000 18-pounder shrapnel shells per week, but early last fall the imperial munitions board was asked to reduce the output of 120,000 per week. The reduction, together with the change over from the mark of shell then being made to the new mark seriously affected the shrapnel plants, which at the present time are not producing 120,000 shells per week.

Foundrymen See Films

Under the auspices of the Foundrymen's Association, Inc., of Indianapolis, the industrial motion picture film "From Mine to Molder" was presented Tuesday evening, June 25, at the Claypool hotel for the first time in Indianapolis. Manufacturers and their employers in attendance were greatly interested in the lecture on the views, by W. H. Knight, special representative of Rogers, Brown & Co., who produced the pictures.

Pushing War Work

The quarterly meeting of the Grinding Wheel Manufacturers' association of the United States and Canada in Worcester, Mass., June 20 and 21, attended by 23 members, was principally devoted to a discussion of the standardization of the plants of the members to help prosecute more expeditiously the war work of the country. Reports of various committees including war service, were submitted and discussed. C. W. Greenwood of the Carborundum Co., Niagara Falls, reported for the standardization committee. L. F. Cunningham, Waltham, Mass., was elected chairman for the ensuing three months, succeeding C. H. Miller of Chicago. Dr. F. B. Henry, of the Dayton Grinding Wheel Co., Dayton, O., is secretary of the association. The delegates were entertained while in Worcester by the Norton Co., where they witnessed a demonstration of a wheel breaking test and also inspected the plant of the Norton Grinding Co., and the Indian hill development, the housing proposition of the Norton Co.

Buys Land for Future

The Republic Iron & Steel Co. has purchased from the Lake Erie & Eastern railroad, Youngstown, O., 15 acres of land on the south side of the Mahoning river, and bordering on that stream just west of its tube mill. The land is for future plant extensions. The Republic is completing its two new 80-ton open-hearth furnaces at Youngstown, which will give it a total of 14. The furnaces probably will be ready for use late in July.

To Build Hoop Mill

A steel hoop mill to cost $1,000,000 will be erected by the Acme Steel Goods Co., Chicago, according to a report coincident with the company's purchase of the former plant of the Asbestos Shingle Co., in the Calumet manufacturing district, Chicago. The company, which manufactures steel specialties, is said to require the mill for production of raw material. The property consists of 130.65 acres in Riverside, on the Calumet river and the Pan Handle and Illinois Central railroads.

Handles Own Sales

To more closely co-ordinate its commercial and railroad services and sales, the Air Reduction Co., after July 1 will handle its railroad sales through its own railroad department, instead of through the Franklin Railway Supply Co., as before. Ellsworth L. Mills has been appointed sales manager of the railroad department and apparatus department of the company, with headquarters at 120 Broadway, New York.

Will Install Mill

The Dominion Steel Foundry Co., Hamilton, Ont., which is building extensive additions for finishing steel, advises that eventually a 22-inch mill for rolling structural shapes up to 12 inches will be installed. This will be equipped with the usual appliances, including tilting table, hot beds, saws, shears, conveyors, etc. The building to be occupied by the extensions will be 60 x 600 feet. A warehouse of sufficient capacity to take care of continuous operations of the mill on various shape sizes also will be built.

Forgers Discuss War-Time Problems

American Drop Forge Association Holds Joint Session With Drop Forge Supply Association—Many Interesting Papers Alluding to Conservation of National Resources Presented—Priority System Discussed

ALMOST successful convention of drop-forge manufacturers was held in Buffalo from Thursday, June 20, to Saturday, June 22. It was the fifth annual gathering of forging experts under the auspices of the American Drop Forge association and the Drop Forge Supply association. Approximately 250 members, representing fully 85 per cent of the largest drop-forge makers in America attended. The general opinion of all speakers was that the saving of fuel and other material used by the drop-forge manufacturers is necessary to win the war. The morning session was opened by Mayor George S. Buck, of Buffalo.

The chair was occupied by R. T. Herdegen, president of the American Drop Forge association. In his opening address, Mr. Herdegen pointed out that the various members of the two associations had gathered together to talk over their troubles and to devise ways of getting around their difficulties. All the members now have many difficulties in common and everyone wants to help the other fellow out. Not long ago Canada investigated the coal situation thoroughly. If John Jones uses 1000 tons of coal a month, the Canadian fuel administration wants to know if he is getting the maximum amount of steam from that coal. If not, the administration wants him to make changes in his equipment. If he does not do this, the administration decreases his supply of coal. Many of the members here feel the time has come when the United States fuel administration will follow the same course. You will have to demonstrate to them that you are getting the maximum amount of heat units out of your coal. In other words, it is up to you to conserve the national resources to the best of our ability. Are you doing it? If not, you had better look into the matter and make a few changes because it will not be long before you will be asked. Such is the opinion of Mr. Herdegen.

Pittsburgh in 1919?

A letter was read from the municipal authorities of Pittsburgh extending an invitation to the two associations to hold their next convention there. Continuing the general session Thursday afternoon, H. D. Savage, vice president of the Locomotive Pulverized Fuel Co., New York, spoke on powdered fuel for drop-forge furnaces. He said: "With coal in Italy at $90 per ton, with coal in France at $60, and with fuel oil on the verge of practical confiscation to the use of armies and navies, it is imperative for each of us to study how we can do our bit to conserve this national resource—perhaps the most important to the needs of the country today. Toward this end it is well to consider that under normal conditions, coal when pulverized and burned in suspension, produces heat at a much less cost than with any known method of combustion other than natural gas. It is also worthy of consideration that with the great advance in prices of oil, the ratio of saving is much greater in favor of coal. Furthermore, the combustion of powdered fuel is as easily controlled as oil or natural gas, and in metallurgical works its advantages are many. There will be those who are still skeptical. It must be stated frankly that the installation of powdered coal at any plant calls for engineering specialization, and considerable grief would have been avoided in the past had those who are interested in the application of powdered coal recognized that each separate installation is a distinct engineering problem and calls for a competent and careful engineering investigation. I believe that powdered coal, if commercially used, will produce a fuel economy from 30 to 60 per cent over oil or coal burned by other methods, will increase production and greatly minimize the human element in the regulation of combustion."

More German Propaganda

THE question, "What will the forging business be after the war?" is one that the American forging industry is facing today. Arthur W. Farr said reports that Germany is exhausted, that her workmen are anemic from starvation, that her railroads and manufacturing plants are run down, and that she will be far behind when the commercial race begins after the war, may well be suspected of being a rather coarse form of German propaganda. The war instead of exhausting Germany's industrial and trading potentialities has actually organized Germany for commerce. The vast majority of the plants that are working to capacity on war-time production can be turned promptly to commercial production. It seems safe to expect that we will have a keen competition to face after the war.

Any Grade of Coal Suitable

In the discussion following the reading of his paper, Mr. Savage said that any grade of coal is suitable for burning in the powdered form. Some coals cannot be burned in any other way. Rhode Island anthracite is a good example. The government said this coal would be the last to be burned in this country. However, at present it is being used successfully.

C. E. Adams, Cleveland Hardware Co., Cleveland, next spoke on welfare work in forge shops. This address was the feature of Thursday afternoon's session. It was accompanied by numerous lantern slides. Mr. Adams said that the care of the human machine has been deeply studied the last few years. "There are several important factors connected with welfare work, but probably the most important is the dining room," he said. "It brings men together and gives them a chance to talk over the working conditions in the shop. My company started out by lining the men up at a lunch counter and serving them coffee. Later we bought large tin cans. The men placed their order early in the morning and at noon their lunch in these tin boxes was brought to them. Later we set up tables in the aisle close to the forging hammers. We distribute 21,000 bottles of milk monthly, the cost of which generally averages about $800. The dining room also gives an opportunity for a library. In our foremen's dining room we have on display a chart which shows the progress of our month's business. Don't be afraid to advertise your business to your men, because it pays good returns. If you

have a good thing in your shop, print it and distribute copies to your men. If good reading matter is good for you, it is good for your men. If you read trade papers and your men do not, then both of you are being educated along different lines and will never get together. We teach English to foreigners by Professor Roberts' oral method. You may be surprised to know that we teach dancing once a week to the girls who operate the presses. A girl who is light on her feet is a better proposition from the safety standpoint than one who is not. If you will look over your past accident records, you will probably find that 80 per cent or more of the accidents were due to clumsiness."

A paper on figuring the cost of drop forge dies was given by S. A. Keller. Various operating costs are kept in many departments of the drop-forge business, but the cost of die sinking is only estimated. It is often kept in the die sinker's note book. Too much dependency is placed on the memory of the foreman. A collection of true itemized statements of die sinking gives an accurate line on costs.

Two Methods of Selling

T. W. Siemon, vice president, Union Switch & Signal Co., Swissvale, Pa., led a discussion as to whether forgings should be sold direct or through brokers. He said the broker's interest is confined to making a sale in order to get a commission. Usually he is granted exclusive territory with a commission not only on initial but also on repeat orders, as well as on all business coming from his territory whether created or handled by him or not. With the incentive of a commission, his zeal for business tempts him to hold out false promises as to deliveries, terms, etc., and he is inclined to make commitments to the embarrassment if not the loss of his employer.

The subject of electrical systems for forge shops was thoroughly delved into by Edward McIlvried, Champion Machine & Forge Co., Cleveland, who also explained in detail the electric installation of his company. Mr. McIlvried contends that the use of the electric motor has gradually revolutionized power transmission and that the use of the electromagnet has correspondingly revolutionized the manual handling of steel production. The electric motor is now being universally used where possible in drop-forge shops for all power purposes.

G. A. Richardson, Midvale Steel & Ordnance Co., Philadelphia, in presenting his paper, "Steel for Gears", said that the choice of proper material for gears depends first upon a thorough knowledge of the character of service to which the gearing is to be used. Second, from the design standpoint, the size and shape of the parts is also important, especially as to heat treatment. The larger the gear, the greater the difficulties in heat treating. Third, the choice further depends upon the maximum qualities, character of the heat treatment, the life of the finished gear, the uniformity of results, and the actual costs. The largest number of gear failures results not from defects in the steel but from improper handling. This is more true of alloy than of carbon steel where heat treatment is necessary and temperature limits narrow. Trouble often arises from heating the steel at too high and too low temperatures, bringing up the temperature too rapidly, inaccurate pyrometer readings, and imperfect cooling conditions. Steels which give the best results are more expensive, require careful handling, and are not readily machined. Case-hardened gears prove more satisfactory than oil-hardened ones.

Warning is Sounded

"MY MESSAGE to the trade," said H. N. Taylor, president Drop Forge Supply association, "would be to urge everyone to be forehanded in preparing for next winter. Operating conditions then may easily be worse than last. In buying materials nowadays, dependability is more important than price. Take on business representing war requirements, both as a matter of patriotism and expediency; unless you do you may starve for lack of raw materials, as the lines are being tightly drawn against nonessentials.

"Few industries are more closely related to war work than the drop forge trade. The members of the Drop Forge association can be counted upon to do their part to the best of their ability, under the difficult conditions brought about by the war, toward equipping our country with all possible speed for the struggle in which it is engaged."

The Friday morning session was opened by B. K. Reed, engineer, Dominion Forge & Stamping Co., Walkerville, Ont. In speaking of his paper entitled "Cost of Heating of Steel", he said that the cost of coal has increased 188 per cent in the past four years and oil 375 per cent for the same period; so it is necessary for the drop forger to reduce the use of this fuel to the lowest possible minimum. Mr. Reed presented data which showed the success his company has made toward reducing the fuel costs.

Mr. Reed was followed by G. W. Pressell, chief chemist, E. F. Houghton Co., Philadelphia, who spoke on quenching oils for forgings. George C. Stebbins, superintendent, Wyman & Gordon Co., Worcester, Mass., presented a paper on "Treatment of Piston Rods". Following Mr. Stebbins' paper was one by A. V. Farr, Hess Steel Corp., Baltimore, who reviewed briefly the method of making electric steel. Moving pictures showing the application of thermit welding were thrown upon the screen and the important stages were pointed out by W. R. Hurlbert, Goldschmidt Metal & Thermit Corp., New York. J. T. N. Hoyt, associated with Albert Kahn, architects and engineers, Detroit, pointed out the salient features of forge-shop construction, as various slides were shown on the screen.

Interest during the Friday afternoon session centered around Thomas C. Powell, representative of the priority division of the war industries board at Washington. Mr. Powell explained the various angles of priority and how they came to be used in this country. He said that approximately 1000 applications were received daily by the priority committee. He emphasized that if anyone in the audience has any cause to apply for a priority, to send their application direct to the priority board and not to an individual member, because the former procedure would save many hours' delay.

Engineers Meet in East

September 9 to 14, will be the dates of the annual convention of the Association of Iron and Steel Electrical Engineers. This meeting will be held at the Southern hotel, Baltimore. A tentative program, which covers a wide range of interesting subjects, has been prepared as follows:

Papers by the standardization, safety and electrical committees of A. I. and S. E. E.
"Methods of Education for Electrical Employes of Iron and Steel Mills," educational committee, A. I. and S. E. E.
"Remote Controlled Substation," W. T. Snyder.
"Automatic Engine Stops," Walter Greenwood.
"Standardization of the Rating of Large Steel Mill Motors," K. A. Pauly.
"Practical Method of Selecting Carbon Brushes," Alfred Mullhaupt Jr.
"Bridge Motors for Cranes," R. H. McLain.
"Condensers and Condensing Engineering Practice," D. D. Pendleton.
"Roller Bearings for Cranes," P. B. Liebermann.
"Installation and Operation of Auxiliary Drives," J. D. Wright.
"High-Tension Installations Under Severe Conditions," James Farrington.
"Electrical Driven Mills Showing Tonnages, Costs, Etc.," J. T. Sturtevant.
"Sixty-Cycle Versus 25-Cycle for Steel Mills," J. E. Fries.

Clear Up Doubts Over Priorities

Clerical Errors in War Industries Board's Announcement of June 6, Are Corrected—Blanket Certificates Will Not be Issued—No Classification of Nonessential Industries Will be Made—Orders to be Ranked

WASHINGTON, June 25.—Clerical errors in the phrasing of the resolutions by which the government on June 6 assumed control of the distribution of all iron and steel products have been found to be mainly responsible for the confusion and misunderstanding in which the trade has found itself following promulgation of the plan. Some uncertainties were expected to follow this drastic action but the adjustment to the new conditions has been much slower than had been anticipated. Last week the errors were discovered and the trouble is believed to have been remedied in full.

The resolutions, word for word, as announced by the war industries board, were carried on page 1477 of THE IRON TRADE REVIEW of June 13. Under the paragraph beginning "Now therefore, it is understood," etc., the resolutions as announced said: "(2) After priority certificates shall have been issued for or filled, then," etc. Maurice Hirsch, secretary of the priorities committee, says the original draft of the resolutions had been copied wrong and should have read "(2) After the orders covered by priority certificates shall have been provided for or filled, then," etc.

No Blanket Priorities

In addition to making this point clear, Mr. Hirsch has sent out a circular letter in answer to all inquiries, which settles some other questions of importance. Among other statements, the letter says no blanket certificates of priority are to be issued. The report has gone out through the trade certain industries or individual plants are to receive blanket priority numbers. This is an error. The priorities committee, in the letter, calls attention to paragraph 31 of circular No. 3. This paragraph which is part of "Rules and Regulations" (Circular No. 3) of the priorities division of the war industries board, says:

"No industry, plant, material or commodities, or work are classified Only specific orders for materials, committees, or work are classified according to their importance in war preparation or in work necessary to the public interest and essential to the national welfare, or otherwise of exceptional importance."

The following is the priorities committee's circular in full:

"1. Allocation of steel is undertaken by the director of steel supply only with reference to direct government orders. All other orders must be placed by the concern desiring the steel. Deliveries will be made by the steel companies under the terms set out in the enclosed copy of a resolution of the war industries board of June 6 adopting an agreement of the steel manufacturers. It should be noted that deliveries of steel can be made for the uses within the classification of purposes stated in the resolution, provided only that such deliveries will not interfere with orders actually covered by priority certificates. Inquiry should be made of the source of supply to ascertain if there will be a delay in delivery. If satisfactory delivery can be secured without priority assistance, no application for a priority certificate should be made. If, however, it appears at any time that there will, without a priority certificate, be a serious delay in the delivery of material which is essential for use in war work or other work of essential importance, application for priority assistance should be made. Application form P. C. 11 must be used.

"2. No blanket priority certificates are issued; only specific orders are classified according to their importance in war work or work otherwise of exceptional or national importance. See paragraph 31 of Circular No. 3, enclosed herewith.

"3. There has been no classification of industries as nonessential. The classification of purposes referred to in paragraph 1 above is the only list at present having to do with preference in securing materials, and at the present time its use in this regard is limited to deliveries of steel. It serves only as a guide to the steel companies with reference to such deliveries of steel as will not interfere with steel orders covered by priority certificates. This classification of purposes is the same as that embodied in the preference list issued by the priorities board. The preference list, however, at the present time applies only to the supply, distribution and transportation of coal and coke.

"4. With reference to material for replacement or maintenance of stock, priority is granted only when it is clearly shown that an urgent need exists for the maintenance of the particular stock for use in was work or other work of exceptional importance. The application must state in detail the nature of the intended uses of the materials and must embody an affidavit and guaranty that the materials will be uesd solely for such purposes. The application must cover specific orders for the materials desired, as no blanket certificates are issued. Application form P. C. 11 must be used."

In the above letter, reference is made twice to "application form P. C. 11." This form is the one set out on pages 12 and 13 of Circular No. 3.

Additions to Preferred List

In paragraph 3 of the priorities committee's letter, reference is made to a preference list at the present time applying only to the supply, distribution and transportation of coal and coke. Part of this list, which is steadily growing, was published in THE IRON TRADE REVIEW last week. It is expected additional names will be carried in these pages from time to time. While the names, as the priorities letter says, do not apply to preferential shipments other than of coal and coke, iron and steel manufacturers, who must always remember the list is subject to change, may find them of assistance in selecting customers engaged in essential war production.

The latest list of preferred coal and coke consumers certified by the priorities committee to the fuel administration, includes the following:

The Chelsea Fiber Mills, Brooklyn, No. Y.; Liberty-Durgin, Inc., Haverhill, Mass.; the Andrew B. Hendryx Co., New Haven, Conn.; the Lee Lime Co., Lee, Mass.; the New England Lime Co., New Milford, Conn., and Renfew, Mass.; the H. K. H. Silk Co., Watertown, Conn.; the United Lead Co., Keokuk, Ia.; the Century Stearic Acid Candle Works, New York; the Buhl Stamping Co., Detroit; the Wrought Iron Range Co., St. Louis, Mo.; the Invincible Grain Cleaner Co., Silver Creek, N. Y.; the W. A. Jones Foundry & Machine Co., Chicago; the Highland Body Mfg. Co., Elmwood Place, O.; C. Kenyon Co., Inc., Brooklyn, N. Y.; the Wheland Co., Chattanooga, Tenn.; the Lookout Boiler Mfg. Co., Waterford, N. Y.; the Columbia Wagon Co., Chattanooga, Tenn.; the Ford Mfg. Co., Waterford, N. Y.; the Columbia Wagon Co., Columbia, Pa.; the New-Castle Knitting Mills, New Castle, Pa.; the Consolidated Expanded Metal Co., Rankin, Pa.; Frank A. Hall & Sons, Southfields, N. Y.; the Keeler Brass Co., Grand Rapids, Mich.; the American Optical Co., Southbridge, Mass.; Dravo Contracting Co., Neville Island, Pa.; Stephen Ransom, Inc., Philadelphia, Pa.; the Underwood Typewriter

Co., Inc., Hartford, Conn.; the Crown Overall Mfg. Co., Cincinnati; the Maryland Brass & Metal Works, Baltimore; the Norberg Mfg. Co., Town of Lake, Wis.; the Bayley Mfg. Co., Milwaukee, Wis.; Frank Betz Co., Hammond, Ind.; the Link-Belt Co., Philadelphia; the E. L. Pach Co., Stoneham, Mass.; the Kusa Spelter Co,. Kusa, Okla.; the Petroleum Iron Works Co., Sharon, Pa.; the Kittingler Co., Buffalo, N. Y.; Fay & Scott, Dexter, Me.; the Edge Moore Iron Co., Edgemore, Del.; the Iron City Products Co., Pittsburgh; the International Metal Stamping Co., Detroit; American Standard Metal products, Paulsboro, N. J.; the Indiana Trunk Corp., Ind.; Wm. Cooper & Stephens, Chicago; the Meade Rubber Co., Stroughton, Mass.; the American Circular Loom Co., Kenilworth, N. J.; the American Zinc, Lead & Smelting Co., Hillsboro, Ill.; the H. K. H. Silk Co., Putnam, Conn.; the Blodgett & Orswell Co., Pawtucket, R. I.; the Linen Thread Co., Greenwich, N. Y.; the W. Warren Thread Works, Westfield, Mass.; the Linen Thread Co., North Grafron, Mass.; the Smith & Dove Mfg. Co., Andover, Mass.; the Union Thread Co., Cincinnati; the Clark Thread Co., Newark, N. J.; the Stamford Foundry Co., Stamford, Conn.; C. L. Berger & Sons, Boston; the Wheelock, Lovejoy & Co., Cambridge, Mass.; Heywood Bros. & Wakefield Co., Wakefield, Mass.; the Wood Flong Corp., Stillwater, N. Y.; the Waterman Mfg. Co., Portland, Me.; Copper Range Co., Painesdale, Mich.; the Keystone Lime & Stone Co., Port Deposit, Md.; the American Lubricator Co., Detroit; William A. Hardy & Sons, Fitchburg, Mass.; Oliver Ames & Sons Corp. Plant Ames Shovel & Tool Co., North Easton, Mass.; the Menantica Sand & Gravel Co., Millville, N. J.; the Sicota Rubber Co., Columbus; the Carlson-Wenstron Co., Philadelphia; the Bassick Co., Bridgeport, Conn.; Kertscher & Co., Elmira, N. Y.; the D. Wilcox Mfg. Co., Mechanicsville, Pa.; Frankel Bros., New York.; Geo. D. Whitcomb Co., Rochelle, Ill.; Hernance Machine Co.. Williamsport, Pa.; Frost-Sibley Lumber Co., Lamison, Ala.; the Linen Thread Co., Paterson, N. J.

Pig Iron Situation Under Close Tab

WASHINGTON, June 25.—Problems of pig iron production gradually are becoming questions requiring governmental solution. With practically the entire furnace output being allocated through the pig iron section in the steel division of the war industries board, difficulties encountered by producers are receiving this department's official attention. The latest phase of the question is the apparent determination of the government to force pig iron consumers to send in properly filled out the questionnaires distributed by the subcommittee on pig iron, iron ore and lake transportation of the American Iron and Steel institute.

The method the government likely will use in compelling the recalcitrants to fall in line is that suggested by H. G. Dalton, chairman of the committee, in his letter of May 28 to producers—to consider them nonessential and to allocate among more essential iron users the tonnages they otherwise might receive. With the demand there is today for pig iron of practically all grades, the government would have little difficulty in disposing of any stocks thus released. It is said this plan would apply to war as well as nonwar consumers. The attitude of some of these customers has been a surprise to furnace companies as well as to the

When Mr. Dalton was in Washington Friday with the steel committee relative to ore, coke, pig iron, scrap and steel prices for the third quarter, he spent considerable time in conference with J. L. Replogle, director of steel supply, and J. C. McLauchlan, chief of the pig iron section. None of these gentlemen would discuss the attitude of the consumers in question, or state what course the war industries board would pursue in dealing with them. The suggestion of this drastic step was heard, however, and it likely will come. Mr. Dalton, in suggesting originally that the time limit be made June 6, selected the date which later saw the entire distribution problem pass into the government's hands. The other suggestion,

Form 1f-4

Name of Company ..... *Report for the Week Ending* .....

Location .....

WAR INDUSTRIES BOARD, WASHINGTON, D. C.

PIG IRON, FERROMANGANESE, ETC.

All in Gross Tons

	BASIC	BESSEMER	FOUNDRY AND MALLEABLE	LOW PHOS.	BESS. FERRO HIGH SILICON	SPIEGEL FERROMANG.	ALL OTHER, INCLUDING OFF IRON	GRAND TOTAL
1. Tonnage brought forward from last week								
2. Tonnage received during week								
3. Total tonnage								
4. Tonnage shipped during week								
5. Tonnage canceled during week								
6. Total outstanding tonnage at end of week								
7. Tonnage produced last week								
8. Stock on hand								
9 Total direct Government tonnage on books								
10. Total indirect Government tonnage on books								
11. Total direct Government shipments during week								
12. Total indirect Government shipments during week								
13. Total direct Allied Governments tonnage on books								
14. Total indirect Allied Governments tonnage on books								

15. Total number of furnaces (.....). Number of furnaces in blast (.....). If reduced output state cause.

Send Original each Monday to
J. LEONARD REPLOGLE,
Director of Steel Supply,
War Industries Board,
Washington, D. C.

Send Duplicate each Monday to
Mr. H. G. Dalton, Chairman,
Subcommittee on Pig Iron, Iron Ore, and Lake Transportation,
800 Western Reserve Building,
Cleveland, Ohio.

Signed .....

By .....

REVISED FORM TO BE USED BY PIG IRON PRODUCERS IN REPORTING CONDITION OF ORDER BOOKS

that of classification as nonessential, may be just as significant.

The extent to which the government expects to keep tab on pig iron distribution may be seen in the revised weekly report blanks Mr. Replogle sent to furnaces. These new reports, duplicates of which now are to go to Mr. Dalton instead of to James B. Bonner, vice chairman of the subcommittee on steel distribution, as formerly, require statistical entries for six additional items: total direct government tonnage on books, total indirect, total direct shipments during week, total indirect; total direct allied governments tonnage on books, total indirect.

Letter Accompanies Blank

The letter concerning the new blanks tells the producers:

"We are sending you under separate cover a new report blank which is to be filled out for the use of the pig iron section of the war industries board. You will see that this report is largely the same as the one you have been filling out and sending in, but we have added to it items relative to the government tonnage which you have on your books and which you are shipping, as well as that for the allied governments. These latter items can be more or less easily handled now that Mr. Dalton's committee is asking you for reports in conjunction with the questionnaires that you are sending out to your customers.

"We do not wish to make a duplication of the committee's work, but we think that we should have this report sent direct to us and copies sent to Mr. Dalton in order to conform along the lines of the steel reports which the war industries board have and are obtaining, thus completing the entire ferrous metal production of the country. If you will give this your very best attention you will oblige."

Five-Billion-Dollar Gun Bill Approved

WASHINGTON, June 23.—The largest appropriation bill ever framed by any nation for heavy armament, a measure providing 5,435,096,224 for scientific armament for a modern army, was reported today by the house committee on fortifications. The bill indicates that the United States is preparing for hostilities until 1921, as much of the money cannot be spent in less than three years.

The purpose of the United States, as explained by Representative Borland, is to attain quantity production of every conceivable agency of armament. It is calculated that all the field artillery and ammunition needed by the American forces in France before January, 1919, will be supplied from French sources, and, in the meantime a supreme effort backed by all the necessary money will be made to put production on a huge basis. The program, approved by General Pershing, does not contemplate the building of siege cannon in great numbers for another year and a half.

The aim of the bill is not only to give the American army superiority in armament over the Germans but to provide the necessary protection for this country against any sort of invasion by land or sea. It provides for anti-aircraft defense and coast defense guns of from five to 12 inches in calibre, mounted on railway carriages for use here and abroad.

The effect of these plans on the iron and steel machinery-building and related industries is expected to be extensive as the government is to put forth greater efforts than ever before to rush production on an enormous scale. Cash appropriations carried by the measure amount to $2,811,630,379 and the contract authorizations allowed are $2,623,465,485. The principal items follow:

Continental United States: Gun and mortar batteries, $3,241,000; searchlights, $1,475,000; sound ranging equipment, $800,000; Sandy Hook proving grounds, $738,250; aviation and balloon stations, permanent, $10,500,000; seacoast cannon acquisition, $12,200,415; seacoast cannon ammunition, $2,175,000; seacoast cannon maintenance, $330,000.

Insular possessions:

Seacoast batteries, Hawaii, $500,000; aviation stations, permanent, $4.420,000; seacoast cannon acquisition, $359,000; seacoast cannon ammunition, $1,349,000; seacoast cannon maintenance, $200,000.

Panama canal:

Seacoast batteries, $343,700; land defenses, $510,000; military roads and railroads, $2.000,000; fire control stations, $345,888.85; aviation stations, permanent, $5,886,000; seacoast cannon ammunition, $368,000; seacoast cannon maintenance, $230,000; military structures, permanent, $16,686,255.

Board of ordnance and fortification, $100,000.

"A liberal allowance was made for the aid of the increased development of facilities in the way of production in this country which would accelerate the manufacturing program," said Representative Borland.

"In order to facilitate production of guns and ammunition, the war department has invested various sums in increasing the facilities of the factories in equipping men for this munitions work. These investments run from $26,000 up to $2,500,000 a factory. The big gun program will necessitate the construction of a complete United States manufacturing arsenal. This will be located on an island below Pittsburgh, where the United States will manufacture guns from the steel ingot up to the finished weapon.

"The large program for shells and ammunition also includes developed facilities all over the country. These facilities include nitrate plants, powder plants, acid and chemical plants, shell filling plants, bag loading plants, and plants for recovering toluol from manufactured gas, from California petroleum, and from the by-products of coke ovens. The program for the manufacture of powder and explosives is designed to make the United States independent of all foreign supply in this important factor in modern warfare.

"An appropriation of $1,500,000 is made for the expense of the operation of the proving ground at Aberdeen, Md., and Sandy Hook, N. J. These proving grounds are working to capacity in testing the guns and shells that are manufactured for the use of the army abroad. Six million three hundred thousand is granted for additional facilities at the proving ground at Aberdeen."

Capital Odds and Ends

WASHINGTON, June 18.—Restrictions upon the importation of chrome ore and chromite from overseas in order to promote the general policy of conserving shipping tonnage, had been announced by the war trade board. By this action it is hoped to stimulate the extensive development of domestic sources of supply which are said to be numerous and are believed to be capable of important exploitation. While the development of domestic deposits is being advanced, imports from Cuba, Guatemala, Newfoundland and Brazil by sea not exceeding 43,500 tons up to March 30, 1919, and from New Caledonia up to 10,000 tons prior to Dec. 31, 1918, will be permitted. Shipments over land or by lake from Canada, over land from Mexico or as return cargo from European ports and coming from convenient ports and not involving delays in loading, will be permitted. All outstanding licenses for import of chrome ore and chromite for overseas had been revoked as to shipments made after June 15, 1918.

* * *

Reports have been made to the department of agriculture by 600 tractor owners on corn belt farms in Illinois. These show that the estimated average life of a farm tractor is from seven and one-half to eight years, and that owners use such outfits on an average of 45 days per year.

Housing Up to Secretary

President Issues Order Vesting Authority in Secretary of Labor Wilson—Requests for Aid Flood Department

WITH full power vested in him by President Wilson, Secretary of Labor Wilson now has entire charge of the housing problem. An executive order signed last week transfers to the latter official the authority granted the President by virtue of the act of congress, entitled "An act to authorize the President to provide housing for war needs," which was approved May 16, 1918.

Work will be started immediately on the various projects which have been considered by the labor department's bureau of industrial housing and transportation. This division, for which Otto M. Eidlitz was appointed director last March, will have charge of the administration of the $60,000,000 which has been appropriated to provide adequate housing in industrial centers. Approximately $10,000,000 of that amount will be for housing within the District of Columbia. Announcement has been made that housing projects in Washington will in all probability embrace sites on the plaza near the Union depot and adjoining the building of the war industries board on Twenty-third and Twenty-fourth streets. Comfortable, sanitary, single-room dormitories for about 5000 women workers will be constructed. Ample recreation facilities and safeguards for health and comfort will be provided.

Munition Workers Problem Solved

Considerable attention has been paid to the housing of munition workers. Investigations have been conducted and housing developments will be made shortly in the following cities: Bath, Me.; Bethlehem, Erie, Sharon and Philadelphia, Pa.; Bridgeport and New London, Conn.; Charleston, W. Va.; Norfolk and Portsmouth, Va.; Portsmouth, N. H.; Rock Island, Moline and East Moline, Ill.; Davenport, Iowa; Quincy and Lowell, Mass.; Watertown and Niagara Falls, N. Y.; Indianhead and Aberdeen, Md.; New Brunswick, N. J.; Mare Island, Cal.; Puget Sound, Wash.; Alliance, Niles and Warren, O.; Hammond, Ind.; and Newport, R. I.

In all probability many districts will be disappointed, since requests for government aid in financing houses for war workers are inundating the labor department. Allotments, while of a tentative character have been officially announced as follows, totaling $49,550,000:

Bethlehem, Pa.	$9,000,000
Norfolk, Va.	7,000,000
Washington	7,000,000
Philadelphia	3,600,000
Rock Island, Ill., Moline, Ill., and Davenport, Ia.	3,000,000
Bridgeport, Conn.	3,000,000
Washington navy yard	3,000,000
Quincy, Mass.	2,500,000
Erie, Pa.	2,800,000
Portsmouth, N. H.	2,500,000
Puget Sound, Wash.	1,500,000
Watertown, N. Y.	1,200,000
Watertown, Mass.	1,000,000
Charlestown, W. Va.	400,000
Bath, Me.	350,000
Groton, Conn.	350,000
Troy, N. Y. (Watervliet arsenal)	250,000
Washington Steel & Ordnance Co., Giesboro Point, D. C.	250,000
Lake Denmark and Dover, N. J., and Iona Island, N. Y.	50,000

Other cities than those previously mentioned, which have made application to the housing bureau for help in solving their housing problems are: Cleveland, Dayton, Canton and Elyria, O.; Alton and Harvey, Ill.; Bay Ridge and Port Jefferson, L. I.; Bayonne, Elizabeth, Jersey City, Newark and Phillipsburg, N. J.; Buffalo; Easton and Williamsport, Pa.; New Haven, Conn.; Pensacola, Fla., and Wilmington, Del.

Co-ordinates War Labor

Designed to bring under central control, the labor activities of all government departments identified with the production of war materials, the office of administrator of war labor activities was recently created by Secretary of Labor Wilson and Prof. Felix Frankfurter was appointed to fill it. His duty will be to co-ordinate the industrial sections of the war and navy departments, the shipping board, the department of agriculture and the war industries board, all of which have hitherto acted independently in obtaining their labor supply and in making wage awards. Since May, 1917, Mr. Frankfurter has been serving as confidential assistant to Secretary of War Baker and has recently returned from a trip to England and France, where he made an intensive study of war labor conditions. In an interview, Mr. Frankfurter said that in his new capacity, he will work for uninterrupted maximum production while endeavoring to distribute adequately, the country's labor supply to meet the increasing needs of war industries. He was born in Vienna in 1882 and located in this country 12 years later. He was graduated in 1906 from Harvard law school and has since held several important positions.

Issues Novel Insurance

Effective May 15, an insurance plan has been inaugurated by the Gilbert & Barker Mfg. Co., West Springfield, Mass., gas machines, tanks, etc., for the benefit of its 1500 employes. This plan provides against disability by sickness and accident, old age and death. The disability feature provides that all employes of one or more year's service will receive half pay for periods ranging from six weeks to a year, according to length of service. The annuity plan provides that a regular allowance of 2 per cent of salary for each year of service for all employes at the age of 65, after 20 years of service, with a minimum of $300 a year and a maximum of 75 per cent of salary or wages. Special provision is made for retiring employes less than 65 years old after 20 and 30 years' service. Death insurance will be graded according to earnings and length of service with a maximum of $2000 and a minimum of $500. The plan is a non-contributary one and is being tried out for the first time in New England.

Labor Notes

Striking employes of the United States Shipbuilding Co., Knightsville, Me., numbering 150, who demanded the government scale of wages, returned to work when the demands were granted.

The employes of the Readville, Mass., shops of the New York, New Haven & Hartford railroad, who struck June 10, returned to work the following morning for two weeks, pending a decision by the war wage and adjustment board in Washington.

Striking employes of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., decided to return to work, when the company granted a wage increase. It was not as much as they had demanded and a demand for the recognition of the Federation of Labor as a union was abandoned.

Effective July 1, the L. S. Starrett Co., Athol, Mass., is to give its employes a midyear bonus. The terms include those who have worked one year and under, 4 per cent; one year and under three years, 6 per cent; over three years and under five years, 8 per cent; five years and over, 10 per cent. The Union Twist Drill Co., in that city will likewise pay the same bonus.

British Iron Trade Revolutionized

Extensive Turning Over of Furnaces to Basic Production Brings Sweeping Changes. With Manufacturers Unable to Commit Themselves as to Future Outlook—Shortage of Fuel Causes Concern

Bureau of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., June 11.

A MARKED difference in the situation in the pig iron market is evident as between the Midland and other iron fields. In the north of England supplies to the controlled consumers have been above normal, trucks having been plentiful, while makers have been able to cope with consumers' demands. In some months previous allocations have had to be cancelled at the end of the month, but nothing of this kind has happened in May, while June certificates will show a substantial increase. Forge iron in particular is easy to get in good quantity, but makers are cautious, preferring not to commit themselves too far ahead.

Export trade is negligible. The total business last month was 40,000 tons, of which 13,000 tons were hematite. Two years ago exports were double the amount in April. The warrant stock is unchanged at 290 tons. Hematite supplies on the east coast show some improvement from which the home consumer has benefited, but this is partly due to smaller shipments to the allies. All sales are at maximum prices.

A different story has to be told in regard to the Midland trade. Derbyshire and Northampton districts are in normal times great sources of foundry iron, as well as of forge pig for the South Staffordshire works. The trade has been nearly revolutionized by the extensive turning over to basic production. The forge and foundry business has to suffer for this. The latter feels the pinch most severely, and quite a large proportion of the time of smelters is taken explaining to their customers their inability to keep up supplies. An undue proportion of the make intended originally for foundry iron, is turning out to be forge material. This is said to be due to poor and unsorted fuel, rain in the mines, which invariably lowers the product from the furnaces, and insufficient and inefficient labor.

More forge pig iron is available than for some time but this is at the expense of the foundries, some of which are in serious straits for supplies. Makers hope for the best but tell their customers frankly they see no prospect for improvement for some time. In the matter of railway service also the Midlanders do worse than in the north. In many cases, iron which usually goes direct to the customer is going on the bank to be picked up again with some additional expense to the producer.

Government Not So Insistent

It is fortunate the government is not so insistent as it has been for munition iron and steel, thanks to abundant supplies now accumulated. Undoubtedly production has gone off for the time being and recovery looks slow, some works not having reopened after the holidays. They found when they came to make repairs that the job was bigger than they supposed when the plant was running, a rather common experience with millwrights and engineers. In other instances consignments of coal from the pits have come along so slowly as to render resumption risky.

A new and disquieting element has appeared. The wages paid in munition works are so liberal that the puddler or millman finds he can get as much or more money on the semi-skilled job, possibly operating a repetition machine, as he could get facing the arduous and exacting furnace or mill. A number of men have forsaken the iron works. If this continues, something drastic will have to be done to arrest the movement. Puddlers are too scarce to be spared to do work which can be done by those without their special qualifications.

Recruiting activities continue although a certain amount of resistance is offered by the management. Then we have the summer weather, which appears to have come in earnest. Several works have put in short time this week and one of the largest Staffordshire forges was wholly idle yesterday. Manufacturers facing the high cost of fuel are not anxious to start mills which may be subject to frequent stoppages. However, from the war point of view, the reduction of output is not so serious as it would have been some months ago. In fact, a certain surplus of iron and steel is being found for nonwar purposes, and customers who were peremptorily turned down a few months ago have been agreeably surprised to receive deliveries or promises thereof. Warehouses also make a better show of stocks than for some time.

There is a great outcry for scrap of which better supplies would be forthcoming if the railways could give more efficient co-operation. All kinds of rolled iron are in good demand including five-eighths and ½-inch bars for the nut and bolt trade, and sheets, chiefly for the requirements of troops on the continent and to no small degree for the acommodation of American soldiers.

The bimonthly return of selling prices for March and April has just been issued by the Midland Iron and Steel Wages board and shows a very slight advance in the selling figure for March and April. The arrest of the long-continued advance staves off further increases in wages, a development very acceptable to ironmasters who greatly desire stability both in selling prices and wages. The agreeable change is attributed to the extension of control by the ministry of munitions. In regard to some products, this involved a decided reduction, which has sufficed to counterbalance whatever small increases may have taken place. Production was well maintained during March and April, but wages will remain at $4.56 per ton for puddling, with forge and mill hands in proportion. The average selling price for the 17 selected firms was £15 13s 2d ($76.16) compared with £15 12s 3d ($75.84) for January and February.

The shortage of fuel causes a good deal of concern. The combing out of colliers is having a double effect. Those men left at work deem it their duty to give their friends drafted into the army a suitable send-off, so numerous small holidays are taken. The garden allotment at this charming season of the year proves more attractive than the dark and dusty coal mine. Moreover, full time in midsummer is contrary to all usages in the coal trade, and the collier is either unable or unwilling to change his habits, even at the call of the highest patriotism. Fortunately no house coal is wanted just now, but wharves are as bare as they were sometimes during periods of a national coal strike, and the consumers are hoping for some improvement in supply before the urgent calls arrive in the fall.

Price Fixing

In Refractories Uncertain—Producers' Books Show High Costs

Pittsburgh, June 25.—Uncertainty exists as to whether or not the government will fix prices on refractories. Accountants of the federal trade commission have examined the books of producers and are understood to have been surprised at their high costs, which have left them only a moderate margin of profit. Conferences were held subsequently in Washington between the manufacturers and representatives of the commission. There is a strong belief that, if prices for refractories are fixed, one of the impelling reasons will be to stabilize the labor situation.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK.

(First Quality)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK

(Second Quality)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESITE BRICK

(Per Net Ton)

9 x 4½ x 2½	$110.00 to 130.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	$135.00 to 140.00

BAUXITE BRICK

(Per Net Ton)

55 per cent	$40.00 base
76 per cent	100.00 base

Operations are estimated at approximately 90 per cent of capacity, and the output is almost on an even keel with demand which is largely for first and second quality brick, for blast, open hearth and heating furnaces and soaking pits. The market is firm at the prices quoted herewith, except for magnesite brick, which is easy at $110 to $130.

Output will be affected considerably, it is feared, if the fuel administration applies its general policy of coal conservation to the refractories interests, as it probably will do. This policy calls for the limiting of coal requirements for socalled nonessentials to 25 per cent of the normal tonnages used.

Nearly the entire force of the Unionville, Conn. plant of the Upson Nut Co. went out on strike recently because it refused to grant the 200 employes a 9-hour day with 10-hour pay. Employes state that they are willing to work a 55-hour week but want 60-hour pay. William A. Hitchcock, manager of the plant told the employes that no other bolt and nut companies are doing what they demanded and he could not.

Completing New Yard

Work is well advanced on the new shipbuilding department of the Ferguson Steel & Iron Co., Buffalo, and it is expected that a start will be made on the government shipbuilding contracts early in July. The new shipyard will have a frontage of approximately 2500 feet on the Buffalo river with a width at its widest point of 800 feet. The John W. Cowper Co., of Buffalo, has the contract for all the construction work in connection with the new plant except the foundation piling which is being done by the Empire Engineering Co., also of Buffalo. The new yard will be about opposite the plant of the Donner Steel Co. and is being equipped with ample tracks and switching facilities from the Delaware, Lackawanna & Western railroad.

The present contract calls for the building of six seagoing tugs and 16 barges for the new state barge canal. All the craft will be of steel construction and each tug and each barge will be 150 feet in length. Work on the tugs will begin in July. There is room for the construction of four tugs at the same time and it is hoped to complete the first two tugs before the close of navigation. The third and fourth tugs will be started approximately two months after work begins on the first and second.

There will be space also for the construction of six barges at the same time the tugs are being built. The first one will probably be completed within six weeks of the time construction begins. One week after the first is begun the second will be begun, and the others will follow at intervals of one week.

The launchings will all be by the side. The fabricating will be done at the present plant of the Ferguson Steel & Iron Co. and railed to the shipyards. About 1000 tons of structural steel fabricated by the company will go into the erection of buildings at the yard. The construction of the ways will be of wood supported by wooden piling capped by concrete.

Furnace D at the Central group of the American Steel & Wire Co., Cleveland, was recently blown out for relining. A 10-foot salamander was encountered in the hearth and this is at present being broken up by means of dynamite. This stack was first placed in operation July 17, 1911, and is of the thin-lined, bucket-cooled type. Heretofore a 12-inch lining was used, but at this overhauling a 22-inch lining will be installed, the buckets removed and cooling of the lining effected by means of sprays.

Steel Specifications

(*Concluded from Page* 1619)

tions are performed by different contractors, the following provisions will apply:

(a) If projectiles are rejected at the plant of the machining contractor on account of defects in the castings, such castings shall be replaced by the foundry contractor or the government shall be reimbursed for the value of the same.

(b) The machining contractor will reimburse the government for the value of castings rejected due to defects in machining operations for which he is responsible.

FACILITIES FOR INSPECTORS

Inspectors and other duly accredited representatives of the government will have free entry at all times to all parts of the manufacturer's plant which concern the manufacture of the material ordered. The manufacturer will afford the government representatives free of cost, all reasonable facilities to satisfy them that the material is being furnished in accordance with these specifications. All the tests and inspections will be made at the place of manufacture prior to shipment and will be so conducted as not to interfere unnecessarily with the operation of the plant. The manufacturer will provide within his plant a suitably furnished office for records, drawings, books, etc., to be used exclusively by the government representatives.

GAGES

The manufacturer will provide all the gages needed for the manufacture and inspection work except that the government will in general provide the inspectors with a set of reference inspection gages covering the important dimensions to be gaged. These will be available for reference purposes. A satisfactory system of gage inspection and checking must be maintained by the manufacturer. Inspection gages will be inspected and checked by the government inspector. Drawings of all gages will be submitted by the manufacturer for approval.

MARKING

(a) When the casting and machining operations are performed by different manufacturers, each casting shall be permanently marked with the cast number and symbol of the foundry and accepted castings shall be stamped by the government inspector. The machined projectiles made from such castings shall be stamped with the cast number, the symbol of the foundry and the symbol of the machiner, and after acceptance shall be stamped by the government inspector.

(b) When the casting and machining operations are performed by the same manufacturer, the finished projectile shall be stamped with the cast number and the symbol of the manufacturer, and after acceptance shall be stamped by the government inspector.

VARNISHING, PAINTING AND PACKING

Varnishing, painting and packing shall be performed in accordance with current specifications.

Restricts Exports

Canada Adopts License System For Shipments of Machinery

Toronto, June 17.—To further restrict importations, the exportation of machinery has been prohibited except under individual license. Applications for the approval of licenses must be made to the war trade board. Restriction will be felt severely by certain makers of agricultural implements having a large export trade.

Several directors of the Steel Co. of Canada, Ltd., who recently went to Pittsburgh to negotiate for an interest in an American coal property have returned. They report having been successful in the purchase of coal areas in association with large American steel companies. The steel company's proportion of the purchase price will be over $1,700,000.

The Dominion Steel Corp., Sydney, N. S., has granted increases of wages aggregating more than $300,000 annually to its lower paid workmen, having accepted the finding of the royal commission which recently investigated labor conditions at Sydney and recommended the increase.

A strike of Toronto iron molders after lasting four weeks has been settled. The men were receiving 50 cents an hour for a 9-hour day. They demanded $6 a day for the same number of hours. A compromise was effected on the basis of an increase of 10 cents an hour. Hamilton and Kingston molders will receive a similar increase.

Canada to Rush Ships

Shipbuilding on an extensive scale is foreshadowed in the formal announcement of C. C. Ballantyne, minister of marine and fisheries, concerning the new industry to be located at Halifax, N. S.

The present drydock at Halifax which was damaged by the explosion last winter has been acquired by the government and will be equipped with the latest machinery for repairing ships of the largest type. The property immediately adjoining the drydock, known as the Acadia Sugar Refinery property, has been purchased by the Halifax Shipbuilders, Ltd., in which James Carruthers and J. W. Norcross of the Canada Steamship Lines, Ltd., and R. M. Wolvin, president of the Montreal Transportation Co., Ltd., are interested. Three shipbuilding berths will be laid down on which ships of approximately 10,000 tons will be constructed. The new plant will cost between $3,000,000 and $4,000,000 and will employ between 3000 and 4000 men.

Sir Joseph Flavelle, chairman of the imperial munitions board, gave some details in a recent interview as to the enormous amount of ship construction and munition work undertaken in Canada. He stated that there is now under construction one-quarter of the total of merchant ship tonnage produced in Britain last year. Eighty per cent of the ships will be completed this year.

The contract originally awarded by the Canadian government to the Norton Griffiths Co., for the development of the St. John, N. B., harbor and recently transferred to the St. John Drydock & Shipbuilding Co., provides for the establishment of a drydock 1150 feet long to accommodate the largest type of ocean vessels, and the establishment of a steel shipbuilding plant. The company is associated in this enterprise with the Midland Shipbuilding Co. and the Great Lakes Transportation Co. Among the capitalists interested is J. A. Paisley, of Cleveland.

The Nova Scotia Steel & Coal Co., during May broke all previous records for the output of iron and steel. The open-hearth plant produced 14,558 tons of steel ingots and the blast furnaces 8835 tons of pig iron, as against 14,243 tons of steel and 8016 tons of iron in March, 1917. These were the best previous records for a period of one month.

Obituaries

R. B. CARNAHAN, vice president of the American Rolling Mill Co., Middletown, O., accidently shot and killed himself June 23 at his home. His body was later found by R. C. Phillips, secretary of the company, with whom he had made an appointment. In Mr. Carnahan's one hand was a small revolver, while in the other he carried a target board. He had slipped on a rug and in trying to break the fall he struck a vase, discharging the gun. The bullet entered his head above the left eye. Mr. Carnahan possessed a national reputation as a metallurgist.

Thomas Ingram Jones, treasurer of the Chrome Steel Co., Chrome, N. J., died June 15 at his home in Brooklyn.

Frederick E. Perkins, president of the Rhode Island Perkins Horeshoe Co., Valley Falls, R. I., died at his summer home, Woodlake, Johnston, R. I., from heart trouble, June 13, aged 68 years.

Morrill A. Phillips, who for many years was in the tack manufacturing business with his father and who later purchased the business of L. C. Waterman, Hanover, Mass., tack manufacturer, died at his home in that city May 30, aged 75.

Edwin Larson, who specialized on tractors and who has installed American-made machinery in almost every country in Europe, died June 16 at Naples, Italy, according to word received by his parents who reside at Elgin, Ill.

Frank E. Brightman, general superintendent of the Brightman Nut & Mfg. Co., Sandusky, O., died recently, aged 53. He formerly was associated with the forging department of the Westinghouse Machine Co., Pittsburgh.

Elmer Parker Howe, one of the founders and a director of the United Shoe Machinery Co., died at his home in Boston, June 18, aged 67. It was in his father's shop in Worcester, Mass., where he learned the machinist's trade. His father, Archelaus M. Howe, was a maker of cutting dies, etc. Since he preferred law, the son developed into a noted patent attorney and served the Shoe Machinery company a long time as general counsel.

Herman H. Klusman, a pioneer machine tool builder, of Cincinnati, died suddenly from apoplexy in that city June 5. Mr. Klusman was a native of Cincinnati, and had been in the manufacturing business all of his business life. He was one of the organizers of the Greaves-Klusman Machine Tool Co., maker of lathes, and retired from that firm about five years ago to become treasurer of the J. R. Wood Supply Co., in which he had a large interest.

Henry S. Hallwood, aged 70, inventor and manufacturer of Columbus, O., died suddenly at his home there June 10. He invented important cash register devices, parts of computing scales, a time lock, car coupling and the Hallwood paving block. He was born at Stockton Heath, Cheshire, near Warrington, England, and located in Canada in 1874. Later, he moved to Charleston, W. Va., and about 30 years ago moved to Columbus, where he since has lived.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

CHRISTIAN GIRL has resumed his duties as president of the Standard Parts Co., Cleveland, having resigned his connection with the motor truck division of the war department. Colonel Glover's appointment to the head of the motor transport service made possible the acceptance of Mr. Girl's resignation, the latter having accomplished since September, 1917, what he set out to do at Washington. His purpose was two-fold; first, to create an organization to supervise the production of standardized trucks, and second, to remain with the organization until the trucks were being produced in quantities. J. G. Utz, director of enengineering, of the Standard Parts Co., who has spent most of his time in Washington during the past year in connection with the designing and production of army trucks has been transferred to Europe. He heads a body of civilians who are assisting the army in work connected with truck maintenance and operation. H. H. Newson, formerly production manager of the Perfection Spring division and later director of purchases for the entire company is assisting in the production of a certain type of radiator for the aircraft division of the government's forces.

W. J. Long has been elected president of the National Steel Products Co., Bessemer, Ala.

E. B. Moon now is director of sales and advertising for the Columbus Tractor Co., Columbus.

Ross Anderson is now manager of the new accessory plant of the American Locomotive Co., at Richmond, Va.

Ernest M. Hopkins, president of Dartmouth college, has been appointed assistant to Secretary of War Baker, in charge of industrial relations.

C. H. Newcomb, resident manager of Crocker Bros., Philadelphia, won the Pennsylvania state trap shooting championship at Lancaster, Pa., recently.

Elbert H. Gary, chairman of the United States Steel Corp., New York City, has rented an estate at Brookville, Long Island, N. Y., for the summer.

Philip T. King, sales manager for J. N. Kinney, 30 Church street, New York, conveying equipment, has entered military service and has reported for duty at a camp in Florida.

Henry Fischer has resigned as general sales manager of the Verona Tool Works, Pittsburgh, to accept an important position with the Procter & Gamble Soap Co., Cincinnati.

E. C. Smith resigned recently his position with the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., to become affiliated with the sales staff of the Matthew Addy Co., Cincinnati.

John F. Kane has been elected secretary of the Pullman Co., Chicago, to succeed A. S. Weinsheimer, deceased. Charles S. Sweet has been elected assistant secretary.

Ralph T. Stone, formerly in the New York office of the Sullivan Machinery Co., Chicago, has been placed in charge of that company's recently opened Washington office in the Union Trust building.

D. P. Brown resigned his position recently with the Bryant Chucking Grinder Co., Detroit. He now has charge of the Rochester, N. Y., office of the Hendy Machine Co., Torrington, Conn.

David L. Hallbert, sales representative of the P. & M. Co., Chicago, manufacturer of ralway supplies, was recently promoted to the position of district sales agent, with headquarters at Chicago.

W. P. Palmer, president of the American Steel & Wire Co., Cleveland, will as usual make Worcester, Mass., his summer headquarters, while the members of his family are at their Maine home.

William H. Barr, Buffalo, president of the National Founders' association, Indianapolis, spoke on war conditions at a conference of the Connecticut Manufacturers' association, New London, Conn., held June 18.

John J. Duggan, Springfield, Mass., was recently elected treasurer of the Chapman Valve Co., Indian Orchard, Mass. He has been a clerk for several years in the company's employ and now succeeds Ralph W. Wight, who died recently.

Stanley W. Midgley, formerly general sales manager of the Acme Supply Co., Chicago, has been made western representative of the railroad sales department in the western office of the Liberty Steel Products Co., Chicago.

George Welworth Hayden, who at one time was president of the Pratt & Cady Co., Hartford, Conn., has been appointed a major in the ordnance department and will have charge of small arms production in the New England states.

Joseph N. Bethel, superintendent of the Taft-Pierce Mfg. Co., Woonsocket, R. I., has been promoted to the position of production manager, and Walter E. Bennett, formerly assistant superintendent, succeeds him as superintendent.

Charles T. Main, Winchester, Mass., president of the American Society of Mechanical Engineers, has received an appointment from Governor McCall of Massachusetts to be a member of the recess commission on water resources.

James W. Hubbard has been reelected president and general manager of the United States Switch Co., Eau Claire, Wis. Charles McArthur was made secretary-treasurer, with Lee T. Pond as his assistant and F. E. Nicoles was elected vice president.

C. C. Hanch, treasurer and director of the Studebaker Corp., South Bend, Ind., has been appointed chief of the automotive products section of the war industries board. He succeeds H. L. Horning, who resigned recently.

Gifford Sibley, superintendent of the Columbia avenue branch of the General Electric Co., Pittsfield, Mass., recently received a first lieutenant's commission in the ordnance reserve corps of the national army. He has reported for duty at Washington.

Ralph A. Walters, assistant superintendent of the American Bridge Co., Pittsburgh, has been made superintendent of steel construction and installation of the ordnance plant to be

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

built at Neville island, near Pittsburgh, by the United States Steel Corp.

M. A. Beck who is vice president and chief engineer of the Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis., was elected president of the Engineers' Society of Milwaukee, Wis., was elected president of the Engineers' Society of Milwaukee at its recent annual meeting.

William G. Mather, president of the Cleveland-Cliffs Iron Co., Cleveland, has been asked by Mayor Davis, of that city, to serve as a member of the city hospital commission in place of W. P. Palmer, president of the American Steel & Wire Co., who is unable to act.

George C. Brainerd of the Hydraulic Pressed Steel Co., Cleveland, has been appointed to specialze in the production of shell forgings in the Cleveland district, under Samuel Scovil, who has been designated as Cleveland district chief of ordnance production.

Charles F. Michael, of the Ohio Locomotive Crane Co., Bucyrus, O., has been made president of a building company organized by manufacturers in that city. F. W. Hudson of the Ohio Steel Foundry is vice president and R. O. Perrott of the American Clay Machinery Co., is secretary.

L. E. Waite resigned his position as superintendent of the Becker Milling Machine Co., Hyde Park, Mass., to accept a similar position in the west. He was given a farewell dinner by his associates at Healey's hotel, Boston, at which he was presented with a silver service.

James L. Wick on July 1 will become special agent of the Youngstown Sheet & Tube Co., Youngstown, O., succeeding Roy Welch, who became assistant to President J. A. Campbell a short time ago. He formerly was employed by the Sheet and Tube company.

A. G. Smith, an electrical engineer who has been connected with the General Electric Co., has been appointed electrical engineer of the Boston & Albany railroad to succeed C. W. Dodge, who resigned to take an important position with the Bethlehem Steel Corp. in Philadelphia.

L. N. Ralph, who until recently had a position under W. P. Seibert in the rail and billet division of the Carnegie Steel Co., Pittsburgh, has been made asssistant treasurer and assistant secretary of the new ordnance department of the United States Steel Corp., at Pittsburgh.

W. S. Dawley, consulting engineer, formerly chief engineer for the Chicago & Eastern Illinois railroad, has been placed in charge of the business of C. E. Smith & Co., St. Louis, sales engineers, during the absence of C. E. Smith, who has received a commission in the national army.

Willis D. Ballard, vice president and general manager of the Coburn Trolley Track Co., Holyoke, Mass., and connected with the company since its organization, has received a major's commission in the ordnance department of the army. His headquarters will be in Boston.

Frederick M. Smith, president of the Henry & Wright Mfg. Co., Hartford, Conn., has been authorized by the United States commission on military athletics in Washington, to find and place civilians who will volunteer their services to improve the physical strength of soldiers.

Frank R. MacNiven has reported for duty at the Springfield, Mass., armory, having received a commission as first lieutenant in the officers' reserve corps. He has been assigned to the ordnance department. Formerly he was employed in the engineering department of the Norton Grinding Co., Worcester, Mass.

Major Louis J. Campbell, vice president of the Youngstown Sheet & Tube Co., Youngstown, O., has arrived safely in France, according to a cablegram received by his father, James A. Campbell, president of the company. Major Campbell received his training at Fort Benjamin Harrison last year and is now in the artillery service.

H. E. Noble, formerly of the New York office of Rogers, Brown & Co., who went to France as second lieutenant of the American Expeditionary forces overseas, after being graduated from the Plattsburgh training camp, has received a first lieutenant's commission after active service on the firing line.

L. D. Williams has been made sales manager of the New Jersey Zinc Co., 55 Wall street, New York. Bushnell Bigelow was appointed eastern sales manager to succeed A. H. Peck, who resigned to become affiliated with the American Smelting & Refining Co., as assistant to Joseph Clendenning, sales manager. F. C. Fuller has been made manager of export sales for the New Jersey Zinc Co.

D. O. Rice, formerly in charge of the Cleveland office of the Whitaker-Glessner Co., Wheeling, W. Va., has been transferred to the company's Cincinnati, O., office. He takes the place of A. F. Scherer, Cincinnati district sales manager, who recently resigned to accept a position as production supervisor in the ordnance department of the army with headquarters in Cincinnati.

B. F. La Follette has resigned from the service of the Clarage Fan Co., Kalamazoo, Mich. He had charge of the engineering, sales and advertising departments and on July 1 will commence to work for the government. He will be located either in Philadelphia or Washington as an engineer with the requirements division of the United States shipping board Emergency Fleet corporation.

Arthur A. Clement, president of the American Wire Fence Co., Chicago, has been elected vice president of the Page Steel & Wire Co., Pittsburgh, with mills in Monessen, Pa., and Adrian, Mich. Mr. Clement is the son of the late Austin Clement, formerly president of the Page company, who was succeeded by B. Lissberger of New York, formerly the company's vice president.

Lloyd Booth, treasurer of the Trumbull Steel Co., Youngstown, O., has been granted an indefinite leave of absence and is now located in Washington. He will enter an officers' training school for instruction to fit him for service in the nonflying division of the aviation corps. In his absence his duties as treasurer of the Trumbull company will be discharged by A. L. Button.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Price Fixing Has No Effect on Stocks

CONCLUSION of the conferences between the war industries board and the representatives of the iron and steel industry at Washington last week, with the decision that no change would be made in price schedules, excepting in the single instance of iron ore, caused hardly a ripple in Wall street. Price fixing has become so commonplace that it would take something radical to stir up much interest in financial circles in such developments. Instead, the street has been viewing with exceeding interest the events on the Italian front and conjecturing as to the amount of the next war loan.

When the Austrians first advanced beyond the Piave, stocks declined. Toward the close of last week, however, when it became known that the Italians were holding firm and inflicting great losses upon the Austrians, stocks strengthened, steel shares closing up about 2 to 4 points for the week.

Now that the collection of the June tax payments has been successfully accomplished, with a minimum of disturbance, the next big financial operation of the government is being regarded seriously. The treasury department recently announced it would raise $6,000,000,000 the next four months on short notes maturing around the end of the period. This is taken to foreshadow a government bond issue in October of a similar amount, but October is still rather distant and the secretary of the treasury has miscalculated before.

Sentiment Much Improved

In general, sentiment is much better in financial circles than in months. The fact that we already have nearly a million men in France, proof of the welding of the country together spiritually in national consciousness is an accomplishment of which all Americans are proud, in Wall street and out. The diversion of these men and a million more in training, from their usual work, with several million more engaged in war work, has been effected with comparative little real suffering in most lines of industry. In agriculture the outlook is bright, for we have the promise of an unusually large harvest, at a time when we are contributing food to our allies. The part we are taking in the war is becoming more and more evident daily, and this part is bound to influence, in a broad way, the security markets.

Leading bankers express the view that any positive turn in our favor in the war would find quick reflection in the stock market.

Westinghouse Buys Plant

The Westinghouse Electric & Mfg. Co., Pittsburgh, has purchased the property, business and good will of the Krantz Mfg. Co., Inc., Brooklyn, N. Y., safety and semisafety electrical and other devices, such as auto-lock switches, distribution panels, switchboards, floor boxes, bushings, etc. The supply department of the Westinghouse company will act as exclusive sales agent for the products of the Krantz Mfg. Co., whose business will be continued under its present name. H. G. Hoke, of the Westinghouse Electric & Mfg. Co., will represent the supply department at the Krantz factory.

Russian Losses Large

For the fiscal year ended April 30, the export firm of Gaston Williams & Wigmore, New York, had a net income of $3,188,727. This is equivalent to $10.63 a share on the 300,000 shares of stock, which while having no par value, are carried on the books at $40 a share. During the year, however, it was necessary to write off $1,751,309 in Russian business, because accounts were considered uncollectable in view of present conditions in Russia. This reduced the net income to $1,437,318, or to $4.79 per share.

Dividends paid during the year amounted to $1,275,000, or $4.25 per share and $23,487 was added to the surplus account. The surplus on May 1 was $1,432,418. Gross business transacted during the year by the export and import branch of the business totaled $57,537,991, and President Gaston stated in his report that on April 30 the corporation had $16,727,942 in unfilled orders.

Body Shares Earn $12.60

For the year ending April 30, net profits of the Fisher Body Corp., Detroit, totalled $2,854,481. This shows a gain over a year ago of $75,673. The company set aside $1,294,485 for the American and Canadian war taxes. The balance available for dividends was equal to $12.60 per share as against $9.51 a share earned in the year ended April 30, 1917. The comparative income account for years ended April 30 is as follows:

	1918	1917
Net earnings*	$4,352,078	$2,876,407
Interest	203,111	96,619
Deduction†	.....	615,043
Taxes	1,294,485	.....
Surplus	$2,854,482	$2,164,745
Prfd. divs.	326,305	262,500
Balance†	$2,528,177	$1,902,245

*Net earnings after deducting all expenses, depreciation, etc.

†Proportion of earnings accrued to Aug. 21, 1916, the date of inception of the Fisher Body Corp.

Use Trade Acceptances, Warburg Urges

The use of trade acceptances was advocated by Paul M. Warburg, vice president of the federal reserve board, in an address to the American Trade Acceptance council in Chicago, June 17. Mr. Warburg explained that a trade acceptance is a two-name note, signed by seller and purchaser, which can be discounted by any bank which is a member of the federal reserve system. More than 4000 firms are now using trade acceptances.

"Objections to trade acceptances could be raised only by two classes of business men, weak or unreliable purchasers who object to binding themselves to definite obligations, and those of great financial strength who desire to preserve their position of advantage as against weaker competitors," said Mr. Warburg.

"Trade acceptance tends to standardization of banking paper and equal-

ization of interest rates. It is to the nation's interest that money paid out for wages and material return as fast as it can to the producer. Pending the return of the money due him he must rely on bank credit. The single-name note serves as 'camouflage'."

Surplus Grows Swiftly

The New York Shipbuilding Corp. reports for the calendar year 1917 net income of $963,915, but included no provision for federal taxes in its statement. The profit and loss surplus as of Dec. 31, 1917, was shown as $1,791,449, an increase of $1,753,099 as compared with a year earlier. President Neeland, in the report, the the first to be issued by the corporation under its present ownership, briefly reviews the work of the yards at Camden under government contracts and says regarding the cost-plus-fixed-fee contracts given it that "this agreement, as finally concluded, has permitted a better utilization of the capacity of your plant for the needs of the government than would have been otherwise possible, and has been a vital factor in its greatly increased efficiency."

The report also reviews the enlargement of the plant during the last year as part of the war program, four large additional ways, capable of building 1000-foot merchant vessels, being practically completed, $1,400,000 having been expended on extensions to shops and ways, and still greater extensions being in contemplation. The number of men employed increased during the year from 4500 to 7500.

German Shipbuilders Busy

That German shipbuilders are not idle and that they are not slacking in their effort to increase that nation's tonnage of shipping, is shown by the report published in the *Svenska Dagbladet,* according to Consul General Albert Halstead, Stockholm, Sweden. He states that many concerns have increased their capital stock. Among them are the following, using $0.238 as a basis for the German mark;Blohms & Voss, Hamburg, from $2,856,000 to $4,760,00; Reiherstieg Shiffswerit, Hamburg, and Joh. C. Tecklenburg, each from $1,190,000 to $1,428,000. Next to the firm of Blohms & Voss, the concern of Howaldtswerke has made the greatest increase, 5,900,000 marks being added to its capitalization, increasing it from $952,000 to $2,380,000. Kook's Shiffswerit at Lybeck is next with an increase of 3,000,000 marks from $142,800 to $856,800. Another concern to make a large increase is Janssen & Schmilinsky from $71,400 to $714,000. Many of the smaller companies have increased from 25 to 50 per cent. The Allgemeine Elektricitats Gesellschaft and the Hamburg-American Line have begun works in Hamburg and two other yards have been constructed in Lybeck. In Stettin and Emden, additional yards are planned.

Buys Car Plant

To double its production of farm tractors and turn out approximately 400 monthly, the Parrett Tractor Co., 343 South Dearborn street, Chicago, recently purchased the Chicago Heights plant of the Central Locomotive & Car Works. The tract covers about 12 acres and the consideration was $250,000. It is improved with buildings, including a 150 x 160-foot machine shop building, a 200 x 300-foot storage building and a large structure covering about four acres for machines and erecting shop, boiler and blacksmith shops and offices. Several months ago, the tractor company sold its South Chicago plant to the Liberty Car & Equipment Co., since its facilities there had grown too small.

Financial Crop Ends

Directors of the Sloss-Sheffield Steel & Iron Co. last week declared a dividend of 6 per cent on the common stock, thereby making up to stock owners the payments which were deferred in the year ending April 30, last. The company renewed dividends on the stock at the rate of 1½ per cent quarterly, early last year, but decided to conserve cash after one payment had been made and passed the next dividend. The dividend will come out of 1917 earnings.

* * *

The National Brass Works, Inc., Los Angeles, Cal., recently organized with a capital stock of $50,000,000, has the following officers: President, H. L. Hartman; vice president, W. W. Witherby; and secretary and treasurer, Leonard Ruegg. Messrs. Hartman and Witherby were the former owners of the National Brass Works and Mr. Ruegg recently acquired an interest The plant will be extended. The company specializes in brass, bronze, zinc, bell metal, aluminum and gun metal castings. Finishing and plating departments also are operated.

T. J. Rafferty & Co., Inc., Worcester, Mass., iron and steel scrap and new and second-hand machinery, has been appointed New England representative of the Hofmann-Sproul Co., Philadelphia, engaged in the same line of business. The latter has a plant at Bell Road station, which supplies the chemical trade with the prepared iron used in the manufacture of aniline oil and allied products.

Benzol Supply

Expected Will be Sufficient to Meet Usual Domestic Requirements

New York, June 22.—Active selling featured the benzol market this week. Much spot and a great deal of contract product was sold. While the government will place contracts for large quantities before long, expectations are that the supply will be sufficient to meet domestic requirements. Consumers believe, however, that in case it becomes necessary to restrict commercial consumption, they will have a better chance of receiving deliveries if they place orders now. Prices on benzol continue around 25 to 30 cents per gallon, both for spot and contract.

Business in phenol reached fairly large proportions this week and producers who participated in the business again have been forced practically to withdraw from the market. Mostly all of the recent buying has involved spot and nearby deliveries. The market may be quoted at 47 to 50 cents per pound. In solvent naphtha there is a lull. Large new government orders are expected shortly. The market is at 18 to 22 cents per gallon, both for spot and contract. Releases for most of the toluol for essential domestic consumption during June were granted around the first of the month, so that no further activity in this direction is expected for another week or two. Then applications for July requirements will be considered. The price continues unchanged at $1.50 per gallon for tank cars and $1.55 for drums.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.25 to .30
Toluol (on sales sanctioned by government) (tank cars)	1.50
Toluol (on sales sanctioned by government) drums	1.55
Toluol (for government)	1.50
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.47 to .50
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia (nom.)	$5.65 to 5.75

Contract

Pure benzol	nominal
Toluol	no market
Solvent naphtha	nominal
Per Pound at Producers Plant	
Phenol	nominal
Per 100 Pounds at Seaboard	
Sulphate of ammonia (for commercial use)	no market
Sulphate of ammonia (for government)	$4.50

Demand for Heavy Equipment Rules

Heavy Ordnance and Shipbuilding Requirements Bring a Strong Inquiry for Large Machine Tools in Which All Districts Participate—Action on Several Large Lists is Still Pending

THAT lull which usually precedes a heavy demand incident to new munitions contracts, the large ordnance plant construction under way, and the railway requirements, is not apparent in the machine tool market. Shipbuilding and the combined volume of replacement buying have served to stabilize the demand for equipment and to tide over what would otherwise be a low point in the market curve. Increasing difficulty is apparent in the procurement of certain classes of heavy equipment. Large planers, boring mills, shears and milling machines are in keen demand, and in the case of used tools commandeering has been resorted to in some cases. The ordnance department through its localized organization has been able to make greater use of this means of procurement and the Emergency Fleet corporation, in the case of cranes has also exercised this perogative. The price consideration has been beside the point in most cases. Action has been deferred on a number of large requirements for which specifications are out. It is expected that an extensive list will be issued in the near future by the Wright-Martin Aircraft Corp., New Brunswick, N. J. This company withdrew a list which was put forth several weeks ago, and a larger inquiry is expected to result. Railway car builders, and ship fabricating shops are making a strong demand for heavy presses, shear, punches and drills and supplementary equipment. Used tools of this class are being sought in many cases, and rebuilt machines find a ready sale. Parallel with these inquiries is a steady demand for cranes. The volume of crane business current is indicated by the fact that in some instances builders are asked to furnish what portion they can of contemplated orders. A notable feature of the machine tool situation at the present time is the increased size of shell-making machinery which is sought. Smaller shell-finishing equipment is no longer in demand by used tool dealers, who find little market for it. Conversely large machines for shells of greater size are in keen demand and some manufacturers who have been buying tools are finding deliveries are slow.

Car Shops and Fabricating Plants Call for Cranes

ACTION on several of the large lists of machine tools now pending in the east is expected daily. These lists involve principally such tools as are needed in the shipbuilding, gunmaking and railroad industries. However, while there is an enormous volume of this business now before the attention of sellers, new lists during the past week have been comparatively few. There has been, however, a fair miscellaneous inquiry, and the actual trading of the past week has been due chiefly to this demand. Much delay continues to be experienced in the placing of orders by the railroads.

Several Large Requirements in Sight

An inquiry of considerable size expected to be issued within the next few days is that of the Wright-Martin Aircraft Corp., Brunswick, N. J. Several weeks ago, this company, after closing on a large number of tools for its plant at Long Island City, N. Y., came into the market with an additional heavy list. This it later withdrew. It is understood that the new list will be considerably larger and will involve several hundred thousand dollars worth of tools. Among several of the large lists expected to be closed within the week are those of the Bethlehem Shipbuilding Corp., which has started work on a yard at Alameda, Cal., and the Midvale Steel & Ordnance Corp., which is building a gun plant at Nicetown, Pa. The inquiry of this latter company, calling for more than 100 tools, will be increased considerably later. The Newport News Shipbuilding & Dry Dock Co. is still awaiting final approval by the government before going ahead with construction of the proposed engine plant at Richmond, Va. Westinghouse, Church, Kerr & Co. have yet to buy machine shop equipment for the Baltimore & Ohio shops now under construction at Glenwood, Pa. The American Shell Co., Paterson, N. J., is planning to erect a large addition to its plant, for which considerable machine tool equipment will be required. The American Car & Foundry Co. will be in the market shortly for several punches and shears. The Pressed Plate Steel Co., Pottstown, Pa., is inquiring for some plate shop equipment. The S. A. Ashman & Sons Co., Philadelphia, is buying a few tools for an addition to its forge shop. The Downey Shipbuilding Corp. is asking for a turret lathe for use at its yard on Staten Island, N. Y.

Crane Market Holds Steady

While the crane market is intensely active, fewer new inquiries came out during the past week. Among large buyers at this time is the New York Shipbuilding Co., which within the past few days has purchased six 20-ton and four 10-ton electric cranes from the Pawling & Harnischfeger Co., Milwaukee, three electric cranes from the Morgan Engineering Co., Alliance, O., 50, 20 and 10 tons respectively, and one 25-ton locomotive crane from the Ohio Locomotive Crane Co., Bucyrus, O. The New York Shipbuilding Co. is now in the market for electric cranes, of which eight will be of 15 tons capacity of 50-foot span, two of 15 tons capacity with 42-foot span; two of 5 tons capacity with 42-foot span, one with two 40-ton hoists and 103-foot span, and one special crane of 15 tons. The Air



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Although the increase in the demand for Agathon Steels is taxing our capacity---great as it is---to the utmost we are determined that the quality shall not suffer in the slightest degree.

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Cleveland Office: Hickox Bldg.
The Hamill-Hickox Co., Dist Rep.

J. E. Dockendorff & Co., 20 Broad St., New York.
Gen. Export Agents.

Philadelphia Office: 603 Widener Bldg.
Frank Wallace, Dist. Sales Mgr.

Syracuse Office: 621 University Block.
T. B. Davies, Dist. Sales Mgr.

Chicago Office: 1370 People's Gas Bldg., 122 South Michigan Boulevard. C. H. Beach, Dist. Sales Mgr.

Nitrates Corp., 360 Madison avenue, New York, is inquiring for eight new or used 15-ton locomotive cranes. The Federal Shipbuilding Co., New York, will close shortly on four 10-ton travelers inquired for a few weeks ago. In addition, the company now is in the market for three 10-ton and two 20-ton cranes. The American Car & Foundry Co. has revised and enlarged its recent inquiry, and is now asking for one 15-ton, one 10-ton and three 5-ton overhead traveling cranes, and one 5-ton gantry. The Vulcan Iron Works, Wilkesbarre, Pa., has awarded the Milwaukee Electric Crane & Mfg. Co., Milwaukee, a contract for one 30-ton, two 20-ton and three 10-ton overhead cranes, and one 5-ton wall crane. The Pratt Engineering Co., 25 West Forty-fourth street, New York, has bought one 50-ton and two 10-ton electric cranes from the Cleveland Crane & Engineering Co. This company also has been awarded a 200-ton crane by the government. The United States Cast Iron Pipe & Foundry Co., New York, has purchased two 10-ton and two 5-ton overhead cranes from the Pawling & Harnischfeger Co., Milwaukee. The Pennsylvania railroad is inquiring through its Philadelphia office for four 15-ton locomotive cranes. The Downey Shipbuilding Corp., Burlington, N. J., will buy a 35-ton overhead crane. The Atlas Crucible Steel Co., Dunkirk, N. Y., is in the market for a 25-ton traveler.

Heavy Equipment Active in Pittsburgh

MACHINERY and machine tool requirements for the plant to be built on Neville island in the Pittsburgh district for the ordnance department by the United States Steel Corp. are not yet known but it is probable the list will be issued soon. This plant will involve a great amount of equipment and considerable time will be required to get some of it, such as large cranes and forging presses. The corporation has put out a tentative inquiry for machine tools to make 1500 twelve, fourteen and sixteen-inch shells daily. The McClintic-Marshall Construction Co. is placing contracts for fabricating plants to be added to its capacity at Leetsdale, Pa., and Pottstown, Pa., at the request of the Emergency Fleet corporation. These plants will require about 60 cranes and hoists each, their capacity ranging from 5 to 20 tons. From this list the company has already awarded a contract for fifty 6-ton and eight 10-ton cranes for its Pottstown extension to Manning, Maxwell & Moore; for 20-ton cranes to the Toledo Bridge & Crane Co., and for 8 and 10-ton cranes to the Pawling & Harnischfeger Co. The Standard Steel Car Co. has placed a contract with Manning, Maxwell & Moore for an accumulator, pumps, a 1000-ton hydraulic press and other equipment for its Hammond, Ind., plant. It is stated The Alliance Machine Co. has been awarded a contract for 10 tower-whirler cranes by the Chicksaw Shipbuilding Co., Mobile, Ala. The Standard Steel Car Co. and the Pressed Steel Car Co. are buying equipment for fabricating work to be done at their plants at New Castle, Pa., and Allegheny, Pa., respectively.

Steady Buying in Chicago District

CHICAGO dealers in machine tools find most demands now are for heavy machinery, although there are in prospect some railroad lists including considerable light roundhouse equipment. In placing orders with manufacturers dealers find it necessary to have priority certificates in cases where definite promise of delivery is desired, but manufacturers are willing to book orders without priority certificates on which delivery will be made at convenience when priorities have been filled. Little information of a definite nature is coming out relative to the large munition plant the government is to establish in Chicago. It is said that the Symington interests at Rochester, N. Y., have been given charge and will erect this plant. Some tentative inquiries have been made for equipment but the plant is not yet under way and orders have not been placed. It is understood the plant will carry operations only through the forging process and tools will be required for that and for tool room use. The Illinois Central railroad is expected to come into the market shortly for equipment for several roundhouse shops to be built in a number of Illinois and southern cities. The McDougal-Duluth Shipbuilding Co. has just closed on an inquiry made several weeks ago, including a 15-ton shop crane and heavy shipbuilding tools, including plate bending rolls, punches, drills and other machines. A cranebuilder was recently asked to bid on such portion of 100 cranes as he could furnish, but the source of the inquiry has not been announced. The Acme Steel Goods Co., Chicago, has just bought 130 acres in the Lake Calumet industrial district, on which it plans later to build a steel hoop rolling mill to supply raw material for its finished product. The General Motors Co., of Detroit, has bought 105 acres at St. Louis, on which to build a body factory and automobile plant.

Brisk Tool Demand in the Cleveland District

NORMAL buying incident to newly placed shell and ordnance business is supplemented in the Cleveland district by considerable replacement activity. Several manufacturers are anticipating the prospect of additional pressure on production by replacing machines which have been in practically continuous operation. This demand coupled with duplication orders supplies an active market. Used tool dealers in particular report the best business in months, as many machines, particularly those used on lighter shell work, are being sold. Used heavy equipment is finding a ready sale. Planers, some classes of milling machines and boring mills are readily disposed of when located. Commandeering has been found necessary on the part of the government, and several instances are mentioned where tools held by used tool dealers have been taken on a commandeering order, which was later followed by an order from the manufacturer himself. The American Shipbuilding Co., Cleveland, has contracted for a portion of its requirements, for which a list was published some weeks ago, but up to the present is still in the market for shears, vertical boring mills and large milling machines. The Cleveland Punch & Shear Co. has purchased some milling machines and other tools for the manufacture of light punches and shears for shipyard work. The H. J. Walker Co., Cleveland, has purchased supplementary machines for the production of airplane crank cases. The White Motor Co. and the Warner & Swasey Co., Cleveland, have also been in the market for a few odd machines. The Standard Steel Car Co., Hammond, Ind., has secured some large used planers for special gun carriage work. The Cuyahoga Galvanizing & Mfg. Co., Cleveland, is in the market for the following tools: One 30 to 32-inch heavy duty lathe; one 18-inch shaper; one 2½-foot radial drill; one 18-inch lathe; one 20-inch drill press; one ⅜ to 1¼-inch bolt cutter, and a Harding furnace. The Kelly-Springfield Tire Co., Springfield, O., is inquiring for a No. 3 duplex milling machine, a 24 to 25-inch heavy duty engine lathe and a No. 3 B. Kearney & Trecker milling machine. The Torbenson Axle Co., Cleveland, is inquiring for heavy duty drill presses and a vertical boring mill. The American Clay Machinery Co., Bucyrus, O., will purchase a 24-inch x 14-foot lathe. The Dann Products Co., Cleveland, is inquiring for a 1¼-inch used hand screw machine. The Cleveland Electric Motor Co. is in the market for a disk grinder, a radial drill and a milling machine.

W.S.S.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BOSTON.—The S. A. Woods Machine Co. has purchased property for the erection of a plant addition.

FALL RIVER, MASS.—The Osborn Mills will build a 2-story, 81 x 107-foot factory, to cost $30,000.

NEW BEDFORD, MASS.—The New Bedford Boiler & Machine Co. is to build an addition.

NEW BEDFORD, MASS. — The Continental Wood Saw Co. plans to build a storehouse.

NEWTONVILLE, MASS. — The Silver Lake Co. has let the contract for a 2-story, 50 x 100-foot addition.

SCITUATE, MASS.—The government has let the contract for proving grounds, to cost $1,000,000, to the Hugh Nawn Construction Co., Roxbury, Mass.

SOUTH BOSTON, MASS.—The Linde Air Products Co. will build a brick plant.

SOUTH BOSTON, MASS.—Plans are being drawn for a mill construction, 2-story, 80 x 100-foot for the John W. West Co.

SOUTH BOSTON, MASS. — The Hunt-Spiller Mfg. Corp. plans a 1-story, 50 x 100-foot addition to its foundry.

WORCESTER, MASS. — The Eastern Bridge & Structural Co. plans building a steel, 1-story, 40 x 44-foot addition.

GREENVILLE, R. I. — The Greenville Finishing Co. has let the contract for a brick, 3-story, 90 x 150-foot plant.

PROVIDENCE, R. I.—Lockwood, Greene & Co., Boston, engineers, are drawing plans for additions to the factory of the Revere Rubber Co. to include a power plant.

HARTFORD, CONN.—The Standard Oil Co. will erect additions costing $75,000.

HARTFORD, CONN.—The Colt's Patent Fire Arms Mfg. Co. will build a 1-story manufacturing building to cost $23,000.

NEW HAVEN, CONN.—The Marlin Rockwell Corp. has awarded a contract to the Fred P. Ley Co., Springfield, Mass., for constructing a $60,000 factory building, 60 x 107 x 177 feet.

Activities in the Central States

ADRIAN, MICH.—The Adrian Water Co. will add pumping machinery to its water works plant, to cost $75,000.

BATTLE CREEK, MICH.—The Rich Steel Products Co. will build a 1-story extension, 49 x 257 feet.

DETROIT. — The Wolverine Tractor Co. plans to erect a plant at Saginaw and is in the market for equipment.

DETROIT.—The Stroh Castings Co. is planning to build an addition to its foundry and cupola house.

DETROIT.—The Michigan Steel Castings Co., F. R. Flinterman, president, is building a 1-story foundry and car shop, 90 x 135 feet.

DETROIT.—The Arrow Tool & Reamer Co. is building a 1-story addition, 36 x 60 feet.

DETROIT.—The Bellevue Industrial Furnace Co., J. C. Hinz general manager, will build a 3-story factory, 60 x 120 feet, to cost $20,000.

GRAND RAPIDS, MICH.—The Hackett Motor Co. is building a 1-story plant, 70 x 100 feet.

GRAND RAPIDS, MICH.—The Accounting Machine Co., New York, will build a new factory here.

LANSING, MICH. — The Eaton Rapids Woolen Mills Co. is contemplating erecting additions. No definite plans have been made.

MUSKEGON, MICH.—The Peninsular Ship Building Co. has purchased 2200 feet of Lake Michigan frontage as the site for its plant.

PONTIAC, MICH.—The Wilson Foundry & Machine Co. will build a 1-story machine shop addition, 41 x 169 feet.

PORT HURON, MICH. — The Mueller Metals Co. is being enlarged by the addition of a rod mill, brass shop and power plant.

SAGINAW, MICH.—The Saginaw Malleable Iron Co. will double the size of its plant by the installation of two more furnaces.

ST. JOHNS, MICH.—The Industrial Foundry Co. will build an addition.

CHICAGO.—A. M. Castle & Co. will build an addition, 136 x 308 feet, to cost $80,000.

CHICAGO. — The Superior Stove Works will build a 1-story addition, 30 x 72 feet. James Burns, 64 West Randolph street, is architect.

CHICAGO.—The Illinois Central railroad is making plans for yard enlargements and shop erection at Amboy, Carbondale, Champaign and Mounds, Ill., including machine shops, blacksmith shops and roundhouses.

CHICAGO.—The Northwestern Steel Corp., Minneapolis, has bought from the Franklin Park Foundry Co. its foundry group and site of 10 acres at Franklin Park, Ill. The plant will be improved and put into operation at once.

EAST ST. LOUIS, ILL.—The Monsanti Chemical Co. is planning a coal tar chemical plant to cost $1,000,000.

CANNELLTON, IND.—The Indiana Cotton Mills, J. E. Sirrine, architect, will erect an addition and install new equipment.

INDIANAPOLIS, IND.—E. M. Costin, of the Big Four railroad, has made public plans for double-tracking the road and for important improvements, to cost $11,000,000.

INDIANAPOLIS, IND. — Leslie Colvin, LaFayette, Ind., has obtained the contract for the erection of a new building for Indiana university, to cost $150,630.

CINCINNATI. — A proposed addition to the Lodge & Shipley Machine Tool Co. will be 94 x 560 feet.

CLEVELAND. — The Cleveland Armature Works is erecting several additions.

DAYTON, O.—The North Dayton Citizens' league has asked the council to arrange for the construction of a new bridge over Mad river.

ELYRIA, O.—Four bids have been received by the county commissioners for the construction of the Houghton bridge, near Wellington.

IVORYDALE, O.—The Procter & Gamble Co. is contemplating erecting several additions. The contract has been let to the Ferro Concrete Construction Co.

LIMA, O.—Legislation for a bond issue of $28,000 to build a bridge at the South Metcalf street crossing of the Ottawa river has been prepared.

BLACKEY, KY.—P. M. Clanahan, Charleston, W. Va., plans the erection of a new plant.

FULTON, KY.—The Illinois Central railroad, A. S. Baldwin, chief engineer, Chicago, will build yards and shops at Fulton, including a machine shop and boiler house 40 x 150 feet, a store house 40 x 120 feet and a boiler shop, at a cost of $225,000.

HAZARD, KY.—The Electrical Supply & Repair Co. will build a $20,000 repair and machine shop.

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PLUS QUALITY HH SERVICE

HAZARD, KY.—Kentucky River Power Co. plans construction of a 25-mile transmission line.

LOUISVILLE, KY.—The Columbia Truck Co. will install a machine shop and complete garage equipment in a $20,000 plant.

LOUISVILLE, KY.—The Louisville Tin Tag & Novelty Co. will install a stamping plant, printing plant, etc.

LOUISVILLE, KY.—Wuest Brothers have let the contract to E. L. Payne for the construction of a machine shop.

LOUISVILLE, KY.—The Louisville Carriage & Taxicab Co. will install a machine shop.

LOUISVILLE, KY.—The Boulier Sheet Metal Works let the contract to C. A. Koerner for the construction of a plant addition.

LOUISVILLE, KY.—The city plans the construction of a large terminal warehouse on the river front, with electric trams for transferring freight.

LOUISVILLE, KY. — The water works board has authorized the taking of bids on a new pumping engine of thirty to forty million gallons daily capacity, and new equipment for replacements of boilers, etc.

MUMFORDSVILLE, KY. — The Glen-Brook Power Co. plans power developments.

PADUCAH, KY. — The Illinois Central railroad is installing flue cleaning machinery, and has also started work on $250,000 round house and shop improvements.

FAIRMOUNT, W. VA.—V. Eshleman & Son, Anderson, Ind., has the contract for the erection of a factory here, 66 x 409 feet to cost $25,000.

WEST UNION, W. VA.—The Ideal Window Glass Co. is planning to rebuild its plant here, to cost $50,000.

WHEELING, W. VA. — The Wheeling Pulverizer Co. has been organized here and is contemplating erecting a plant.

BARABOO, WIS.—Sauk county is planning to build a 120-foot steel span bridge, to cost $50,000. M. W. Torkelson, Madison, is state bridge engineer.

CLINTONVILLE, WIS.—Sealed bids for the construction of 5000 lineal feet of 4 to 8-inch cast iron water mains are being taken until June 24 by Julius Spearbraker, city clerk.

FOND DU LAC, WIS.—The Galloway-West Co. is in the market for a boiler and other equipment for its new power plant, 30 x 40 feet, now being completed.

GREEN BAY, WIS.—The Northwest Engineering Works will begin work soon on construction of a steel fabricating plant and other improvements, to cost between $150,000 and $200,000.

HARTFORD, WIS.—The Kissel Motor Car Co. is erecting a 1-story factory and warehouse addition, 40 x 365 feet.

KENOSHA, WIS.—The Simmons Co. has awarded the contract for a new office building to cost $100,000 to Wells Bros., Chicago.

KENOSHA, WIS. — Architect John D. Chubb, Chicago, is preparing plans for a 3-story school, 300 x 300 feet.

KENOSHA, WIS.—The erection of a new motor truck plant, 125 x 300 feet for the Winther Motor Truck Co., Winthrop Harbor, Ill., is contemplated.

LA CROSSE, WIS.—The LaCrosse Plow Co. has broken ground for a new manufacturing building, 80 x 200 feet.

MADISON, WIS.—Armour & Co., Chicago, have acquired a site in Madison for a cold storage plant to cost $75,000.

MENASHA, WIS.—The Graef Mfg. Co. will build a one-story machine shop, 55 x 150 feet, and a screen manufacturing building, 110 x 150 feet.

MILWAUKEE. — The Maynard Electric Steel Casting Co. is building a 1-story foundry, 86 x 200 feet.

MILWAUKEE.—A factory building, 40 x 100 feet, to cost $10,000, will be erected for the Crown Metal Co.

MILWAUKEE.—The Modern Pattern Co. is enlarging its plant and installing eight to ten electric motors.

MILWAUKEE.—Kauffman Bros. will build a brick and concrete garage and service shop, 50 x 75 feet.

MILWAUKEE.—The gray iron foundry at Cedarburg, owned by the Western Rope & Mfg. Co., Milwaukee, is being doubled.

MILWAUKEE.—The Modern Steel Casting Co. recently enlarged its plant and further extensions are contemplated.

MILWAUKEE, WIS.—The Universal Machinery Co. has awarded the contract for the erection of a new foundry and core room to the Michie Construction Co.

MILWAUKEE.—Architects Gray & Siebert are ready for bids for erection of a factory and warehouse building, 60 x 155 feet, 2-story and basement.

MILWAUKEE.—The Milwaukee Dye Casting Co. has been granted a permit to build an addition, 50 x 60 feet, to its foundry building.

MILWAUKEE.—It is reported the Ferdinand Schlesinger interests will establish a plant for the manufacture of powder and other explosives here.

MILWAUKEE. — The Delta Construction Co., Escanaba, Mich., has the contract for constructing the new interstate bridge over the Menominee river.

MILWAUKEE.—The Globe Seamless Steel Tubes Co. will break ground for two additional units, 130 x 250 feet, and 130 x 170 feet.

MILWAUKEE.—The Milwaukee Structural Steel Co. has the contract for erecting the fog and light signal station at Manitowoc, Wis.

RACINE, WIS.—The Perfex Radiator Co. will build a 1-story manufacturing plant, 125 x 300 feet.

RHINELANDER, WIS. — E. A. Forbes, president, the Rhinelander Light & Power Co. is taking bids for an additional generating unit.

SHEBOYGAN, WIS. — Verhulst Bros. have the contract for erecting a $20,000 addition to the shops of the Jenkins Machine Company.

SHEBOYGAN, WIS.—A. Locke & Co. have awarded a contract to Loesing & Zurheide for the erection of a 3-story manufacturing plant, 60 x 85 feet, to cost $20,000.

STEVENS POINT, WIS.—The Automatic Cradle Mfg. Co. and the Bukolt Mfg. Co. are having plans prepared by Architect Frank Spalenka for steam generating plants.

WEST ALLIS, WIS.—The employes' clubhouse of the Allis-Chalmers Mfg. Co. was damaged by fire with a loss of $35,000 recently. It will be rebuilt.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y. — A $20,000 boiler plant will be constructed by the Robert Gair Co., 50 Washington street.

NEW YORK. — The Meuer Steel Barrel Co. is contemplating the erection of a group of factory buildings. The general contract has been let to Peter Gutby, Inc.

ROCHESTER, N. Y.—The F. I. Heughes & Co. Iron Works plans construction of a 1-story, 30 x 150-foot addition.

ROCHESTER, N. Y.—A 1-story, 50 x 100-foot extension will be made by the Monroe Iron Metal Cooperage Co.

WATERVLIET, N. Y. — The Adirondak Steel & Foundry Corp. is reported contemplating erecting a plant near here.

CONNEAUTVILLE, PA. — The Burke Electric Co., Erie, Pa., is said to be contemplating the erection of a branch plant here.

CONNELLSVILLE, PA. — The Capstan Glass Co. has bought the old plant of Ripley & Co. and will make extensive improvements and alterations.

FORT WASHINGTON, PA.—The Columbia Chemical Co. will build an addition to its plant.

HOLLIDAYSBURG, PA.—The McLanahan & Stone Machine Works was badly damaged by fire of unknown origin recently. The loss was estimated at $100,000.

HYDE CITY, PA.—The Nickel Alloys Co. is constructing a 140 x 250-foot tube mill, and a 40 x 80-foot machine shop.

NEW CASTLE, PA. — The Pennsylvania Engineering Works is contemplating the erection of a large addition.

PHILADELPHIA.—A $10,000 power house will be constructed by the Bellevue Worsted Mills, 30 x 90 feet.

PHILADELPHIA.—Thomas Reilly has the contract for building a $130,000 power house for the League island navy yard.

PHILADELPHIA.—A 1-story, 40 x 190-foot building will be erected at the ship chandlery works of Elisha Webb & Sons Co.

PHILADELPHIA.—Work will be started soon on construction of four additions to the plant of the David Lupton's Sons Co.

PHILADELPHIA.—The Keystone Supply & Mfg. Co. is having plans drawn for a 100 x 114-foot addition.

PHILADELPHIA.—The Mifflin Chemical Corp. is receiving bids through Architect Frank E. Hahn on construction of a boiler house.

PITTSBURGH.—The Aetna Chemical Co. is constructing a large plant at Mount Union, Pa., for the manufacture of explosives.

POTTSTOWN, PA.—L. F. Shoemaker & Co. have purchased 23 acres from the Pottstown Iron Co. to provide room for an addition.

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CLEVELAND, OHIO, U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, C'eve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 biack sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1, Chg.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	28.00 to 28.50
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	28.00 to 28.50
Heavy melt'g steel, Birming.	24.00 to 26.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup., St. Louis	32.50 to 33.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops eastern Pa.	39.00
Low phos. guaranteed E. Pa.	36.50
Shoveling steel, Chicago	29.00
Shoveling steel, St. Louis	27.00 to 27.50
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	30.75 to 31.25
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Chgo.	25.50 to 26.50
Stove plate, Cincinnati	21.50 to 22.00
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	24.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	24.00 to 25.00
Stove plate, eastern Pa.	24.00 to 25.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.40
Newark, N. J.	4.40
Boston	4.60
Philadelphia	4.10
Pittsburgh	1.40
St. Louis	4.60
Minneapolis, St. Paul	5.70
Buffalo to:	
Albany, N. Y.	$1.75
New England (rail)	3.90
New York and Brooklyn (rail)	3.90
Virginia furnaces to:	
Philadelphia	$4.10
New England	4.70
Brooklyn, Jersey City, Newark	4.40
Birmingham, Ala., to:	
Boston	$7.50
Cincinnati	3.60
Chicago	5.00
Cleveland	5.00
Louisville, Ky.	3.30
Minneapolis, St. Paul	7.30
New York (r. and w.)	7.50
Philadelphia (r. and w.)	6.60
Pittsburgh	6.10
Savannah, Ga.	3.40
St. Louis	4.25
Chicago to:	
Des Moines	$3.50
Minneapolis, St. Paul	2.50
Milwaukee	.60
Moline, Ill.	1.40
Omaha	4.50
St. Louis	1.90
Ironton and Jackson, O., to:	
Chicago	$3.75
Cincinnati	1.75
Cleveland	2.40
Detroit	2.60
Indianapolis	2.30
Minneapolis, St. Paul	5.70
Duluth, Minn., to:	
Minneapolis, St. Paul	$1.60
Mayville, Wis.:	
Minneapolis-St. Paul	$2.20

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	24.5 cents
Philadelphia	23.0 cents
Boston	27.0 cents
Buffalo	21.5 cents
Baltimore	22.5 cents
Cleveland	17.0 cents
Cincinnati	23.0 cents
Chicago	27.0 cents
Detroit	23.0 cents
Minneapolis and St. Paul	49.5 cents
Denver	$1.09
St. Louis	33.5 cents
New Orleans	38.5 cents
Birmingham	56.5 cents
Pacific coast (all rail)	$1.25
Pacific coast (tin plate)	1.25

IRON MILL USE

Angle bars, iron, Chgo.	39.00
Angle bars, steel, St. Louis	30.75 to 31.25
Angle splice bars, St. Louis (iron)	37.50 to 38.00
Arch bars, transoms, Chgo.	45.50 to 46.50
Arch bars and transoms, St. Louis	44.00 to 44.50
Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	29.00 to 29.50
Busheling, No. 2, Chgo.	19.00 to 20.00
Busheling, No. 1, St. Louis	28.00 to 28.50
Cast borings, New York	16.50 to 17.50
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast, borings, Cleveland	18.25 to 18.50
Cast borings, Cincinnati	17.00 to 17.50
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 12.50
Cast borings, Chgo.	18.50 to 19.00
Cast borings, St. Louis	17.25 to 17.75
City wrought, long, N. Y.	31.50
Cut forge, Chgo.	31.00 to 31.50
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.50 to 25.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	24.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	37.00 to 37.50
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	17.00 to 17.50
Machine turnings, Cleve.	17.00 to 17.75
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	18.00 to 19.00
Machine turnings, east. Pa.	19.00
Machine turnings, Birming.	16.50 to 17.00
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.50 to 27.00
Pipes and flues, St. Louis	26.25 to 26.75
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wrgt., No. 2, Chgo.	31.00 to 31.50
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
R. R. wrgt. No. 1, Birming.	24.00 to 25.50
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	32.00 to 32.50
Railroad wrought, No. 2	31.00 to 31.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	33.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	24.00
Shafting, New York	35.50
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	30.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 26.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 23.50
Cast, No. 1, Birmingham	24.00 to 26.00
Cast, No. 1, cupola east. Pa.	34.00
Cast No. 1, Cleveland	31.00 to 31.50
Cast, No. 1, Cincinnati	32.00 to 32.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32.50 to 32.75
Cast, No. 1, Chicago	31.50 to 32.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	27.50 to 28.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	33.00
Malleable railroad, Chgo.	33.00 to 34.00
Malleable, agricultural, Chgo.	31.75 to 32.25
Malleable railroad, St. Louis	29.50 to 30.00
Malleable agricultural, St. L.	28.50 to 29.00

MISCELLANEOUS USES

Boiler punchings, Chgo.	35.00 to 35.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birm.	37.50 to 38.50
Locomotive tires, Chgo.	44.00 to 45.00
Locomotive tires, St. Louis	41.50 to 42.00

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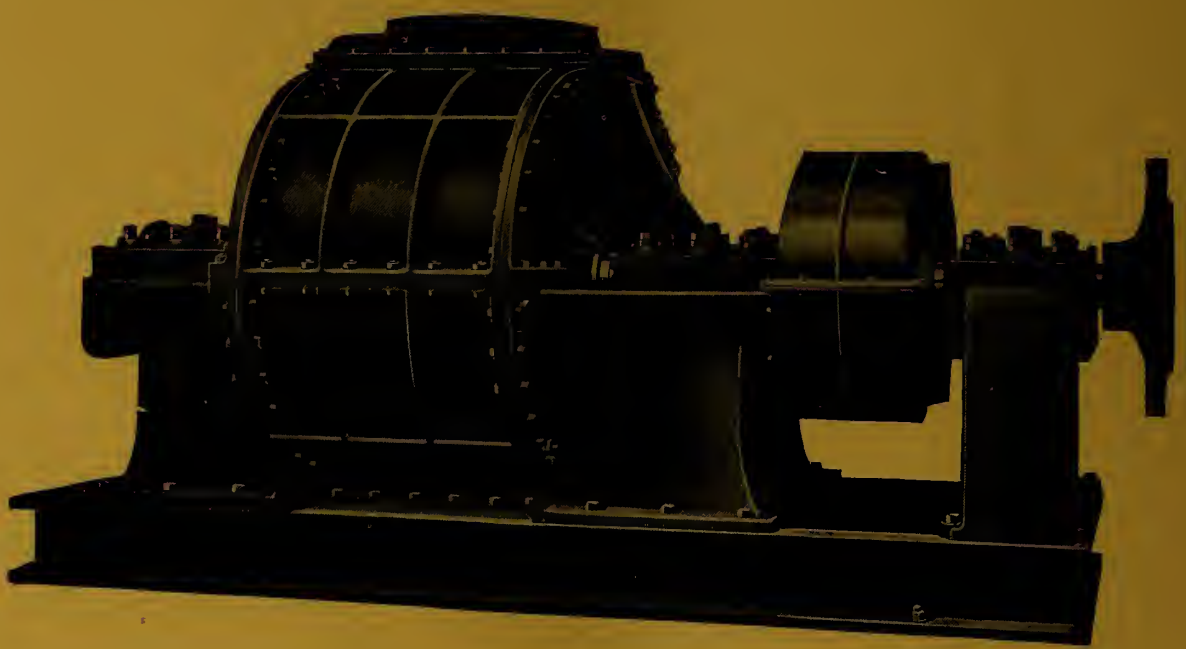
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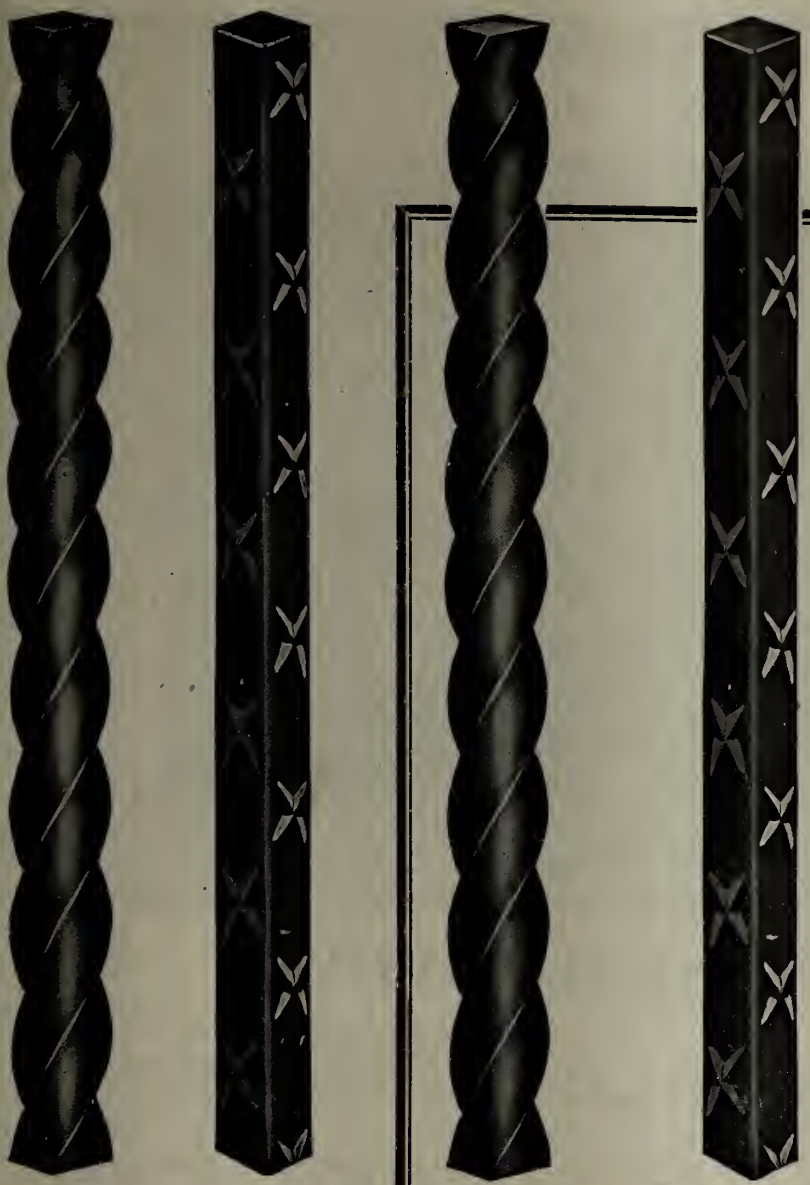
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You can save the loss of much ***time*** and ***money*** by specifying ***Buffalo*** Steel Company Bars for your reinforced concrete work. Their prompt service insures your having bars on the ground when the men go to work.

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Buffalo Steel Company

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Complete responsibility for the satisfactory delivery of commercially perfect steel, suitable for Drawing, Stamping, Cold Rolling, Hoops, Bands—and many other commercial purposes, backed by a complete organization of highly experienced operators, has established our successful, uninterrupted relationship with many old friends over a period of seventeen years.

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Small Special Shapes	Cotton Ties	Corrugated Roofing

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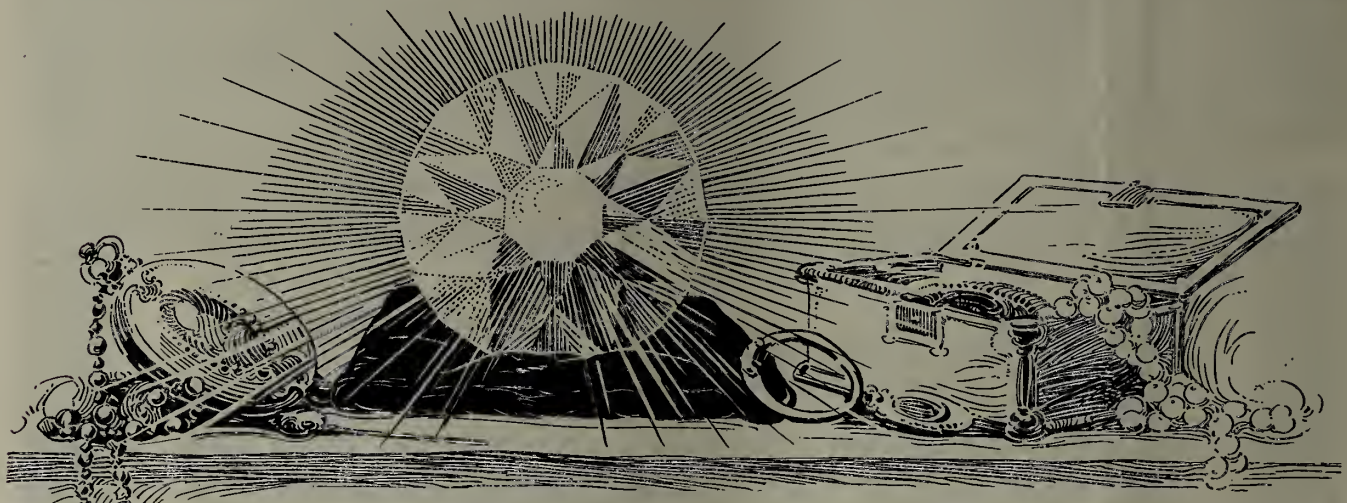
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The Diamond—The Recognized Standard of Quality Among Jewels

Q—Quality

Q is the 17th letter of the alphabet and the 17th of this series—The A. B. C. of "NATIONAL" Pipe Service. R—Research will appear July 11.

*Quality—(1) ******
*(2) ******
*(3) A distinguished and characteristic excellence or superiority.**
**(Century Dictionary.)*

¶ In this day so over-prolific of writers, good, bad and indifferent, certain words have lost much of their pristine freshness and therefore much of their original power to carry an idea-bearing meaning. Prominent among these hapless victims of exaggeration and over-statement is the word "QUALITY".

¶ QUALITY!—the word may sound trite and hackneyed through petty association—but by using this fine word in its true sense, even in this limited space, the QUALITY, "the characteristic excellence or superiority" of "NATIONAL" Pipe can be demonstrated.

¶ QUALITY may indicate basic virtue or represent comparative value. Sometimes it may do both, as in the case of "NATIONAL" Pipe. No one can deny that any great success must have beneath it a foundation of unassailable merit and QUALITY—so when we take into consideration the fact that about 90 per cent of all wrought pipe made and used today is steel, and that "NATIONAL" Pipe represents "the highest development of the art" of steel pipe-making, it will be seen that "NATIONAL" is a QUALITY product both fundamentally and comparatively.

¶ The high QUALITY of "NATIONAL" Pipe, by which it has assumed the leadership referred to and by which the industry as a whole has been improved and strengthened, is the result of QUALITY residing in the organization behind its production.

¶ National Tube Company has been a QUALITY organization from 1868 when the founders began in a little 20x125 ft. shop in Boston to the present time when 11 modern plants with an annual manufacturing capacity in the neighborhood of one and one-half million tons are engaged in manufacturing QUALITY pipe—"NATIONAL" Pipe.

¶ QUALITY gravitated to the organization through its policy of systematically employing highly trained men, modern methods and high grade materials, and this QUALITY has its natural expression in the product, "NATIONAL" Pipe.

NATIONAL TUBE COMPANY

DISTRICT SALES OFFICES

Atlanta · Boston · Chicago · Denver · New Orleans · New York · Philadelphia · Pittsburgh · Salt Lake City · St. Louis · St. Paul

ONAL" Pipe Service



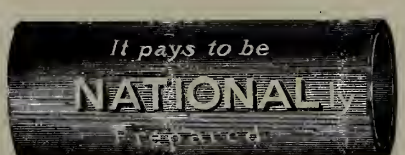
"NATIONAL"—The Recognized Standard of Pipe Quality

¶ Like the QUALITY of the diamond as compared to other jewels, the QUALITY of "NATIONAL" Pipe represents a standard among pipe values because of the "distinguished and characteristic excellencies" which have been woven into it by a QUALITY organization—these being as follows:

"NATIONAL" Pipe is the result of fifty years of pipe making experience.
"NATIONAL" Pipe is made under the unified control of one organization, operating eleven modern plants.
"NATIONAL" Pipe embraces a complete line — REMEMBER! THERE'S A "NATIONAL" TUBE FOR EVERY PURPOSE!
"NATIONAL" Pipe is Spellerized in the smaller sizes (4-in. and under) to lessen any tendency to corrosion.
"NATIONAL" Pipe is uniform in chemical and physical properties.
"NATIONAL" Pipe is manufactured in lengths up to forty feet.
"NATIONAL" Pipe is made full standard weight only.
"NATIONAL" Pipe is subjected to many regular and special tests and frequent inspections, thus eliminating any defective material.
"NATIONAL" Pipe is marked with the name "NATIONAL" to prevent substitution of inferior pipe.
"NATIONAL" Pipe is made in various types, suitable for practically every class of tubular service.
"NATIONAL" Pipe is economical—both in initial and ultimate cost.
"NATIONAL" Pipe is durable (and therefore economical).
"NATIONAL" Pipe is strong and ductile.
"NATIONAL" Pipe gives clean-cut and strong threads.
"NATIONAL" Pipe is especially adapted for bends and coils (because strong and ductile).
"NATIONAL" Pipe is smooth both inside and out and is therefore particularly suitable where enamel or other coatings are to be applied.
"NATIONAL" Pipe is an international standard of QUALITY, as recognized by the award of the Grand Prize at the Panama-Pacific International Exposition, 1915.
"NATIONAL" Pipe is the realization of an ideal.
"NATIONAL" Pipe is "the highest development of the art" so said the Superior Jury of Awards of the Panama-Pacific Exposition.

¶ It will be seen from the foregoing that the word QUALITY, as applied to "NATIONAL" Pipe, has a definite, tangible meaning, and when analyzed readily proves that "NATIONAL" Pipe and Allied Tubular Products possess a "distinguished and characteristic excellence or superiority" and are therefore QUALITY products.





(General Sales Offices: FRICK BUILDING) **PITTSBURGH, PA.**

PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle
EXPORT REPRESENTATIVES: U. S. Steel Products Co., New York City

Say you saw it in THE IRON TRADE REVIEW



WE have plans for our future development covering extension of our lines of manufacture to serve our natural territory, which will be of interest to steel consumers. But present construction costs are prohibitive and machinery and equipment impossible to obtain within a reasonable time. So we await the result of impending events.

INLAND STEEL COMPANY

First National Bank Bldg., Chicago

Works Indiana Harbor, Ind. and Chicago Heights, Ill.

Branch Offices - ST. LOUIS - ST. PAUL - MILWAUKEE - DENVER - DALLAS

All Enemy Attacks Repelled

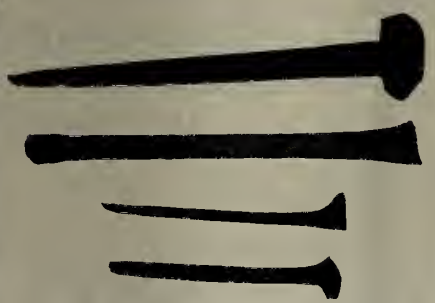
In the atmosphere, in the soil and in the waters of the ground are the active enemies of the useful metals, seeking always to weaken and consume.

Impure iron and steel quickly give way, but that which has been refined till only traces of foreign substance remain resists these assaults for generations.

Armco Iron is the **purest,** most **even** and most **durable** iron on the market. Hundreds of progressive manufacturers are insuring the future of their business by employing it for their products.



Armco Iron Tank for Railroad Volatiles, built by S. F. Bowser Co., Fort Wayne, Ind.



Pure Iron Nails from the Coffin of a Soldier buried in 1792 at Ft. St. Clair, Ohio, and exhumed in 1892. After 100 years in the ground they are practically unbarmed by rust. Analysis shows that they are 99.83% pure iron



Matthews Scrulix Anchors with Rods of Armco Iron.



The Kirby Casket—one of several handsome models built of Armco Iron, by The Springfield Metallic Casket Co., Springfield, Ohio.

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AMERICAN ARMCO INGOT IRON

The trade mark ARMCO carries the assurance that iron bearing that mark is manufactured by The American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

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PIG IRON
"Pioneer" Brand

"REPUBLIC" PIPE

Standard, Black and Galvanized
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Our customers number so many types and nationalities that we doubt if there is a single country in which "Republic" Pipe is not being used.
Quality is the reason.

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The first solid steel wheels made by Charles T. Schoen on October 5, 1903, were made from cast steel slabs. Later wheels were forged and rolled from rolled steel slabs.

In spite of defects due to imperfections in equipment and methods of manufacture, these early wheels gave most excellent service and some of them attained to phenomenal runs. This demonstrated the merits of the solid rolled steel wheel.

Since the Carnegie Steel Company engaged in the manufacture of rolled steel circular sections, particular attention has been paid to the selection of material and to improvements in equipment and methods of manufacture. In consequence, these products are now made exclusively from circular blooms cut to suitable lengths (disks), by whose use the very best distribution of metal in the finished product is attained.

Carnegie Rolled Steel Wheels

for railway and industrial uses represent the very best in modern methods of manufacture.

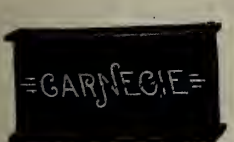
Particular attention is called to the Carnegie

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This product is characterized by all the excellencies of the rolled and circular sections, proper distribution of material, excellent wearing qualities and toughness. Service tests demonstrate their high endurance under most severe operating conditions.

Our engineers will be pleased to consult with you as to your requirements.

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It protects the user

Carnegie Steel Company

General Offices: Pittsburgh, Pa.

757-A

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Open Hearth Alloy Steels
Iron and Steel Tieplates

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Bars, Bands, Angles, Channels, Tees and Special Shapes in Wrought Iron, Soft Steel and Rail Quality Steel.

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Wire Rods, Barbed Wire, Market Wire, (various finishes), Woven Wire Fencing, Rivets, Nails, Tacks, Burrs, Staples and Glazier Points.

Interstate Iron and Steel Co.

104 S. Michigan Ave., Chicago

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This Old Iron Furnace—

typical of many that dotted the country sides in the early days of the 19th century, and an immense modern steel plant represent extremes that are no greater than those that mark the wide range of our products, namely: a fine wire nail weighing 1-2000 pound and a gigantic steel casting weighing 200 tons.

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SOUTH BETHLEHEM, PENNSYLVANIA

PIG IRON: Basic, Bessemer, Foundry, Low Phosphorus, Mayari, Ferro-Manganese, Spiegeleisen.

CASTINGS: Steel and Iron, Brass, Bronze and Manganese.

FORGINGS: Drop, Hammered, Hydraulically Pressed, Solid and Hollow, Rough, and Finished Machine; Cement Mill and Ore Crusher Balls.

RAILS: Standard, Girder, Guard, High Tee, Industrial; Splice Bars, Tie Plates, Bolts, Frogs, Switches, Signals.

SWITCH STANDS: To Meet Every Track Condition; High, Intermediate and Low Stands, Adjustable and non-Adjustable.

MANARD ANVIL-FACE FROGS: Equipped with "Mayari" Never-Turn Bolts. All Bolts Receiving Side Thrust of Wheels are HEAT TREATED.

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TITANIUM TALKS

No. 35



Look at the spangles in this illustration. Notice the large fern leaf Crystals of zinc which appear on the surface of the sheet metal.

Three heats of steel were divided into approximately equal parts by tapping the metal into two ladles.

To the steel in one of these ladles there was added three pounds of Ferro Carbon-Titanium per ton of metal—while the steel in the other was given the regular Open Hearth department practice. From that point on the steel from both ladles was handled as usual, being inspected and graded by the regular plant inspectors.

Out of 7450 sheets manufactured from the Titanium-Treated portions 6190 or 83% had large spangles, while only 913 sheets or 12½% of the 7300 sheets made from the untreated portions had large spangles.

When sheets are produced with Small Spangles remember it is the Steel Base and not the Galvanizing that is at fault.

The Titanium Alloy Mfg. Company

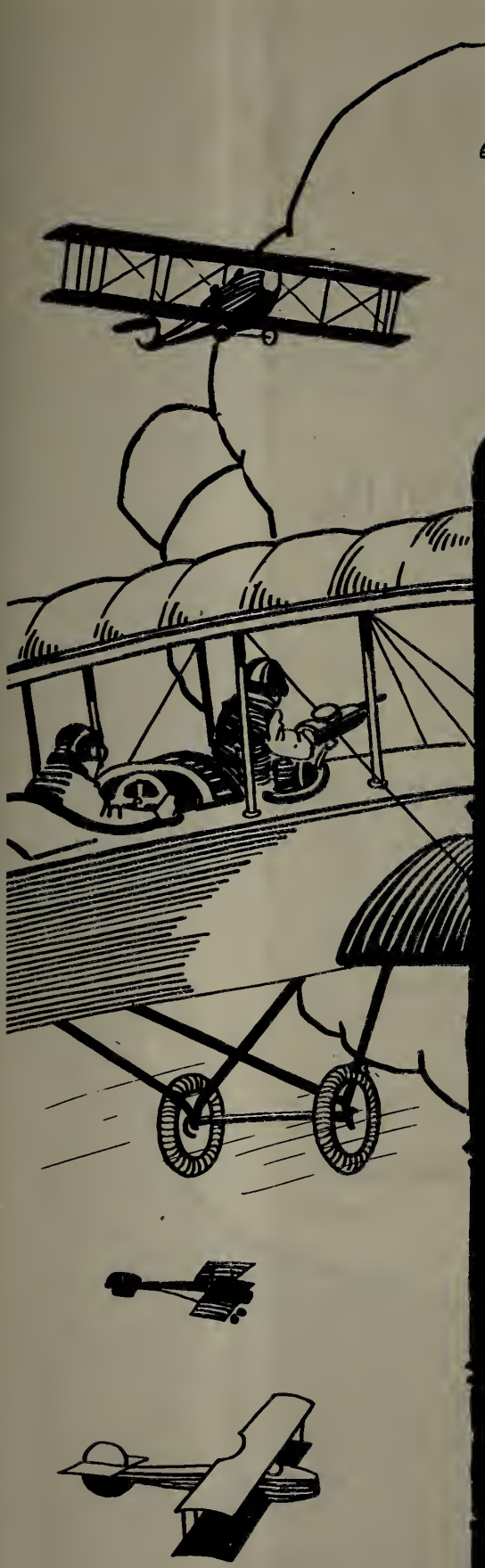
Niagara Falls, New York

Pittsburgh Office. Oliver Building
New York Office, 165 Broadway

FERRO CARBON TITANIUM F.C.T.

Chicago Office, Peoples Gas Building
T. Rowlands & Co., Sheffield, England

Agents for Great Britain and Europe



"Up There"

"Up there" two, three, four, yes five thousand feet from safety—*"up there"* where a dead engine means a dead crew, thousands of Our Boys are risking their lives. One slight defect in the steel used in the construction of their planes might send them crashing down to their death. Their planes must be flawless.



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"Electrite" Uranium the *super-steel* will work with ease and speed on the toughest kinds of jobs. Speed up your production with "Electrite." Sample upon request.

Latrobe Electric Steel Co.

Latrobe, Pennsylvania

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The Right Steel at the Right Time.

BECAUSE—

Carbon-Vanadium Steel possesses all the static and dynamic properties of the more complex alloy steels and in addition has Forging, Machining and Welding properties all its own.

It is a straight carbon steel with Vanadium alone added. There is, thus, no shortage of any of the elements entering into its composition nor any restrictions as to its use for war necessities only.

Let us tell you more about Carbon-Vanadium Steel.

American Vanadium Company

New York Pittsburgh London

Conserve Manganese and Man-Power

YOU CAN HELP UNCLE SAM TO CONSERVE MANGANESE, AND AT THE SAME TIME MAKE YOUR PLANT MORE EFFICIENT BY SAVING MATERIAL AND LABOR

THE Government has pointed out the necessity for, and urgently requested the conservation of manganese, one of the most important constituents of steel.

We want to help—to do our share—first, by making it possible to conserve manganese without curtailing production of essentials; and second, by continuing our work of increasing plant efficiency generally through the saving of both materials and labor.

We have been manufacturing for years, in rapidly increasing volume, the super-carbon alloy—"ADAMITE" This alloy contains less than .45% of manganese (only about one-twenty-fifth as much as in manganese steel) but it has the good qualities of the best manganese steel, and some additional superior merit points. It is hard, yet tough, strong and resists wear and abrasion better than any other metal.

"ADAMITE" is the highest-efficiency material for rolls, gears, pinions, dies, plungers, and hundreds of other parts which must give continuous, dependable service under most severe conditions.

Help Your Government to Conserve Manganese.

Help Yourself to Cut Operating Costs, and increase profits by Using "ADAMITE."

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National Strips are an innovation in strip steel serviceability. In the first place, our special rolling and heating processes give them higher quality, more uniform texture, scale-free surfaces and greater ductility.

On the other hand, our extra widths (up to 24") give the designer greater latitude and reduce wastage.

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We Specialize in Rolling

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STEEL PLATES
for all purposes

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AND
ALLEGHENY IRON

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SOLICITING AGENTS

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SPECIAL DEEP DRAWING STEEL SHEETS

HOT AND COLD PRESSED STAMPINGS

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OF SHEET METAL BUYERS

KEYSTONE COPPER STEEL

Look for this mark below the regular brands on Black Sheets, Galvanized Sheets and Terne Plates. It is put there for your *protection.*

There are legions of sheet metal buyers who know from personal experience that *Keystone Copper Steel* is unquestionably the best material that can be used for roofing and all purposes where rust resistance and satisfactory service are important factors.

There are also other careful buyers and users who would gladly adopt this better product if they had personal assurance of the superiority of the copper-steel alloy. Try *Keystone*—then be guided by your own good judgment.

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This is not a special sheet picked out for the photo.

All La Belle Sheets come that way.

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General Offices: **Steubenville, Ohio**
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Deep Drawing and Extra Deep Drawing Auto Body Stock. Deep Drawing and Extra Deep Drawing Crown Fender Stock. Hood Stock.

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San Francisco, Cal. and Vancouver, B. C.

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Stands for Quality

Black, Galvanized, Corrugated
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A product of the 35 years of Page dominance in the fence and wire field.

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Equally suitable for interior partitions, machinery guards and similar purposes. Fireproof and does not obstruct light. Easily installed.

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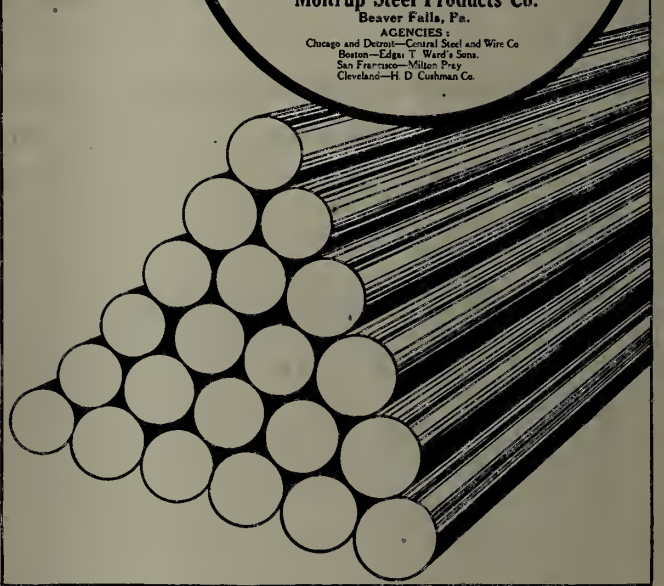
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for Shafting and Free Cutting Screw Steel. Straightness and accuracy of size guaranteed.
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Our New Fire Proof Plant

ERDLE
PERFECTLY PERFORATED
SHEET METALS

Our experience covers half a century.
We are perforators of **Aluminum, Brass, Copper, Steel, Tin, Zinc,** etc., for all purposes.
Our Experimental Department is at your service—we invite you to take advantage of it.

May we send you a Metal Sample Plate?

We manufacture Perforated Steel for Machinery Guards and also carry a stock of Perforated Steel.

ERDLE PERFORATING COMPANY
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"Red Cut Superior"

HIGH SPEED STEEL

YOU have thought of many qualities you would like to have in High Speed Steel Tools—such as cutting edges with long life, freedom from brittleness, great reserve strength and toughness to resist shocks and strains, tools that would not require special heat treatment, tools that would take deep roughing cuts or fine smooth finishing cuts, and in addition, could be worked at higher speeds than you ever dreamed of. All these virtues and many more are contained in "Red Cut Superior", a First Quality High Speed Steel. Furnished in Annealed Bar Stock, Discs, and Treated Tool Holder Bits.

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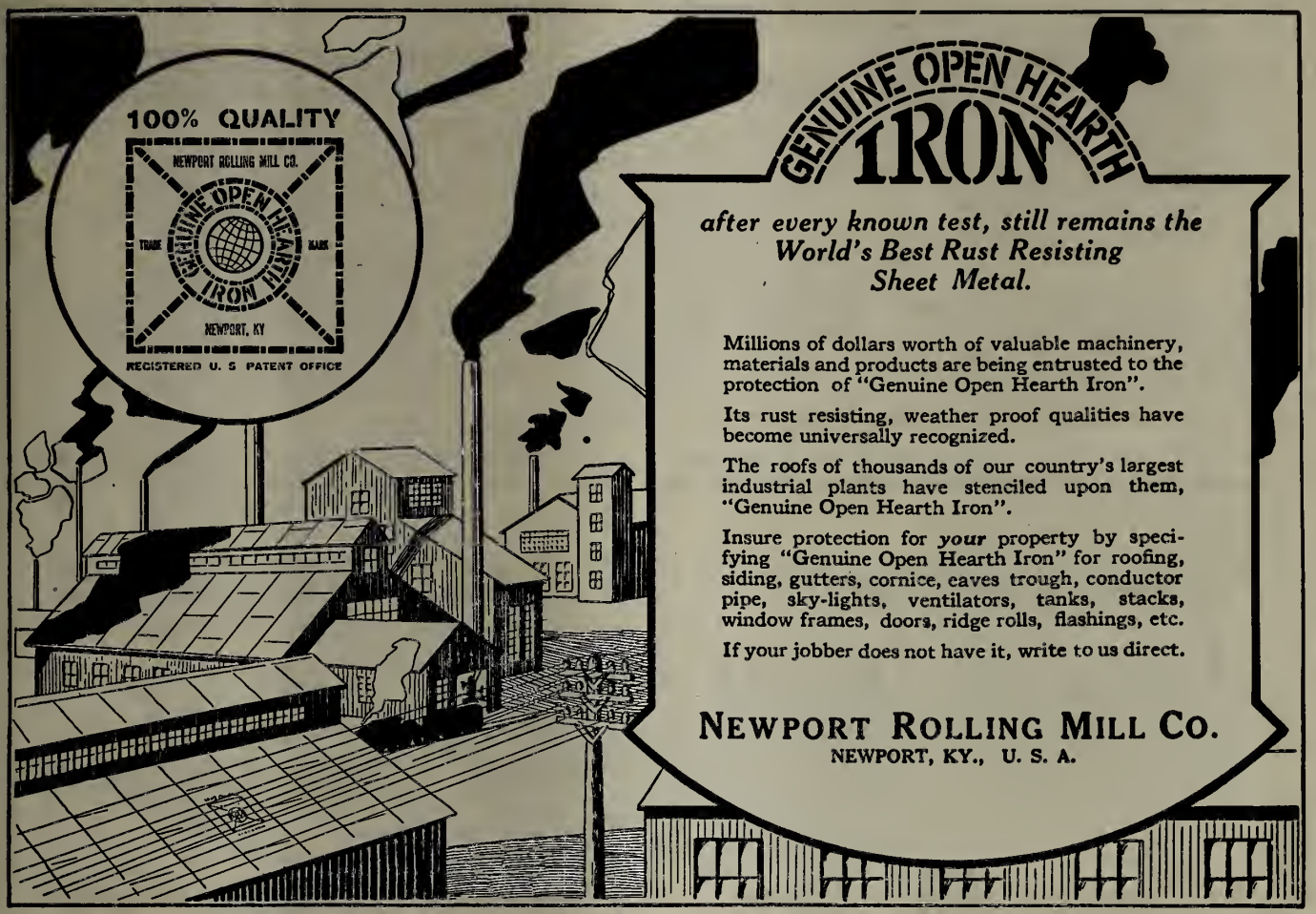
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reaches out to serve you with the products of the world's largest bright finished steel plant.

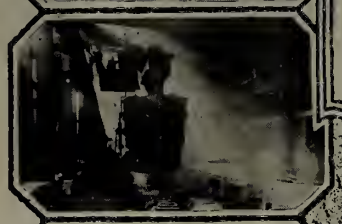
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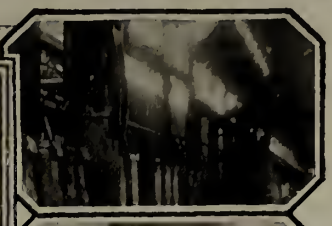
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Where Quality is Considered--Price should be forgotten



SQUEEZER

is an old saying, but it holds as true today as does the *old-fashioned puddling process* of making iron.

The first cost of good iron may be higher than steel, but its final cost is lower; for in the kind of work where quality should be considered, where security is necessary and service is wanted, as in Engine Bolts, Staybolts, Foundation Bolts and similar service, the economy of good iron is indisputable.

Where work is constantly exposed to the weather, to great stress, shock and vibration, the superiority of old fashioned puddled IRON is unquestionable and true economy demands its use—

Not only have the tests of time proved *old fashioned puddled IRON* rust-resisting to a degree unheard of in steel but service tests and special tests like the vibratory test in use by nearly all large railroads, have shown the utter unfitness of steel as compared to it.

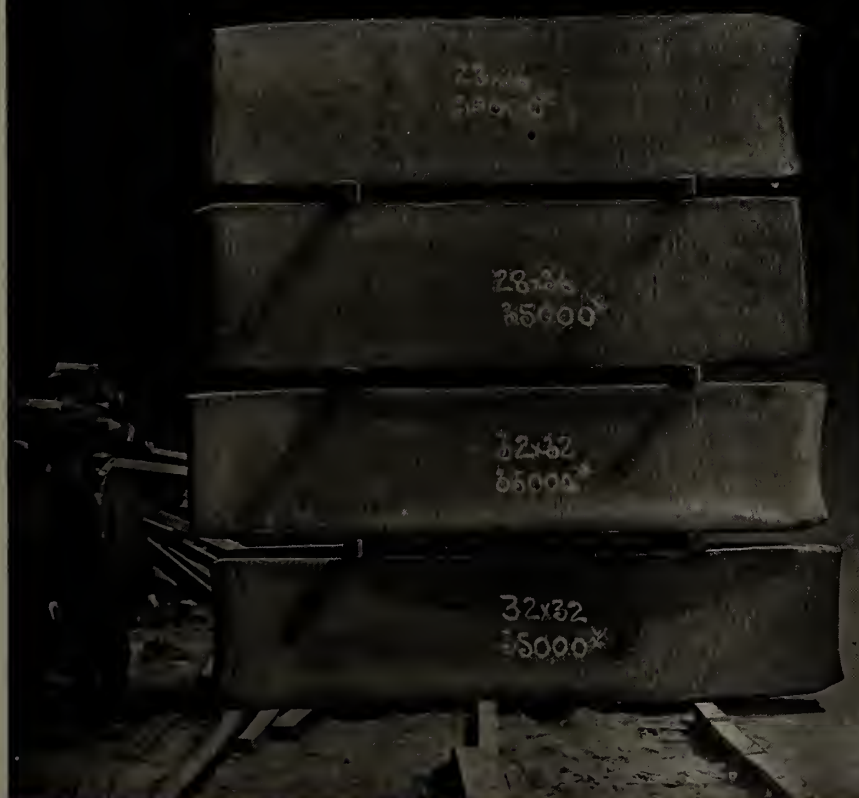
Above is the second phase in the process of converting pig iron into VULCAN FINISHED BAR.

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VULCAN SPECIAL
VULCAN XX



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For Engine Bolts
For Locomotive Bolts

Lackawanna facilities provide for large work as well as small



The Lackawanna plant is equipped to meet commercial requirements in—

Billets, Blooms, Slabs, Plates, Sheet Bars, Rails, Merchant Bars and Structural Shapes.

Our extensive experience can be made profitable to users of rolled steel products and we are always ready to co-operate in furnishing the grade of material that is best adapted to subsequent forging, forming, fabricating and service.

Let us consider your needs.

Lackawanna Steel Company

297

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Tool Checks; Badges;
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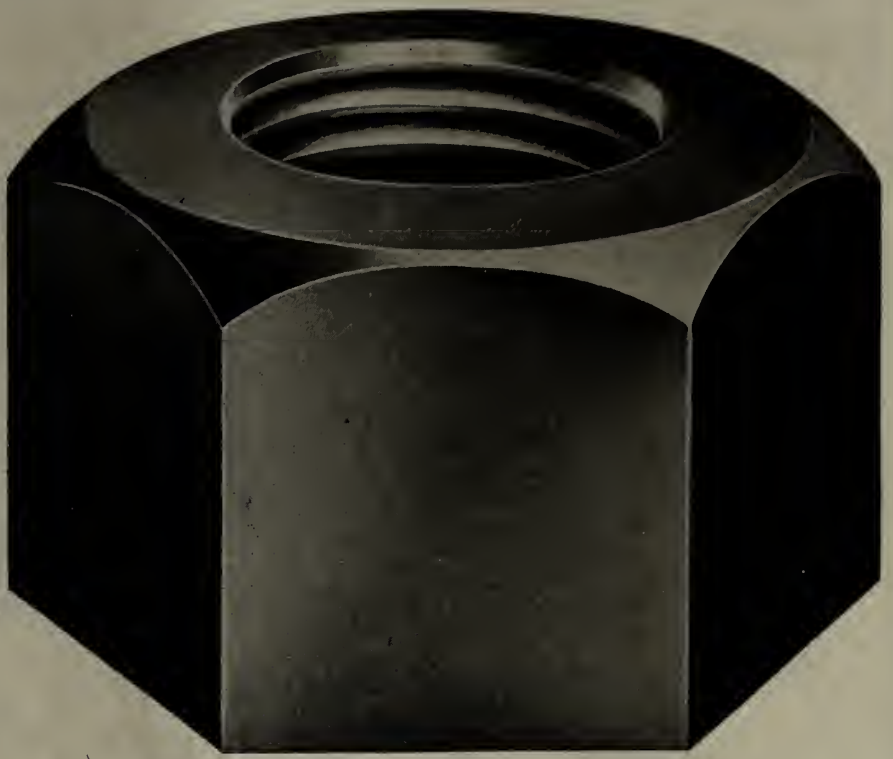
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ANY SIZE
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STEEL
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Where Quality Joins Service!

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Steel especially well adapted for reinforcing work and quick, accurate service.

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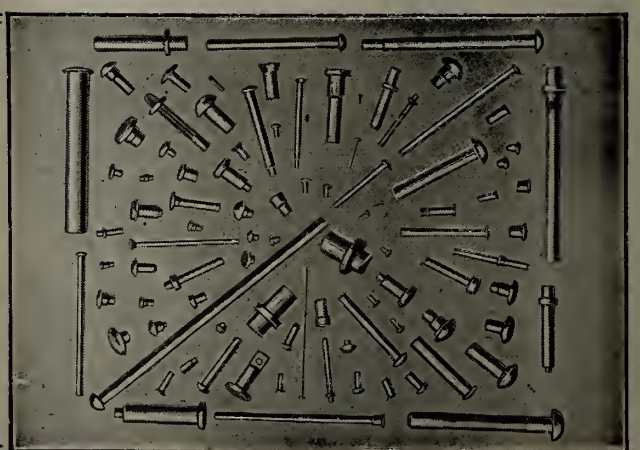
Each article illustrated was made for discriminating customers who demand something better than the usual kind. Our process enables us to make many articles that are now made on screw machines. We make them **just as good, much quicker and MUCH cheaper.**

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It has met the test of more production, at a lower cost in time, effort and material. The cost of the equipment itself has only been considered in relation to the results it would produce. For first cost has significance only in relation to operating expense and production capacity.

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will shortly be delivering

One Million Pounds of Pulverized Coal Per Hour

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Over 1200 Furnaces

Including Annealing, Bushelling, Continuous Billet, Bloom Heating, Converters, Drop Forge, Galvanizing Pots, Ingot, Puddling, Plate Heating, Reverberatory, Sheet and Pair, Spring Furnaces and Tin Pots.

Our Engineers will be glad to figure on your Requirements.

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Write our nearest office

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PIG IRON COKE COAL

The use of **Pulverized Coal** in **Open Hearth Furnaces** was not a success until the **RAYMOND SYSTEM** was used for grinding the coal.

With the Raymond System of Pulverizing and Air-Separation instead of screen separation you get any fineness of coal desired and the resultant product is so uniform that it burns immediately when introduced into the furnace.



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Blast Furnaces and Foundries

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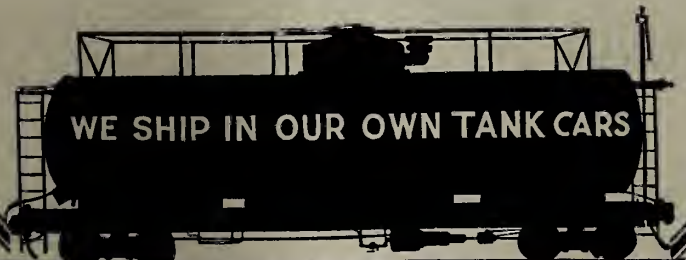
Coal shortage during the past winter cost American industries millions of dollars in lost time and profits.

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Our Government advises that all fuels ***must be saved.*** Fuel oil and natural gas are growing scarcer every year.

SMITH GAS PRODUCERS

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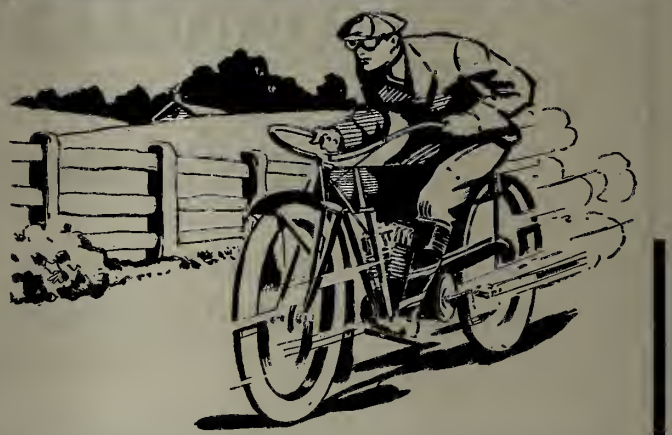
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Saves Fuel
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The American manufacturers who make motor parts like the Hendee Mfg. Co., Springfield, Mass., for Liberty Motors, connecting rods, drop forgings and malleable iron and steel castings, watch their heats with Brown Pyrometers as carefully as American locomotive builders or American shipyards.

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Prompt Delivery

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Large Tonnage too.

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FINISH TURNING
FROM 1-IN. TO 4-IN.

HEAT TREATING ANNEALING

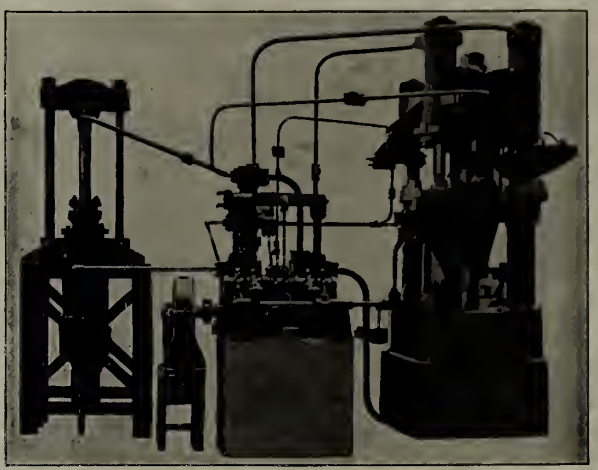
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We are equipped with
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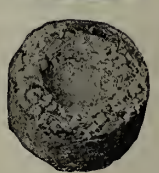
Cast Iron Borings: The practice of charging borings loose is wasteful. A number of methods have been adopted to overcome this loss, but none are so beneficial and so satisfactory as briquetting.



Steel Turnings: These are a problem to the foundryman from the very start. They are usually bulky, hard to handle and require considerable storage room. Frequently when kept for a length of time they ignite from spontaneous combustion and present a serious loss. Briquetting eliminates all this.



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Make every ton of that troublesome light scrap become a new source of revenue.

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Send for our bulletins Series "G".

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Back Up Uncle Sam

Give Him Prompt Deliveries of Steel

Avoid Breakdowns and Delays

USE

M-H ROLLS

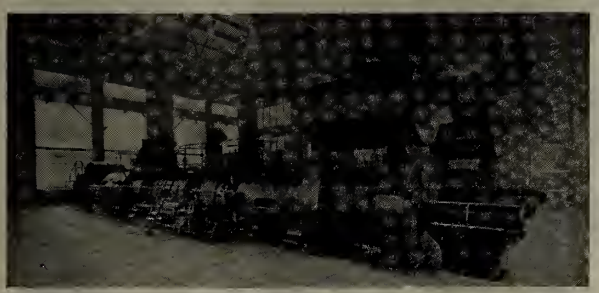
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DESIGNERS AND BUILDERS OF

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No. 20 Gas Blowing Engine



46" Slabbing Mill



Works of the Mesta Machine Co.



Tin Plate Mill



Steam Hydraulic Forging Press

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PITTSBURGH, PA., U. S. A.

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REDUCING GEARS
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In sizes from
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HORSE POWER

Designed to meet growing tendency toward the use of *High Speed* Electric Motors *for Rolling Mill Drives*

Built to meet severest Rolling Mill conditions
All parts easily accessible



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WIRE DRAWING EQUIPMENT

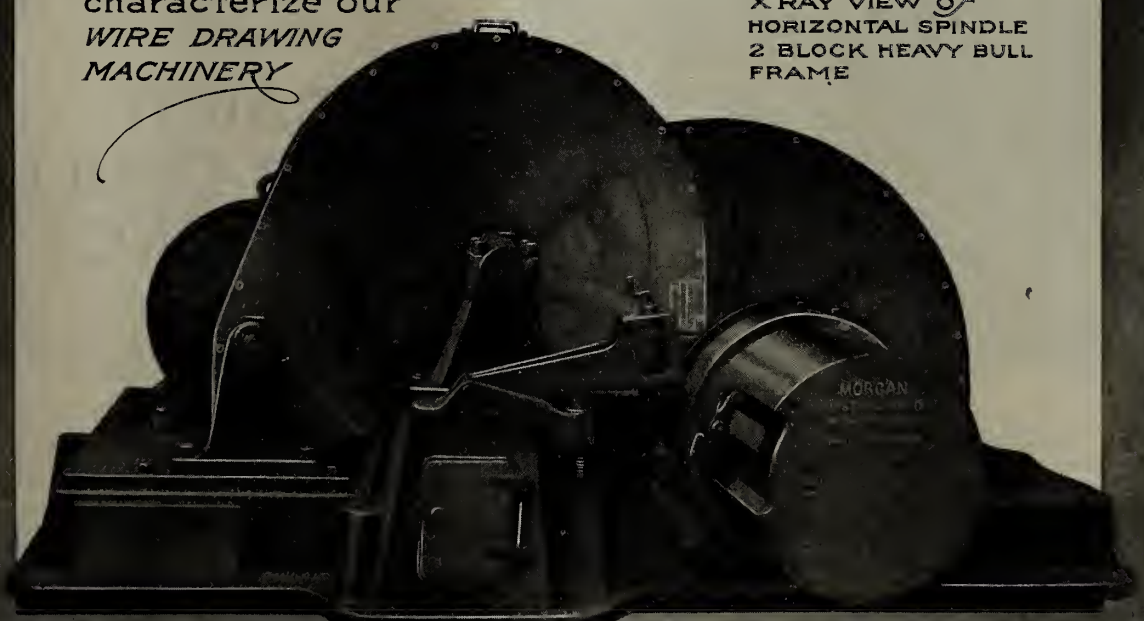
M C Co

FROM WIRE ROD
TO ALL SIZES OF
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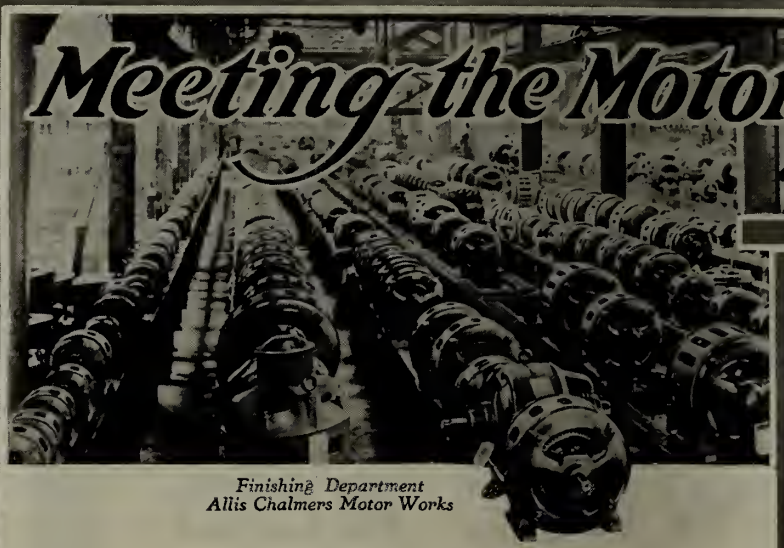
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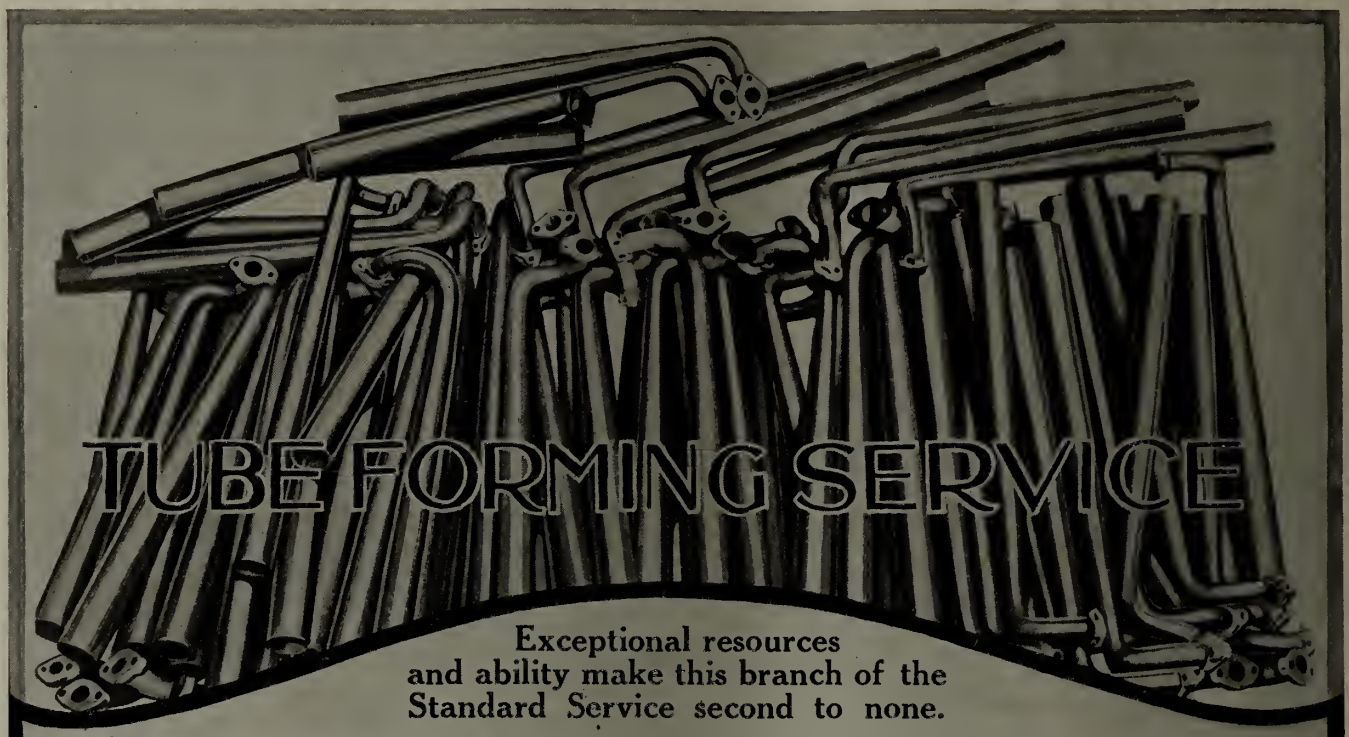
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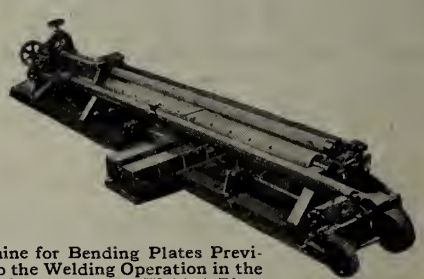
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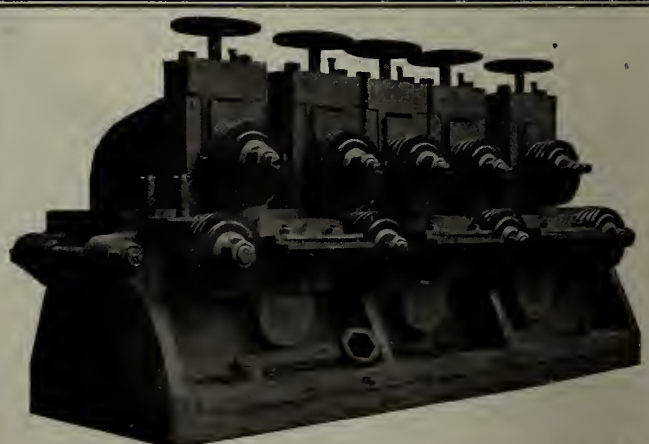
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PITTSBURGH BIRMINGHAM

A Special Alliance Crane

The crane illustrated on this page is a *Ten-Ton Special Gantry Crane,* Four-Motor Type, 46-foot Span, with 24-foot and 25-foot Cantilever Extensions. The Cage is attached to the trolley from where the operator controls the Ingot and Bloom Handling Tongs shown. Trolley also provided with magnet Hoist.

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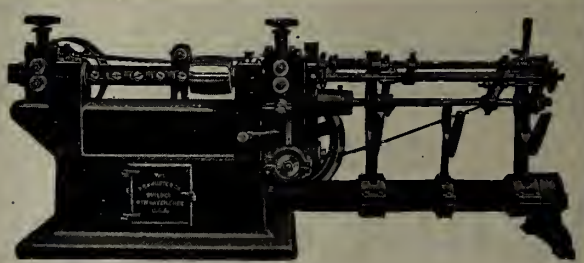
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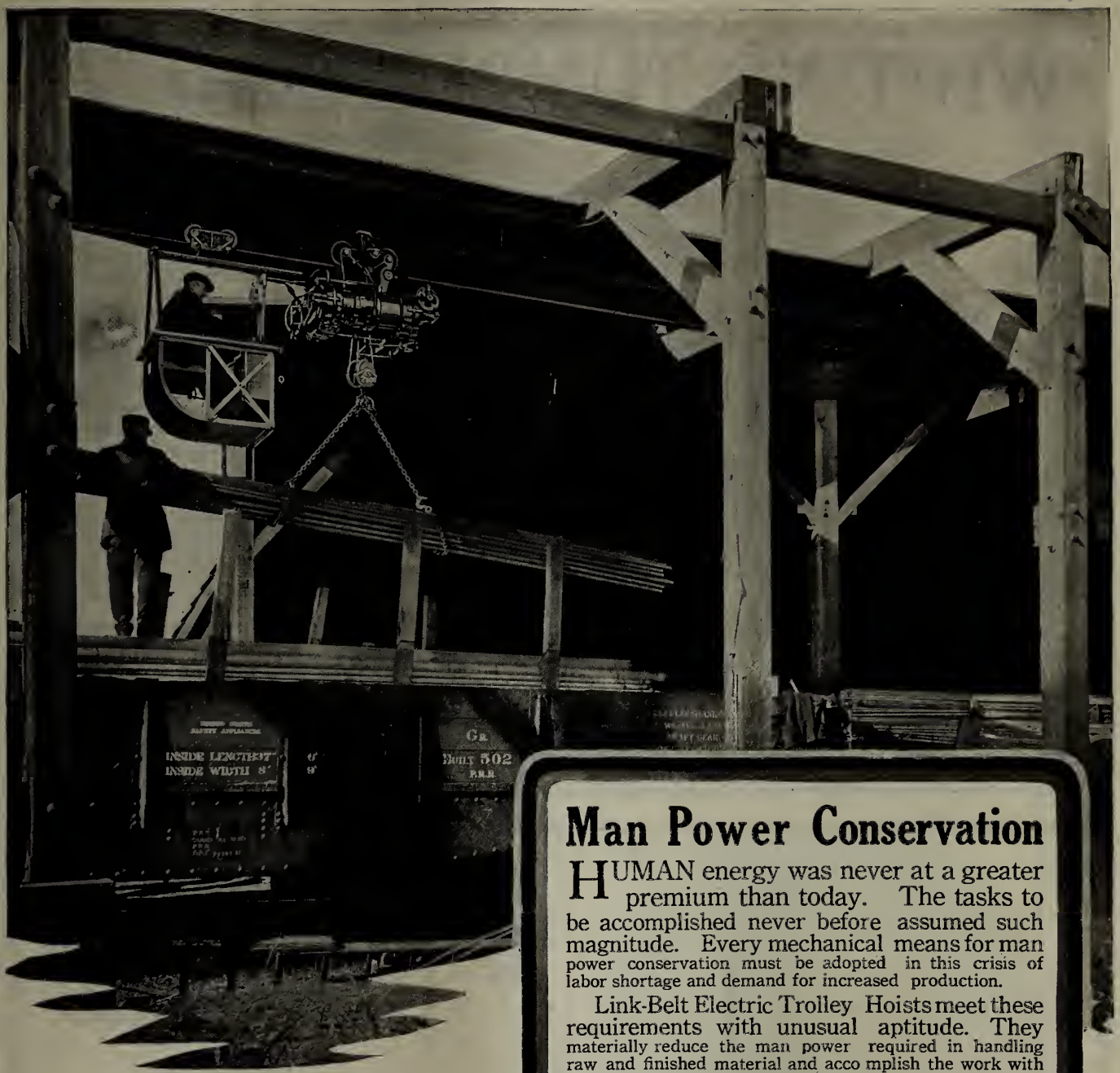
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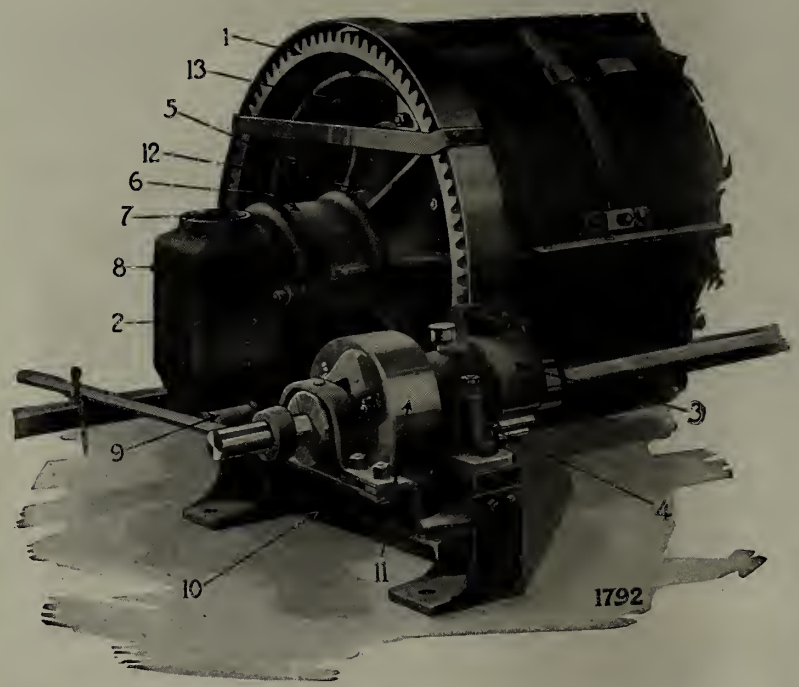
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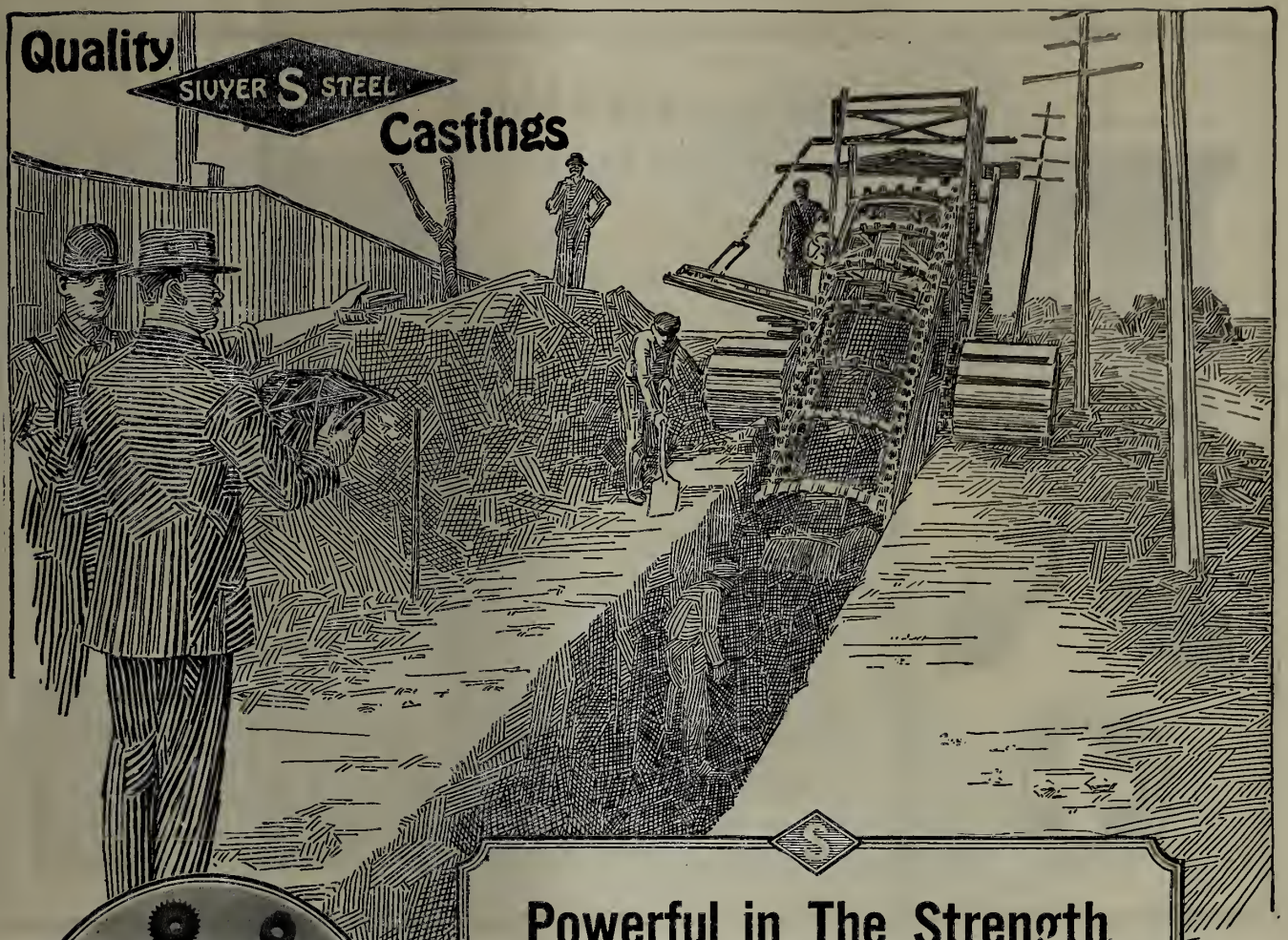
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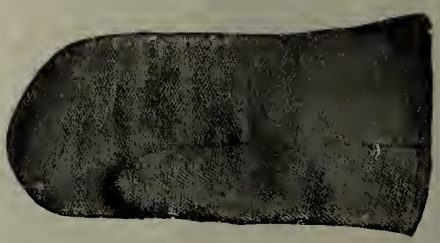
Asbestos Glove



Asbestos Long Mitten



Asbestos Mitten



The Simpson Intensive Foundry Mixer

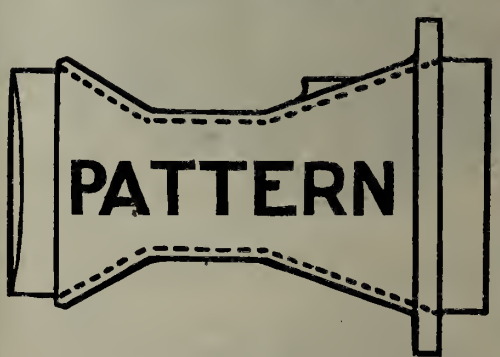
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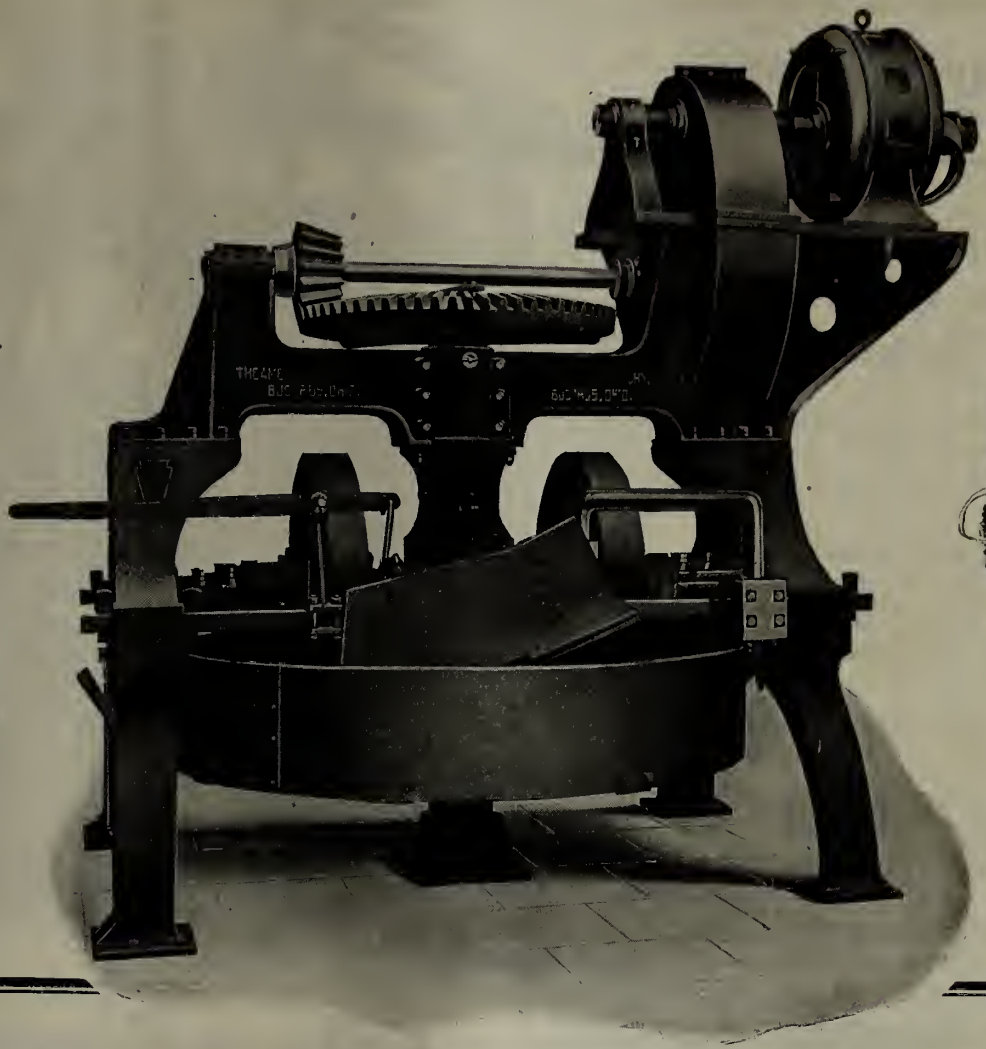
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Morton Heavy Duty Draw Cut Pillar Shapers

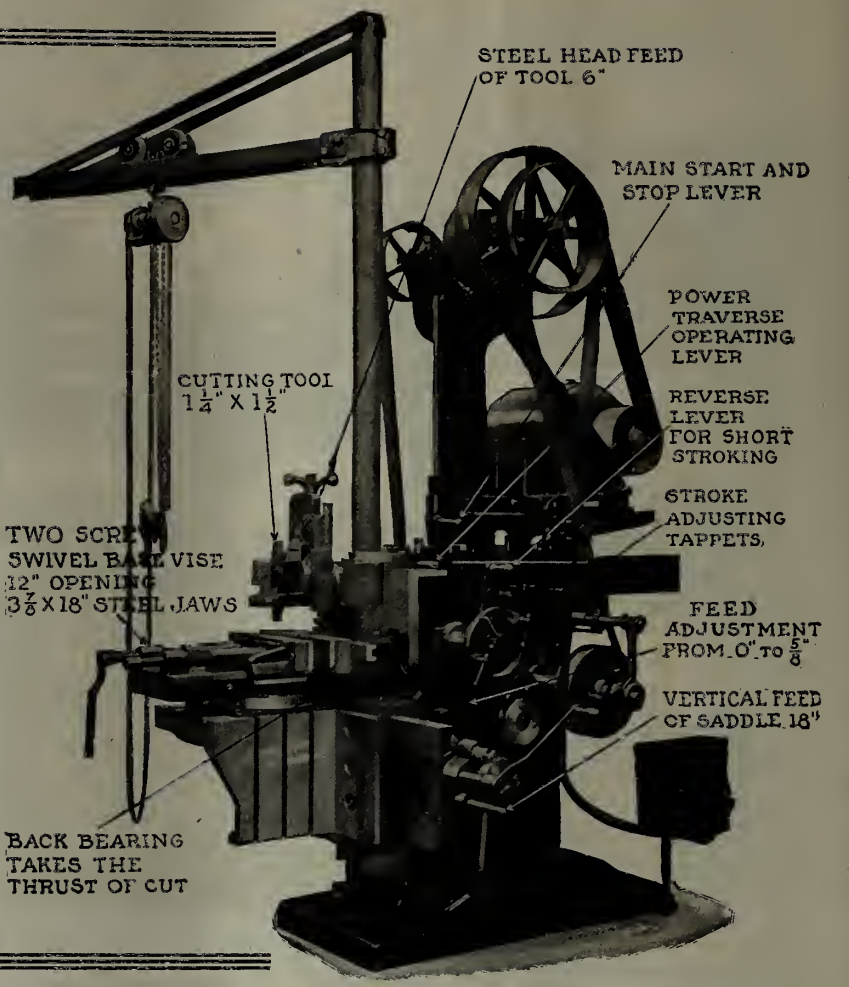
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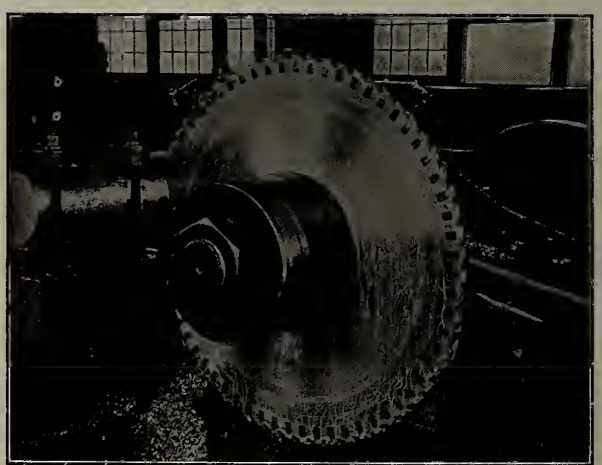
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Made in sizes from 10" to 84" diameter.

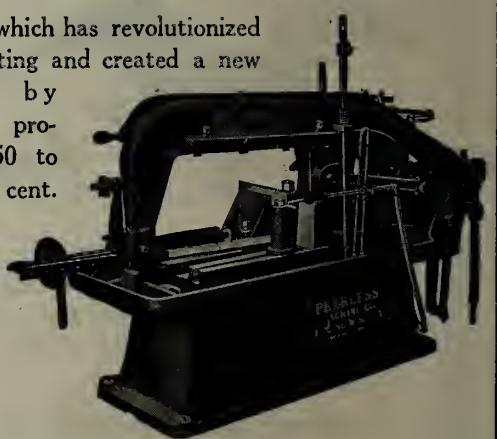
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The saw which has revolutionized metal cutting and created a new standard, by increasing production 50 to 100 per cent.



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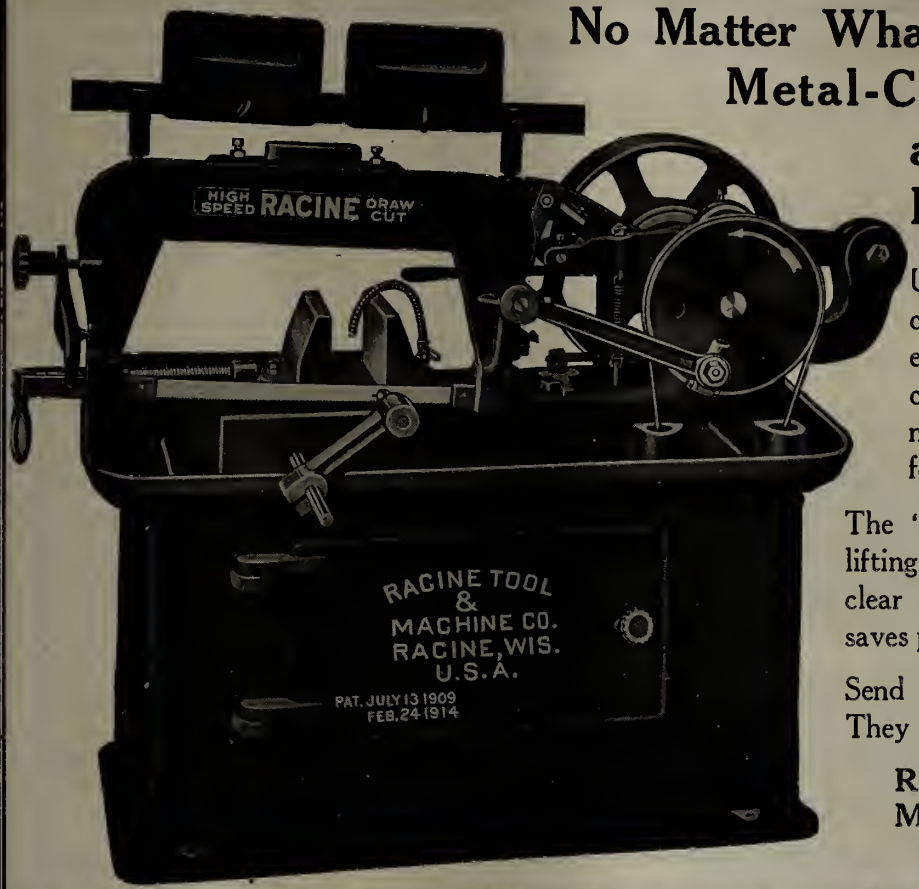
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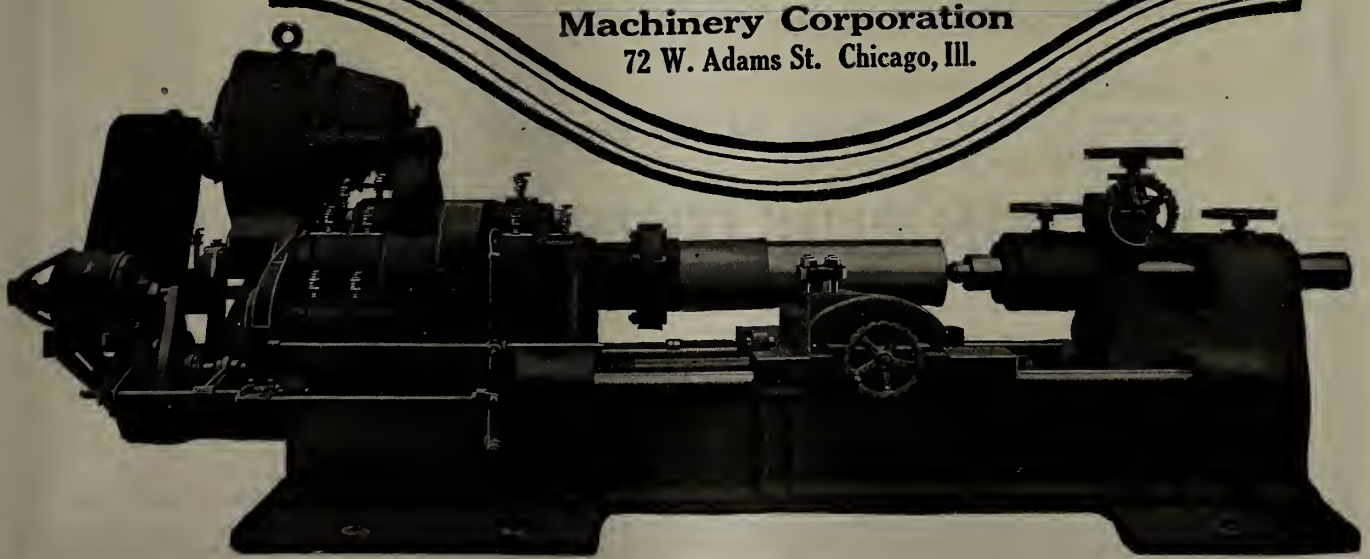
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Analysis of Iron to be Converted into Steel
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Hot Cracks in Steel and How They May be Overcome
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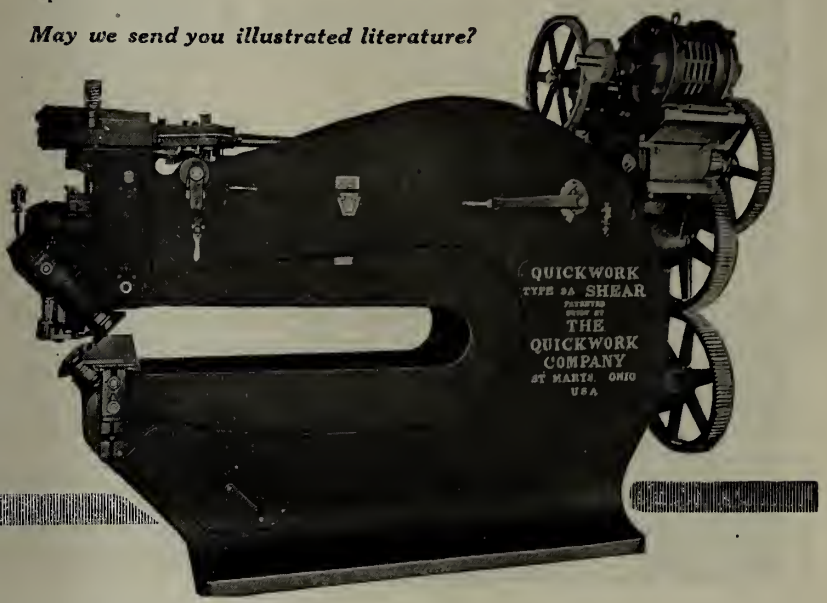
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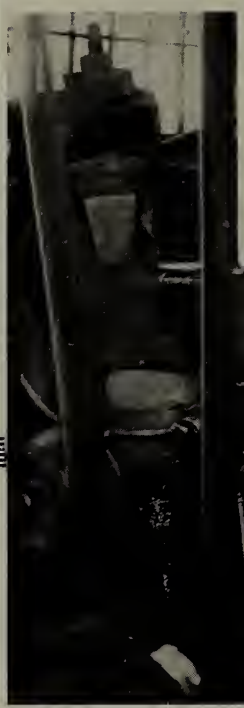
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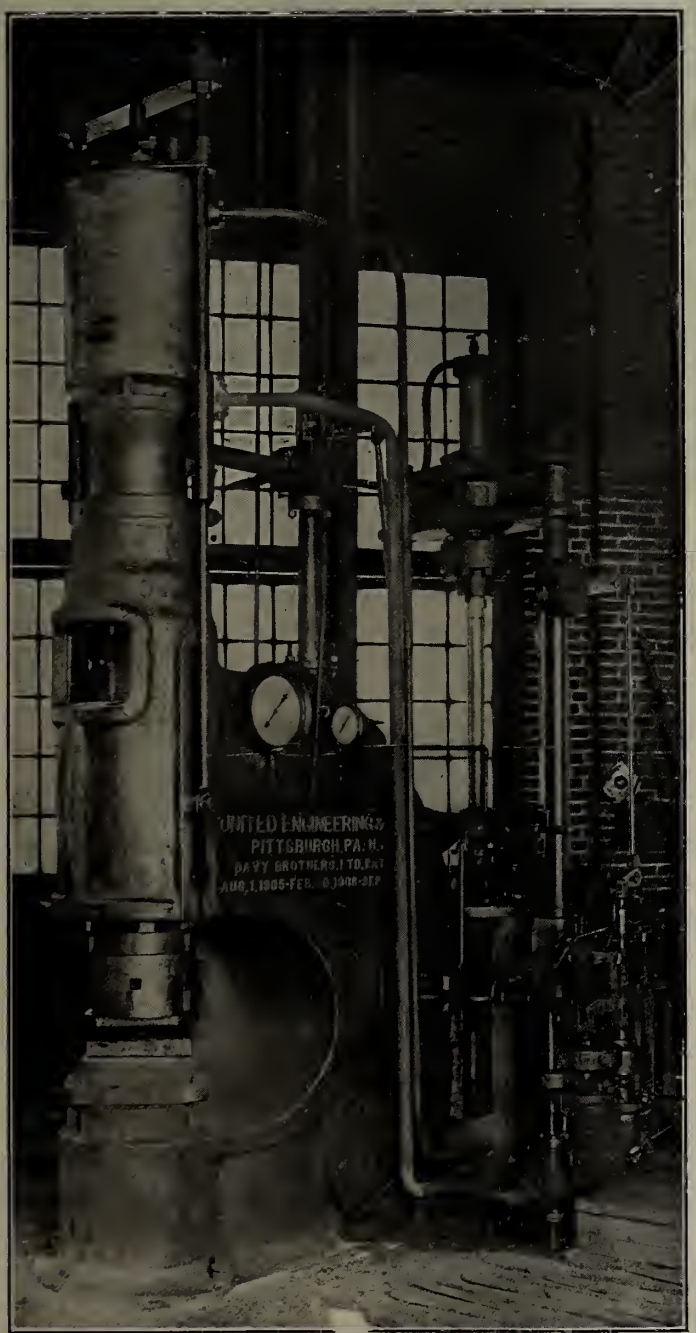
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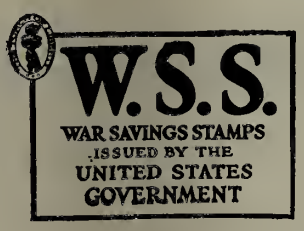
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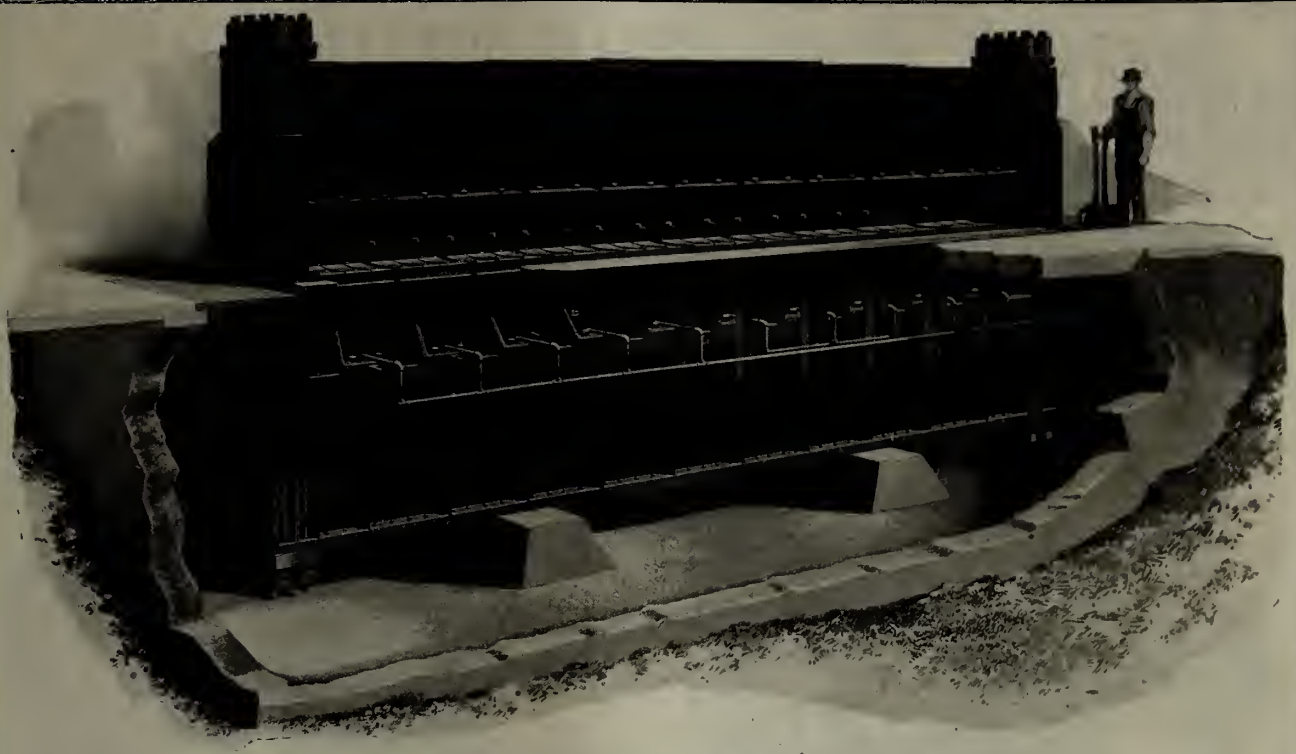


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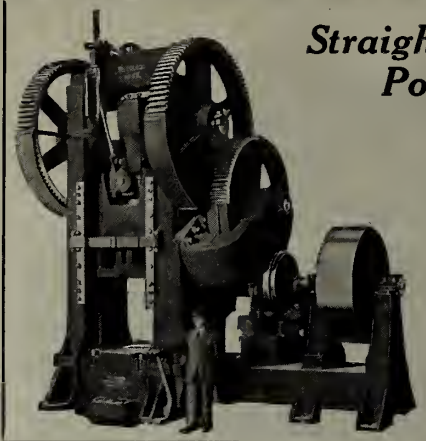


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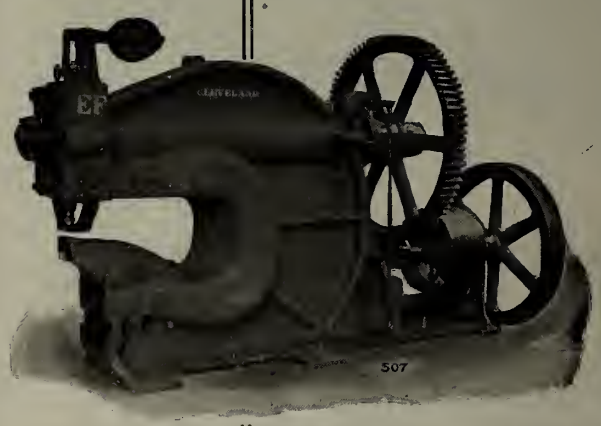
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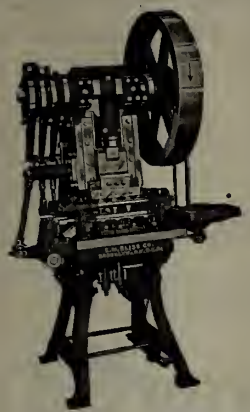
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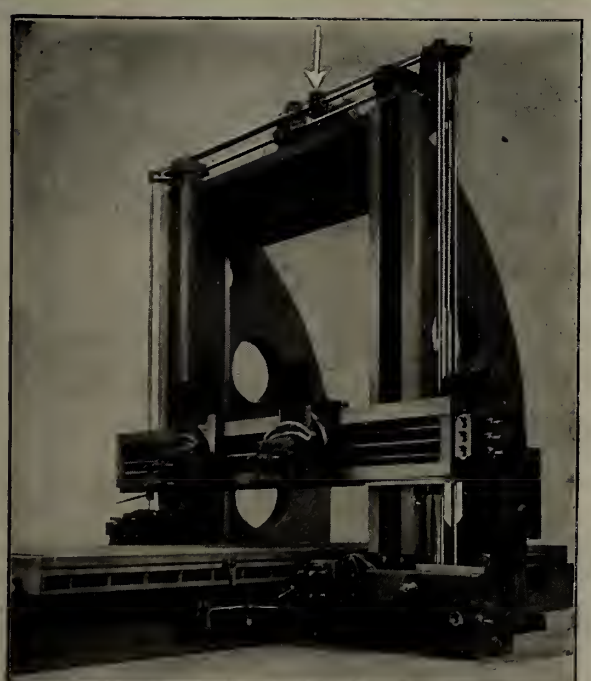
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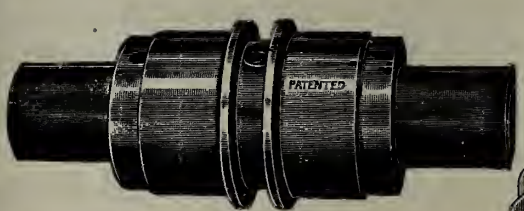
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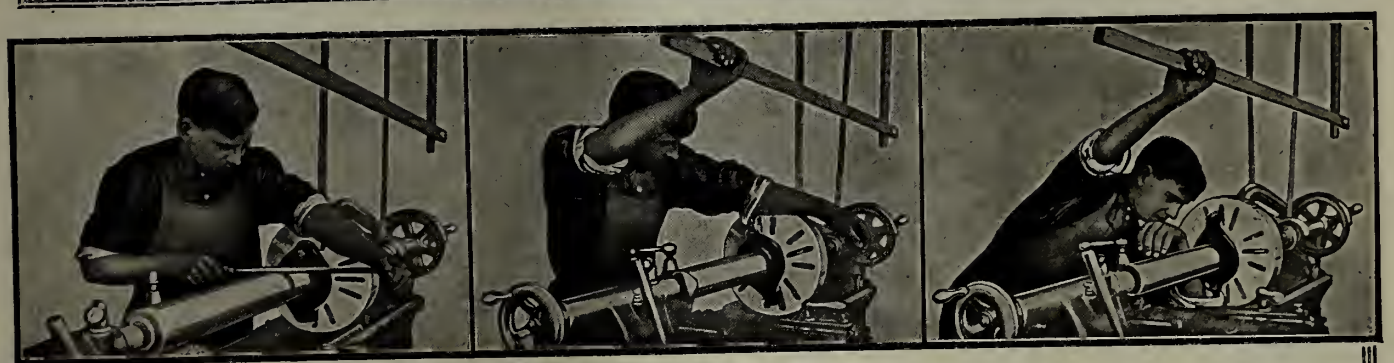
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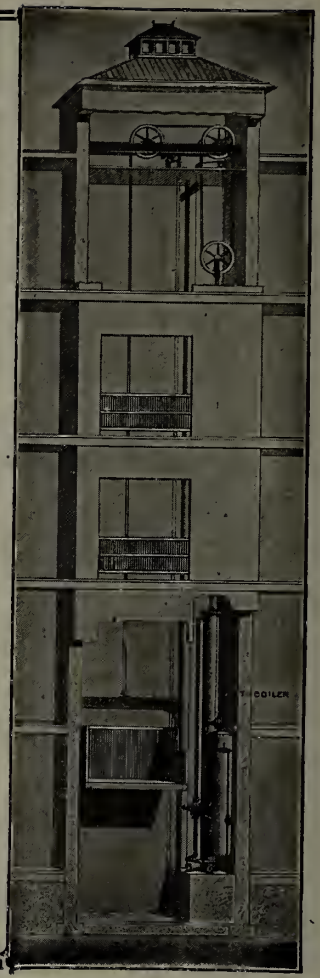


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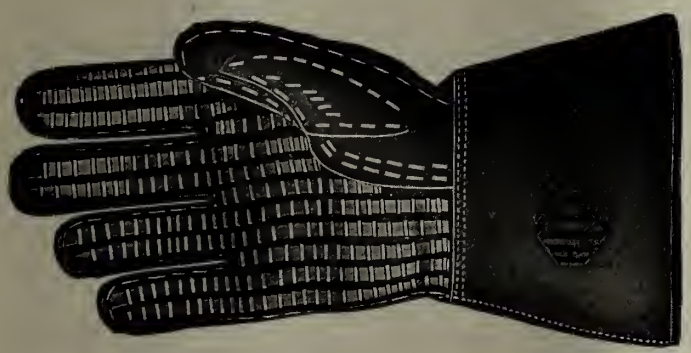


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BARS (Charcoal Iron)
Carnahan Tin Plate & Sheet Co., Canton, O.

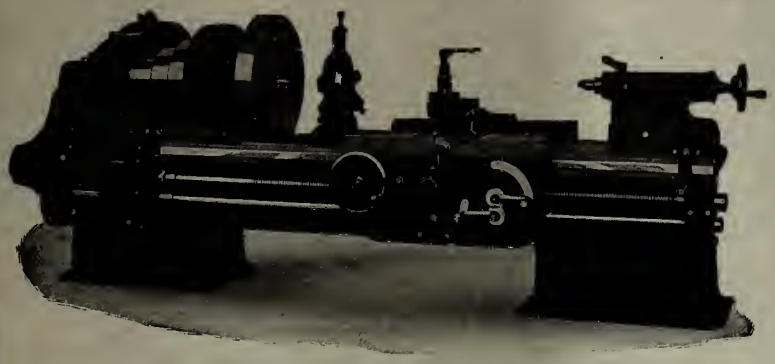
BARS (Concrete Reinforcing)
Bourne-Fuller Co., Cleveland, O.
Buffalo Steel Co., Tonawanda, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Pacific Coast Steel Co., San Francisco, Cal.
Ryerson, Jos. T., & Son, Chicago, Ill.
Truscon Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

BARS (High Speed Steel)
Onondaga Steel Co., Syracuse, N. Y.

BARS (Iron and Steel)
Amalgamated Products Co., 165 Broadway, New York City
American Bridge Co., New York, N. Y.
American Steel Export Co., New York City
Amiron Supply Co., Inc., New York, N. Y.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Buffalo Steel Co., Tonawanda, N. Y.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Donner Steel Co., Inc., Buffalo, N. Y.
Federal Export Corp., 115 Broadway, New York City
Ford, R. M., & Co., Inc., New York, N. Y.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

WICKES HEAVY DUTY ENGINE LATHE



The Wickes 26" Heavy Duty Quick Change Gear Lathe

Built in lengths from 8 ft. up. Has 3-step cone, is double back geared and has double plate apron.

This tool is built for the most severe service; all parts liberal in size; has special ball thrust bearings; steel apron gears; coarse pitch and wide face gears, which are all well guarded. Let us tell you about this lathe and also our 18", 32" and 36" machine.

We can make prompt shipments.

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SAGINAW, MICH.

AGENTS—Wickes Bros., Seattle, Wash. Rolph Mills & Co., San Francisco, Cal. Rolph Mills & Co., Los Angeles, Cal. Machine Tool Sales Co., Pittsburg, Pa. Badger Packard Machy. Co., Milwaukee, Wis.

R. D. Wood & Co.

Guillotine Plate Shears, Forging Presses, Punches, Riveters and General Steel Working Tools. Accumulators, Pressure Pumps, Steam and Centrifugal Pumps, Gas Holders, Gas Power Plants with Producers. : : :

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Made in several sizes, suitable for all classes of work.

Used by many of the principal steel mills and foundries.

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FRANKFORD, PHILA., PA.

Portable Warehouse Scales

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Guaranteed to give instant and accurate results.
We build scales for every purpose.
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Single Frame—Double Frame
and
STEAM DROP HAMMERS

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Massillon - - - Ohio

MACHINE TOOLS

Electric Travelling Cranes - Steam Hammers

NILES-BEMENT-POND CO.

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BOSTON PHILADELPHIA BIRMINGHAM PITTSBURGH CINCINNATI CLEVELAND DETROIT CHICAGO ST. LOUIS SAN FRANCISCO

BARS (Iron and Steel) (Continued)
Liberty Steel Products Co., New York
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago
Shippers Car Line, New York, N. Y.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
United Alloys Steel Corp., The, Canton, O.
Upson Nut Co., Cleveland, O.
Vulcan Steel Products Co., 120 Broadway, New York City
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Rib)
Truscon Steel Co., Detroit, Mich.

BARS (Tin)
Andrews Steel Co., Newport, Ky.
Inland Steel Co., Chicago, Ill.

BEAMS, CHANNELS AND ANGLES
American Steel Export Co., New York City
Belmont Iron Works, Philadelphia, Pa.
Bourne-Fuller Co., Cleveland, O.
Buffalo Steel Co., Tonawanda, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Chesapeake Iron Works, Baltimore, Md.
Empire Art Metal Co., College Pt., N. Y.
Federal Export Corp., 115 Broadway, New York City
Ford, R. M., & Co., New York, N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., The, Chicago, Ill.
Liberty Steel Products Co., New York
Pacific Coast Steel Co., San Francisco, Cal.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago
Shippers Car Line, New York, N. Y.
Snead Architectural Iron Works, Louisville, Ky.
Vulcan Steel Products Co., 120 Broadway, New York City
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Auburn Ball Bearing Co., 30 Elizabeth St., Rochester, N. Y.
New Departure Mfg. Co., Bristol, Conn.
S. K. F. Ball Bearing Co., Hartford, Conn.

BEARINGS (Bronze, Babbitt)
Aluminum Castings Co., Cleveland

BEARINGS (Roller)
Hyatt Roller Bearing Co., Industrial Bearing Division, Metropolitan Tower, New York

BELT CEMENT AND DRESSING
Dixon, Joseph, Crucible Co., Dept. 64-B, Jersey City, N. J.
Graton & Knight Mfg. Co., Worcester, Mass.
Texas Co., Dept. T., 17 Battery Pl., New York City

BELT LACING (Leather)
Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago

BELTING (Chain)
Link-Belt Co., Chicago, Ill.

BELTING (Leather)
Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago
Graton & Knight Mfg. Co., Worcester, Mass.

BENCHES (Steel)
New Britain Mach. Co., New Britain, Conn.

BENCHES AND FRAMES (Drawing)
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

BENDING AND STRAIGHTENING MACHINES
Abramsen Engrg. Co., Pittsburgh, Pa.
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Front and Girard Ave., Philadelphia
Hinman, D. A., & Co., Sandwich, Ill.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Niles-Bement-Pond Co., 111 Broadway, New York City
Simmons Machine Co., Inc., Albany, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

BENZOL RECOVERY PLANTS
Koppers, H., Co., Pittsburgh, Pa.

BILLETS
American Steel Export Co., New York City
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Donner Steel Co., Buffalo, N. Y.
Federal Export Corp., 115 Broadway, New York City
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Liberty Steel Products Co., New York
Mudge, Edmund W., & Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
Whitaker-Glessner Co., Wheeling, W. Va.
Wickwire Steel Co., Buffalo, N. Y.
Wood, Alan, Iron & Steel Co., Philadelphia
Youngstown Sheet & Tube Co., Youngstown, O.

BILLET DIES
Moss, Henry, & Co., 37 Beaver St., New York City

BINS (Steel)
Edwards Mfg. Co., 401-451 Culvert St., Cincinnati
Empire Art Metal Co., College Pt., N. Y.

BLAST FURNACE EQUIPMENT
Mackintosh-Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.

BLAST FURNACE TUYERES
Keystone Bronze Co., Pittsburgh, Pa.

BLAST FURNACE VOLUME METERS
Clark, Chas. J., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., New York City

BLOCKS (Creosoted Wood)
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.
Rodd Co., The, Century Bldg., Pittsburgh, Pa.

BLOCKS (Wood Flooring)
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.
Rodd Co., The, Century Bldg., Pittsburgh, Pa.

BLOOMS
American Steel Export Co., New York City
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Donner Steel Co., Buffalo, N. Y.
Federal Export Corp., 115 Broadway, New York City
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Liberty Steel Products Co., New York
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
United Alloy Steel Corp., Canton, O.
Upson Nut Co., Cleveland, O.
Wood, Alan, Iron & Steel Co., Philadelphia
Youngstown Sheet & Tube Co., Youngstown, O.

BLOOMS (Charcoal)
Carnahan Tin Plate & Sheet Co., Canton, O.

BLOWERS
Connersville Blower Co., The, Connersville, Ind.
General Electric Co., Schenectady, N. Y.
Gilbert & Barker Mfg. Co., Union St., Springfield, Mass.
Roots, P. H., & F. M., Co., Connersville, Ind.
Southwark Foundry & Mach. Co., Philadelphia
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

BLUE PRINTING MACHINES (Electric)
Wickes Brothers, Dept. A, Saginaw, Mich.

BOILER COVER
Magnesia Association of America, The, Bulletin Bldg., Philadelphia

BOILER AND ENGINE ROOM SUPPLIES
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.

BOILER INSULATION
Armstrong Cork & Insulation Co., 101 Twenty-fourth St., Pittsburgh

BOILER SETTINGS
Brighton Fire Brick Co., New Brighton, Pa.
Clinton Metallic Paint Co., Clinton, N. Y.

BOILER TUBES
Detroit Seamless Steel Tubes Co., Detroit

BOILERS AND SUPERHEATERS
Babcock & Wilcox Co., The, New York City
Curtis-Willis Co., New York City.
Davis, J. F., Chicago, Ill.
Erie City Iron Works, Erie, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Sterling Iron & Steel Co., Philadelphia, Pa.
Uniflow Boiler Co., Philadelphia, Pa.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.
Wickes Brothers, Dept. A, Saginaw, Mich.

BOLT CUTTERS
New York Machinery Exchange, Inc., New York, N. Y.

BOLT AND NUT MACHINERY
Baker Bros., Toledo, O.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, O.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia
Webster & Perks Tool Co., P. O. Box 1200, Springfield, O.

BOLTS (Connecting Rod)
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.

BOLTS (Heat Treated)
Bethlehem Steel Co., So. Bethlehem, Pa.

BOLTS (Spring and Shackle)
Ferry Cap & Screw Co., 2151 Scranton Rd., Cleveland, O.

BOLTS AND NUTS
American Bridge Co., New York City
Bayonne Bolt & Nut Co., Bayonne, N. J.
Beals, McCarthy & Rogers, Buffalo, N. Y.
Bourne-Fuller Co., Cleveland, O.
Clark Bros. Bolt Co., Milldale, Conn.
Ferry Cap & Screw Co., 2151 Scranton Rd., Cleveland, O.
Milton Mfg. Co., Milton, Pa.
National Bolt & Nut Co., Pittsburgh, Pa.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago
St. Louis Screw Co., St. Louis, Mo.
Upson Nut Co., Cleveland, O.

BONDING MATERIAL (Fire Brick Cement)
Clinton Metallic Paint Co., Clinton, N. Y.

BORING MILLS
Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis.
New York Machinery Exchange, Inc., New York, N. Y.
Simmons Machine Co., Inc., Albany, N. Y.

BORING AND TURNING MACHINES
Amalgamated Machinery Corp., 72 W. Adams St., Chicago
Baker Bros., Toledo, O.
Cincinnati Planer Co., Cincinnati, O.
Espen-Lucas Machine Works, Front and Girard Ave., Philadelphia
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia
Niles-Bement-Pond Co., 111 Broadway, New York City
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.

BOX PRINTING DIES
Moss, Henry, & Co., 37 Beaver St., New York City

BOX STRAPPING (Steel)
Acme Steel Goods Co., 2840 Archer Ave., Chicago

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

THE TANK WITH A REPUTATION

Caldwell

Simple, Strong, Safe

There's the story of a Caldwell Tubular Tower.

It is so simple that you can erect it yourself. It is so strong that it will endure cyclones and tornadoes. It conforms strictly with approved engineering principles. The cost is moderate

If you want these qualities in a tower, equip yourself with a Caldwell Tubular.

Send for Catalogue

W. E. CALDWELL CO.
Incorporated
2350 Brook St. Louisville, Ky.





Fig. 72
Electric mine pump. Made in three sizes. Capacities, 50, 100 and 150 gallons per hour. For 200-ft. head.

DEMING PUMPS

Cover practically all the pumping requirements of the mine, mill and factory. They are made in many different styles and sizes. Capacities from 300 gallons to 132,000 gallons per hour in standard sizes.

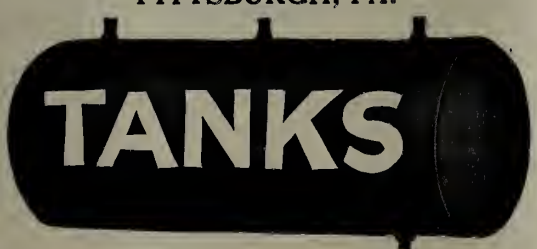
The Deming Company - Salem, Ohio

CHICAGO: Henion & Hubbell. PITTSBURGH: Harris Pump & Supply Co.
BUFFALO: Root, Neal & Co. NEW YORK: Ralph B. Carter Co.
BOSTON: Charles J. Jager Co., 15 Custom House St.
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Horizontal and Vertical Water Tube Boilers
Stationary Return Tubular Boilers
Economic Return Tubular Boilers
Steel Plate Construction
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PITTSBURGH, PA.



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The valve movement of Dean Bros. **Durable Duplex Steam Pump** is the most important improvement that has been made on the Duplex Pump for twenty-five years. *Send for Catalog 103.*

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Stacks; Breechings; Tanks; Plate Work—riveted and welded; Iron Castings.

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Meadville, Pa.

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Automatic Selective Proportional Unloaders are found exclusively on the **NORWALK COMPRESSOR** These improvements mark a new era in compressor construction. They gain the instant and favorable attention of all skilled engineers.

For the usual hackneyed claims of ECONOMY, DURABILITY and EFFICIENCY, let our forty years' experience be an assurance of adequate and discerning attention to every feature.

THE NORWALK IRON WORKS CO. South Norwalk, Conn.

BOXES (Case-Hardening and Carbonizing)
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Sivyer Steel Castings Co., Milwaukee, Wis.

BOXES (Cast Steel Open Hearth Charging)
Wellman-Seaver-Morgan Co., Cleveland, O.

BRAKES (Electric)
Cutler-Hammer Mfg. Co., The, Milwaukee
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Toledo Bridge & Crane Co., 2900 Dorr St., Toledo, O.

BRAKE SHOES
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

BRANDING IRONS
Moss, Henry, & Co., 37 Beaver St., New York City

BRASS AND BRONZE SIGNS AND TABLETS
Moss, Henry, & Co., 37 Beaver St., New York City

BRASS AND COPPER
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City

BRASS AND COPPER (Perforated)
Erdle Perforating Co., Rochester, N. Y.

BRASS GOODS
Lunkenheimer Co., The, Cincinnati, O.
McKenna Brothers, Pittsburgh, Pa.

BRAZING OUTFITS
Linde Air Products Co., New York, N. Y.
Oxweld Acetylene Co., Chicago, Ill.

BRICK (Silica, Magnesia, Chrome)
American Refractories Co., 208 S. La Salle St., Chicago, Ill.
Murphysboro Paving Brick Co., Murphysboro, Ill.
Orth, Frank, 3437 Fir St., Indiana Harbor, Ind.
Pyro Clay Products Co., The, Oak Hill, O.
Soisson, Jos., Fire Brick Co., Connellsville, Pa.
Union Mining Co., Mount Savage, Md.

BRICK INSULATING (See Insulating Brick)

BRICKMAKING MACHINERY
American Clay Machinery Co., Bucyrus, O.
Stevenson Co., The, Wellsville, O.

BRIDGES, BUILDINGS AND VIADUCTS (Steel)
Alliance Structural Co., Alliance, O.
American Bridge Co., New York, N. Y.
Belletontaine Bridge & Steel Co., The, Bellefontaine, O.
Case Crane & Engineering Co., Columbus, O.
Chase, Frank D., Chicago, Ill.
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia.
McClintic-Marshall Co., Pittsburgh, Pa.
McMyler Interstate Co., Cleveland, O.
Mt. Vernon Bridge Co., Mt. Vernon, O.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Price, T. W., Engineering Co., Woolworth Bldg., New York City
Riter-Conley Mfg. Co., Pittsburgh, Pa.

BRIQUETTING
General Briquetting Co., 25 Broad St., New York City.

BROKERS (Customhouse, Marine and Insurance)
Grandfield, W. J., & Co., 308 Chestnut St., Philadelphia

BRONZE
Aluminum Castings Co., Cleveland.
Keystone Bronze Co., Pittsburgh, Pa.

BRONZE (Manganese)
Bethlehem Steel Co., The, S. Bethlehem, Pa.

BRUSHES (Dynamo)
Dixon, Joseph, Crucible Co., Dept. 64-B, Jersey City, N. J.

BUCKETS (Clam Shell)
Brosius, Edgar E., Pittsburgh, Pa.
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York
Hayward Co., The, 50-54 Church St., New York City
Lakewood Engrg. Co., Cleveland, O.
Wellman-Seaver-Morgan Co., Cleveland, O.
Williams, G. H., Co., Erie, Pa.

BUCKETS (Drag Line)
Hayward Co., The, 50-54 Church St., New York City.

BUCKETS (Dumping)
Atlas Car & Mfg. Co., Dept. E, Cleveland, O.

BUCKETS (For All Purposes)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh

BUCKETS (Grab)
American Bridge Co., New York, N. Y.
Brosius, Edgar E., Pittsburgh, Pa.
Brown Hoisting Machy. Co., Cleveland, O.
Case Crane & Engineering Co., Columbus, O.
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York.
Hayward Co., The, 50-54 Church St., New York City.
Industrial Works, Bay City, Mich.
Link-Belt Company, Chicago, Ill.
McMyler Interstate Co., Cleveland, O.
Orton & Steinbrenner Co., 612 S. Dearborn St., Chicago
Pawling & Harnischfeger Co., Milwaukee, Wis.
Wellman-Seaver-Morgan Co., Cleveland, O.
Williams, G. H., Co., Erie, Pa.

BUCKETS (Skip)
Bartlett & Snow, C. O., Co., Cleveland, O.

BUGGIES (Wire)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BUILDERS (Community Homes)
Road Co., The, Century Bldg., Pittsburgh, Pa.

BULLDOZERS
Simmons Machine Co., Inc., Albany, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

BUNDLES—SCRAP, WIRE AND ROD
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BURNERS (Acetylene)
Linde Air Products Co., New York, N. Y.
Oxweld Acetylene Co., Chicago, Ill.

BURNERS (Fuel Oil and Gas)
American Shop Equipment Co., Chicago, Ill.
Gilbert & Barker Mfg. Co., Union St., Springfield, Mass.

BUSBAR INSULATING SUPPORTS
General Devices & Fittings Co., Chicago, Ill.

BUSHINGS
Aluminum Castings Co., Cleveland, O.

BUSINESS CARDS (Engraved)
Wiggins, John B., Co., 705 Peoples Gas Bldg., Chicago

BY-PRODUCT COKE OVENS
Koppers, H., Co., Pittsburgh, Pa.

CABLE (Ignition)
Roebling's, John A., Sons Co., Trenton, N. J.

CABLEWAYS AND TRAMWAYS
American Steel & Wire Co., Chicago, Ill.
Brown Hoisting Machy. Co., Cleveland, O.
Macomber & Whyte Rope Co., Kenosha, Wis.
McClintic-Marshall Co., Pittsburgh, Pa.

CABLE WIRE
Wright Wire Co., Worcester, Mass.

CANS (Waste, Shop and Oil)
New Britain Mach. Co., New Britain, Ct.

CARS (Dump)
Lakewood Engineering Co., Cleveland, O.
Orenstein-Arthur Koppel Co., Koppel, Pa.

CARS (Industrial and Mining)
American Bridge Co., New York, N. Y.
American Steel Export Co., New York.
Atlas Car & Mfg. Co., Dept. E, Cleveland, O.
Birdsboro Steel Fdy. & Mach. Co., Birdsboro, Pa.
Chase Fdy. & Mfg. Co., Columbus, O.
Lakewood Engrg. Co., Cleveland, O.
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia
Mesta Machine Co., Pittsburgh, Pa.
Orenstein-Arthur Koppel Co., Koppel, Pa.
Shippers Car Line, New York, N. Y.
Treadwell Engineering Co., Easton, Pa.
Whiting Fdy. Equipment Co., Harvey, Ill.

CARS (Steel)
Cambria Steel Co., Philadelphia, Pa.
Orenstein-Arthur Koppel Co., Koppel, Pa.

CASE HARDENING
Bidle, W. S., Co., 1411 E. 45th St., Cleveland, O.
Cleveland Metal Treating & Welding Co., Cleveland, O.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

CASE HARDENING BOXES
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Ohio Steel Foundry Co., The, Springfield, O.
Sivyer Steel Castings Co., Milwaukee, Wis.

CASTINGS (Air Furnace)
Mesta Machine Co., Pittsburgh, Pa.
United Engineering & Fdy. Co., Pittsburgh, Pa.

CASTINGS (Alloy Steel)
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Columbia Steel Co., San Francisco, Cal.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Ohio Steel Foundry Co., The, Springfield, O.
Sivyer Steel Casting Co., Milwaukee, Wis.
St. Louis Steel Foundry Co., 1501 Kienlen Ave., St. Louis, Mo.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
Taylor-Wharton Iron & Steel Co., Highbridge, N. J.

CASTINGS (Aluminum)
Aluminum Castings Co., Cleveland

CASTINGS (Brass, Bronze and Aluminum)
Aluminum Castings Co., Cleveland
Arcade Mfg. Co., Dept. C, Freeport, Ill.
Bronzbraswyt Metals Co., Pittsburgh, Pa.
France Equipment Co., N. Baltimore, O.
Keystone Bronze Co., Pittsburgh, Pa.
Klotz Machine Co., Sandusky, O.
Mackintosh, Hemphill & Co., Pittsburgh.
Mitchell-Tappen Co., New York, N. Y.
Morgan Engineering Co., Alliance, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

CASTINGS (Chemical)
Farrar & Trefts, Buffalo, N. Y.

CASTINGS (Chilled)
Fuller-Lehigh Co., Fullerton, Pa.

CASTINGS (Converter Steel)
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Ohio Steel Foundry Co., Springfield, O.
Reading Steel Casting Co., Reading, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, Geo. H., Steel Casting Co., Milwaukee, Wis.

CASTINGS (Crucible Steel)
Sivyer Steel Casting Co., Milwaukee, Wis.

CASTINGS (Die)
Lubricating Metal Co., 2 Rector St., New York City.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.

CASTINGS (Electric Furnace)
Latrobe Electric Steel Co., Latrobe, Pa.
Pelton Steel Co., Milwaukee, Wis.
Racine Steel Castings Co., Racine, Wis.
Sivyer Steel Castings Co., Milwaukee.
Treadwell Engrg. Co., Easton, Pa.
United Alloys Steel Corp., The, Canton, O

CASTINGS (Furnace)
Marshall Foundry Co., Pittsburgh, Pa.

CASTINGS (Gear)
Allyne-Ryan Foundry Co., Cleveland, O.
Dayton Steel Foundry Co., Dayton, O.
Farrell-Cheek Steel Foundry Co., Sandusky, O
Link-Belt Company, Chicago, Ill.
Mesta Machine Co., Pittsburgh, Pa.
Ohio Steel Foundry Co., Springfield, O.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

Black Diamond File Works



Twelve Medals Awarded for "Very Superior Goods" at International Exhibitions

Special Prize GOLD MEDAL at Atlanta, Ga., 1895

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INGOT MOLDS

Molds *that* Last Longer

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H. S. SANDS, Treas.
W. V. HOGE, Gen'l Mgr.

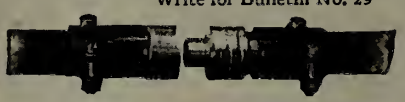
The Penn Mold & Mfg. Co.

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AUTOMATIC AIR HOSE COUPLINGS
AND NEVER-SLIP HOSE CLAMPS
Write for Bulletin No. 29

Saves Air Time and Temper



Tight Under all Pressures

OVER 1,000,000 IN GENERAL USE
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Make Your Safety First Bulletins Attractive and Impressive.

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Foundry Chaplets and Stove Trimmings

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With Portage Molding Sands the molders can make a better showing.

Portage Sand Blast Sands also mean high grade work.

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Dustless Sand Blast Rooms
Rotary Table Machines
Revolving Barrel Machines, Hose Sand Blast and all other Sand Blast Equipment.

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"Indispensable" equipment in more than 1,000 leading foundries for core and facing sand. Blystone Mix is the most thorough in existence.

Made in several sizes—with or without revolving screen and electric motor. Catalog on request.

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HAGERSTOWN, MD.

SAND-BLAST SPECIALISTS



Roller Bearing Cars.
Trucks for all purposes and
Complete Industrial Railway Equipments

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AMERICAN-WADSWORTH PRESSURE SAND BLAST APPARATUS

is a patented Automatic Filling Valve that eliminates elevating buckets, chains, overhead hoppers. No sand valves to wear. 30% to 50% higher efficiency than any suction system. Less than half the mechanism of any other pressure system.

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CASTINGS (Gear) (Continued)
Penn Seaboard Steel Corp., Franklin Bank Bldg., Philadelphia
Sivyer Steel Casting Co., Milwaukee, Wis.
Standard Steel Castings Co., Cleveland, O.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

CASTINGS (Grey Iron)
Adamson Machine Co., Akron, O.
Advance-Rumely Co., Battle Creek, Mich.
Advance-Rumely Co., La Porte, Ind.
Allegheny Foundry & Machine Co., Glassmere, Pa.
American Bridge Co., New York, N. Y.
Arcade Mfg. Co., Dept. C, Freeport, Ill.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mach. Co., Birdsboro, Pa.
Cascade Foundry Co., Erie, Pa.
Centre Foundry & Machine Co., Wheeling, W. Va.
Cyclops Foundry Co., Pittsburgh, Pa.
Davis, Charles E., Rutland, Vt.
Decatur Pump & Mfg. Co., Decatur, Ill.
Erie Foundry Co., Erie, Pa.
Farrar & Trefts, Buffalo, N. Y.
Farrel Foundry & Mach. Co., Ansonia, Conn.
Kilby Mfg. Co., Cleveland, O.
Knott & Harker Co., Beaver Falls, Pa.
Koltz Machine Co., Sandusky, O.
Lansing Foundry Co., The, Lansing, Mich.
Lewis Foundry & Machine Co., Pittsburgh
Link-Belt Company, Chicago, Ill.
Mackintosh, Hemphill & Co., Pittsburgh.
Marshall Foundry Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Murphy Foundry Co., Beaver Falls, Pa.
National Foundry Co., Erie, Pa.
North Buffalo Hdwe. Fdy. Co., Buffalo, N. Y.
Ohio Foundry Co., Cleveland, O.
Phoenix Iron Works Co., Meadville, Pa.
Producers Supply Co., Franklin, Pa.
Simpson Foundry Co., Newark, O.
Simpson, J. L., Co., Bellefontaine, O.
Smith, T. L., Co., Milwaukee, Wis.
Smyser-Royer Co., York, Pa.
Standard Engrg. Co., Ellwood City, Pa.
Standard Foundry Co., Buffalo, N. Y.
St. Louis Malleable Casting Co., St. Louis, Mo.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Termaat & Monahan Co., Oshkosh, Wis.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
U. S. Cast Iron Pipe & Foundry Co., 730 E. Pearl St., Burlington, N. J.
Vogt Brothers Mfg. Co., Louisville, Ky.
Wellman-Seaver-Morgan Co., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Williamson, J. E., Co., Bellwood, Pa.

CASTINGS (Machinery)
Ohio Foundry Co., Cleveland, O.

CASTINGS (Malleable)
Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Malleables Co., Lancaster, N. Y.
Belle City Malleable Iron Co., Racine, Wis.
Columbus Malleable Iron Co., Columbus, O.
Danville Malleable Iron Co., Danville, Ill.
Dayton Malleable Iron Co., Dayton, O.
Decatur Malleable Iron Co., Decatur, Ill.
Erie Malleable Iron Co., Erie, Pa.
Fanner Mfg. Co., Dept. T, Cleveland, O.
Frazer & Jones Co., Syracuse, N. Y.
Hammond Malleable Iron Co., Hammond, Ind.
Illinois Malleable Iron Co., Chicago, Ill.
Lakeside Malleable Castings Co., Racine, Wis.
Lancaster Foundry Co., Lancaster, Pa.
Link-Belt Company, Chicago, Ill.
Mal-Gra Castings Co., Cambridge City, Ind.
Marion Malleable Iron Works, Marion, Ind.
Missouri Malleable Iron Co., E. St. Louis, Ill.
Moline Malleable Iron Co., St. Charles, Ill.
Northwestern Malleable Iron Co., Milwaukee, Wis.
Peoria Malleable Castings Co., Peoria, Ill.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve, Foundry & Const. Co., Pittsburgh, Pa.
Richmond Malleable Castings Co., Richmond, Ind.
Ross-Meehan Foundries, Chattanooga, Tenn.
Standard Malleable Iron Co., Muskegon, Mich.
St. Louis Malleable Castings Co., St. Louis, Mo.
Vermilion Malleable Iron Co., Hoopeston, Ill.
Wisconsin Malleable Iron Co., Milwaukee, Wis.
Zanesville Malleable Iron Co., Zanesville, O.

CASTINGS (Open Hearth)
Atlantic Steel Castings Co., Chester, Pa.
Atlas Steel Casting Co., Buffalo, N. Y.
Columbia Steel Co., San Francisco, Cal.
Fahnestock Mfg. Co., Avonmore, Pa.
National Steel Foundries, Milwaukee, Wis.
Penn Seaboard Steel Corp., Franklin Bank Bldg., Philadelphia
Wellman-Seaver-Morgan Co., Cleveland, O.

CASTINGS (Semi-Steel)
Adamson Machine Co., Akron, O.
Allyne-Ryan Fdy. Co., Cleveland, O.
Centre Foundry & Machine Co., Wheeling, W. Va.
Cyclops Foundry Co., Pittsburgh, Pa.
Decatur Pump & Mfg. Co., Decatur, Ill.
Farrar & Trefts, Buffalo, N. Y.
Morgan Engineering Co., Alliance, O.
Murphy Foundry Co., Beaver Falls, Pa.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Producers Supply Co., Franklin, Pa.
Smith, T. L., Co., Milwaukee, Wis.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

CASTINGS (Steel)
Adamson Machine Co., Akron, O.
Allegheny Steel Co., Pittsburgh, Pa.
American Bridge Co., New York City.
American Rolling Mill Co., Middletown, O.
American Steel Foundries, Chicago, Ill.
Atlantic Steel Castings Co., Chester, Pa.
Atlas Steel Casting Co., Buffalo, N. Y.
Bayonne Steel Casting Co., Bayonne, N. J.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Burnside Steel Co., Chicago
Columbia Steel Co., San Francisco, Cal.
Connecticut Electric Steel Co., Inc., Hartford, Conn.
Dayton Steel Foundry, Dayton, O.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Federal Steel Foundry Co., Chester, Pa.
Hubbard Steel Foundry Co., E. Chicago, Ind.
Kelly & Jones Co., Greensburg, Pa.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Michigan Steel Castings Co., Detroit, Mich.
Midvale Steel Co., Philadelphia, Pa.
Milwaukee Steel Foundry Co., 101-121 S. Water St., Milwaukee, Wis.
Morgan Engineering Co., Alliance, O.
National Foundry Co., Erie, Pa.
National Roll & Foundry Co., Avonmore, Pa.
National Steel Foundries, Milwaukee, Wis.
Ohio Steel Foundry Co., The, Springfield, O.
Otis Steel Co., Cleveland, O.
Penn Seaboard Steel Corp., Franklin Bank Bldg., Philadelphia
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.
Reading Steel Casting Co., Reading, Pa.
Reliance Steel Casting Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sharon Foundry Co., Sharon, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, Geo. H., Steel Casting Co., Milwaukee, Wis.
Standard Steel Castings Co., Cleveland, O.
St. Louis Steel Foundry Co., 1501 Kienlen Ave., St. Louis, Mo.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.
West Steel Casting Co., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

CASTINGS (Steel, for Electrical Apparatus)
Burnside Steel Co., Chicago.
Dayton Steel Foundry, Dayton, O.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Ohio Steel Foundry Co., Springfield, O.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, Geo. H., Steel Casting Co., Milwaukee, Wis.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
West Steel Casting Co., Cleveland, O.

CASTINGS (Stellite)
Haynes Stellite Co., The, Kokomo, Ind.

CASTINGS (White Metal)
Bronzbraswyt Metals Co., Pittsburgh, Pa.

CAUSTIC POTS
Farrar & Trefts, Buffalo, N. Y.

CEMENT (Fire Brick)
Botfield Specialties Co., Swanson and Clymer Sts., Philadelphia
Clinton Metallic Paint Co., Clinton, N. Y.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City

CEMENT (Furnace, High Temperature)
Clinton Metallic Paint Co., Clinton, N. Y.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City

CEMENT MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.

CEMENT WATERPROOFING
Texas Co., Dept. T., 17 Battery Pl., New York City

CENTRAL STATION EQUIPMENT
General Electric Co., Schenectady, N. Y.
Smith Gas Engrg. Co., The, Dayton, O.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CENTRIFUGAL COAL DRIERS
Link-Belt Company, Chicago, Ill.

CHAIN BLOCKS
Yale & Towne Mfg. Co., 9 E. 40th St., New York City.

CHAIN DRIVES
Link-Belt Company, Chicago, Ill.

CHAIN MACHINERY (Coil Chain)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

CHAINS
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Link-Belt Company, Chicago, Ill.

CHAINS (Conveyor)
Bartlett & Snow, C. O., Co., Cleveland, O.
Link-Belt Company, Chicago, Ill.

CHAINS (Power Transmitting)
Link-Belt Company, Chicago, Ill.

CHANNELS (See Steel Structural)

CHAPLETS
Champion Mch. & Forging Co., Cleveland, O.
Fanner Mfg. Co., Dept. T, Cleveland, O.
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia

CHARCOAL
Hillman, J. H., & Sons Co., Pittsburgh.

CHECKS (Time, Tool and Pay)
Moss, Henry, & Co., 37 Beaver St., New York City
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh

CHEMICAL APPARATUS
Farrar & Trefts, Buffalo, N. Y.

CHEMICALS
Ele-Kem Co., 1512 Clybourn Ave., Chicago
Ford, J. B., Co., Wyandotte, Mich.

CHEMISTS AND METALLURGISTS
Steel Improvement & Forge Co., Cleveland, O.

CHROME ORE
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

CHUCKS
Modern Tool Co., 3rd and French Sts., Erie, Pa.
Toomey, Frank, Inc., Philadelphia, Pa.

CHUCKS (Drill)
Clark Equipment Co., Buchanan, Mich.

CHUCKS (Lathe)
Whiton, D. E., Mach. Co., New London, Conn.

CINDER MILLS (Water)
Whiting Foundry Equipment Co., Harvey, Ill.

CINDER POTS
Marshall Foundry Co., Pittsburgh, Pa.

CIRCUIT BREAKERS
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CLAM SHELL BUCKETS
Lakewood Engineering Co., Cleveland, O.

CLAMP INSULATOR SUPPORTS
General Devices & Fittings Co., Chicago, Ill.

CLAMPS ("C")
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

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CASTINGS

Sharon Foundry Co.

STEEL CASTINGS

ACID OPEN HEARTH

We solicit your business and guarantee satisfaction

Sharon, Pa.

Open Hearth Castings

Thirty Tons a Day

Our ten-ton Open Hearth Furnace permits us to take care of a considerably increased tonnage of open hearth castings, in addition to our facilities for making converter steel castings. We solicit your inquiries.

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THE FAHNESTOCK MFG. CO.

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STEEL CASTINGS
FROM 15 LBS. TO 15 TONS
For Mills, Railroads, Machinery, Ships and Government Specifications; Capacity doubled and surplus tonnage available for prompt delivery in form of castings or ingots.

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ERIE, PA.

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OPEN HEARTH STEEL CASTINGS
QUALITY MILWAUKEE SERVICE
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ATLANTIC STEEL CASTINGS COMPANY

ACID OPEN HEARTH STEEL
CHESTER, PA.
Miscellaneous Steel Castings from 1 to 4000 Lbs.
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Nickel and Other Alloy Steel Castings
Inquiries Solicited Prompt Deliveries

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CONVERTER and Open HEARTH STEEL CASTINGS
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Chicago Office: 1657 Conway Bldg. J. B. MARSHALL

TISCO MANGANESE STEEL CASTINGS

FOR SEVERE SERVICE
Taylor-Wharton Iron & Steel Co.
High Bridge, New Jersey

CLAY MACHINERY
American Clay Machinery Co., Bucyrus, O.
Stevenson Co., The, Wellsville, O.

CLEANER (Metal)
Ford, J. B., Co., Wyandotte, Mich.

CLEANERS (Electric)
Wisconsin Electric Co., 3002 Dumore Bldg., Racine, Wis.

CLEANING SPECIALTIES
Ford, J. B., Co., Wyandotte, Mich.

CLUTCHES
Carlyle Johnson Mach. Co., Manchester, Conn.
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Link-Belt Company, Chicago, Ill.
Wellman-Seaver-Morgan Co., Cleveland, O.

CLUTCHES (Couplings)
Carlyle Johnson Mach. Co., Manchester, Conn.

CLUTCHES (Friction)
Carlyle Johnson Mach. Co., Manchester, Conn.
Plamondon, A., Mfg. Co., Chicago, Ill.

CLUTCHES (Pulley)
Carlyle Johnson Mach. Co., Manchester, Conn.

COAL
Addy, Matthew, Co., The, Cincinnati, O.
Alden Coal Mining Co., New York City.
Baird & West, Detroit, Mich.
Eaton, Rhodes & Co., Cincinnati, O.
Hanna, M. A., & Co., Cleveland, O.
Hillman, J. H., & Sons Co., Pittsburgh.
Mudge, Edmund W., & Co., Pittsburgh.
Reilly-Peabody Fuel Co., Pittsburgh, Pa.
Rogers, Brown & Co., Cincinnati, O.
Semet-Solvay Co., Syracuse, N. Y.
Snyder, W. P., Co., Pittsburgh, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Washington Coal & Coke Co., Dawson, Pa.

COAL CRUSHERS AND PULVERIZERS..
Bartlett & Snow, C. O., Co., Cleveland, O.
Fuller-Lehigh Co., Fullerton, Pa.
Link-Belt Company, Chicago, Ill.
Orton & Streinbrenner Co., 612 S. Dearborn St., Chicago
Raymond Bros. Impact Pulverizer Co., 1313 N. Branch St., Chicago

COAL, ORE AND ASH HANDLING MACHINERY
American Bridge Co., New York, N. Y.
Bartlett & Snow, C. O., Co., Cleveland, O.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh
Brown Hoisting Machy. Co., Cleveland, O.
Godfrey, John F., Elkhart, Ind.
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York
Hayward Co., The, 50-54 Church St., New York City
Link-Belt Company, Chicago, Ill.
Orton & Streinbrenner Co., 612 S. Dearborn St., Chicago
Wellman-Seaver-Morgan Co., Cleveland, O.

COAL TIPPLES
Bartlett & Snow, C. O., Co., Cleveland, O.
Link-Belt Company, Chicago, Ill.

COAL WASHERS
Link-Belt Company, Chicago, Ill.

COILING MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

COILS (Pipe)
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Power Piping Co., Pittsburgh, Pa.
Roessing-Ernst Co., Etna, Pittsburgh, Pa.

COKE
Addy, Matthew, Co., The, Cincinnati, O.
Alden Coal Mining Co., New York City.
Baird & West, Detroit, Mich.
Bourne-Fuller Co., Cleveland, O.
Crocker Bros., New York City.
Eaton, Rhodes & Co., Cincinnati, O.
Hanna, M. A., & Co., Cleveland, O.
Hillman, J. H., & Sons Co., Pittsburgh.
McKeefrey & Co., Leetonia, O.
Mohr, J. J., & Son, Philadelphia, Pa.
Mudge, Edmund W., & Co., Pittsburgh, Pa.
Reilly-Peabody Fuel Co., Pittsburgh, Pa.
Rogers, Brown & Co., Cincinnati, O.
Semet-Solvay Co., Syracuse, N. Y.
Snyder, W. P., & Co., Pittsburgh, Pa.
Stewart Iron Co., Ltd., Cleveland, O.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Washington Coal & Coke Co., Dawson, Pa.

COKE OVEN MACHINERY
Wellman-Seaver-Morgan Co., Cleveland, O.

COKE OVENS (By-Product)
Koppers, H., Co., Pittsburgh, Pa.

COMPRESSORS (Air)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Mackintosh, Hemphill & Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
Norwalk Iron Works Co., So. Norwalk, Conn.
Southwark Foundry & Mach. Co., Philadelphia, Pa.
Standard Scale & Supply Co., Pittsburgh, Pa.
Wickes Brothers, Dept. A., Saginaw, Mich.

COMPRESSORS (Gas)
Norwalk Iron Works Co., So. Norwalk, Conn.

CONCRETE INSERTS
Dayton Malleable Iron Co., Dayton, O.

CONCRETE MIXERS
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.
Lakewood Engrg. Co., Cleveland, O.
Smith, T. L., Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.

CONCRETE REINFORCEMENT
American Steel & Wire Co., Chicago, Ill.

CONDENSERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Connersville Blower Co., The, Connersville, Ind.
Cooper, C. & G., Mt. Vernon, O.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Farrar & Trefts, Buffalo, N. Y.
Mesta Machine Co., Pittsburgh, Pa.

CONDUCTORS (Armored Electric)
Youngstown Sheet & Tube Co., Youngstown, O.

CONDUITS (Electric)
Youngstown Sheet & Tube Co., Youngstown, O.

CONTRACTORS (See Engineers and Contractors)

CONTRACT WORK
Lincoln Engineering Co., Main and Center Sts., Cleveland, O.

CONTROLLERS (Electric)
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Morgan Engineering Co., Alliance, O.
Toledo Bridge & Crane Co., 2900 Dorr St., Toledo, O.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CONVERTERS (Bessemer)
Pennsylvania Engineering Works, New Castle, Pa.

CONVERTERS (Steel Castings)
Whiting Foundry Equipment Co., Harvey, Ill.

CONVEYORS (Elevating and Conveying)
Bartlett & Snow, C. O., Co., Cleveland, O.
Brown Hoisting Machinery Co., Cleveland, O.
Godfrey, John F., Elkhart, Ind.
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York
Link-Belt Company, Chicago, Ill.
McMyler Interstate Co., Cleveland, O.
Roots, P. H., & F. M., Co., Connersville, Ind.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.

COOLING BEDS
Treadwell Engineering Co., Easton, Pa.

COPPER
United Smelting & Aluminum Co., New Haven, Conn.

COPPER (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

COPPER ALUMINUM (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

COPPER NICKEL (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa

CORE MAKING MACHINES
Pridmore, Henry E., Chicago, Ill.

CORE OVENS
Whiting Fdy. Equipment Co., Harvey, Ill

CORE REDUCERS
National Engineering Co., 5 N. La Salle St., Chicago

CORRUGATED FASTENERS
Acme Steel Goods Co., 2840 Archer Ave., Chicago

COUNTERSHAFTS
Kempsmith Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES
Hart, R. A., Mfg. Co., 79 Wilson Court, Battle Creek, Mich.

COUPLING BOXES
Pittsburgh Iron & Steel Foundries, Pittsburgh, Pa.

COUPLINGS
Connersville Blower Co., The, Connersville, Ind.
Mark Mfg. Co., 1907 Dempster St., Evanston, Ill.
Roots, P. H., & F. M., Co., Connersville, Ind.

COUPLINGS (Carriage)
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

CRANE HOOKS
American Forge & Machine Co., 1625 Barth Court, Canton, O.

CRANES
New York Machinery Exchange, Inc., New York, N. Y.

CRANES (Charging)
Alliance Machine Co., Alliance, O.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Morgan Engineering Co., Alliance, O.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Wellman-Seaver-Morgan Co., Cleveland, O.

CRANES (Electric)
Brosius, Edgar E., Pittsburgh, Pa.
Case Crane & Engrg. Co., The, Columbus, O.
Link-Belt Company, Chicago, Ill.
Mitchell-Tappen Co., New York, N. Y.
Morgan Engineering Co., Alliance, O.
Northern Engineering Works, Detroit, Mich.
Whiting Fdy. Equipment Co., Harvey, Ill.

CRANES (Electric Traveling)
Alliance Machine Co., Alliance, O.
Brown Hoisting Machinery Co., Cleveland, O.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engineering Co., Wickliffe, O.
Euclid Crane & Hoist Co., Dept. B., Euclid, O.
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.
Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 Broadway, New York City
Northern Engineering Works, Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Payne, N. B., New York, N. Y.
Pittsburgh Crane & Equipment Co., 907 Phipps Power Bldg., Pittsburgh, Pa.
Schoonmaker, A. G., & Sons, New York, N. Y.
Shaw Electric Crane Co New York, N. Y.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Toledo Bridge & Crane Co., 2900 Dorr St., Toledo, O.

CRANES (Hand)
Brosius, Edgar E., Pittsburgh, Pa.
Brown Hoisting Machinery Co., Cleveland, O.
Case Crane & Engrg. Co., The, Columbus, O.
Cleveland Crane & Engrg. Co., Wickliffe, O
Euclid Crane & Hoist Co., Dept. B., Euclid, O

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CASTINGS

AMERICAN STEEL FOUNDRIES

NEW YORK · CHICAGO · PITTSBURGH

STEEL CASTINGS

CASTINGS

High grade Malleable and Electric Steel castings.
Quality, finish and service assured.

ACME STEEL & MALLEABLE IRON WORKS, INC.
BUFFALO, N. Y.

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INCORPORATED 1903

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STEEL CASTINGS
of Finest Quality
From 1 Pound to 20,000 Pounds



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RAILWAY EXCHANGE CHICAGO

STEEL CASTINGS

Electric Furnace and Converter

Bayonne Steel Casting Co.
BAYONNE, N. J.

CRANES (Hand)
(Continued)
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.
Link-Belt Company, Chicago, Ill.
Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 Broadway, New York City
Northern Engineering Works, Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Toledo Bridge & Crane Co., 2900 Dorr St., Toledo, O.
Whiting Foundry Equipment Co., Harvey, Ill.

CRANES (Hydraulic)
Alliance Machine Co., Alliance, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Morgan Engineering Co., Alliance, O.
Ridgway, Craig, & Son, Coatesville, Pa.
Southwark Fdy. & Mach. Co., Philadelphia
United Engrg. & Fdy. Co., Pittsburgh, Pa.

CRANES (Jib)
Case Crane & Engineering Co., Columbus, O.
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.

CRANES (Locomotive)
Brown Hoisting Machinery Co., Cleveland, O.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Factory Products Co., Pittsburgh, Pa.
Industrial Works, Bay City, Mich.
Link-Belt Company, Chicago, Ill.
McMyler Interstate Co., Cleveland, O.
Niles-Bement-Pond Co., 111 Broadway, New York City
Orton & Streinbrenner Co., 612 S. Dearborn St., Chicago
Pawling & Harnischfeger Co., Milwaukee, Wis.
Shaw Electric Crane Co., New York, N. Y.

CRANES (Pillar)
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.
Northern Engineering Works, Detroit, Mich.

CRANES (Steam Cleaning House)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

CRANES (Steam and Pneumatic, Wire Mills)
Cleveland Crane & Engrg. Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

CRANK SHAFTS
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

CRUCIBLES
Dixon, Joseph, Crucible Co., Dept. 64-B, Jersey City, N. J.

CRUSHER JAWS AND ROLLS
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

CRUSHING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bartlett & Snow, C. O., Cleveland, O.
Fuller-Lehigh Co., Fullerton, Pa.
Link-Belt Company, Chicago, Ill.
Stevenson Co., The, Wellsville, O.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.

CUPOLA BLOCKS
Hydraulic-Press Brick Co., Fire Brick Dept., St. Louis, Mo.
Mutton Hollow Fire Brick Co., The, Woodbridge, N. J.

CUPOLA, FURNACE AND FORGE LININGS. See Linings (Cupola, Furnace and Forge)

CUPOLAS
Northern Engineering Works, Detroit, Mich.
Whiting Fdy. Equipment Co., Harvey, Ill.

CUPRO-VANADIUM
American Vanadium Co., Pittsburgh, Pa.

CUT-OFF COUPLINGS
Carlyle Johnson Mach. Co., Manchester, Conn.

CUTTERS (Keyway)
Morton Mfg. Co., Muskegon Heights, Mich.

CUTTERS (Milling)
Becker Milling Machine Co., Boston, Mass.
Cleveland Power Transmission Co., Guardian Bldg., Cleveland, O.

CUTTERS (Pipe)
Hunter Saw & Machine Co., Pittsburgh.
Pittsburgh Saw & Mfg. Co., 32nd and Smallman Sts., Pittsburgh, Pa.

CUTTERS (Stellite)
Haynes Stellite Co., The, Kokomo, Ind.

CUTTERS LINK (Coil Chain)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

CUTTING AND WELDING (Oxy-Acetylene Process)
Linde Air Products Co., New York
Oxweld Acetylene Co., Chicago, Ill.

CUTTING AND WELDING APPARATUS (Electric)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CUTTING OFF MACHINES
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Front and Girard Ave., Philadelphia
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia
New York Machinery Exchange, Inc., New York, N. Y.
Peerless Machine Co., 1605 Racine St., Racine, Wis.
Racine Tool & Machine Co., Racine, Wis.
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Toomey, Frank, Inc., Philadelphia, Pa.

CYANIDE HARDENING COMPOUND
Ele-Kem Co., 1512 Clybourn Ave., Chicago

CYANIDE POTS
Sivyer Steel Castings Co., Milwaukee, Wis.

CYLINDERS (Pressure)
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
National Tube Co., Pittsburgh, Pa.

DELIVERY TRUCKS
Federal Motor Truck Co., Detroit, Mich.

DEOXIDIZERS (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

DERRICKS AND FITTINGS
American Bridge Co., New York, N. Y.
Case Crane & Engineering Co., Columbus, O.
Dake Engine Co., Grand Haven, Mich.
Hayward Co., The, 50-54 Church St., New York City
Williams, G. H., Co., Erie, Pa.

DERRICKS (Steel)
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.

DIE BLOCKS
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Hammond Steel Co., Inc., Syracuse, N. Y.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.

DIE HEADS (Automatic)
Rickert-Shafer Co., 612 W. 12th St., Erie, Pa.

DIE MAKING MACHINES
Anderson Die Machine Co., Bridgeport, Conn.

DIES
American Vanadium Co., The, Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
Lansing Stamping & Tool Co., Lansing, Mich.
Modern Tool Co., 3rd and French Sts., Erie, Pa.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis.
Standard Tool & Mfg. Co., 70 Lafayette Blvd. E., Detroit, Mich.
Toledo Machine & Tool Co., Toledo, O.

DIES (For Special Shapes)
Empire Art Metal Co., College Pt., N. Y.

DIES (Lettering and Embossing)
Moss, Henry, & Co., 37 Beaver St., New York City
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh

DIES (Pipe Threading)
Treadwell Engineering Co., Easton, Pa.

DIGGING AND EXCAVATING MACHINERY
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York
Hayward Co., The, 50-54 Church St., New York City
Williams, G. H., Co., Erie, Pa.

DOLOMITE (Dead Burned)
Davison, Allen S., Company, Pittsburgh, Pa.

DOORS (Hollow Steel)
Empire Art Metal Co., College Pt., N. Y.

DOORS AND SHUTTERS (Steel Rolling)
Edwards Mfg. Co., 401-451 Culvert St., Cincinnati

DRAW BENCHES
Treadwell Engineering Co., Easton, Pa.

DRAWING TABLES
Economy Drawing Table Co., Toledo, O.
Hein Furniture Co., 126-136 S. Huron St., Toledo, O.

DRILLING MACHINES
Allen, John F., Co., 372 Gerard Ave., New York City
Baker Bros., Toledo, O.
Cleveland Pneumatic Tool Co., Cleveland, O.
Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis.
National Machine Co., The, Tiffin, O.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia
New York Machinery Exchange, Inc., New York, N. Y.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.

DRILLS
Clark Equipment Co., Buchanan, Mich.
Cleveland Power Transmission Co., Guardian Bldg., Cleveland, O.
Latrobe Tool Co., The, Latrobe, Pa.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.
Wickes Brothers, Dept. A., Saginaw, Mich.
Wisconsin Electric Co., 3002 Dumore Bldg., Racine, Wis.

DRILLS (Rock)
Wickes Brothers, Dept. A., Saginaw, Mich.

DRILLS (Twist)
Clark Equipment Co., Buchanan, Mich.

DRIVES (Rope and Gear)
Treadwell Engineering Co., Easton, Pa.

DRYERS (Ore)
Fuller-Lehigh Co., Fullerton, Pa.

DRYERS (Sand, Coal, Ores, Chemicals, etc.)
Bartlett & Snow, C. O., Co., Cleveland, O

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CASTINGS



OWOSSO, MICHIGAN

American Malleables Co.

General Offices
Lancaster, New York
(Suburb of Buffalo)

Malleable Iron Castings



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MALLEABLE CASTINGS

For General Purposes

MALLEABLE CASTINGS

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THE COLUMBUS MALLEABLE IRON CO.
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DECATUR ILLINOIS
MALLEABLE IRON CASTINGS

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Dayton, Ohio

MISSOURI MALLEABLE IRON CO.
Highest Grade Malleable Iron Castings
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VERMILION MALLEABLE IRON CO.
HOOPESTON, ILLINOIS
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OF ALL DESCRIPTIONS
MADE BY
STANDARD MALLEABLE IRON CO.
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ESTABLISHED 1896

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Brass, Bronze and Copper Castings
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Operates Two Modern Plants
General Offices: 39th St., Pittsburgh, Pa.
Operating Brighton Brass & Bronze Co.
New Brighton, Pa.

DRY PANS
Stevenson Co., The, Wellsville, O.

DUST ARRESTING SYSTEMS
Hoevel Manufacturing Corp., 40 Church St., New York City
Pangborn Corporation, Hagerstown, Md.
Whiting Foundry Equipment Co., Harvey, Ill.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Duquesne Electric & Mfg. Co., Pittsburgh, Pa.
Electric Controller & Mfg. Co., Cleveland, O.
General Devices & Fittings Co., Chicago Ill.
General Electric Co., Schenectady, N. Y.
Green, Wells S., Co., Philadelphia, Pa.

ELECTRIC LIGHT EQUIPMENT
Link-Belt Company, Chicago, Ill.
Smith Gas Engrg. Co., The, Dayton, O.

ELECTRIC LOCOMOTIVES AND TRACTORS
Lakewood Engineering Co., Cleveland, O.

ELECTRIC MACHINERY (Second Hand)
Miller-Owen Electric Co., Pittsburgh, Pa.
Nathan Klein & Co., Inc., New York City
Potts, Henry, & Co., Philadelphia, Pa.
Power Equipment Co., Philadelphia, Pa.
Sterling Iron & Steel Co., Philadelphia, Pa.

ELEVATORS
Ridgway, Craig & Son, Coatesville, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

ELEVATORS (Bucket)
Bartlett & Snow, C. O., Co., Cleveland, O.
Link-Belt Company, Chicago, Ill.
Stevenson Co., The, Wellsville, O.

ELEVATORS (Concrete)
Smith, T. L., Co., Milwaukee, Wis.

ELEVATORS (Hydraulic)
Ridgway, Craig, & Son, Coatesville, Pa.

ELEVATORS (Portable)
N. Y. Revolving Portable Elevator Co., 391 Garfield Ave., Jersey City, N. J.
Revolvator Co., 391 Garfield Ave., Jersey City, N. J.

ENAMEL SIGNS
Moss, Henry, & Co., 37 Beaver St., New York City

ENGINE LATHES—See LATHES (Engine)

ENGINEERS AND CONTRACTORS
Abramsen Engineering Co., Pittsburgh, Pa.
Alliance Structural Co., Alliance, O.
American Bridge Co., New York City
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Blair Engineering Co., Chicago, Ill.
Case Crane & Engrg. Co., The, Columbus, O.
Chase, Frank D., Chicago, Ill.
Chesapeake Iron Works, Baltimore, Md.
Freyn, Brassert & Co., Peoples Gas Bldg., Chicago, Ill.
General Briquetting Co., 25 Broad St., New York City
Kennedy, Julian, Pittsburgh, Pa.
Kratzer, W. N., Co., 3212 Smallman St., Pittsburgh, Pa.
Laughlin, Alex, & Co., Pittsburgh, Pa.
McClintic-Marshall Co., Pittsburgh, Pa.
McClure, Geo. W., Sons & Co., Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, O.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Price, T. W., Engineering Co., Woolworth Bldg., New York City
Rinehart, J. W., Cleveland, O.
Rodd Co., The, Century Bldg., Pittsburgh, Pa.
Smythe, S. R., The, Co., Pittsburgh, Pa.
Swindell, Wm., & Bros., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Whitehead & Kales Iron Works, Detroit, Mich.

ENGINEERS (Consulting)
Chase, Frank D., Chicago, Ill.
Duff, Samuel E., Pittsburgh, Pa.
Ellis, Frank I., Pittsburgh, Pa.
Freyn, Brassert & Co., Peoples Gas Bldg., Chicago, Ill.
General Briquetting Co., 25 Broad St., New York City
Kennedy, Julian, Pittsburgh, Pa.
Moore, W. E., & Co., Pittsburgh, Pa.
Price, T. W., Engineering Co., Woolworth Bldg., New York City
Shover, Barton R., Pittsburgh, Pa.

ENGINEERS (Foundry, Mechanical and Electrical)
General Briquetting Co., 25 Broad St., New York City
Standard Sand & Mach. Co., Cleveland, O.

ENGINEERS (Metallurgical)
American Incandescent Heat Co., Inc., 10 P. O. Square, Boston, Mass.

ENGINES (Gas, Gasoline and Oil)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Cooper, C. & G., Co., Mt. Vernon, O.
Mesta Machine Co., Pittsburgh, Pa.
Producers Supply Co., Franklin, Pa.
Sterling Iron & Steel Co., Philadelphia, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

ENGINES (Hoisting)
Dake Engine Co., Grand Haven, Mich.
Sterling Iron & Steel Co., Philadelphia, Pa.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.

ENGINES (Marine)
Carlyle Johnson Mach. Co., Manchester, Conn.

ENGINES (Steam)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Cooper, C. & G., Co., Mt. Vernon, O.
Dake Engine Co., Grand Haven, Mich.
Erie City Iron Works, Erie, Pa.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Standard Scale & Supply Co., Pittsburgh, Pa.
Toomey, Frank, Inc., Philadelphia, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.

ENGRAVERS (Steel and Copper Plate)
Wiggins, John B., Co., 705 Peoples Gas Bldg., Chicago

ENGRAVERS (Steel, Die and Stamp)
Moss, Henry, & Co., 37 Beaver St., New York City

EXCAVATING MACHINERY
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh

EXHAUSTERS (Gas)
Connersville Blower Co., The, Connersville, Ind.
Roots, P. H., & F. M., Co., Connersville, Ind.

EXPORTERS
American Steel Export Co., New York City
Federal Export Corp., 115 Broadway, New York City
Ford, R. M., & Co., Inc., New York City
Liberty Steel Products Co., New York City
Vulcan Steel Products Co., New York City

EYEBARS
American Bridge Co., New York, N. Y.

FACINGS (Foundry)
Dixon, Joseph, Crucible Co., Dept. 64-B, Jersey City, N. J.

FELT (Mechanical)
Booth Felt Co., 442-452 Nineteenth St., Brooklyn, N. Y.

FELT WASHERS
Booth Felt Co., 442-452 Nineteenth St., Brooklyn, N. Y.

FENCE GATES
American Steel & Wire Co., Chicago, Ill.

FENCE POSTS (Creosoted)
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.

FENCES (Factory)
Page Steel & Wire Co., Adrian, Mich.

FENCING (Wire)
Page Steel & Wire Co., Adrian, Mich.

FENCING (Woven Wire)
Youngstown Sheet & Tube Co., Youngstown, O.

FERRO-ALLOYS
Canada Carbide Sales Co., 30 Church St., New York
Davidson, Allen S., Co., Pittsburgh, Pa.
Fairbanks, Morse & Co., New York City
Southern Ferro Alloys Co., Chattanooga, Tenn.
United States Alloys Corp., 28 E. 42nd St., New York City

FERRO-CARBON TITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERRO-CHROME
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

FERRO-MANGANESE
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Crocker Bros., New York City
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Marshall, Edward E., Bullitt Bldg., Philadelphia, Pa.
Mohr, J. J., & Sons, Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, Harrison Bldg., Philadelphia, Pa.

FERRO-MOLYBDENUM
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

FERRO-SILICON
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Canada Carbide Sales Co., 30 Church St., New York City
Crocker Bros., New York City
Davison, Allen S., Co., Pittsburgh, Pa.
Fairbanks, Morse & Co., New York City
Globe Iron Co., Jackson, O.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Mohr, J. J., & Sons, Philadelphia, Pa.
Niagara Electric Furnace Co., Inc., Niagara Falls, N. Y.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, Harrison Bldg., Philadelphia, Pa.
Southern Ferro Alloys Co., Chattanooga, Tenn.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
United States Alloys Corp., 28 E. 42nd St., New York City
Wolverine Metal Sales Co., Griswold Bldg., Detroit, Mich.

FERRO-TUNGSTEN
Fairbanks, Morse & Co., New York City
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Vanadium Alloys Steel Co., Pittsburgh, Pa.

FERRO-VANADIUM
American Vanadium Co., Pittsburgh, Pa.

FILES
Barnett, G. & H., Co., Philadelphia, Pa.
Disston, Henry & Sons, Inc., Philadelphia, Pa.
Nicholson File Co., Providence, R. I.

FIRE BRICK AND CLAY
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Brighton Fire Brick Co., New Brighton, Pa.
Claycraft Mining & Brick Co., Dept. B., Columbus, O.
Clearfield Fire Brick Co., Clearfield, Pa.
Clinton Metallic Paint Co., Clinton, N. Y.
Dover Fire Brick Co., Cuyahoga Bldg., Cleveland, O.
Hydraulic-Press Brick Co., Fire Brick Dept., St. Louis, Mo.
Kier Fire Brick Co., Pittsburgh, Pa.
Louisville Fire Brick Co., Highland Park, Ky.
Mutton Hollow Fire Brick Co., The, Woodbridge, N. J.
North American Magnesite Co., Ltd., 911 Citizens Bldg., Cleveland, O.
Pope, Frank B., Pittsburgh, Pa.
Portsmouth Refractories Co., Portsmouth, O.
Pyro Clay Products Co., The, Oak Hill, O.
Queen's Run Fire Brick Co., Lock Haven, Pa.
Sharon Fire Brick Co., Sharon, Pa.
Soisson, Jos., Fire Brick Co., Connellsville, Pa.
Union Mining Co., Mt. Savage, Md.
West Virginia Fire Clay Mfg. Co., Diamand Bank Bldg., Pittsburgh, Pa.

FIRE BRICK CEMENT
Botfield Specialties Co., Swanson and Clymer Sts., Philadelphia
Clinton Metallic Paint Co., Clinton, N. Y.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City

FIRE CLAY (Ground)
Union Mining Co., Mt. Savage, Md.

FIRE FIGHTING EQUIPMENT
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.

FIREPROOF CLOTHING
Holcomb Safety Garment Co., 12-14 S. Jefferson St., Chicago, Ill.

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HIGH GRADE MALLEABLES

Malleable Iron Castings of every description. True to pattern—free from blemishes, scale or shrinkage cracks. Made to specified tensile or transverse strength tests. ¶ We are in a position to furnish you castings from your blue prints. Let us figure on your requirements.

We are serving many of the most prominent manufacturing industries in these United States to their entire satisfaction. Let us add you to the list.

THE MAL-GRA CASTINGS CO.

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ST. LOUIS MALLEABLE CASTING CO.
ST. LOUIS, MO.
High Grade Malleable and Gray Iron Castings
Prompt Delivery

PEORIA MALLEABLE CASTINGS COMPANY
The factory of service
High Grade Malleables of all descriptions
PEORIA, ILL., U. S. A.
MODERN EQUIPMENT LARGE CAPACITY

ERIE MALLEABLE IRON COMPANY

ERIE, PA.

HAMMOND
Malleable Iron Co.

Capacity 20,000 tons per annum
Hammond, Indiana

Richmond Malleable Castings Co.
Richmond, Indiana
MALLEABLE CASTINGS OF QUALITY

Belle City Malleable Iron Company
Malleable Iron Castings
Racine Steel Castings Company
Refined Electric Steel Castings
RACINE, WISCONSIN

HIGH GRADE
Malleable Iron Castings
PROMPT DELIVERY
THE LANCASTER FOUNDRY CO.
Lancaster, Pa.

Refined Air Furnace Malleable Castings.

LAKESIDE MALLEABLE CASTINGS CO. RACINE, WIS.

FLANGES (Pipe)
Dart, E. M., Mfg. Co., Providence, R. I.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Power Piping Co., Pittsburgh, Pa.

FLAT WIRE—HIGH AND LOW CARBON
American Steel & Wire Co., Chicago, Ill.

FLOORING (Creosoted Wood Block)
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.
Pittsburgh Wood Preserving Co., Century Bldg., Pittsburgh, Pa.
Rodd Co., The, Century Bldg., Pittsburgh, Pa.

FLUE CUTTERS
Clark Equipment Co., Buchanan, Mich.

FLUE WELDERS
Southwark Foundry & Mach. Co., Philadelphia, Pa.

FLUOR-SPAR
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.

FLUXES (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

FLY WHEELS
Mesta Machine Co., Pittsburgh, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

FORGES
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

FORGES (Portable and Stationary Rivet)
American Shop Equipment Co., Chicago, Ill.

FORGING MACHINERY
Bliss, E. W., Co., 8 Adams St., Brooklyn
Erie Foundry Co., The, Erie, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Simmons Machine Co., Inc., Albany, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

FORGINGS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Cleveland Knife & Forge Co., Cleveland, O.

FORGINGS (Drop)
American Forge & Machine Co., 1625 Barth Ct., Canton, O.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Champion Mch. & Forging Co., Cleveland, O.
Cleveland Hardware Co., Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Drop Forging Co. of New York, Jersey City, N. J.
Eccles, Richard, Co., Auburn, N. Y.
General Drop Forge Co., Buffalo, N. Y.
Ingalls-Shepard Forging Co., Chicago, Ill.
Lakeside Forge Co., Erie, Pa.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Rockford Drop Forge Co., Rockford, Ill.
Scranton Forging Co., Scranton, Pa.
Steel Car Forge Co., Pittsburgh, Pa.
Steel Improvement & Forge Co., Cleveland, O.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

FORGINGS (Ingot)
Allegheny Steel Co., Pittsburgh, Pa.
American Rolling Mill Co., Middletown, O.
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., S. Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Crowley, John A., Detroit, Mich.
General Steel Co., Milwaukee, Wis.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Steel & Ordnance Co., Philadelphia, Pa.
Nagle Steel Co., Pottstown, Pa.
Penn Seaboard Steel Corp., Franklin Bank Bldg., Philadelphia, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
United Alloys Steel Corp., Canton, O.
Upson Nut Co., Cleveland, O.
Wickwire Steel Co., Buffalo, N. Y.

FORGINGS (Iron and Steel)
Aborn Steel Co., Inc., 24 Clark St., New York
Amalgamated Products Co., 165 Broadway, New York City
American Bridge Co., New York City
American Forge & Machine Co., 1625 Barth Ct., Canton, O.
American Rolling Mill Co., Middletown, O.
American Steel Export Co., New York City
American Vanadium Co., The, Pittsburgh, Pa.
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bradley, C. C., & Son, Inc., Syracuse, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Champion Mch. & Forging Co., Cleveland, O.
Cleveland Hardware Co., Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Cruse-Crawford Manufacturing Co., Birmingham, Ala.
Drop Forging Co. of New York, Jersey City, N. J.
Eccles, Richard, Co., Auburn, N. Y.
Hammond Steel Co., Inc., Syracuse, N. Y.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.
Ingalls-Shepard Forging Co., Chicago, Ill.
Jersey Forgings Works, Jersey City, N. J.
Joliet Forge Co., Joliet, Ill.
Midvale Steel Co., Philadelphia, Pa.
Morgan Engineering Co., Alliance, O.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.
Rockford Drop Forge Co., Rockford, Ill.
Steel Car Forge Co., Pittsburgh, Pa.
Steel Improvement & Forge Co., Cleveland, O.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

FORMS (Concrete Construction)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

FORMS (Special Wire)
American Steel & Wire Co., Chicago, Ill.

FOUNDRY EQUIPMENT AND SUPPLIES
Arcade Mfg. Co., Dept. C, Freeport, Ill.
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.
Hoevel Manufacturing Corp., 40 Church St., New York City
National Engineering Co., 5 N. La Salle St., Chicago, Ill.
Oldham, Geo., & Sons Co., Frankford, Philadelphia, Pa.
Pangborn Corp., Hagerstown, Md.
Pridmore, Henry E., Chicago, Ill.
Standard Sand & Machine Co., Cleveland, O.
Whiting Foundry Equipment Co., Harvey, Ill.

FOUNDRY GLOVES
Hickory Steel-Grip Glove Co., Box No. R. 6, Chicago, Ill.

FOUNDRY MIXING PANS
Stevenson Co., The, Wellsville, O.

FOUNDRY PLANTS
Chase, Frank D., Chicago, Ill.
Price, T. W., Engineering Co., Woolworth Bldg., New York City
Whiting Foundry Equipment Co., Harvey, Ill.

FRAMES (Wire Drawing)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

FROGS (Railroad and Trolley)
Bethlehem Steel Co., The, So. Bethlehem, Pa.

FUEL OIL
Clarendon Refining Co., 423 Oliver Bldg., Pittsburgh, Pa.
Texas Co., Dept. T, 7 Battery Pl., New York

FURNACE INSULATION
Armstrong Cork & Insulation Co., 101 Twenty-fourth St., Pittsburgh, Pa.
Celite Products Co., 11 Broadway, New York

FURNACE SPECIALTIES
Botfield Specialties Co., Swanson & Clymer Sts., Philadelphia
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City

FURNACES (Annealing and Case Hardening)
American Incandescent Heat Co., Inc., 10 P. O. Square, Boston, Mass.
General Electric Co., Schenectady, N. Y.
Gilbert & Barker Mfg. Co., Union St., Springfield, Mass.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Mahr Mfg. Co., Minneapolis, Minn.
Millier, W. R., Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Rockwell, W. S., Co., 50 Church St., New York City
Swindell, Wm., & Bros., Pittsburgh, Pa.
Whiting Fdy. Equipment Co., Harvey, Ill.

FURNACES (Annealing, Car Type and Solid Bottom)
American Shop Equipment Co., Chicago, Ill.

FURNACES (Automatic)
American Shop Equipment Co., Chicago, Ill

FURNACES (Blast)
Hagan, Geo. J., Co., Pittsburgh, Pa.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
McClure, G. W., Son & Co., Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, O.
Mt. Vernon Bridge Co., Mt. Vernon, O.
Pennsylvania Engrg. Works, New Castle, Pa.
Riter-Conley Mfg. Co., Pittsburgh, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

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American Shop Equipment Co., Chicago, Ill.

FURNACES (Bolt Heading)
American Shop Equipment Co., Chicago, Ill.

FURNACES (Bulldozer)
American Shop Equipment Co., Chicago, Ill.

FURNACES (Case Hardening and Heat Treating)
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American Shop Equipment Co., Chicago, Ill.

FURNACES (Crucible)
Gilbert & Barker Mfg. Co., Union St., Springfield, Mass.
Laughlin, Alex., & Co., Pittsburgh, Pa.
Whiting Fdy. Equipment Co., Harvey, Ill.

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Crowley, John A., Co., New York City
Industrial Electric Furnace Co., 53 W. Jackson Blvd., Chicago, Ill.
Ludlum Electric Furnace Corp., New York City
Moore, W. E., & Co., Pittsburgh, Pa.
Pittsburgh Furnace Co., 707 Union Bank Bldg., Pittsburgh, Pa.

FURNACES (Flue Welding)
American Shop Equipment Co., Chicago, Ill.

FURNACES (Forging)
American Shop Equipment Co., Chicago, Ill.
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Mahr Mfg. Co., Minneapolis, Minn.

FURNACES (Gas, Oil and Combination)
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FURNACES (Hammer)
American Shop Equipment Co., Chicago, Ill.

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American Incandescent Heat Co., Inc., 10 P. O. Square, Boston, Mass.

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Ludlum Electric Furnace Corp., New York, N. Y.
Mahr Mfg. Co., Minneapolis, Minn.
Pittsburgh Furnace Co., 707 Union Bank Bldg., Pittsburgh, Pa.

FURNACES (Munition)
American Shop Equipment Co., Chicago, Ill.

FURNACES (Open Hearth)
Blair Engineering Co., Chicago, Ill.
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia, Pa.
Orth, Frank, 3437 Fir St., Indiana Harbor, Ind.
Smythe, S. R., Co., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.

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American Shop Equipment Co., Chicago, Ill.

FURNACES (Shrapnel)
Gilbert & Barker Mfg. Co., Union St., Springfield, Mass.
Metals Production Equipment Co., Springfield, Mass.

FURNACES (Spring Fitting)
American Shop Equipment Co., Chicago, Ill.

FURNACES (Water Cooled Specialties for Open Hearth)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

FURNACES (Wire Annealing)
American Shop Equipment Co., Chicago, Ill.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

GALVANIZING EQUIPMENT
American Bridge Co., New York City
Erie Foundry Co., Erie, Pa.

GALVANIZED WIRE (Equipment)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

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Construction and Operation of the Open-Hearth Furnace.
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GASKETS (Leather)
Graton & Knight Mfg. Co., The,
Worcester, Mass.

GAS BOOSTERS (Rotary Positive Pressure)
Connersville Blower Co., The,
Connersville, Ind.
Roots, P. H., & F. M., Co.,
Connersville, Ind.

GAS EXHAUSTERS
Roots, P. H., & F. M., Co.,
Connersville, Ind.

GAS PRODUCERS
Chapman Engineering Co., Mt. Vernon, O.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Koppers, H., Co., Pittsburgh, Pa.
Miller, W. R., Co., Pittsburgh, Pa.
Morgan Construction Co.,
Worcester, Mass.
Smith Gas Engine Co., The, Dayton, O.
Wellman-Seaver-Morgan Co.,
Cleveland, O.

GAS RECOVERY COKE OVENS
Koppers, H., Co., Pittsburgh, Pa.

GAUGES (Caliper)
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

GEAR BLANKS
Aluminum Castings Co., Cleveland, O.
Jersey Forgings Works, Jersey City, N. J.

GEAR CUTTING MACHINERY
Newton Machine Tool Works, Inc.,
23rd and Vine St., Philadelphia, Pa.
New York Machinery Exchange, Inc.,
New York, N. Y.
Simmons Machine Co., Inc., Albany, N. Y.

GEARS
Plamondon, A., Mfg. Co., Chicago, Ill.

GEARS AND GEAR CUTTING
National Roll & Foundry Co.,
Avonmore, Pa.
Sivyer Steel Castings Co., Milwaukee, Wis.

GEARS AND GEAR CUTTING (Iron and Steel)
American Steel Foundries, Chicago, Ill.
Farrell Foundry & Machine Co.,
Ansonia, Conn.
Fawcus Machine Co., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Horsburgh & Scott Co.,
5114 Hamilton Ave., Cleveland, O.
Hubbard Steel Fdy. Co., E. Chicago, Ind.
Lansing Foundry Co., The,
Lansing, Mich.
Link-Belt Company, Chicago, Ill.
Mackintosh, Hemphill & Co.,
Pittsburgh, Pa.
Mesta Machine Co., The, Pittsburgh, Pa.
Morgan Construction Co.,
Worcester, Mass.
New Process Gear Corp., Syracuse, N. Y.
Newton Machine Tool Works, Inc.,
23rd and Vine St., Philadelphia, Pa.
Pittsburgh Iron & Steel Foundries,
Pittsburgh, Pa.
Ross-Meehan Foundries,
Chattanooga, Tenn.
Simonds Mfg. Co., Pittsburgh, Pa.
Taylor-Wharton Iron & Steel Co.,
High Bridge, N. J.
Taylor-Wilson Mfg. Co.,
McKees Rocks, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

GEARS (Herringbone)
Fawcus Machine Co., Pittsburgh, Pa.

GEARS (Rawhide)
Chicago Rawhide Mfg. Co.,
1301 Elston Ave., Chicago, Ill.
Horsburgh & Scott Co.,
5114 Hamilton Ave., Cleveland, O.
New Process Gear Corp., Syracuse, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

GEARS (Reverse, Marine)
Carlyle Johnson Mach. Co.,
Manchester, Conn.

GEARS (Steel)
Farrell-Cheek Steel Foundry Co.,
Sandusky, O.

GENERATORS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Wickes Brothers, Dept. A, Saginaw, Mich.

GENERATORS (Direct and Alternating Current)
Duquesne Electric & Mfg. Co.,
Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Sterling Iron & Steel Co., Philadelphia, Pa.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

GLOVES AND MITS (Asbestos)
Holcomb Safety Garment Co.,
12-14 S. Jefferson St., Chicago, Ill.

GLOVES (Sand Blast)
Hickory Steel Grip Glove Co.,
Box No. R. 6, Chicago, Ill.

GLOVES (Steel Grip)
Hickory Steel Grip Glove Co.,
Box No. R. 6, Chicago, Ill.

GLOVES (Workmen's)
Hickory Steel Grip Glove Co.,
Box No. R. 6, Chicago, Ill.

GOLD (Boronic All-Metal in Shot Form)
American Boron Products Co.,
636 Court St., Reading, Pa.

GRAPHITE
Dixon, Joseph, Crucible Co.,
Dept. 64-B, Jersey City, N. J.

GRATE BARS
Green Engrg. Co., E. Chicago, Ind.
Treadwell Engineering Co., Easton, Pa.

GREASES
Dixon, Joseph, Crucible Co.,
Dept. 64-B, Jersey City, N. J.
Texas Co.,
Dept. T, 17 Battery Pl., New York City

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Hunter Saw & Machine Co.,
Pittsburgh, Pa.
Pittsburgh Saw & Mfg. Co.,
32nd and Smallman Sts., Pittsburgh, Pa.

GRINDERS (Surface)
National Machine Co., Hartford, Conn.

GRINDING MACHINES
Blake & Johnson Co., Waterbury, Conn.
Waterbury, Conn.
Cincinnati Electric Tool Co.,
Cincinnati, O.
Cleveland Pneumatic Tool Co.,
Cleveland, O.
Modern Tool Co.,
3rd and French Sts., Erie, Pa.
National Machine Co., Hartford, Conn.
Newton Machine Tool Works, Inc.,
23rd and Vine St., Philadelphia, Pa.
New York Machinery Exchange, Inc.,
New York, N. Y.
Ransom Mfg. Co., Oshkosh, Wis.
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.
Webster & Perks Tool Co.,
P. O. Box 1200, Springfield, O.
Wisconsin Electric Co.,
3002 Dumore Bldg., Racine, Wis.

GRINDING PANS
American Clay Machinery Co.,
Bucyrus, O.
National Engineering Co.,
5 N. La Salle St., Chicago, Ill.
Phillips & McLaren Co., Pittsburgh, Pa.
Stevenson Co., The, Wellsville, O.

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Webster & Perks Tool Co.,
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Pittsburgh, Pa.

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Springfield, Mass.
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Beaudry & Co., Inc.,
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Bliss, E. W., Co.,
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Chambersburg Engrg. Co.,
Chambersburg, Pa
Erie Foundry Co., Erie, Pa.
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Massillon, O.
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Toledo Machine & Tool Co., Toledo, O.
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Pittsburgh, Pa.
United Hammer Co.,
Oliver Bldg., Boston, Mass.

HAMMERS (Link Welding)
Turner, Vaughn & Taylor Co.,
Cuyahoga Falls, O.

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Cleveland, O.
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Oliver Bldg., Boston, Mass.

HANDLES (Machine)
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

HAND PADS (Steel Grip)
Hickory Steel-Grip Glove Co.,
Box No. R. 6, Chicago, Ill.

HANGERS (Shaft)
Hyatt Roller Bearing Co.,
Industrial Bearing Division,
Metropolitan Tower, New York

HARDWARE (Wagon)
Cleveland Hardware Co., Cleveland, O.
Oliver Iron & Steel Co., Pittsburgh, Pa.

HARROW TEETH
Inland Steel Co., The, Chicago, Ill.

HEATERS (Feed Water)
Harrisburg Pipe & Pipe Bending Co.,
Harrisburg, Pa.

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Celite Products Co.,
11 Broadway, New York City
Magnesia Association of America, The,
Bulletin Bldg., Philadelphia, Pa.

HEAT TREATING
Bidle, W. S., Co.,
1411 E. 45th St., Cleveland, O.
Cleveland Metal Treating & Welding Co.,
Cleveland, O.
Gilbert & Barker Mfg. Co.,
Union St., Springfield, Mass.
Steel Improvement & Forge Co.,
Cleveland, O.
Williams, J. H., & Co.,
58 Richards St., Brooklyn, N. Y.

HOISTING ENGINES
Bartlett & Snow, C. O. Co., Cleveland, O.
Carpenter, Geo. B., & Co.,
Dept. 26, 440 N. Wells St., Chicago, Ill.

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Alliance Machine Co., Alliance, O.
Brosius, Edgar E., Pittsburgh, Pa.
Case Crane & Engineering Co.,
Columbus, O.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engrg. Co.,
Wickliffe, O.
Dake Engine Co., Grand Haven, Mich.
Euclid Crane & Hoist Co.,
Dept. B, Euclid, O.
Hendrick Mfg. Co., Carbondale, Pa.
Illinois Malleable Iron Co., Chicago, Ill.
Lakeside Bridge & Steel Co.,
123 Villard Ave., N. Milwaukee, Wis.
Link-Belt Company, Chicago, Ill.
Morgan Engineering Co., Alliance, O.
Niles-Bement-Pond Co.,
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Pawling & Harnischfeger Co.,
Milwaukee, Wis.
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Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

HOISTS (Electric)
Euclid Crane & Hoist Co., Dept. B., Euclid, O.
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.
Northern Engineering Works, Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 9 E. 40th St., New York City

HOISTS (Pneumatic)
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

HOOKS (Hoist)
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

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Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago
Sharon Steel Hoop Co., Sharon, Pa.
West Leechburg Steel Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

HOOPS (Wire)
American Steel & Wire Co., Chicago, Ill.

HORSE SHOES AND CALKS
American Steel & Wire Co., Chicago, Ill.

HOSE (Pneumatic)
Cleveland Pneumatic Tool Co., Cleveland, O.
Oldham, Geo., & Sons Co., Frankford, Philadelphia, Pa.

HOT BEDS
Treadwell Engineering Co., Easton, Pa.

HYDRAULIC MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Mackintosh-Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

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New York Machinery Exchange, Inc., New York, N. Y.

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International Oxygen Co., 115 Broadway, New York City

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Grandfield, W. J., & Co., 308 Chestnut St., Philadelphia

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Chase, Frank D., Chicago, Ill.
Price, T. W., Engineering Co., Woolworth Bldg., New York City

INDUSTRIAL RAILWAYS
Lakewood Engineering Co., Cleveland, O.
Orenstein-Arthur Koppel Co., Koppel, Pa.

INGOT AND OPEN HEARTH CHARGING CARS
Birdsboro Steel Fdy. & Machine Co., Birdsboro, Pa.
Pennsylvania Engrg. Works, New Castle, Pa.
Treadwell Engineering Co., Easton, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.

INGOT MOLDS
Birdsboro Steel Fdy. & Machine Co., Birdsboro, Pa.
Marshall Foundry Co., Pittsburgh, Pa.
Penn Mold & Mfg. Co., Wheeling, W. Va.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

INGOT (Electric Furnace Steel)
Latrobe Electric Steel Co., Latrobe, Pa.

INGOTS (Steel)
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
Penn Seaboard Steel Corp., Franklin Bank Bldg., Philadelphia

INSERTS (Steel)
Truscon Steel Co., Detroit, Mich.

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General Electric Co., Schenectady, N. Y.
Smith Gas Engrg. Co., The, Dayton, O.

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Roebling's, John A., Sons Co., Trenton, N. J.

INSULATING BRICK
Armstrong Cork & Insulation Co., 101 Twenty-fourth St., Pittsburgh
Celite Products Co., 11 Broadway, New York City

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Armstrong Cork & Insulating Co., 101 Twenty-fourth St., Pittsburgh
Celite Products Co., 11 Broadway, New York City

IRON
Andrews Steel Co., Newport, Ky.
Beals, McCarthy & Rogers, Buffalo, N. Y.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Brown-Wales Co., Boston, Mass.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Lockhart Iron & Steel Co., McKees Rocks, Pa.
McCalla, Harold, Philadelphia, Pa.
Monongahela Iron & Steel Co., Pittsburgh, Pa.
Newport Rolling Mill Co., Newport, Ky.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago
Vulcan Iron & Steel Co., Pittsburgh, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

IRON AND TIMBER LANDS
Neely, Benjamin C., Crystal Falls, Mich.

IRON (Bar)
Lockhart Iron & Steel Co., McKees Rocks, Pa.
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Monongahela Iron & Steel Co., Pittsburgh, Pa.
St. Louis Screw Co., St. Louis, Mo.
Vulcan Iron & Steel Co., Pittsburgh, Pa.

IRON (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

IRON (Ornamental)
Belmont Iron Works, Philadelphia, Pa.

IRON (Silvery)
Globe Iron Co., Jackson, O.

IRON (Vanadium)
Thomas Iron Co., The, Hokendauqua, Pa.

IRON ORE
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Breitung, E. N., & Co., Cleveland, O.
Cuyuna Minneapolis Iron Co., Minneapolis, Minn.
Hanna, M. A., & Co., Cleveland, O.
Hillman, J. H., & Sons Co., Pittsburgh, Pa.
La Belle Iron Works, Steubenville, O.
Oglebay, Norton & Co., Cleveland, O.
Pickands, Mather & Co., Cleveland, O.
Snyder, W. P., & Co., Pittsburgh, Pa.
Tod-Stambaugh Co., Cleveland, O.
Wharton Steel Co., New York City

IRON ORE (Manganiferous)
Marshall, Edward E., Bullitt Bldg., Philadelphia, Pa.

JOISTS AND STUDS (Pressed Steel)
Truscon Steel Co., Detroit, Mich.

JOLT RAMMING MACHINES
Pridmore, Henry E., Chicago, Ill.

KEYS AND COTTERS (Machine)
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City
Moltrup Steel Products Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.
Standard Gauge Steel Co., Beaver Falls, Pa.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

KEYSEATERS
Baker Bros., Toledo, O.
New York Machinery Exchange, Inc., New York City
Simmons Machine Co., Inc., Albany, N. Y.

KNIVES (Circular)
Hunter Saw & Machine Co., Pittsburgh
Pittsburgh Saw & Mfg. Co., 32nd and Smallman Sts., Pittsburgh

KNIVES (Machine)
Cleveland Knife & Forge Co., Cleveland, O.

LADLES
Mitchell-Tappen Co., New York City
Pennsylvania Engrg. Works, New Castle, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

LADLE BRICK
Dover Fire Brick Co., Cuyahoga Bldg., Cleveland, O.
Pope, Frank B., Pittsburgh, Pa.

LAKE PASSENGER AND FREIGHT
Cleveland & Buffalo Transit Co., Cleveland, O.

LAMPS (Arc and Incandescent)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

LATH (Expanded Metal)
Truscon Steel Co., Detroit, Mich.

LATHES
Acme Machine Tool Co., Cincinnati, O.
Bridgeford Machine Tool Works, 155 Winton Rd., Rochester, N. Y.
Bullard Machine Tool Co., Bridgeport, Conn.
Cincinnati Iron & Steel Co., Cincinnati, O.
Duplex Machinery Co., 532 Leader-News Bldg., Cleveland, O.
Greaves-Klusman Co., Cincinnati, O.
Jones & Lamson Mach. Co., Springfield, Vt.
Manning, Maxwell & Moore, Inc., 119 W. 40th St., New York City
Mesta Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
New Britain Mach. Co., New Britain, Conn.
Niles-Bement-Pond Co., 111 Broadway, New York City
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Warner & Swasey Co., Cleveland, O.
Wickes Brothers, Dept. A, Saginaw, Mich.
Youngstown Fdy. & Mch. Co., Youngstown, O.

LATHES (Chucking, Vertical)
Bullard Machine Tool Co., Bridgeport, Conn.
Simmons Machine Co., Inc., Albany, N. Y.

LATHES (Engine)
Bridgeford Machine Tool Works, 155 Winton Rd., Rochester, N. Y.
New York Machinery Exchange, Inc., New York City
Thompson, C. M., Co., Chicago, Ill.
Toomey, Frank, Inc., Philadelphia, Pa.

LATHES (Vertical Turret)
Bullard Machine Tool Co., Bridgeport, Ct.
New York Machinery Exchange, Inc., New York City
Simmons Machine Co., Inc., Albany, N. Y.

LATHE DOGS (Safety)
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

LEAD
United Smelting & Aluminum Co., New Haven, Conn.

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FORGINGS

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LEATHER (Hydraulic)
Graton & Knight Mfg. Co., Worcester, Mass.

LEATHER BELTING (See Belting, Leather)

LEATHER (Belt Lace)
Graton & Knight Co., Worcester, Mass.

LEG AND FOOT PROTECTORS
Holcomb Safety Garment Co., 12-14 S. Jefferson St., Chicago, Ill.

LETTERS AND FIGURES (Steel, Hand Made)
Moss, Henry, & Co., 37 Beaver St., New York City

LETTERHEADS (Engraved)
Wiggins, John B., Co., 705 Peoples Gas Bldg., Chicago

LIFTING MAGNETS
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.

LIMESTONE
Davison, Allen S., Co., Pittsburgh, Pa.

LININGS (Cupola, Furnace and Forge)
Botfield Specialties Co., Swanson & Clymer Sts., Philadelphia
Brighton Fire Brick Co., New Brighton, Pa.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Hydraulic-Press Brick Co., Fire Brick Dept., St. Louis, Mo.
Louisville Fire Brick Wks., Highland Park, Ky.
Mutton Hollow Fire Brick Co., Woodbridge, N. J.

LINK BELTING
Link-Belt Company, Chicago, Ill.

LOADERS (For Wagons, Trucks R. R. Cars)
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York

LOCKERS (Metal)
Edwards Mfg. Co., 401-451 Culvert St., Cincinnati

LOCOMOTIVES
General Electric Co., Schenectady, N. Y.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co., Dept. E, Cleveland
Baldwin Locomotive Works, Philadelphia, Pa.
Lakewood Engineering Co., Cleveland, O.

LOCOMOTIVES (Second Hand)
Duquesne Electric & Mfg. Co., Pittsburgh, Pa.
Zelnicker, Walter A., Supply Co., St. Louis, Mo.

LOCOMOTIVE CRANES (Second Hand)
Titan Equipment Co., New York City

LUBRICANTS
Dixon, Joseph, Crucible Co., Dept. 64-B, Jersey City, N. J.
Texas Co., Dept. T, 17 Battery Pl., New York City

LUMBER (Boxing, Crating, Flask, Pattern and Templet)
Smith, Fassett & Co., N. Tonawanda, N. Y.
Wuichet, Louis, Railway Exchange, Chicago

LUMBER (Creosoted)
Ayer & Lord Tie Co., Dept. C., Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.

MACHINE COUNTERS
Hart, R. A., Mfg. Co., 79 Wilson Court, Battle Creek, Mich

MACHINE KEYS (See Keys and Cotters, Machine)

MACHINE SHOP EQUIPMENT
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.

MACHINE WORK
Adamson Machine Co., Akron, O.
Air Tight Steel Tank Co., Pittsburgh, Pa.
Blake & Johnson Co., Waterbury, Conn.
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Case Crane & Engrg. Co., The, Columbus, O.
Diamond Machine Co., Monongahela, Pa.
Erie Foundry Co., Erie, Pa.
Fawcus Machine Co., Pittsburgh, Pa.
Gwynn Engineering Co., Pittsburgh, Pa.
Hill Pump Valve Co., Chicago, Ill.
Ing-Rich Mfg. Co., Beaver Falls, Pa.
Klotz Machine Co., Sandusky, O.
Lincoln Engineering Co., Main and Center Sts., Cleveland, O.
Link-Belt Company, Chicago, Ill.
Mackintosh-Hemphill & Co., Pittsburgh, Pa.
Manning, Maxwell & Moore, Inc., 119 W. 40th St., New York City
Mesta Machine Co., Pittsburgh, Pa.
Metal Machining Co., The, Cleveland, O.
Metal Machine Tool Co., Cleveland, O.
Morgan Engrg. Co., Alliance, O.
Newbold, R. S., Son & Co., Norristown, Pa.
Standard Tool & Mfg. Co., 70 Lafayette Blvd., E., Detroit, Mich.
Toledo Mach. & Tool Co., Toledo, O.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.

MACHINERY (Pipe Bending)
American Pipe Bending Machine Co., 93 Pearl St., Boston, Mass.

MACHINERY (Sand Sifting)
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.

MACHINERY (Second Hand) (See Used and Rebuilt Equipment)

MACHINERY (Special)
Lammert & Mann Co., Chicago, Ill.
M. & T. Engineering Co., Cleveland, O.
Plamondon, A., Mfg. Co., Chicago, Ill.
Treadwell Engineering Co., Easton, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Yoder Co., The, Cleveland, O.

MAGNESITE
American Refractories Co., 208 S. La Salle St., Chicago, Ill.
Davison, Allen S., Co., Pittsburgh, Pa.
North American Magnesite Co., Ltd., 911 Citizens Bldg., Cleveland, O.

MAGNESITE (Calcined, Crude, Dead Burned)
Davison, Allen S., Co., Pittsburgh, Pa.
Harbison-Walker Refractories Co., Pittsburgh, Pa.

MAGNETIC SEPARATORS
Cutler-Hammer, The, Mfg. Co., Milwaukee, Wis.

MANGANESE ORE
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Marshall, Edward E., Bullitt Bldg., Philadelphia, Pa.

MARINE EQUIPMENT AND HARDWARE
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.

MASON CONTRACTORS (Blast Furnace Work)
Chambers, Lloyd, Sharpsville, Pa.
Rinehart, J. W., Cleveland, O.

MERCHANT MILL EQUIPMENT
Treadwell Engineering Co., Easton, Pa.

METAL (Acid Proof)
Keystone Bronze Co., Pittsburgh, Pa.

METAL CLEANER
Ford, J. B., Co., Wyandotte, Mich.

METAL CUTTING MACHINES
Racine Tool & Machine Co., Racine, Wis.

METAL CUTTING TOOLS (Stellite)
Haynes Stellite Co., The, Kokomo, Ind.

METAL SPECIALTIES AND PARTS
Erdle Perforating Co., Rochester, N. Y.
White, L. & I. J., Co., 15 Columbia St., Buffalo, N. Y.

METALLURGISTS
Haynes Stellite Co., The, Kokomo, Ind.
Steel Improvement & Forge Co., Cleveland, O.

METAL (Perforated)
Erdle Perforating Co., Rochester, N. Y.

METALS (Bearing)
Aluminum Castings Co., Cleveland, O.

METALS (Non-Ferrous)
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, England
Lubricating Metal Co., 2 Rector St., New York City
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

MILL AND MINE SUPPLIES
Lunkenheimer Co., The, Cincinnati, O.

MILL WEARING PARTS
Midvale Steel Co., The, Philadelphia, Pa.

MILLING MACHINES
Becker Milling Machine Co., Boston, Mass.
Cincinnati Milling Mach. Co., Cincinnati, O.
Espen Lucas Machine Works, Front and Girard Ave., Philadelphia
Kempsmith Mfg. Co., Milwaukee, Wis.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia, Pa.
New York Machinery Exchange, Inc., New York, N. Y.
Niles-Bement-Pond Co., 111 Broadway, New York City
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar)
Mesta Machine Co., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.

MILLS (Boring and Turning, Vertical)
Bullard Machine Tool Co., Bridgeport, Conn.

MINING MACHINERY
Link-Belt Company, Chicago, Ill.
McMyler Interstate Co., Cleveland, O.
Wellman-Seaver-Morgan Co., Cleveland, O.

MINING OPTIONS AND LEASES
Neely, Benjamin C., Crystal Falls, Mich.

MITTENS (Steel Grip)
Hickory Steel Grip Glove Co., Box No. R. 6, Chicago, Ill.

MIXERS (Concrete)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.
Lakewood Engineering Co., Cleveland, O.
Smith, T. L., Co., Milwaukee, Wis.
Standard Scale & Supply Co., Pittsburgh, Pa.

MIXERS (Foundry Facings)
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.
National Engineering Co., 5 N. La Salle St., Chicago, Ill.
Stevenson Co., The, Wellsville, O.

MIXERS (Hot Metal)
Pennsylvania Engineering Works, New Castle, Pa.
Treadwell Engineering Co., Easton, Pa.

MIXERS (Ore)
Lakewood Engineering Co., Cleveland, O.

MIXERS (Sand)
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.
Lakewood Engineering Co., Cleveland, O.
National Engineering Co., 5 N. La Salle St., Chicago, Ill.
Smith, T. L., Co., Milwaukee, Wis.

MOLDS (Concrete)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh

MOLDS (Ingot)
Penn Mold & Mfg. Co., Wheeling, W. Va.

MOLDING MACHINES
Arcade Mfg. Co., Dept. C., Freeport, Ill
Pridmore, Henry E., Chicago, Ill.

MOLDING (Automobile)
Empire Art Metal Co., College Pt., N. Y.

MONEL METAL
Williams & Co., Pittsburgh, Pa.

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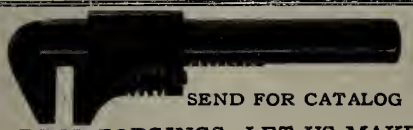
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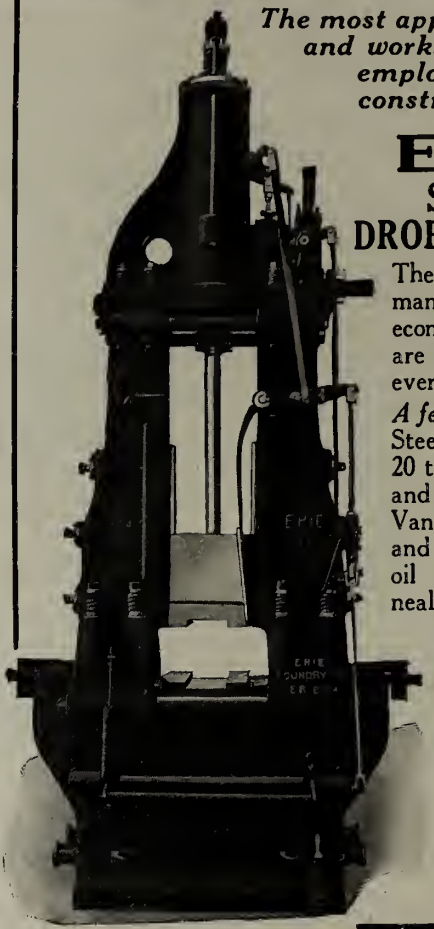


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Wickes Brothers, Dept. A., Saginaw, Mich.

MOTORS (Air)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Duquesne Electric & Mfg. Co., Pittsburgh, Pa.
MacGovern & Co., Inc., New York City
Wisconsin Electric Co., 3002 Dumore Bldg., Racine, Wis.

MOTORS (Second Hand)
Duquesne Electric & Mfg. Co., Pittsburgh, Pa.
Green, Wells S., Co., Philadelphia, Pa.
Klein, Nathan, & Co., Inc., New York City
MacGovern & Co., Inc., New York City
Miller-Owen Electric Co., Pittsburgh, Pa.

MOTOR TRUCKS
Federal Motor Truck Co., Detroit, Mich.

MUFFLERS (Wire Mill Equipment)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

NAIL MACHINERY (Wire)
Kilby Mfg. Co., Cleveland, O.
National Machinery Co., Tiffin, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O

NAILS
American Steel & Wire Co., Chicago, Ill.
Cambria Steel Co., Philadelphia, Pa.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
La Belle Iron Works, Steuhenville, O.
Youngstown Sheet & Tube Co., Youngstown, O.

NAILS (Copper)
American Steel & Wire Co., Chicago, Ill.

NAME PLATES (Cast Bronze, Stamped and Etched)
Moss, Henry, & Co., 37 Beaver St. New York City
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh, Pa.

NICKEL
Williams & Co., Pittsburgh, Pa.

NICKEL (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

NUTS (See Bolts and Nuts)

NUTS (Hot Pressed)
Bourne-Fuller Co., Cleveland, O.
St. Louis Screw Co., St. Louis, Mo.
Upson Nut Company, Cleveland, O.

NUTS (Semi-Finished)
St. Louis Screw Co., St. Louis, Mo.
Upson Nut Company, Cleveland, O.

OIL
Clarendon Refining Co., 423 Oliver Bldg., Pittsburgh, Pa.
Texas Co., Dept. T, 17 Battery Pl., New York City

OIL CANS
New Britain Machine Co., New Britain, Conn.

OPEN HEARTH FURNACES (See Furnaces —Open-Hearth)

ORDNANCE
Midvale Steel Co., Philadelphia, Pa.

ORE (Chrome)
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.

ORE DOCKS
American Bridge Co., New York City

ORE GRINDING MACHINERY
Bonnot Co., The, Canton, O.
Stevenson Co., The, Wellsville, O.

ORE HANDLING MACHINERY
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Brown Hoisting Machinery Co., Cleveland, O.
Hayward Co., The, 50-54 Church St., New York City
Wellman-Seaver-Morgan Co., Cleveland, O.

OVENS (Coke, By-Product Recovery)
Koppers, H., Co., Pittsburgh, Pa.

OXY-ACETYLENE WELDING AND CUTTING
Linde Air Products Co., New York City
Oxweld Acetylene Co., Chicago, Ill.

OXYGEN
International Oxygen Co., 115 Broadway, New York City
Linde Air Products Co., New York City
Oxweld Acetylene Co., Chicago, Ill.

PACKING (Felt)
Booth Felt Co., 442-452 19th St., Brooklyn, N. Y.

PACKING (Leather)
Graton & Knight Mfg. Co., Worcester, Mass.

PACKING (Metallic)
Lubricating Metal Co., 2 Rector St., New York City

PAINT (Silica-Graphite)
Dixon, Joseph, Crucible Co., Dept. 64-B, Jersey City, N. J.

PANS (Grinding)
American Clay Machinery Co., Bucyrus, O.
National Engineering Co., 5 N. La Salle St., Chicago, Ill.
Stevenson Co., The, Wellsville, O.

PANS (Lathe and Shop)
American Bridge Co., New York City
New Britain Mach. Co., New Britain, Conn.

PATTERN LUMBER
Smith, Fassett & Co., North Tonawanda, N. Y.
Wuichet, Louis, Railway Exchange, Chicago, Ill.

PATTERN PLATES (Steel)
Moltrup Steel Products Co., Beaver Falls, Pa.

PATTERNS (Electric Furnace)
Acme Steel & Malleable Iron Works, Buffalo, N. Y.

PATTERNS (Wood and Metal)
Aluminum Castings Co., Cleveland, O.
Arcade Mfg. Co., Dept. C, Freeport, Ill.
Corbett-Steeves Pattern Works, Rochester, N. Y.
Diamond Machine Co., Monongahela, Pa.
Empire Art Metal Co., College Pt., N. Y.
Hammond Malleable Iron Co., Hammond, Ind.
Marion Malleable Iron Works, Marion, Ind.
Pridmore, Henry E., Chicago, Ill.
Smyser-Royer Co., York, Pa.
Wellman Products Co., Cleveland, O.

PERFORATED METAL
Erdle Perforating Co., Rochester, N. Y.
Hendrick Mfg. Co., Carbondale, Pa.

PHOSPHOR BRONZE
Aluminum Castings Co., Cleveland, O.

PIERCING POINTS, PLUGS AND BALLS (For Tube Mills)
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

PIG IRON
Addy, The, Matthew, Co., Cincinnati, O.
Amalgamated Products Co., 165 Broadway, New York City
Baird & West, Detroit, Mich.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Central Iron & Steel Co., Harrisburg, Pa.
Crocker Bros., New York City
Davison, Allen S., Co., Pittsburgh, Pa.
Delaware River Steel Co., Chester, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Eaton, Rhodes & Co., Cincinnati, O.
Globe Iron Co., Jackson, O.
Hanna, M. A., & Co., Cleveland, O.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
McKeefrey & Co., Leetonia, O.
Mitchell-Diggins Iron Co., Cadillac, Mich.
Mohr, J. J., & Son, Philadelphia, Pa.
Mudge, Edward W., & Co., Pittsburgh, Pa.
Pickands, Mather & Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Rogers, Brown & Co., Cincinnati, O.
Snyder, W. P., & Co., Pittsburgh, Pa.
Stewart Iron Co., Ltd., Cleveland, O.
Struthers Furnace Co., The, Cleveland, O.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Thomas Furnace Co., Milwaukee, Wis.
Thomas Iron Co., The, Hokendauqua, Pa.
Upson Nut Co., Cleveland, O.
Wharton Steel Co., New York City
Wickwire Steel Co., Buffalo, N. Y.

PIG IRON BREAKERS
Brown Hoisting Machinery Co., Cleveland, O.

PILE DRIVERS
Industrial Works, Bay City, Mich.

PILING (Creosoted)
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.

PILING (Steel Sheet)
Carnegie Steel Co., Pittsburgh, Pa.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.

PINIONS (See Gears and Gear Cutting)

PINS
Oliver Iron & Steel Co., Pittsburgh, Pa.

PIPE (Cast Iron)
American Cast Iron Pipe Co., Birmingham, Ala.
Clow, James B., & Sons, Chicago, Ill.
Donaldson Iron Co., Emaus, Lehigh Co., Pa.
Glamorgan Pipe & Fdy. Co., Lynchburg, Va.
Lynchburg Fdy. Co., Lynchburg, Va.
Massillon Iron & Steel Co., Massillon, O.
U. S. Cast Iron Pipe & Foundry Co., 730 E. Pearl St., Burlington, N. J.
Warren Foundry & Machine Co., New York City

PIPE (Culvert)
Newport Rolling Mill Co., Newport, Ky.

PIPE (Iron and Steel)
Amalgamated Products Co., 165 Broadway, New York City
American Bridge Co., New York City
American Steel Export Co., New York City
Bourne-Fuller Co., The, Cleveland, O.
Byers, A. M., Co., Pittsburgh, Pa.
Central Tube Co., Pittsburgh, Pa.
Frick & Lindsay Co., Sandusky and Robinson Sts., Pittsburgh, Pa.
La Belle Iron Works, Steuhenville, O.
Mark Mfg. Co., 1907 Dempster St., Evanston, Ill.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Riter-Conley Mfg. Co., Pittsburgh, Pa.
Sterling Iron & Steel Co., Philadelphia, Pa.
U. S. Cast Iron Pipe & Foundry Co., 730 E. Pearl St., Burlington, N. J.
Vulcan Steel Products Co., 120 Broadway, New York City
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE (Steel)
National Tube Co., Pittsburgh, Pa.
Wheeling Steel & Iron Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE (Wrought Iron)
Bourne-Fuller Co., The, Cleveland, O.
Byers, A. M., Co., Pittsburgh, Pa.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE BENDING MACHINES
American Pipe Bending Machine Co., 93 Pearl St., Boston, Mass.

PIPE BENDS
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Roessing-Ernst Co., Etna, Pittsburgh, Pa.

PIPE COVERING (Steam and Cold Water)
Armstrong Cork & Insulating Co., 101 Twenty-fourth St., Pittsburgh, Pa.
Magnesia Association of America, Bulletin Bldg., Philadelphia, Pa.

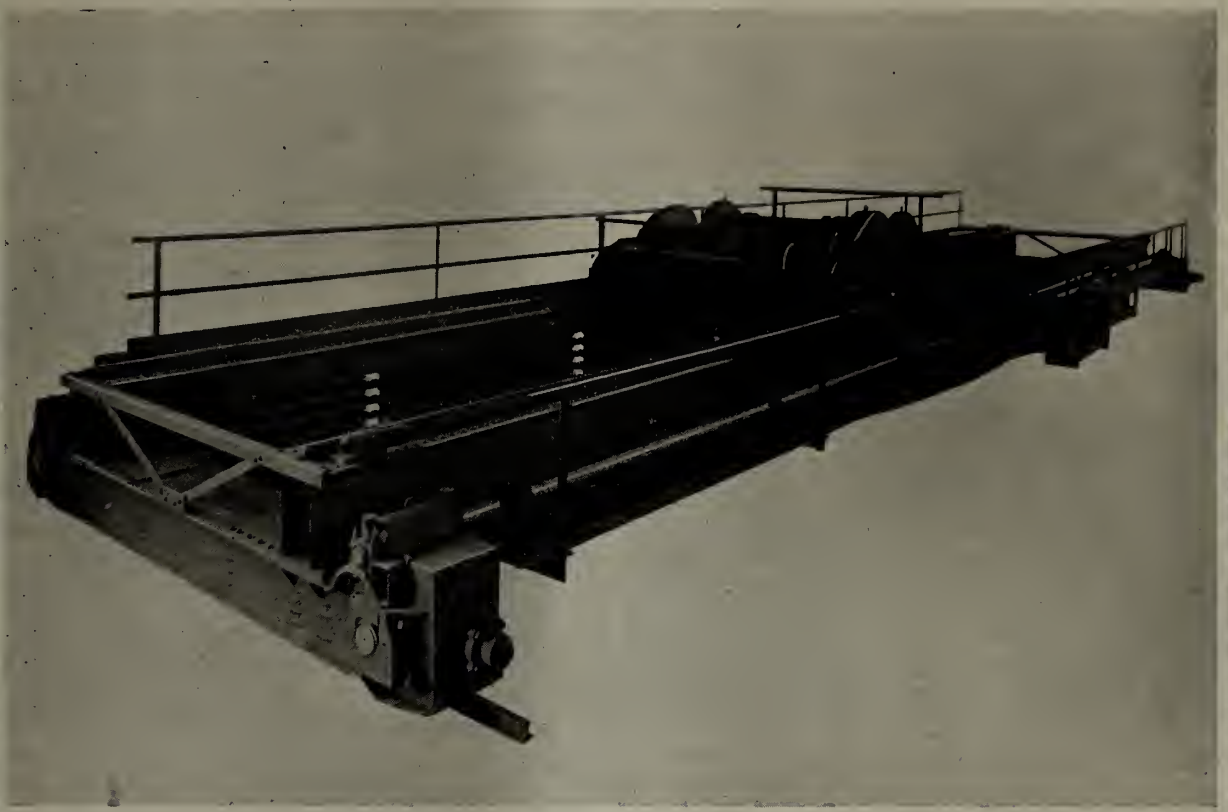
PIPE FITTINGS
Illinois Malleable Iron Co., Chicago, Ill.
Lunkenheimer Co., The, Cincinnati, O.
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Power Piping Co., Pittsburgh, Pa.
Southwark Fdy. & Mach. Co., Pittsburgh, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

PIPE MACHINES
New York Machinery Exchange, Inc., New York City

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

The Morgan Line

A Morgan Mill Crane



Morgan Accessibility

Accessibility combined with Strength, Safety and Simplicity are found in Morgan mill type cranes.

All shaft bearings are in line; no overhung gears; all gears enclosed; footwalk on both sides of bridge and trolley; massive end castings and rigid construction throughout; all the latest safety features.

These are some of the points of superiority. There are many others explained in our Bulletin No. 10, showing the different steps of construction and assembly of parts. More than 4300 Morgan Cranes in operation.

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American Trust Bldg.
BRUSSELS, BELGIUM
COPENHAGEN
TOKIO

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Alliance, Ohio. U.S.A.

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M. Mett & Co
LONDON
PARIS

PIPE MILL MACHINERY
Landis Machine Co., Waynesboro, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

PIPE MOLDS (Concrete)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

PIPE TAGS
Moss, Henry, & Co., 37 Beaver St., New York City

PIPE THREADING MACHINERY
Standard Engrg. Co., Elwood City, Pa.
Toomey, Frank, Inc., Philadelphia, Pa.
Treadwell Engineering Co., Easton, Pa.

PIPING CONTRACTORS
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.
Power Piping Co., Pittsburgh, Pa.

PISTONS
Aluminum Castings Co., Cleveland, O.

PISTON RODS
Bay City Forge Co., Erie, Pa.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.

PLANERS
Cincinnati Planer Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Manning, Maxwell & Moore, Inc., 119 W. 40th St., New York City
Morton Mfg. Co., Muskegon Heights, Mich.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia, Pa.
New York Machinery Exchange, Inc., New York City
Niles-Bement-Pond Co., 111 Broadway, New York City
Simmons Machine Co., Inc., Albany, N. Y.
Thompson, C. M., Co., Chicago, Ill.
Toomey, Frank, Inc., Philadelphia, Pa.

PLATE (Bending, Rolling, Warping, Flanging Presses)
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.

PLATES (Rolled Steel—Floor)
Carnegie Steel Co., Pittsburgh, Pa.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.

PLATES (Sheared and Universal)
Allegheny Steel Co., Pittsburgh, Pa.
American Rolling Mill Co., Middletown, O.
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.
Belmont Iron Works, Philadelphia, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Nagle Steel Co., Pottstown, Pa.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Republic Structural Iron Works, Cleveland, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Sharon Steel Hoop Co., Sharon, Pa.
Shippers Car Line, New York City
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Whitaker-Glessner Co., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Worth Bros. Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES (Terne and Tin)
American Sheet & Tin Plate Co., Pittsburgh, Pa.

PLUNGERS (For Pumps)
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

POINTERS (Wire and Rod)
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
Webster & Perks Tool Co., P. O. Box 1200, Springfield, O.

POLISHERS AND BUFFERS (Electric)
Webster & Perks Tool Co., P. O. Box 1200, Springfield, O.
Wisconsin Electric Co., 3002 Dumore Bldg., Racine, Wis.

POLISHING MACHINERY
Webster & Perks Tool Co., P. O. Box 1200, Springfield, O.

POSTS (Steel Fence)
American Steel & Wire Co., Chicago, Ill.

POULTRY NETTING
American Steel & Wire Co., Chicago, Ill.

POWDERED COAL EQUIPMENT
Bonnot Co., The, Canton, O.
Fuller-Lehigh Co., Fullerton, Pa.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City
Raymond Bros. Impact Pulverizer Co., 1313 N. Branch St., Chicago, Ill.

POWER PLANTS
Chase, Frank D., Chicago, Ill.
Price, T. W., Engineering Co., Woolworth Bldg., New York City

POWER TOOLS
Southwark Foundry & Mach. Co., Philadelphia, Pa.

POWER TRANSMITTING MACHINERY
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Link-Belt Co., Chicago, Ill.
Mesta Machine Co., Pittsburgh, Pa.
Plamondon, A., Mfg. Co., Chicago, Ill.
Treadwell Engineering Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

PRESSED METAL
Empire Art Metal Co., Inc., College Pt., N. Y.

PRESSES
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.
Birdsboro Steel Fdy. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Erie Foundry Co., Erie, Pa.
General Briquetting Co., 25 Broad St., New York City
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Massillon Foundry & Mach. Co., Massillon, O.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
New York Machinery Exchange, Inc., New York City
Niles-Bement-Pond Co., 111 Broadway, New York City
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Toledo Machine & Tool Co., Toledo, O.
Toomey, Frank, Inc., Philadelphia, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSURE GAGES
Clark, Chas. J., Chicago, Ill.

PRESSURE REGULATORS
Connersville Blower Co., The, Connersville, Ind.
Electric Controller & Mfg. Co., Cleveland, O.

PROJECTILES
Midvale Steel Co., Philadelphia, Pa.

PULLEYS (Friction Clutch)
Carlyle Johnson Mach. Co., Manchester, Conn.

PULVERIZING MILLS
Bartlett & Snow, C. O., Co., Cleveland, O.
Bonnot Co., The, Canton, O.
Fuller-Lehigh Co., Fullerton, Pa.
Raymond Bros. Impact Pulverizer Co., 1313 N. Branch St., Chicago, Ill.
Stevenson Co., The, Wellsville, O.

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Chambersburg Engrg. Co., Chambersburg, Pa.
Connersville Blower Co., The, Connersville, Ind.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
Deming Co., Salem, O.
Goulds Mfg. Co., Seneca Falls, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
Roots, P. H., & F. M., Co., Connersville, Ind.
Standard Scale & Supply Co., Pittsburgh, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Vulcan Iron Works, 1739 Main St., Wilkes-Barre, Pa.

PUMPS (Centrifugal)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Goulds Mfg. Co., Seneca Falls, N. Y.

PUMPS (Motor Driven)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

PUNCHES AND SHEARS
New York Machinery Exchange, Inc., New York City

PUNCHING AND SHEARING MACHINERY
Allen, John F., Co., 372 Gerard Ave., New York City
Alliance Machine Co., Alliance, O.
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Bourne-Fuller Co., The, Cleveland, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Erie Foundry Co., Erie, Pa.
Excelsior Tool & Machine Co., E. St. Louis, Ill.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Massillon Foundry & Mach. Co., Massillon, O.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Niles-Bement-Pond Co., 111 Broadway, New York City
Quickwork Co., St. Marys, O.
Richards, I. P., Providence, R. I.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Simmons Machine Co., Inc., Albany, N. Y.
Thomas Spacing Machine Co., Pittsburgh, Pa.
Toomey, Frank, Inc., Philadelphia, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wickes Brothers, Dept. A, Saginaw, Mich.
Wood, R. D., & Co., Philadelphia, Pa.

PUSH BUTTONS
Electric Controller & Mfg. Co., Cleveland, O

PYROMETERS
Brown Instrument Co., Philadelphia, Pa.

RACKS (Steel or Tool)
Empire Art Metal Co., Inc., College Pt., N. Y.
New Britain Mach. Co., New Britain, Conn.

RAIL BONDS
American Steel & Wire Co., Chicago, Ill.

RAIL JOINTS
Carnegie Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.

RAILROAD SUPPLIES
American Steel Export Co., New York City
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.
Mitshkun, M., Co., Detroit, Mich.
Zelnicker, Walter A., Supply Co., St. Louis, Mo.

RAILS
American Steel Export Co., New York City
Atlantic Equipment Co., New York City
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Cambria Steel Co., Johnstown, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Green, L. A., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Sterling Iron & Steel Co., Philadelphia, Pa.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.

RAILS (Girder)
Bethlehem Steel Co., The, So. Bethlehem, Pa.

RAILS (High Tee)
Bethlehem Steel Co., The, So. Bethlehem, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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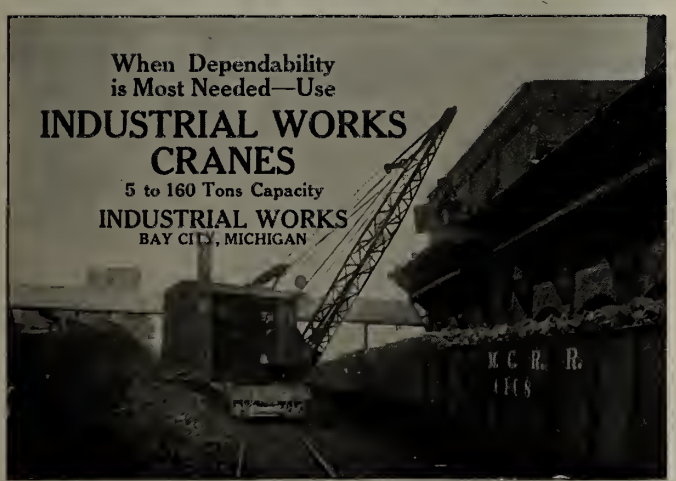
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NORTHERN CRANES

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ELECTRIC and AIR HOISTS and TROLLEYS
NORTHERN ENGINEERING WORKS.
DETROIT, MICH. U.S.A.
Canadian Works—Northern Crane Works, Ltd., Walkerville, Ont.





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One O. S. Locomotive Crane will take the place of many men, and the work that would have taken the men days, is accomplished in minutes.

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Write us immediately.

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Chicago, Ill.

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Huntington, Ind.



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REAMERS
Clark Equipment Co., Buchanan, Mich.
Cleveland Power Transmission Co., Guardian Bldg., Cleveland, O.

REAMERS (Bridge)
Latrobe Tool Co., The, Latrobe, Pa.

RECORDING GAGES
Brown Instrument Co., Philadelphia, Pa.

REELS (Wire Mill Equipment)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

REINFORCEMENT (Steel)
Inland Steel Co., The, Chicago, Ill.
Truscon Steel Co., Detroit, Mich.

RELAYS (Pressure and Vacuum)
Cutler-Hammer Mfg. Co., Milwaukee, Wis.

RETORTS (Cast Iron)
Farrar & Trefts, Buffalo, N. Y.

RHEOSTATS
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.

RINGS (Forged Steel)
Akron-Selle Co., The, Akron, O.
Cleveland Knife & Forge Co., Cleveland, O.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

RINGS (Steel, Weldless)
Bay City Forge Co., Erie, Pa.

RIVETING MACHINERY
Allen, John F., Co., 372 Gerard Ave., New York City
Chambersburg Engrg. Co., Chambersburg, Pa.
Cleveland Pneumatic Tool Co., Cleveland, O.
Oldham, Geo., & Sons Co., Frankford, Philadelphia, Pa.
Shuster, The F. B., Co., New Haven, Conn.
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

RIVETS
Bourne-Fuller Co., The, Cleveland, O.
Carlin, Anthony, Mfr., Cleveland, O.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul Minn.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
National Bolt & Nut Co., Pittsburgh, Pa.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Upson Nut Co., Cleveland, O.

RODS
United Smelting & Aluminum Co., New Haven, Conn.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

RODS (Connecting)
Bay City Forge Co., Erie, Pa.

RODS (Drill)
Aborn Steel Co., Inc., 24 Clarke St., New York City
Bourne-Fuller Co., The, Cleveland, O.
Kidd Drawn Steel Co., Aliquippa, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.

RODS (Iron and Steel)
American Steel Export Co., New York City
American Steel & Wire Co., Chicago, Ill.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Federal Export Corp., 115 Broadway, New York City
Liberty Steel Products Co., New York City
Upson Nut Co., Cleveland, O.
Youngstown Sheet & Tube Co., Youngstown, O.

RODS (Wire)
Page Steel & Wire Co., Adrian, Mich.

ROLLER BEARINGS
Hyatt Roller Bearing Co., Industrial Bearing Division, Metropolitan Tower, New York City

ROLLING MILLS (For Laboratory Use)
Crocker, Samuel A., Co., Cincinnati, O.

ROLLING MILL EQUIPMENT
Abramsen Engrg. Co., Pittsburgh, Pa.
Alliance Machine Co., Alliance, O.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Blake & Johnson Co., Waterbury, Conn.
Farrel Foundry & Machine Co., Ansonia, Conn.
Fawcus Machine Co., Pittsburgh, Pa.
Garrison, A., Foundry Co., Bingham St., Pittsburgh, Pa.
Hubbard Steel Fdy. Co., E. Chicago, Ind.
Hyde Park Fdy. & Mch. Co., Hyde Park, Pa.
Industrial Works, Bay City, Mich.
Lewis Foundry & Machine Co., The, Pittsburgh, Pa.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Mitchell-Tappen Co., New York City
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., Alliance, O.
National Roll & Foundry Co., Avonmore, Pa.
Newbold, R. S., & Son Co., Norristown, Pa.
Standard Engineering Co., Ellwood City, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Youngstown Fdy. & Mch. Co., Youngstown, O.

ROLLING MILL TABLES
Treadwell Engineering Co., Easton, Pa.

ROLLS
Mackintosh-Hemphill & Co., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLS (Adamite)
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

ROLLS (Bending and Straightening)
Mackintosh-Hemphill & Co., Pittsburgh, Pa.
New York Machinery Exchange, Inc., New York City
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wickes Brothers, Dept. A, Saginaw, Mich.

ROLLS (Forged Steel)
Bay City Forge Co., Erie, Pa.

ROLLS (Manganite)
Mackintosh-Hemphill & Co., Pittsburgh, Pa.

ROLLS (Sand Chilled and Steel)
American Steel Foundries, Chicago, Ill.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Farrel Fdy. & Mach. Co., Ansonia, Conn.
Garrison, A., Foundry Co., Bingham St., Pittsburgh, Pa.
Hubbard Steel Fdy. Co., E. Chicago, Ind.
Hyde Park Fdy. & Mch. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., The, Pittsburgh, Pa.
Mackintosh-Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.
Pittsburgh Rolls Corporation, Pittsburgh, Pa.
Seaman, Sleeth & Co., Pittsburgh, Pa.
Standard Engrg. Co., Ellwood City, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Youngstown Foundry & Machine Co., Youngstown, O.

ROLLS (Wood)
Dart, E. M., Mfg. Co., Providence, R. I.

ROOFING AND SIDING (Composite)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Texas Co., Dept. T., 17 Battery Pl., New York City

ROOFING AND SIDING (Iron and Steel)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Canton Sheet Steel Co., Canton, O.
Edwards Mfg. Co., 401-451 Culvert St., Cincinnati, O.
Inland Steel Co., The, Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Newport Rolling Mill Co., Newport, Ky.
Ryerson, Jos. T., & Son, Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Whitaker-Glessner Co., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING TIMBER (Creosoted)
Ayer & Lord Tie Co., Dept. C., Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.

ROPE DRESSING
Macomber & Whyte Rope Co., Kenosha, Wis.
Texas Co., Dept. T., 17 Battery Pl., New York City

RUBBER HAND STAMPS
Moss, Henry, & Co., 37 Beaver St., New York City

SAFE ENDS (Boiler Tube)
National Tube Co., Pittsburgh, Pa.
Worth Brothers Co., Philadelphia, Pa.

SAFETY FIRST BULLETIN BOXES
K. H. Sign Co., Pittsburgh, Pa.

SAFETY FIRST CLOTHING, GLOVES, MITTS
Holcomb Safety Garment Co., 12-14 S. Jefferson St., Chicago, Ill.

SAFETY FIRST SIGNS
K. H. Sign Co., Pittsburgh, Pa.

SAND
Gordon Sand Co., Inc., The, Conneaut, O.
Portage Silica Co., Youngstown, O.
Standard Sand & Machine Co., Cleveland, O.

SAND BLAST (Shot)
Globe Steel Co., Mansfield, O.

SAND BLAST EQUIPMENT AND ACCESSORIES
American Foundry Equipment Co., 52 Vanderbilt Ave., New York City
Hoevel Manufacturing Corp., 40 Church St., New York City
Pangborn Corporation, Hagerstown, Md.

SAND BLAST GLOVES
Hickory Steel-Grip Glove Co., Box No. R. 6, Chicago, Ill.

SAND BLAST ROOMS WITH REVOLVING TABLES
American Foundry Equipment Co., 52 Vanderbilt Ave., New York City
Hoevel Manufacturing Corp., 40 Church St., New York City
Pangborn Corporation, Hagerstown, Md.

SAND BLAST SAND
Portage Silica Co., The, Youngstown, O.

SAND BLAST TUMBLING BARRELS
American Foundry Equipment Co., 52 Vanderbilt Ave., New York City
Hoevel Manufactnring Corp., 40 Church St., New York City
Pangborn Corporation, Hagerstown, Md.

SAND CONVEYING AND HANDLING MACHINERY
Bartlett & Snow, C. O., Co., Cleveland, O.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York City
Link-Belt Company, Chicago, Ill.
Standard Sand & Machine Co., Cleveland, O.

SAND CUTTING MACHINERY
American Foundry Equipment Co., 52 Vanderbilt Ave., New York City
Bartlett & Snow, C. O., Co., Cleveland, O.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

- THE MILWAUKEE CRANE -



THE MILWAUKEE CRANE

THE MILWAUKEE CRANE

MILWAUKEE ELECTRIC CRANE & MFG. CO.

INCORPORATED

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MILWAUKEE, WIS.

PITTSBURGH: 704 EMPIRE BLDG.

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Made in either Hook or Trolley Types have advantages in compactness, convenience and economy of operation which

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MONARCH WHYTE STRAND WIRE ROPE

If you wish to cut down wire rope expenses, and eliminate those accidents which are due to rope breakage, use Monarch Whyte Strand Wire Rope.

The most successful for *Hoisting, Hauling, Logging, Dredging*, etc.

It's the toughest rope for the roughest usage.

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MACOMBER & WHYTE ROPE CO.

KENOSHA WISCONSIN

ELECTRIC EUCLID HOISTS

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The worth of Euclid Hoists is proven by the many repeat orders received from satisfied customers in every line of manufacturing.

Our catalog gives the "reason why" of this satisfaction.

Write for it

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Dept. B. EUCLID, O.

PAWLING & HARNISCHFEGER CO.

CRANES AND HOISTS

QUALITY P & H SERVICE

MILWAUKEE, WIS. U.S.A.

SAND DRYERS
Bartlett & Snow, C. O., Co., Cleveland, O.
Indiana Foundry Co., Indiana, Pa.

SAND MIXING MACHINERY
Bartlett & Snow, C. O., Co., Cleveland, O.
Blystone Mfg. Co., Ironton St., Cambridge Springs, Pa.
National Engineering Co., 5 N. La Salle St., Chicago, Ill.
Smith, T. L., Co., Milwaukee, Wis.
Standard Sand & Machine Co., Cleveland, O.

SAND RECLAIMERS
American Clay Machinery Co., Bucyrus, O.

SAND SIFTERS
Arcade Mfg. Co., Dept. C., Freeport, Ill.
Blystone Mfg. Co., Cambridge Springs, Pa.
Standard Sand & Machine Co., Cleveland, O.
Whiting Foundry Equip. Co., Harvey, Ill.

SASH (Steel Casement)
Truscon Steel Co., Detroit, Mich.

SAW BLADES (Inserted Tooth)
Disston, Henry & Sons, Inc., Philadelphia, Pa.
Huther Bros. Saw & Mfg. Co., 1107 University Ave., Rochester, N. Y.
Pittsburgh Saw & Mfg. Co., 32nd and Smallman Sts., Pittsburgh, Pa.

SAWS
New York Machinery Exchange, Inc., New York, N. Y.
Simmons Machine Co., Inc., Albany, N. Y.

SAWS (Cold and Hot Metal)
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Espen-Lucas Machine Works, Front and Girard Ave., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Huther Bros. Saw & Mfg. Co., 1107 University Ave., Rochester, N. Y.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia, Pa.
Peerless Machine Co., 1605 Racine St., Racine, Wis.
Pittsburgh Saw & Mfg. Co., 32nd and Smallman Sts., Pittsburgh, Pa.
Racine Tool & Machine Co., Racine, Wis.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

SAW SHARPENING MACHINERY
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Pittsburgh Saw & Mfg. Co., 32nd and Smallman Sts., Pittsburgh, Pa.

SCALES
Standard Scale & Supply Co., Pittsburgh, Pa.

SCRAP RECLAIMING EQUIPMENT
Southwark Foundry & Mach. Co., Philadelphia, Pa.

SCREENS AND SIEVES
Bartlett & Snow, C. O., Co., Cleveland, O.
Erdle Perforating Co., Rochester, N. Y.
Hendrick Mfg. Co., Carbondale, Pa.
Link-Belt Company, Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

SCREENS (Coal and Sand)
Bartlett & Snow, C. O., Co., Cleveland, O.
Erdle Perforating Co., Rochester, N. Y.
Haiss, George, Mfg. Co., Inc., 145th St. and Rider Ave., New York
Link-Belt Company, Chicago, Ill.
Standard Sand & Machine Co., Cleveland, O.
Wright Wire Co., Worcester, Mass.

SCREENS (Pulsating and Revolving)
Link-Belt Company, Chicago, Ill.
National Engineering Co., 5 N. La Salle St., Chicago, Ill.

SCREENS (Water Intake)
Link-Belt Company, Chicago, Ill.

SCREW MACHINE PRODUCTS
Atlantic Mfg. Co., The, Bridgeport, Conn.
Auburn Ball Bearing Co., 30 Elizabeth St., Rochester, N. Y.
Barnes, Wallace, Co., 118 South St., Bristol, Conn.
Corbin Screw Corp., New Britain, Conn.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.
Metal Machining Co., The, Cleveland, O.
Metal Machining Tool Co., Cleveland, O.
Moore, George W., 44 Farnsworth St., Boston, Mass.
St. Louis Screw Co., St. Louis, Mo.
Standard Screw Products Co., Detroit, Mich.

SCREW MACHINES
Acme Machine Tool Co., Cincinnati, O.
New York Machinery Exchange, Inc., New York City
Simmons Machine Co., Inc., Albany, N. Y.
Warner & Swasey Co., Cleveland, O.

SCREW STOCK (Free Cutting)
American Steel & Wire Co., Chicago, Ill.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Peerless Drawn Steel Co., Massillon, O.

SCREWS
Clark Bros. Bolt Co., Milldale, Conn.
Corbin Screw Corporation, New Britain, Conn.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.
Milton Mfg. Co., Milton, Pa.
Progressive Mfg. Co., Torrington, Conn.
Republic Iron & Steel Co., Youngstown, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

SCREWS (Cap and Set)
Auburn Ball Bearing Co., 30 Elizabeth St., Rochester, N. Y.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.
St. Louis Screw Co., St. Louis, Mo.

SECTIONS (Steel)
Buffalo Steel Co., Tonawanda, N. Y.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

SHAFT HANGERS
Hyatt Roller Bearing Co., Industrial Bearing Division, Metropolitan Tower, New York
New Departure Mfg. Co., Bristol, Conn.

SHAFTING
American Vanadium Co., The, Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Cincinnati Iron & Steel Co., Cincinnati, O.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Cumberland Steel Co., Cumberland, Md.
Donner Steel Co., Inc., Buffalo, N. Y.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Tube Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

SHAPERS
Cleveland Punch & Shear Works Co., Cleveland, O
Manning, Maxwell & Moore, Inc., 119 W 40th St., New York City
Morton Mfg. Co., Muskegon Heights, Mich.
Newton Machine Tool Works, Inc., 23rd and Vine St., Philadelphia, Pa
New York Machinery Exchange, Inc., New York, N. Y.
Niles-Bement-Pond Co., 111 Broadway, New York City
Simmons Machine Co., Inc., Albany, N. Y.
Toomey, Frank, Inc., Philadelphia, Pa.

SHAPES (Iron and Steel)
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.
Belmont Iron Works, Philadelphia, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Buffalo Steel Co., Tonawanda, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Chesapeake Iron Works, Baltimore, Md.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Empire Art Metal Co., Inc., College Pt., N. Y.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Moltrup Steel Products Co., Beaver Falls, Pa.
Peerless Drawn Steel Co., Massillon, O
Phoenix Iron Co., 410 Walnut St., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Shippers Car Line, New York City.
Youngstown Sheet & Tube Co., Youngstown, O.

SHAPES (Special Form)
Empire Art Metal Co., Inc., College Pt., N. Y.
Peerless Drawn Steel Co., Massillon, O.

SHEAR BLADES AND KNIVES
Cleveland Knife & Forge Co., Cleveland, O.
Heppenstall Forge & Knife Co., Pittsburgh, Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Tinker, F., & Sons Co., 5687-97 Butler St., Pittsburgh, Pa
White, L. & I. J., Co., 15 Columbia St., Buffalo, N. Y

SHEARS
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
Erie Foundry Co., Erie, Pa.
Garrison, A., Foundry Co., Bingham St., Pittsburgh, Pa.
Lewis Foundry & Machine Co., Pittsburgh, Pa
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
New York Machinery Exchange, Inc., New York City
Quickwork Co., St. Marys, O.
Simmons Machine Co., Inc., Albany, N. Y.
Toledo Machine & Tool Co., Toledo, O.
Treadwell Engineering Co., Easton, Pa.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Youngstown Foundry & Machine Co., Youngstown, O.

SHEET BARS
Carnegie Steel Co., The, Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., The, Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Mudge, Edmund W., & Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.

SHEET IRON WORK
Hendrick Mfg. Co., Carbondale, Pa.

SHEET METAL STRAIGHTENER
Shuster, The F. B., Co., New Haven, Conn

SHEET METAL WORKING MACHINERY
Bliss, E. W., Co., 8 Adams St., Brooklyn, N. Y.
National Roll & Foundry Co., Avonmore, Pa.
Quickwork Co., St. Marys, O.

SHEET MILL EQUIPMENT
Treadwell Engineering Co., Easton, Pa

SHEET ZINC
United Smelting & Aluminum Co., New Haven, Conn.

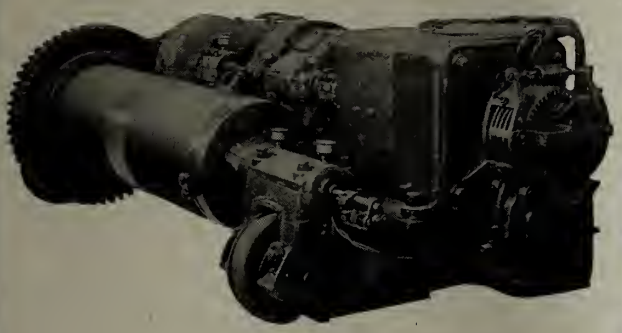
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CRANES

for all purposes

Electric and Hand Power

Case Standard Cranes are the result of thoroughly tested ideas secured during many years from the best designing and operating engineers. They are manufactured under the most favorable conditions in a plant recently equipped at large expense for this particular purpose. They represent the greatest value for price charged.



The Case Crane & Engineering Co.

Electric Overhead Traveling Cranes

COLUMBUS, OHIO



BROSIUS

Single Hook Grab Bucket Handling Converting Mill Cinder

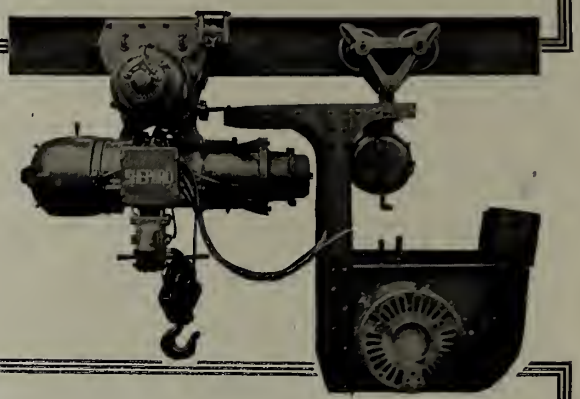
In some of the largest blast furnace and steel plants Brosius Buckets are saving a heap of money in operating costs. The bucket shown in the illustration is handling roll scale from a pit. When the pit is cleaned out the bucket is detached in a moment and moved to some other part of the plant to be used on another crane for handling other material.

Brosius Single Hook Grab Buckets are being used in over 200 different plants. Several of the 325 in use have saved the wages of as many as 25 laborers. At $3.00 per day this would mean a saving of approximately $27,375.00 a year—with an initial investment of but a few hundred dollars. It may do the same for you. Send for bulletin.

EDGAR E. BROSIUS

Pittsburgh, Pa.

SHEPARD Cranes *and* Hoists



The handling proposition in any plant is a most important one.

The crane or hoist you choose will go a long way toward determining the efficiency of your business.

For light and normal monorail duty, the Shepard Form 25 Hoist (illustrated above) cannot be equaled.

There is a Shepard Crane or Hoist built for every service—over 90 different industries are now using them.

"Hoist — By a Shepard"

Let us send you our Shepard Line Bulletin S

SHEPARD

ELECTRIC CRANE & HOIST CO.

NEW-YORK PHILADELPHIA MONTOUR FALLS N.Y. PITTSBURG CHICAGO

BOSTON, BALTIMORE, BIRMINGHAM, SAN-FRANCISCO, MONTREAL, MELBOURNE - AUSTRL., LONDON.

SHEETS
Allegheny Steel Co., Pittsburgh, Pa.
Amalgamated Products Co., 165 Broadway, New York City
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Canton Sheet Steel Co., Canton, O.
Carnahan Tin Plate & Sheet Co., Canton, O.
Central Iron & Steel Co., Harrisburg, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Mansfield Sheet & Tin Plate Co., Mansfield, O.
Nagel Steel Co., Pottstown, Pa.
Newport Rolling Mill Co., Newport, Ky.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Trumbull Steel Co., Warren, O.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
Whitaker-Glessner Co., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Automobile)
Allegheny Steel Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Mansfield Sheet & Tin Plate Co., Mansfield, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Sharon Steel Hoop Co., Sharon, Pa.
Trumbull Steel Co., Warren, O.
Whitaker-Glessner Co., Wheeling, W. Va.

SHEETS (Black)
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Brier Hill Steel Co., Youngstown, O.
Canton Sheet Steel Co., Canton, O.
Carnahan Tin Plate & Sheet Co., Canton, O.
Cincinnati Iron & Steel Co., Cincinnati, O.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Mansfield Sheet & Tin Plate Co., Mansfield, O.
Newport Rolling Mill Co., Newport, Ky.
Ryerson, Jos. T., & Son, Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Wheeling Steel & Iron Co., Wheeling, W. Va.
Whitaker-Glessner Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Blue Annealed)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Brier-Hill Steel Co., Youngstown, O.
Canton Sheet Steel Co., Canton, O.
Cincinnati Iron & Steel Co., Cincinnati, O.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Newport Rolling Mill Co., Newport, Ky.
Ryerson, Jos. T., & Son, Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O

SHEETS (Cold Rolled)
Bourne-Fuller Co., The, Cleveland, O.
Inland Steel Co., Chicago, Ill.
Sharon Steel Hoop Co., Sharon, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Corrugated)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Brier Hill Steel Co., Youngstown, O.
Canton Sheet Steel Co., Canton, O.
Cincinnati Iron & Steel Co., Cincinnati, O.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Newport Rolling Mill Co., Newport, Ky.
Ryerson, Joseph T., & Son, Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Trumbull Steel Co., Warren, O.
Whitaker-Glessner Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Dead Soft)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Canton Sheet Steel Co., Canton, O.
Inland Steel Co., The, Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Mansfield Sheet & Tin Plate Co., Mansfield, O.
Newport Rolling Mill Co., Newport, Ky.
Seneca Iron & Steel Co., Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
Whitaker-Glessner Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Deep Stamping)
Sharon Steel Hoop Co., Sharon, Pa.

SHEETS (Deoxidized)
Carnahan Tin Plate & Sheet Co., Canton, O.
Sharon Steel Hoop Co., Sharon, Pa.

SHEETS (Electrical)
Allegheny Steel Co., Pittsburgh, Pa.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Sharon Steel Hoop Co., Sharon, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Galvanized)
Allegheny Steel Co., Pittsburgh, Pa.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Brier Hill Steel Co., Youngstown, O.
Canton Sheet Steel Co., Canton, O.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Newport Rolling Mill Co., Newport, Ky.
Ryerson, Jos. T., & Son, Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Trumbull Steel Co., Warren, O.
Whitaker-Glessner Co., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Long Terne)
Canton Sheet Steel Co., Canton, O.

SHEETS (Nickel)
Newport Rolling Mill Co., Newport, Ky.

SHEETS (Perforated)
Erdle Perforating Co., Rochester, N. Y.

SHEETS (Polished and Planished)
American Rolling Mill Co., Middletown, O.
Bourne-Fuller Co., The, Cleveland, O.
Carnahan Tin Plate & Sheet Co., Canton, O.
Mansfield Sheet & Tin Plate Co., Mansfield, O.

SHEETS (Roofing) (See Roofing and Siding)

SHELVING (Steel)
Edwards Mfg. Co., 401-451 Culvert St., Cincinnati, O.
Empire Art Metal Co., Inc., College Pt., N. Y.
New Britain Mach. Co., New Britain, Conn.

SHINGLES (Galvanized and Terne Painted)
Canton Sheet Steel Co., Canton, O.

SHIP BUILDERS' EQUIPMENT AND TOOLS
Carpenter, Geo. B., & Co., Dept. 26, 440 N. Wells St., Chicago, Ill.

SHIPYARD MACHINERY
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.

SHOP BOXES AND CANS
New Britain Machine Co., New Britain, Conn.

SHOP FURNITURE
Western Tool & Mfg. Co., Springfield, O.

SIGNS (Illuminated)
K. H. Sign Co., Pittsburgh, Pa.

SILICON (Ferro)
Canada Carbide Sales Co., 30 Church St., New York City
Fairbanks, Morse & Co., New York City
United States Alloys Corp., 28 E. 42nd St., New York City

SILVER (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

SKELP (Open Hearth Basic)
Sharon Steel Hoop Co., Sharon, Pa.

SKIM GATES
Erdle Perforating Co., Rochester, N. Y.

SKIP HOISTS
Bartlett & Snow, C. O., Co., Cleveland, O.

SLABS
American Steel Export Co., New York City
Andrews Steel Co., Newport, Ky.
Donner Steel Co., Inc., Buffalo, N. Y.
Federal Export Corp., 115 Broadway, New York City
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Liberty Steel Products Co., New York City
Mudge, Edmund W., & Co., Pittsburgh, Pa.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Whitaker-Glessner Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SLEEPERS (Creosoted)
Ayer & Lord Tie Co., Dept. C., Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.

SLEEVES AND NOZZLES
Manown Mfg. Co., Pittsburgh, Pa.

SLINGS (Wire Rope)
Roebling's, John A., Sons Co., Trenton, N. J.

SLITTING CUTTERS (Circular)
Tinker, F., & Sons Co., 5687-97 Butler St., Pittsburgh, Pa.

SLOTTERS
New York Machinery Exchange, Inc., New York City

SOCKETS (Drill)
Clark Equipment Co., Buchanan, Mich.

SOLDER
United Smelting & Aluminum Co., New Haven, Conn.

SPELTER
United Smelting & Aluminum Co., New Haven, Conn.

SPIEGELEISEN
Marshall, Edward E., Bullitt Bldg., Philadelphia, Pa.

SPIKES
American Steel & Wire Co., Chicago, Ill.
Illinois Steel Co., Chicago, Ill.
Republic Iron & Steel Co., Youngstown, O.

SPIKES (Steel)
Inland Steel Co., The, Chicago, Ill.

SPOKE WIRE FOR WIRE WHEELS
American Steel & Wire Co., Chicago, Ill.

SPRING COILING MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS
American Steel & Wire Co., Chicago, Ill.
American Vanadium Co., Pittsburgh, Pa.
Barnes, Wallace, Co., 118 South St., Bristol, Conn.
Duer Spring & Mfg. Co., Pittsburgh, Pa.
Fort Pitt Spring & Mfg. Co., Pittsburgh, Pa.
Raymond Mfg. Co., Corry, Pa.

SPRINGS (Coil and Elliptic)
Fort Pitt Spring & Mfg. Co., Pittsburgh, Pa.

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CHESAPEAKE CRANES

Electric Traveling Cranes

Most Rugged Crane Built

QUICK DELIVERY

CHESAPEAKE IRON WORKS, Baltimore, Md.



SPROCKET AND TRACTION WHEELS
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Fuller-Lehigh Co., Fullerton, Pa.

SQUEEZER MOLDING MACHINES
Pridmore, Henry E., Chicago, Ill.

SQUEEZERS (Power)
Pridmore, Henry E., Chicago, Ill.

STACKS (Steel)
American Bridge Co., New York City
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia, Pa.
Phoenix Iron Works Co., Meadville, Pa.

STAMPINGS
Allegheny Steel Co., Pittsburgh, Pa.
American Tube & Stamping Co., Bridgeport, Conn.
Bettcher Mfg. Co., Cleveland, O.
Bossert Corporation, The, Utica, N. Y.
Burr Mfg. Co., The, Cleveland, O.
Conway Stove Co., The, Bellevue, O.
Empire Art Metal Co., Inc., College Pt., N. Y
Erdle Perforating Co., Rochester, N. Y.
Fouts, C. C., Company, Middletown, O.
Gem Mfg. Co., Pittsburgh, Pa.
Lansing Stamping & Tool Co., Lansing, Mich.
New Britain Mch. Co., New Britain, Conn.
Standard Tool & Mfg. Co., 70 Lafayette Blvd. E., Detroit, Mich.

STAMPINGS IN BLACK IRON (Baked or Porcelain Enamel Finish)
Ing-Rich Mfg. Co., Beaver Falls, Pa.

STAMPS (Steel)
Moss, Henry, & Co., 37 Beaver St., New York City
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh, Pa.

STAMP HOLDERS (Steel)
Moss, Henry, & Co., 37 Beaver St., New York City
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh, Pa.

STAMP SHOES AND DIES
Midvale Steel Co., Philadelphia, Pa.

STAPLES
American Steel & Wire Co., Chicago, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

STARS (Hard Iron)
Fanner Mfg. Co., Dept. T., Cleveland, O.

STARTERS (Electric Motor)
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

STEAMSHIP AGENTS
Grandfield, W. J., & Co., 308 Chestnut St., Philadelphia, Pa.

STEAM SHIP COMPANIES
Cleveland & Buffalo Transit Co., Cleveland, O.

STEEL
American Bridge Co., New York City
Andrews Steel Co., Newport, Ky.
Atlas Crucible Steel Co., Dunkirk, N. Y.
Beals, McCarthy & Rogers, Buffalo, N. Y.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Buffalo Steel Co., Tonawanda, N. Y.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Chicago Metal Treating Co., Chicago, Ill.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Federal Export Corp., 115 Broadway, New York City
Ferguson Steel & Iron Co., Buffalo, N. Y.
Ford & Co., Inc., R. M., New York City
Franklin Steel Works, Franklin, Pa.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Kidd Drawn Steel Co., Aliquippa, Pa.
La Belle Iron Works, Steubenville, O.
Latrobe Electric Steel Co., Latrobe, Pa.
Liberty Steel Products Co., New York City
Lindenberg Steel Co., New York City
Lockhart Iron & Steel Co., Metals Service Co., 801 Union National Bank Bldg., Cleveland, O.
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Nagle Steel Co., Pottstown, Pa.
Otis Steel Co., Cleveland, O.
Pacific Coast Steel Co., San Francisco, Cal.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Stanley Works, The, New Britain, Conn.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
United Alloys Steel Corp., The, Canton, O.
Upson Nut Co., Cleveland, O.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
West Leechburg Steel Co., Pittsburgh, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.
Wickwire Steel Co., Buffalo, N. Y.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

STEEL (Alloy)
Aborn Steel Co., Inc., 24 Clarke St., New York City
American Vanadium Co., Pittsburgh, Pa.
Andrews Steel Co., Newport, Ky.
Atlas Crucible Steel Co., Dunkirk, N. Y.
Central Steel Co., The, Massillon, O.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Crowley, John A., Co., New York City
Farrell-Cheek Steel Foundry Co., Sandusky, O.
General Steel Co., Milwaukee, Wis.
Hammond Steel Co., Inc., Syracuse, N. Y.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
Midvale Steel Co., Philadelphia, Pa.
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
National Pressed Steel Co., Massillon, O.
Peerless Drawn Steel Co., Massillon, O.
Union Drawn Steel Co., Beaver Falls, Pa.
United Alloys Steel Corp., The, Canton, O.
Union Electric Steel Co., Pittsburgh, Pa.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.

STEEL (Alloy, Stellite)
Haynes Stellite Co., The, Kokomo, Ind.

STEEL (Boronic All-Metal in Shot Form)
American Boron Products Co., Inc., 636 Court St., Reading, Pa.

STEEL (Carbon)
Aborn Steel Co., Inc., 24 Clarke St., New York City
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Ludlum Steel Co., Watervliet, N. Y.

STEEL (Cold Drawn)
Aborn Steel Co., Inc., 24 Clarke St., New York City
Barnes, Wallace, Co., 118 South St., Bristol, Conn.
Bourne-Fuller Co., The, Cleveland, O.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Peerless Drawn Steel Co., Massillon, O.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Pittsburgh Cold Rolled Steel Co., Pittsburgh, Pa.
Rome Metal Products Co., Inc., 87 Nassau St., New York City
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
United Alloys Steel Corp., The, Canton, O.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL (Crucible)
Atlas Crucible Steel Co., Dunkirk, N. Y.
Bethlehem Steel Co., S. Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Ludlum Steel Co., The, Watervliet, N. Y.
Pittsburgh Cold Rolled Steel Co., Pittsburgh, Pa.
Vanadium Alloys Steel Co., Pittsburgh, Pa.

STEEL (Die)
Atlas Crucible Steel Co., Dunkirk, N. Y.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.

STEEL (Electric Furnace)
Allegheny Steel Co., Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Connecticut Electric Steel Co., Inc., Hartford, Conn.
Crowley, John A., Co., New York City
Firth-Sterling Steel Co., McKeesport, Pa.
Ford, R. M., & Co., Inc., New York City
General Steel Co., Milwaukee, Wis.
Illinois Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
Union Electric Steel Co., Pittsburgh, Pa.
United Alloys Steel Corp., The, Canton, O.

STEEL (High Speed)
Aborn Steel Co., Inc., 24 Clarke St., New York City
Atlas Crucible Steel Co., Dunkirk, N. Y.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Steel Co., Philadelphia, Pa.
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Onondaga Steel Co., Syracuse, N. Y.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

STEEL (High Speed—Reclaimed)
Onondaga Steel Co., Syracuse, N. Y.

STEEL (High Speed, Stellite)
Haynes Stellite Co., The, Kokomo, Ind.

STEEL (Open-Hearth)
Andrews Steel Co., Newport, Ky.
Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
McConway & Torley Co., Arsenal Station, Pittsburgh, Pa.
Mitchell-Tappen Co., New York City
Nagle Steel Co., Pottstown, Pa.
National Pressed Steel Co., Massillon, O.
Penn Seaboard Steel Corp., Franklin Bank Bldg., Philadelphia, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Upson Nut Co., Cleveland, O.
Whitaker-Glessner Co., Wheeling, W. Va.

STEEL (Spring)
Aborn Steel Co., Inc., 24 Clarke St., New York City
Firth-Sterling Steel Co., McKeesport, Pa.
Rome Metal Products Co., 87 Nassau St., New York City
United Alloys Steel Corp., The, Canton, O.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

STEEL (Stamping and Drawing)
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Sharon Steel Hoop Co., Sharon, Pa.
Stanley Works, The, New Britain, Conn.

STEEL (Strip, Hot and Cold Rolled)
Amalgamated Products Co., 165 Broadway, New York City.
American Steel & Wire Co., Chicago, Ill.
American Tube & Stamping Co., Bridgeport, Conn.
Carnahan Tin Plate & Sheet Co., Canton, O.
Columbia Steel Co., Elyria, O.
Griffin Mfg. Co., The, Erie, Pa.
National Pressed Steel Co., Massillon, O.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Rome Metal Products Co., Inc., 87 Nassau St., New York City
Stanley Works, The, New Britain, Conn.
Trumbull Steel Co., Warren, O.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL (Structural)
Alliance Structural Co., Alliance, O.
American Bridge Co., New York City
Amiron Supply Co., Inc., New York City
Baily & Allen Co., 124 S. Michigan St., Chicago, Ill.
Bellefontaine Bridge & Steel Co., The, Bellefontaine, O.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Bourne-Fuller Co., The, Cleveland, O.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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THE G. H. WILLIAMS COMPANY, Erie, Penna.

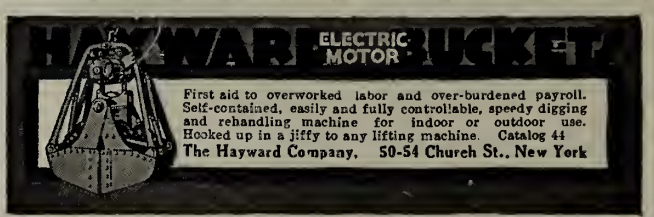
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HAISS DIGGING WAGON LOADER

Hand labor versus Haiss Wagon Loader in loading a motor truck with 5 cubic yards of material.

Hand Labor		Haiss Wagon Loader	
10 hour day	600 mins.	10 hour day	600 mins
8 trips, 75 mins. per round trip.		16 trips, 38 mins. per round trip.	
Time to load truck with 2 men	45 mins.	Time to load truck with 2 men	8 mins.
Running time of truck	30 mins.	Running time of truck	30 mins.
Round trip	75 mins.	Round Trip	38 mins.

8 trips x 30m.= 240m. running time efficiency out of auto truck per 600m. or per 10 hour day. Thus truck only gives 40 per cent efficiency each day, with hand labor loading. Making 8 trips per day with an auto truck, costing $20.00 per day, results in the cost of $2.50 for the delivery of every 5 cubic yards of material.

600 m. x 38 m.=nearly 16 trips per day, or 100 per cent. gain in auto truck efficiency.

Making 16 trips per day with an auto truck, costing $20.00 per day, results in the cost of $1.25 for the delivery of every 5 cubic yards of material

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STEEL (Structural)
(Continued)
Buffalo Steel Co., Tonawanda, N. Y.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Case Crane & Engineering Co., Columbus, O.
Chesapeake Iron Works, Baltimore, Md.
Cincinnati Iron & Steel Co., Cincinnati, O.
Empire Art Metal Co., Inc., College Pt., N. Y.
Ferguson Steel & Iron Co., Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Kratzer, W. N., Co., 3212 Smallman St., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
McClintic-Marshall Co., Pittsburgh, Pa.
Midgley & Prentice, Inc., New York City
Phoenix Iron Co., 410 Walnut St., Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Republic Structural Iron Works, Inc., Cleveland, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Shippers' Car Line, New York City
Snead Architectural Iron Works, Louisville, Ky.
Sterling Iron & Steel Co., Philadelphia, Pa.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Truscon Steel Co., Detroit, Mich.
Whitaker-Glessner Co., Wheeling, W. Va.

STEEL (Tool)
Aborn Steel Co., Inc., 24 Clarke St., New York City
American Steel Export Co., New York City
Atlas Crucible Steel Co., Dunkirk, N. Y.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Cincinnati Iron & Steel Co., Cincinnati, O.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
General Steel Co., Milwaukee, Wis.
Hammond Steel Co., Inc., Syracuse, N. Y.
Harrisburgh Pipe & Pipe Bending Co., Harrisburg, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
Metals Service Co., 801 Union National Bank Bldg., Cleveland, O.
Midvale Steel Co., Philadelphia, Pa.
Miner-Morse Corp., 15th and Ash Sts., Erie, Pa.
Ryerson, Joseph T., & Sons, Chicago, Ill.
United Alloy Steel Corporation., Canton, O.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.

STEEL (Tool, Stellite)
Haynes Stellite Co., The, Kokomo, Ind.

STEEL BUILDINGS
Chase, Frank D., Chicago, Ill.
Price, T. W., Engineering Co., Woolworth Bldg., New York City
Truscon Steel Co., Detroit, Mich.

STEEL PLANT CONSTRUCTION
Chase, Frank D., Chicago, Ill.
Lindsay, W. W., Co., Inc., 2 S. 15th St., Philadelphia, Pa.
Price, T. W., Engineering Co., Woolworth Bldg., New York City

STEEL PLATE CONSTRUCTION
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Colonial Iron Works Co., Cleveland, O.
Erie City Iron Works, Erie, Pa.
Pennsylvania Engrg. Works, New Castle, Pa.

STEEL STAMPINGS
American Tube & Stamping Co., Bridgeport, Conn.
Griffin Mfg. Co., Erie, Pa.
Kempsmith Mfg. Co., Milwaukee, Wis.

STEEL STRUCTURAL WORK
Chase, Frank D., Chicago, Ill.
Price, T. W., Engineering Co., Woolworth Bldg., New York City

STELLITE
Haynes Stellite Co., The, Kokomo, Ind.

STENCILS (Brass and Rubber)
Moss, Henry, & Co., 37 Beaver St., New York City

STOKERS
Babcock & Wilcox Co., The, New York City
Erie Foundry Co., Erie, Pa.
Green Engineering Co., E. Chicago, Ind.
Hagan, Geo. J., Co., Pittsburgh, Pa.

STOVE TRIMMINGS
Fanner Mfg. Co., Dept. T, Cleveland, O.

STRAIGHTENING MACHINERY
Abramsen Engineering Co., Pittsburgh, Pa.
Shuster, The F. B., Co., New Haven, Conn.

STRAND
Roebling's, John A., Sons Co., Trenton, N. J.

STRAPS (Connecting)
Bay City Forge Co., Erie, Pa.

STRIP STEEL STRAIGHTENERS
Shuster, The F. B., Co., New Haven, Conn.

STRUCTURAL TIMBER (Creosoted)
Ayer & Lord Tie Co., Dept. C, Chicago, Ill.
Jennison-Wright Co., 2485 Broadway, Toledo, O.

STUDS (Milled)
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.

SULPHATE OF IRON
American Steel & Wire Co., Chicago, Ill.

SWITCHBOARDS
Electric Controller & Mfg. Co., Cleveland, O.

SWITCHES (Electric)
Electric Controller & Mfg. Co., Cleveland, O.
General Devices & Fittings Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

SWITCH STANDS
Bethlehem Steel Co., The, So. Bethlehem, Pa.

SYNDOLAG
Davison, Allen S., Co., Pittsburgh, Pa.

TACHOMETERS
Brown Instrument Co., Philadelphia, Pa.

TACKS
American Steel & Wire Co., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.

TANK CARS
Shippers Car Line, New York City

TANKS
Air Tight Steel Tank Co., Pittsburgh, Pa.
American Bridge Co., New York City
Caldwell, W. E., Co., 2350 Brook St., Louisville, Ky.
Farrar & Trefts, Buffalo, N. Y.
Morgan Construction Co., Worcester, Mass.
National Tube Co., Pittsburgh, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Riter-Conley Mfg. Co., Pittsburgh, Pa.
Shippers Car Line, New York City

TANKS (Acetylene)
Linde Air Products Co., New York City
National Tube Co., Pittsburgh, Pa.
Oxweld Acetylene Co., Chicago, Ill.

TANKS (Gasoline and Oil Storage)
Air Tight Steel Tank Co., Pittsburgh, Pa.

TANKS (Patented Oil Quenching)
American Shop Equipment Co., Chicago, Ill.

TANKS (Pressure)
Air Tight Steel Tank Co., Pittsburgh, Pa.

TANKS (Second Hand)
National Products Co., East Liverpool, O.
Zelnicker, Walter A., Supply Co., St. Louis, Mo.

TANKS (Storage)
Producers Supply Co., Franklin, Pa.

TANKS (Wooden)
Caldwell, W. E., Co., 2350 Brook St., Louisville, Ky.
Hauser-Stander Tank Co., Cincinnati, O.

TAPPING MACHINES
Cleveland Power Transmission Co., Guardian Bldg., Cleveland, O.
New York Machinery Exchange, Inc., New York City
Rickert-Shafer Co., 612 W. 12th St., Erie, Pa.
Webster & Perks Tool Co., P. O. Box 1200, Springfield, O.

TAR EXTRACTORS
Smith Gas Engrg. Co., The, Dayton, O.

TELEGRAPH AND TELEPHONE WIRE
American Steel & Wire Co., Chicago, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.

THERMOMETERS
Brown Instrument Co., Philadelphia, Pa.

THREAD CUTTING TOOLS
Landis Machine Co., Waynesboro, Pa.
Webster & Perks Tool Co., P. O. Box 1200, Springfield, O.

TIE PLATES
Inland Steel Co., Chicago, Ill.

TIERING MACHINES
N. Y. Revolving Portable Elevator Co., 391 Garfield Ave., Jersey City, N. J.
Revolvator Co., 391 Garfield Ave., Jersey City, N. J.

TIES (Creosoted Wood)
Jennison-Wright Co., 2485 Broadway, Toledo, O.
Rodd Co., The, Century Bldg., Pittsburgh, Pa.

TILE (Fire Clay)
Union Mining Co., Mt. Savage, Md.

TILE (Metal)
Truscon Steel Co., Detroit, Mich.

TIN
United Smelting & Aluminum Co., New Haven, Conn.

TINNED WIRE (Equipment)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

TIN PLATE
American Sheet & Tin Plate Co., Pittsburgh, Pa.
American Steel Co., Pittsburgh, Pa.
American Steel Export Co., New York City
Carnahan Tin Plate & Sheet Co., Canton, O.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City
Liberty Steel Co., The, Warren, O.
Phillips Sheet & Tin Plate Co., Weirton, W. Va.
Standard Tin Plate Co., Canonsburg, Pa.
Taylor, N. & G., Co., Inc., 300 Chestnut St., Philadelphia, Pa.
Trumbull Steel Co., The, Warren, O.
Wheeling Steel & Iron Co., Wheeling, W. Va.

TIN PLATE MILL EQUIPMENT
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
National Roll & Fdy. Co., Avonmore, Pa.
Treadwell Engineering Co., Easton, Pa.
United Eng. & Fdy. Co., Pittsburgh, Pa.

TIRES (Locomotive and Car Wheel)
Midvale Steel Co., The, Philadelphia, Pa.

TITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

TOE CALK (Steel)
American Steel & Wire Co., Chicago, Ill.

TOOL BITS (High Speed)
Onondaga Steel Co., Syracuse, N. Y.

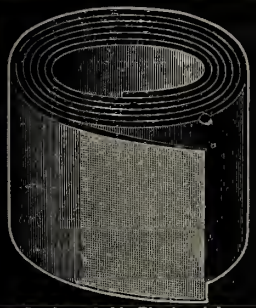
TOOL HOLDER BITS (Treated)
Vanadium-Alloys Steel Co., Pittsburgh, Pa.

TOOL HOLDERS
Clark Equipment Co., Buchanan, Mich.
Western Tool & Mfg. Co., Springfield, O.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

TOOL STEEL (High Speed)
Onondaga Steel Co., Syracuse, N. Y.

TOOLS
Cleveland Pneumatic Tool Co., Cleveland, O.
Cleveland Power Transmission Co., Guardian Bldg., Cleveland, O.
General Electric Co., Schnectady, N. Y.
Haynes Stellite Co., The, Kokomo, Ind.
Lansing Stamping & Tool Co., Lansing, Mich.

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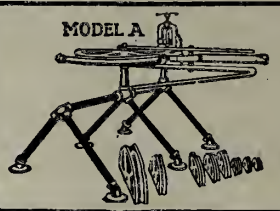
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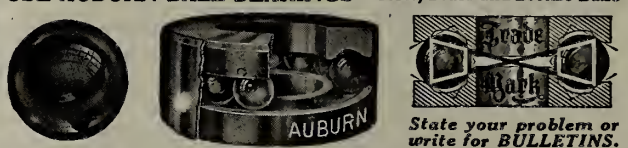
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TOOLS
(Continued)
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City
Oldham, Geo., & Sons Co., Frankford, Philadelphia, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Standard Tool & Mfg. Co., 70 Lafayette Blvd. E., Detroit, Mich.
White, L. & I. J., Co., 15 Columbia St., Buffalo, N. Y.
Williams, J. H., & Co., 58 Richards St., Brooklyn, N. Y.

TORCHES (Acetylene, Blow, Oxy-acetylene)
Linde Air Products Co., New York City
Oxweld Acetylene Co., Chicago, Ill.

TORCHES (Foundry)
Mahr Mfg. Co., Minneapolis, Minn.

TRACK AND RAIL SUPPLIES
American Steel Export Co., New York City
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Chase Foundry & Mfg. Co., Columbus, O.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., The, Chicago, Ill.
Lackawanna Steel Co., Buffalo, N. Y.
Republic Iron & Steel Co., Youngstown, O.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.

TRACK (Barn Door and Hay Carrier)
Buffalo Steel Co., Tonawanda, N. Y.

TRACK (Industrial)
Lakewood Engineering Co., Cleveland, O.
Orenstein-Arthur Koppel Co., Koppel, Pa.

TRACKS (Portable)
Lakewood Engineering Co., Cleveland, O.

TRACTORS (Storage Battery)
Lakewood Engineering Co., Cleveland, O.

TRAILERS (Factory and Warehouse)
Lakewood Engineering Co., Cleveland, O.

TRAMRAILS (Overhead Systems)
Brown Hoisting Machinery Co., Cleveland, O.
Whiting Foundry Equipment Co., Harvey, Ill.

TRAMWAYS
Link-Belt Company, Chicago, Ill.

TRAMWAYS (Wire Rope)
American Steel & Wire Co., Chicago, Ill.
Macomber & Whyte Rope Co., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton, N. J.

TRANSFORMERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

TRANSMISSION CHAINS
Link-Belt Company, Chicago, Ill.

TROLLEYS
Cleveland Crane & Engrg. Co., Wickliffe, O.
Lakeside Bridge & Steel Co., 123 Villard Ave., N. Milwaukee, Wis.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Whiting Foundry Equipment Co., Harvey, Ill.

TROLLEY AND TRACK EQUIPMENT
Yale & Towne Mfg. Co., 9 E. 40th St., New York City

TROLLEY WHEELS
Aluminum Castings Co., Cleveland, O.

TROLLEY WIRE
Roebling's, John A., Sons Co., Trenton, N. J.

TRUCKS (Elevating and Conveying)
Stuebing Truck Co., 143 E. 4th St., Cincinnati, O.

TRUCKS (Factory and Foundry)
Lakewood Engineering Co., Cleveland, O.
Orenstein-Arthur Koppel Co., Koppel, Pa.
Standard Scale & Supply Co., Pittsburgh, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

TRUCKS (Industrial)
Atlas Car & Mfg. Co., Dept. E, Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Orenstein-Arthur Koppel Co., Koppel, Pa.

TRUCKS (Motor)
Federal Motor Truck Co., Detroit, Mich.

TRUCKS (Small Hand)
Standard Scale & Supply Co., Pittsburgh, Pa.

TRUCKS (Storage Battery)
Lakewood Engineering Co., Cleveland, O.
Orenstein-Arthur Koppel Co., Koppel, Pa.

TRUCKS (Wire Mill)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

TUBE MILL MACHINERY
Standard Engrg. Co., Ellwood City, Pa.

TUBES
Allegheny Steel Co., The, Pittsburgh, Pa.
American Steel Export Co., New York City
Bourne-Fuller Co., The, Cleveland, O.
Detroit Seamless Steel Tube Co., Detroit, Mich.
Empire Art. Metal Co., Inc., College Pt., N. Y.
La Belle Iron Works, Steubenville, O.
Latshaw Steel & Metal Products Corp., 261 Broadway, New York City
National Tube Co., Pittsburgh, Pa.
Republic Iron and Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Suite 1127 New Continental & Commercial Bank Bldg., Chicago, Ill.
Toledo Steel Tube Co., Toledo, O.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston, Mass.
Wheeling Steel & Iron Co., Wheeling, W. Va.
Worth Brothers Co., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

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Rome Metal Products Co., Inc., 87 Nassau St., New York City

TUBS (Wire Mill Cleaning House)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

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Whiting Fdy. Equipment Co., Harvey, Ill.

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Vasco Mining Company, Boulder, Colo.

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General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

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Bourne-Fuller Co., The, Cleveland, O.
Merrill Brothers, Maspeth, N. Y.
Michigan Bolt & Nut Works, Detroit, Mich.
Republic Iron & Steel Co., Youngstown, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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Bidle, W. S., Co., 1411 E. 45th St., Cleveland, O.

TURNTABLES
American Bridge Co., New York City
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Chase Foundry & Mfg. Co., Columbus, O.
Whiting Foundry Equipment Co., Harvey, Ill.

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Jennison-Wright Co., 2485 Broadway, Toledo, O.

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UNIONS (Pipe)
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Illinois Malleable Iron Co., Chicago, Ill.
Mark Mfg. Co., 1907 Dempster St., Evanston, Ill.

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Biggs-Watterson Co., Cleveland, O.
Bunton & Bockins, Pittsburgh, Pa.
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Castle & Wilson, Pittsburgh, Pa.
Clarke, George W., & Co., New York City
Colman Machinery & Tool Co., Inc., New York City
Curtis-Willis Co., New York City.
Davis, J. F., Chicago, Ill.
Davis, W. F., Machine Tool Co., New York City
Duplex Machinery Co., 532 Leader News Bldg., Cleveland, O.
Duquesne Electric & Mfg. Co., Pittsburgh, Pa.
Factory Products Co., Pittsburgh, Pa.
Graves Machinery Exchange, New York City
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Harris Brothers Co., Chicago, Ill.
MacGovern & Co., Inc., New York City
Mitchell-Tappen Co., New York City
Mitshkun, M., Co., Detroit, Mich.
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National Products Co., East Liverpool, O.
New Jersey Machinery Exchange, Newark, N. J.
New York Machy. Exchange, New York City
Niles-Bement-Pond Co., 111 Broadway, New York City
Osborne, D. M., Machinery Co., Cleveland, O.
Pettler, P., & Son, Beaver Falls, Pa.
Potts, Henry, & Co., Philadelphia, Pa.
Power Equipment Co., Philadelphia, Pa.
Railway & Power Equipment Co., New York City
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Russell Machine Co., Pittsburgh, Pa.
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Milton Mfg. Co., Milton, Pa.
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Stevenson Co., The, Wellsville, O.

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American Steel Foundries, Chicago, Ill.
Carnegie Steel Co., Pittsburgh, Pa.
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Midvale Steel Co., Philadelphia, Pa.
Pittsburgh Iron & Steel Foundries Co.,
Pittsburgh, Pa.

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WHEELS (Steel Tired)
Midvale Steel Co., Philadelphia, Pa.

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Youngstown Sheet & Tube Co.,
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Page Steel & Wire Co., Adrian, Mich.

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American Steel & Wire Co., Chicago, Ill.
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WIRE GUARDS
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Macomber & Whyte Rope Co.,
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Roebling's, Sons Co., John A.,
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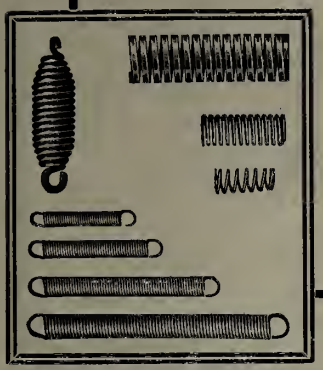
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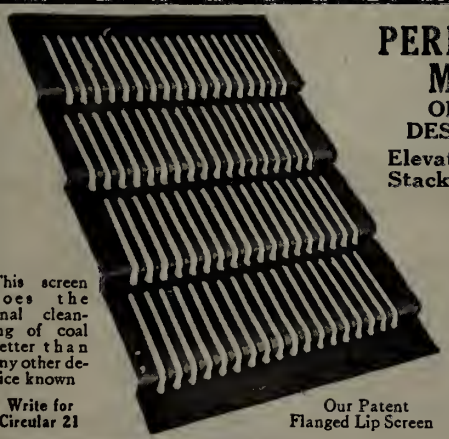
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Write for circular No. 2 and our liberal test proposition.

Clinton "Super-Heat" Cement
FIRE BRICK
Manufactured by
CLINTON METALLIC PAINT COMPANY
Factory Office, CLINTON, N. Y. New York Office, 101 PARK AVE.

For bonding and repairing fire clay or silica brick work, tile, retorts, crucibles, etc.

USE **HYTEMPITE** THE
(Reg. U. S. Pat. Off.)
High Temperature Fire Brick Cement.

Quigley Furnace Specialties Co.
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CYANIDE HARDENING COMPOUND

Why not try it?

A good substitute for Cyanide at a much lower price.

PARK CHEMICAL COMPANY
DETROIT - - - MICHIGAN

Employment

POSITIONS OFFERED
Minimum ad. set solid, 50 words $1.50
Minimum ad. all caps, 50 words $2.00

POSITIONS WANTED
Minimum ad. set solid, 25 words $0.50
Minimum ad. all caps, 25 words $0.75

Positions Offered

SALESMEN, WE MAKE AN UNIQUE and liberal offer to good men in any part of the country who can find customers for wire rope, engines and boilers, hoists and derricks, Locomotive and traveling cranes, machine tools, generating sets, etc., etc. Salesman to find bonafide customers and we to do the rest on a 50-50 split of the net profits. Two references required with first letter. Address Box 500, THE IRON TRADE REVIEW, New York.

COLD ROLLED STRIP STEEL
GENERAL FOREMAN

MAN CAPABLE OF TAKING ENTIRE CHARGE OF ALL DEPARTMENTS, PRODUCING BOTH QUALITY AND TONNAGE. GIVE FULL DETAILS OF PAST EXPERIENCE. ADDRESS BOX 549, THE IRON TRADE REVIEW, CLEVELAND, O.

THE BEST WAY TO GET A GOOD position in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

WANTED: — MAN FAMILIAR WITH High Grade Steel Specialties, with or without selling experience. State age, experience in detail; salary expected. Address Box 263, THE IRON TRADE REVIEW, Cleveland, O.

AA. WANTED, MAN UNDERSTANDing Tool and Alloyed Steels from actual shop experience, who wishes to enter either sales or office end of Steel distributing business. To receive attention state age, experience fully in confidence, salary expected. Address Box 457, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: MASTER MECHANIC — draft exempt—for sheet metal plant manufacturing articles from 10-gauge and lighter. Must have had experience along these lines together with knowledge of drawing and forming dies. Preference will be given to the man who can eventually fill a higher position. Address Box 532, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — THREE FIRST CLASS Rolling Mill Draftsmen. National Tube Co., Wheeling, W. Va.

WANTED: — MAN COMPETENT TO fill clerical position in Iron and Steel Warehouse. To receive attention give experience, age, and salary expected. Address Box 377, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — DRAFTSMAN, FAMILIAR with steel works construction. State experience and salary wanted. Address C. F. & I. Company, manager, Minnequa Works, Pueblo, Colo.

CHEMIST:—MAN TO WORK IN AND take charge of Laboratory. Permanent position for capable man. Apply National Malleable Castings Co., 7706 Platt Ave., Cleveland, O.

Positions Offered

BOOKKEEPER: — WOMAN HAVING ACCOUNTING AND STENOGRAPHIC EXPERIENCE IN IRON AND STEEL BUSINESS PREFERRED; STATE FULLY IN CONFIDENCE QUALIFICATIONS, EXPERIENCE, SALARY DESIRED. ADDRESS BOX 568, THE IRON TRADE REVIEW, Cleveland, O.

CHEMIST WANTED

To take charge of chemical laboratory in large factory using alloy and carbon steels.

Must be expert steel analylist and should be familiar with oil, coal, boiler water, etc. Location near New York City.

Give full particulars, strictly confidential.

Address
Chemist Box 810 Broad St.,
Newark, N. J.

CHEMIST

Wanted Chemist for blast furnace work. Address, giving experience and full particulars.

Detroit Furnace Co.,
foot of Meldrum Ave.,
Detroit, Mich.

CHECKERS AND DRAFTSMEN:—TENnessee Coal, Iron & Railroad Company requires men experienced in steel plant work. Apply giving education, experience, salary and reference to R. E. Brakeman, Chief Engineer, Fairfield Works, Birmingham, Ala.

For Employes

The weekly exchange where competent—wide-awake—industrious—men with initiative can find a wide market for the sale of their services.

621

Positions Offered

MECHANICAL DRAFTSMAN EXPEnienced on boiler installations desirable. Unusual opportunity for advancement. Cleveland location, Address Box 567, THE IRON TRADE REVIEW, Cleveland, O.

GENERAL ENGINEERING AGENCY, Jenkins Arcade, Pittsburgh, Pa. Solicits confidential records of Managers, Superintendents, Engineers, Mechanics and Draftsmen for our correspondence work among employers. Our Mr. Parker calls personally on executive heads at all points between New York and Chicago. Straight commission service, moderate. Established 1909. Salaried men $1000 to $10,000 yearly.

WANTED: — CHIEF ENGINEER OF long experience to take charge of the Power and Mechanical end of a large plant in St. Louis. A good and permanent position for a man of right qualifications. Address in confidence, giving age, experience, nationality, salary expected, etc. Address Box 570, THE IRON TRADE REVIEW, Cleveland, O.

WANTED—METALLURGIST, TO TAKE charge of physical and chemical investigation connected with the manufacture of high speed tools. Applicant must have had experience in directing similar work and must be equipped with knowledge that will produce results from the start. Works located in Chicago, and opportunity for good permanent position is especially promising. Address Box 557, THE IRON TRADE REVIEW, Cleveland, O.

TEN DRAFTSMEN WANTED. — AT once for permanent position with new steel plant just starting operation on Navy work. Only men having steel mill experience need apply. State full particulars, salary expected and availability. Address Chief Engineer, Erie Forge & Steel Co., Erie, Pa.

WANTED: — EXPERIENCED CORERoom Foreman for Malleable Foundry located in Middle West. State experience and salary wanted. Address Box 566, THE IRON TRADE REVIEW, Cleveland, O.

WANTED SEVERAL

DRAFTSMEN AND CHECKERS

not subject to military duty with general steel plant experience. State salary, education, experience and birthplace in first letter.

Address Box 571,

THE IRON TRADE REVIEW,

Cleveland, O.

WANTED—MECHANICAL DRAFTSMEN, CHECKERS, DETAILERS, TRACERS. REPLY, STATING EDUCATION AND EXPERIENCE IN DETAIL, AGE, PRESENT EMPLOYER, SALARY EXPECTED, WHEN AVAILABLE, AND RELATION TO DRAFT. UNITED STATES STEEL CORPORATION, ORDNANCE DEPT., AMBRIDGE, PA.

Positions Offered

WANTED: — SALESMAN, WHO IS thoroughly conversant with iron and steel products, for work in central west. Reply fully. Full confidence given. Address Box 551, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — SALESMAN WHO IS CALLING ON AEROPLANE MANUFACTURERS, MUNITIONS AND SHIPBUILDING PLANTS. WE MAKE A TRADE NAME SOLDERING APPLIANCE WHICH IS A NECESSITY, AND IS EASILY SOLD. WE PAY A LIBERAL COMMISSION. ADDRESS BOX 564, THE IRON TRADE REVIEW, 90 WEST ST., NEW YORK.

WANTED: EXPERIENCED MAN WHO is thoroughly acquainted with figuring weights, and extras over base prices on plate, angles, flats, rounds, etc. for ship yard use. This man must also be familiar with the keeping of steel store ledgers. A reasonable salary will be paid for this position. If you are not experienced with this kind of work do not waste your time in answering this advertisement. APPLY TO: A. L. Oertel, Pur. Agent, Groton Iron Works, Groton, Conn.

Positions Wanted

MAN FAMILIAR WITH IRON AND steel business, as manager and selling agent for 25 years, desires responsible position. Highest references. Address Box 556, THE IRON TRADE REVIEW, Cleveland, O.

PORCELAIN ENAMELING. A MAN OF WIDE EXPERIENCE WANTS A JOB TO BUILD OR OPERATE A PLANT. ADDRESS BOX 390, THE IRON TRADE REVIEW, CLEVELAND, O.

Positions Wanted

GENERAL MANAGER — SALES MANAger. Young man at present general manager of well known company will consider a change. Experienced executive with well grounded manufacturing and sales experience. Technically trained and capable of handling complete organization. Will consider management of sales department or important branch office. Location in Pittsburgh District or Ohio preferred. Address Box 559, THE IRON TRADE REVIEW, Cleveland, O.

WELL TRAINED EXECUTIVE NOW IN charge of large manufacturing plant desirous of bettering himself seeks change. Age 38. Twenty-two years experience in office, selling, buying and factory work with progressive firms manufacturing Brass and Iron products. Has ability to manage by up to date and sensible methods. Address Box 553, THE IRON TRADE REVIEW, Cleveland, O.

MANAGER OR GENERAL SUPERINtendent of steel foundry. Services of a very valuable man can be had at this time due to his disposing of his interests as a partner. A thoroughly practical and trained executive. Wishes to correspond with any firm who is looking for such a man and willing to offer favorable inducements. Address Box 537, THE IRON TRADE REVIEW, Cleveland, O.

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WORKS MANAGER OR GEN. SUPT. 22 years experience, machine tools, ordnance, hydraulic machinery, gas engines, etc., covering machine shop, foundry, smith shop, boiler shop, drawing room. 16 years in executive positions both in design and production. Address Box 572, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

PURCHASING AGENT, YOUNG MAN (32) of wide practical experience in buying and handling factory supplies and raw materials in steel line (14 years), desires to change connection. Experience is supplemented by executive qualifications. Address Box 563, THE IRON TRADE REVIEW, Cleveland, O.

BY-PRODUCT COKE OVEN OPERATOR, TECHNICALLY TRAINED, THOROUGHLY EXPERIENCED IN ALL BRANCHES OF THE BUSINESS. DESIRES POSITION AS SUPERINTENDENT IN A NEW PLANT. BEST OF REFERENCES. ADDRESS BOX 562, THE IRON TRADE REVIEW, CLEVELAND, O.

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ACCOUNTANT (32) EXPERIENCED IN Corporation Accounting, Iron and Steel costs and Cashiering desires executive position offering opportunity for advancement. Address capable. Address Box 515, THE IRON TRADE REVIEW, Cleveland, O.

STRUCTURAL ENGINEER, M. AM. SOC. C. E., fourteen years experience in design and construction, open for engagement. Cleveland or vicinity preferred. Address Box 555, THE IRON TRADE REVIEW, Cleveland, O.

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Opportunities Department
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Cleveland

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Galvanized Sheets

Limited amount of Galvanized Flat Sheets in odd sizes running in gauge from 20 to 30. Government prices. In inquiries state range of sizes can use.

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Write Chamber of Commerce for complete data.

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DEPENDABLE sources of supply permit us to offer quantity shipments of Light Steel Rails and accessories for both domestic and export markets.

The unusually heavy demand for light rails and accessories, both here and abroad, has caused us to give this line special attention, with the result that our resources have been considerably extended.

Owing to the unprecedented call for these products, however, it is advisable to act promptly.

Tell us what you need and we will quote you at once.

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LIBERTY STEEL PRODUCTS CO-INC

Woolworth Bldg.
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Large Manufacturing Plant
Mahoning District of Eastern Ohio

Consisting of Machine and Pattern Shop, Grey Iron Foundry and Woodworking Plant. An established concern, manufacturing steam and gas engines, woodworking and special machines. Now finishing contract building special boring lathes for Government. Physical Valuation approximately $350,000.00.

Subsidiary Plant, owned by same stockholders, producing boilers and special plate work. Worth about $[illegible],000.00. Could be sold with above plant but not separately. Satisfactory terms. Possession immediately.

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Single rope installation.
Storage 1000 tons per 100 feet.



One man operator. Handles all sizes of coal up to 60 tons per hour. Can be erected and operated at any angle from railroad switch.

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Good Shipping Facilities. Location in Southern Michigan.

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200 miles of 8" 29-⅓ lbs. wrought iron pipe with collars and threads in excellent condition.

Also handle all sizes pipe and casing.

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60x80—nearly new—considerable Machinery—3 acres land, Electric Power—water, R. R. Switch—Cheap.

Inquire of
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FIRST CLASS MACHINE SHOP

Equipped for all kind of heavy and light repair work or manufacturing.
Overhead crane 20' bridge 75 runways,
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Fire proof building.
Located on railroad and traction line; 150' railroad frontage.

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Large Stock
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¼" 5/16" 3/8" ½" 5/8" 7/16" 11/16" ¾" 7/8" 1" 1⅛" 1¼" 1½".
Most Plate over 60" wide and over 15' long.
Also Light Rails 25# 30# 40#

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Material Sold Plain or Fabricated.

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you may need in the iron and steel field can be obtained by putting a classified ad in

THE IRON TRADE REVIEW
630

New Steel Buildings For Immediate Delivery

On account of revised plans we offer for sale the following steel buildigs which are in our Works but have never been erected

1—Building 48-3/8" wide, 145' long, 69'7" to bottom chord of truss weight of steel 597,551 l This building is especia designed for heat treating ant and is of very heavy coruction. It has crane ruays and can be sold with without 30 ton Shaw cra having five ton auxiliary ist, especially made w fast lowering speeds for tical quenching. Weight of ane 104,000 lbs. —voltage0 D. C., total lift 75 ft.

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Fourteen basic open steel ingots 19" x 21", approximately " long.
Three basic open heartingots 20" x 20", approximately 6-ft.
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Carbon range from .1

If interested, qte f.o.b. cars, Marion, C

The Marion Stohovel Co.
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1,500 pieces	- -	18" x 9" x ¼" Flat
1,050 "	- -	18" x 8" x ¼" Flat
5,600 ft.	- -	4" x ⅜ Flat"
1,820 "	- -	14" x ⅛" Flat
4,000 "	- -	12" x ⅛" Flat
4,000 "	- -	6½" x 3/16" Flat
5,600 "	- -	4" x ⅝" Flat
30,000 "	- -	2½" x 5/16" Flat
1,400 "	- -	25" x ¼" Flat
5,600 "	- -	2½" x ¼" Flat
2,100 "	- -	24" x ¼" Flat

STERLING IRON & STEEL CO.
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Small stove and jobbing foundry with railroad siding is offered at $10,000. The establishment is complete in every respect and included is a large number of patterns for stoves for which there is a big demand. If interested, address

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115 tons of Special Steel, similar to moulding, 10 to 16 ft. lengths, in original cases. Same could be used for reinforce work. Price 3c per lb., f. o. b. cars, New York.

ALSO

150 tons of annealed and cleaned, lime coated, .445 Open Hearth Rivet Wire in coils of approximately 250 lbs. each

AND

50 tons of Cold Rolled Strip Steel, 6 and 8 ft. lengths. Lists and prices upon application.

All of the above material can be inspected, and is offered subject to prior sale.

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24" x 20' Reed.
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2" x 24" Jones & Lamson Geared Head.
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4" Bar Niles Boring and Drilling Machine.
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36" x 36" x 8' Gray Two Heads.
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New Demco Roller Bearing Bushed.
" New Kokomo Hi-Speed Roller Bearing Bushed, cap. ⅞" in Steel.
" New Kokomo Hi-Speed Roller Bearing Bushed, cap. ⅞" in Steel.
" Four Spindle New Kokomo Hi-Speed Roller Bearing Bushed, ap. ⅞" in Steel.
" New Superior W. & L.
" New Champion B.G. P.F.
" New Superior B.G. P.F.
" New Superior B.G. P.F.
" New Weigel Tapping Attachment.
" G. & E. Sliding Head with compound table.
" New Superior Sliding Head.
" Rockford Heavy Duty.

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0-lb. Sellers Steam.
0-lb. Little Giant Belt. New.
0-lb. Little Giant Belt. New.
-lb. Beaudry Belt.
-lb. Little Giant Belt. New.
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" Throat Industrial Double End Geared Punch.
. 2 Stiles Press.
—No. 1 Stiles Presses.
—No. 130 New Max Ams Inclinable Presses.
—No. 126 A. New Max Ams Inclinable Presses.
—Pels Hand Bar Shears ¾" cap.
ls Hand Punch cap. ½ thru "$\frac{5}{16}$.
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" x 16" New Peerless High Speed.
x 9" New Peerless High Speed.
x 6" New Peerless High Speed.
pen Lucas Circular Saw.

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1—21 x 36 x 16 LeBlonde heavy duty, quick change, double back geared, (new).
1—26 x 14 Shumaker & Boye quick change, (new).
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1—26 x 14 Fitchburg, complete.
1—90 x 20 Face plate drive massive pattern, Pond, complete.

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1—No. 34 Ohio Universal, (new) feeds 34 x 12 x 19.
1—No. 4 LeBlonde Universal, (new).
1—No. 2 Kempsmith Universal (new).
1—No. 1½ Valley City Universal (new).
1—No. 1 Kempsmith Universal, (new).
1—No. 1 Cincinnati Universal with vertical head, (new).
1—No. 1 Cincinnati plain, (new).
1—No. 2 Kempsmith plain, (new).
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1—No. 4-B Becker vertical with rotary table, (new).
1—No. 5 Becker vertical with rotary table, complete.
1—No. 5-C Vertical Becker with rotary table, (new) 54" Longitudinal range.
1—Slab Miller, Becker-Brainard, working of table between pockets 84 x 20 42" between housings, as good as new.

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1—Newton-Duplex horizontal, 2½" bar.
1—Binssee horizontal 2½" bar.
1—No. 0 Fosdick horizontal, 3⅛" bar.
1—24" Bullard vertical with turret and side head.
1—37" Bertram vertical, one turret head, (new).
1—84" Bickford vertical, two heads equipped with 20 H.P. D.C. motor complete.

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1—10 x 72 Brown & Sharpe, plain.
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1—No. 5 Duplex internal and external, complete.
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1—26 x 26 x 7 Pond heavy duty, single head.
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1—36 x 36 x 10 Woodward & Powell, (new).

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1—No. 2 National Acme, four spindle.
2—4¼" Gridley, complete.
1—⅝" Cleveland single spindle, (new).
1—¾" Cleveland, single spindle, complete.

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1—3' Morris, plain, (new).
1—3½' Cincinnati-Bickford, single pulley drive, tapping attachment.
1—4' Prentiss, single pulley drive, plain.
1—5' Prentiss plain, complete.
1—6' Prentiss, single pulley drive, tapping attachment complete, (new).

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1—2 x 24 J. & L. cone drive, bar equipment.
1—2 x 24 J. & L. geared head, bar equipment.
1—2½ x 26 Pratt & Whitney, flat, geared head, chuck equipment.

CRANE

1—5-ton Locomotive standard gauge.

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2—14" Nutter & Barnes cold saws.
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1—3½C Bliss Toggle Press, practically new.
1—No. 5 Langelier swaging machines.
1—1600-lbs. Model D Billings & Spencer board drop hammer, (new).
1—2000-lbs. Bliss board drop hammer, complete.

Machinery Guaranteed. **can make immediate delivery on above.**
"We have in our warehouse for immediate delivebout 500 modern machine tools. Are always equipped to fill any demand. Aachines guaranteed. *Try us"*

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NEW YORK'S GREATEST STOCK

(PARTIAL LIST)

CRANE

10-TON READING ELECTRIC TRAVELING CRANE, 52 FT. SPAN, 3 MOTORS, D.C., 220 VOLTS, CAGE OPERATED.

PUNCHES and SHEARS BENDING ROLLS

KLING BROS. ROTARY SPLITTING SHEAR, CAPACITY ¾" PLATE ANY WIDTH; motor driven.

Hilles & Jones double end Punch and Shear, 20" throats, capacity 1" in 1", shear 6" x ¾" flats.

Class "E" Queen City single end Punch and Shear, 25" throat, architectural jaw, punch 6" in ½", shear 1" x 6" flats, variable punch holder for one or two punches; weight 16,000 lbs.; good as new.

Farrel single end Punch and Shear, 12" throat, punch 1" in ⅞", shear 8" x ¾" flat, 1½" round, weight about 10,000 lbs.

No. 1 Long & Allstatter Plate Punch, 13" throat, punch 1½" in 1"; spacing table 27' long having automatic feed with quick return.

Columbus single end Punch, 24" throat, punch ¾" in ¾".

Reade single end Punch and Shear, 19" throat, punch ½" in ½".

Wais & Roos PLATE BENDING ROLLS, 12'5" BETWEEN HOUSINGS, ⅝" capacity.

Bertsch Plate Bending Rolls, 10'6½" between housings, about 1" capacity.

Plate Bending Rolls, 5'8" between housings.

Hand Boiler Plate Bending Rolls, 6'2½" between housings, capacity ½" plate.

PLANERS--SHAPERS

55" x 46" x 15' Lincoln four head Stone Planer.
48" x 48" x 13' 5" Betts Planer.
44" x 44" x 14' Fitchburg two head Planer.
32" x 32" x 10' Niles two head Planer.
30" x 30" x 8' Cleveland open-side Planer.
30" x 30" x 8' New Haven Planer.
Two 24" Morton Draw Cut Shapers.
Six NEW 24" HOLLINGWORTH TRIPLE GEARED CRANK SHAPERS; immediate delivery from stock.
New 18" Hollingworth back geared Crank Shaper.

BORING MILLS

10 FT. BETTS HEAVY VERTICAL TWO HEADS. IMMEDIATE DELIVERY.

4" Bridgeport Vertical, two heads.
3" Niles Vertical, two heads.
3" Colburn Vertical, one head.
N. 0 Fosdick Horizontal Boring, Drilling and Milling, 3" bar.
N. 1 Beaman & Smith Horizontal Boring, Drilling and tapping, 3" bar.
Beaman & Smith Horizontal Boring and Drilling, 3" bar.
Nes Car Wheel Boring, takes 36" wheel, table 48" diameter; swinging derrick attached to machine.

MILLING MACHINES

x 36" x 12' INGERSOLL HEAVY DUTY HORIZONTAL SLAB, ADJUSTABLE RAIL, WEIGHT 42,000 LBS.
x 24" x 8' Newton Slab with vertical and horizontal spindles adjustable rail.
ersoll Slab, 23" between housings, table 20" x 60".
2 Milwaukee Universal.
6 Fox Plain.

ENGINE LATHES

x 20' Pond Turning or Boring Lathe, face plate drive.
x 16' Putnam, face plate drive.
x 18' 10" Fitchburg Turning, double back geared, face plate drive, powerful machine.
Niles Tool Works Pulley Lathe.
x 26' Putnam, raised to 72", face plate drive, 18' centers.
x 15' New Haven.
x 16' Niles Tire or Car Wheel Lathe, double head type, face plate drive, triple geared.
x 19' Putnam, heavy duty, raised to 54", triple geared, face plate drive, taper attachment.
x 26' Pond Machine Tool Co., face plate drive, 18' 6" centers.
x 20' Pond Machine Tool Co., face plate drive, 13' centers.
x 16' New Haven, 2⅜" hollow spindle 10'8" centers, taper attachment.
x 16' Niles, 9' 11" between centers.
x 16' Fay & Scott, 2 1/16" hollow spindle, 10'9" centers.
nd 48" x 18' McCabe 2 spindle raised to 38" and 60", face plate drive, 2⅛" hollow spindle; just like new.
x 14' Putnam, 9' 1" centers.
x 14' Pond, 9' 2" between centers.
x 14' Lodge-Shipley quick change, gear, d.b.g., 2¼" hollow spindle, motor driven.
18" x 8' Hollingworth quick change and loose change.

NEW YORK MACHERY EXCHANGE

50 CHURCH STREET **NEW YORK CITY**

Machine Shops and Wouses: Jersey City
220-236 Culver Avenue 63-83 Pollock Avenue

"RELIABUILT"

ONE PROFIT—QUICK DELIVERY—AS REPRESENTED
WATCH THIS PAGE

Millers

1—New No. 3 Becker Universal Milling Machine.
11—New No. 1½ American Plain Milling Machines
2—New No. 2 Garvin Universal Milling Machines.
1—New No. 1 Kempsmith Milling Machine.
2—Used No. 3 Garvin Hand Miller.
1—Used 3½ Van Norman Duplex Miller.
1—Used No. 15 Garvin Plain Miller.

Planers

5—New 48″ x 48″ x 14′ Planers, 4 heads, very heavy
1—Used 38″ x 38″ x 12′6″ Reliabuilt, 3 heads.
1—Used 52 x 74 x 52 x 24′ Betts, two heads.
2—Used 25 x 25 x 6′ Sellers.
1—Used 74 x 52 x 14′ Reliabuilt, two heads.
1—Used 54 x 44 x 13′6 Reliabuilt, two heads on ra one side head.
1—Used 38 x 38 x 8′6 Reliabuilt Planer, two heads.
1—Used 54 x 50 x 12′6 Reliabuilt, two side heads, tv rail heads.
1—Used 66 x 52 x 13′ 6 Reliabuilt, two heads.
1—Used 78 x 52 x 14′ Reliabuilt, two heads.
1—Used 52 x 48 x 10′ Pond Planer, one head.

Drills

1—New 4′ Dresses Plain Radial Drill.
1—New 3½′ Canedy-Otto Radial No. 51.
1—New 3½′ Canedy-Otto Radial No. 101.
1—New No. 17 Foote-Burt 4 spindle Gang Drill.
1—New No. 15 Harrington 4 spindle Gang Drill.
1—Used 8′ Warren Semi-Universal Radial.
1—Used 5′6 Niles Radial, motor drive, D.C. Motor
1—Used 3′ Reed-Prentice Plain Radial, single pulle tapping attach.
1—Used 24″ Prentice, sliding head.
1—Used 24″ Aurora Sliding Head.
1—Used 3 spindle Burnham Sensitive.
1—Used No. 13 Pratt-Whitney Multiple Spindle Dril
1—Used Rockford Six Spindle Mfg. Type Drill.

Lathes

1—New 14 x 6 Filsmith Lathe.
1—New 15 x 6′ Sidney Tool Room Lathe.
5—New 25″ Sidney Heavy Duty Lathes, 16′ to 24′.
1—Used 14 x 8′ Perkins Lathe.
1—Used 18 x 6′ Blaisdell Lathe, raised to 24″.
1—Used 20 x 8′ Pond Lathe.
1—Used 24 x 10′ Harrington Lathe.
1—Used 28 x 8′ Pond Lathe.
2—Used 2½ x 36″ Lodge-Shipley Marvel Lathes Geared Head.
1—Used 30 x 10′ Harrington Lathe.
1—Used 30 x 10′ Pond Lathe.
1—Used 30 x 14′ Pond Lathe.
1—Used 34 x 10′ Pond Lathe, raised to 48″.
1—Used 38 x 16′ D. W. Pond Lathe.
1—Used Large Pitt Lathe, 9′ face plate.
1—Used 14 x 5 Putnam.

Grinders

11—New Premier Tool and Cutter Grinders.
1—New 18″ Hoysradt-Case Disc Grinder.
1—New No. 1 Wilmarth & Morman Surface Grinder.
1—New Dumore Electric Grinder.
1—Used No. 2 Walker Universal Grinder.
1—Used No. 5 Brown & Sharpe Universal Grinder.
1—Used 16 x 36 Bridgeport Plain Grinder.
1—Used No. 2 Putnam Tool and Cutter Grinder.
1—Used 12″ x 72″ Landis, Plain.

Automatics

3—Used 2″ Cleveland Model A Automatics.
1—Used 2¼″ Cleveland Automatic.
1—Used 2¼″ Gridley Single Spindle Automatic.
1—Used No. 0 Brown & Sharpe Automatic.

Boring Mills

1—New No. 1 Cleveland Horizontal Boring Mill.
1—New No. 0 Giddings & Lewis Horizontal Boring Mill.
1—Used Bement Horizontal Boring Mill, knee type, 2½″.
1—Used 7′ Bickford Vertical Boring Mill, motor drive.

Shapers and Screw Machines

1—Used 20″ Smith-Mills Back Geared Shaper.
5—Used No. 32½ Garvin Turret Lathes, wire feed, friction head, back geared, power feed to turret, 2⅛″ capacity.
20—Used 20″ 8′ Rolsted Turret Lathes.
1—Used 20″ x 6′ Perkins Turret Lathe.
1—Used 20″ x 8′ Bridgeport Turret Lathe.

Miscellaneous

1—Used 10-Ton Bedford Crane, two motor type 40′ span.
1—Used 42″ Niles Car Wheel Borer.
18—New Simmons Universal Dividing Heads.

GUARANTEED EXACTLY AS RESENTED OR MONEY RETURNED
NO QUESNS ASKED

100 Otherols in Stock

SIMMONS MACHINE CO.

OFFICE AND WARIUSE, ALBANY, N. Y.

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801-802 SINGER BLDG. NEW YORK
316 RIALTO BLDG. SAN FRANCISCO
04 DIME BANK BLDG. DETROIT
358 ELLICOTT SQUARE BUFFALO

BIGGEST AND BEST
WATCH FOR "GRAVES'" SPECIALS

96″ BETTS VERTICAL BORING MILL, heavy duty, motor driven, modern, excellent condition.
96″ BICKFORD VERTICAL BORING MILL, modern, excellent condition, belt driven.
84″ SELLERS VERTICAL BORING MILL, heavy type, excellent condition.

PUNCHES and SHEARS

PELS COMBINATION, double end, punch and shear (armour plate steel frame) three operations.
PELS COPING MACHINE (armour plate steel frame).
JOHN F. ALLEN PNUEMATIC BULL RIVETER, 24″ gap, latest type.
JOHN F. ALLEN PNEUMATIC BULL RIVETER, 10″ gap, latest type.
CLEVELAND SINGLE END COMBINATION PUNCH and SHEAR, 24″ gap, type E.F., weighs 13,500 lbs.
CLEVELAND PUNCH, 18″ gap.

ROLLS

BEMENT & SON BOILER PLATE ROLLS, extra heavy, 10′ between housings, 12″ rolls.
STEEL ROLLING MILL, 14″ between housings, 12″ rolls, direct motor drive.
HILLES & JONES BOILER PLATE ROLLS, 9′ heavy type, drop end housings.
Two (2) TOLEDO, 12″ between housings.
TOLEDO, 14″ between housings
TOLEDO, 44″ between housings.
BLISS, 14″ between housings.
BLISS, 30″ between housings.
Two (2) BLISS, 40″ between housings.

RADIAL DRILLS

6′ BICKFORD, plain, single pulley drive.
6′ BAUSH, tapping attachment, belt driven.
4′ BICKFORD, arranged for motor drive.
3½′ NILES, semi-universal.

SLOTTER

10″ PUTNAM, rotary table, good as new.

GEAR CUTTERS

48″ GOULD & EBERHARDT, single pulley drive, excellent condition.
Two (2) 24″ FELLOWS, gear shapers.

SHAPERS

20″ GOULD & EBERHARDT, back geared, crank, nearly new.
28″ SMITH & MILLS, back geared, etc.

STEAM HAMMERS

30# BLISS, board drop hammer.
1[illegible]. MORGAN, double frame.
1[illegible]. MORGAN, single frame.

MILLING MACHINES

Two (3) No. 3 HENDY PLAIN MILLERS.
One (1) No. 2 HENDY, plain.
No. CINCINNATI PLAIN.
No. CINCINNATI UNIVERSAL.

VERTICAL MILLING MACHINES

Two (2) NEWTON, heavy duty, heavy cutter heads, 36″ dia.

Write for Stock List

GRAVES MACHINERY EXCHANGE

WAREHOUSE and R. R. SIDINGS: Johnson Ave. and Monitor St., Jersey City, N. J.
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OFFICES: Suite 482, 50 Church St., New York City, N. Y.

D. M. OSBORNE MACHINERY CO.

Office and Salesroom

221 St. Clair Ave. N.E. **CLEVELAND, OHIO**

1—102″ x 32′ Triple Geared Engine Lathe, 21′ centers, screw cutting. Immediate delivery.
1—24″ x 14′ Schumacher & Boye Engine Lathe, QCG, Taper attachment. GUARANTEED Equal to New.
1—48″ x 48″ x 12′ NILES Planer, 2 heads on rail.
1—22″ x 22″ x 4′ 6″ NEWTON Slab Miller with Horizontal Arbor.
1—26″ x 26″ x 6′ INGERSOLL Slab Miller with Horizontal Arbor.
1—No. 5 BECKER BRAINARD Vertical Milling Machine, arranged for motor drive.
1—No. 6 MORTON Keyseater, Cap. 24″ x 2″ with bars and cutters.
1—No. 3 MITTS & MERRIL Keyseater, Cap. 16″ x 2″ with bars and cutters.

26″ MORTON Draw Stroke SHAPER, arranged for motor drive.
ESPEN-LUCAS Double Spindle Horizontal Boring and Drilling Machine, 6″ diam. bars. Bars adjustable as close as 24″. Maximum 50″. Very heavy and powerful.
FARREL, Floor Type Horizontal Boring & Drilling Machine, 4″ diam. bar, Vertical movement of head 4′, horizontal movement of head 5′. Belt drive.
25″ WEIGEL Drill Press, sliding head, NEW.
4″ CLEVELAND Automatic Worm Milling Machine.
4½″ x 30″ BARDONS & OLIVER Heavy Turret Lathe, geared head, Automatic Chuck, bar feed. Like new. Motor driven.

We have other good used machines in stock. Let us have your requirements by mail, wire, telephone or a personal visit to our new salesroom.

MACHINES WE OWN—FOR IMMEDIATE DELIVERY

6—NEW Cleveland, 2 spindle high speed, ball bearing Sensitive drills.
2—NEW Cleveland, 4 spindle high speed, ball bearing Sensitive drills.
4—NEW No. 5-20″ Buffalo Stationary Head, back geared drills.
1—NEW 21″ Cleveland Upright Back geared, power feed drill.
3—NEW Cleveland 25″ Sliding head, back geared, power feed drills.
1—NEW 28″ Cleveland high speed upright drill, with taping attachment.
1—NEW 32″ Cleveland, upright sliding head.
24—NEW 20th Century Filing Machines.
1—NEW Cleveland Profile Grinder, motor driven.
4—NEW Greenfield Universal Tool and Cutter Grinders.
2—NEW No. 190 Wells Universal Tool and Cutter Grinders.
1—No. 60 Heald Cylinder Grinder.
4—NEW No. 1 LaSalle Plain and Surface Grinders, micrometer adjustment.
1—USED 36″ Fellows Gear Shaper.
1—USED No. 2 Knowles Keyseater.
2—NEW 12″ x 5′ Cleveland Toolroom Precision Lathes, complete equipment.
3—NEW 16″ x 6′ Cleveland Toolroom Lathes, complete equipment.
2—NEW 16″ x 6′ Cleveland quick change Engine Lathes, regular equipment.
1—NEW 17″ x 8′ National quick change Engine Lathe.
1—USED 24″ Libby Turret Lathe.
1—NEW No. 2 Garvin Universal Milling Machine.
1—USED No. 5 Cincinnati Plain Milling Machine, quick change feeds, in A-1 condition.
1—NEW No. 2 Marvel Draw Cut Hack Saw with swivel vise.
1—NEW No. 1 Chicago Automatic.
1—NEW Grand Rapids Universal Tool and Cutter Grinder.
1—USED 6′ Bickford Radial Drill, gear box drive, very good condition.
1—NEW No. 2 Garvin Universal Milling Machine.
1—NEW No. 2½ Rockford Universal Milling Machine.
4—NEW Adams Farwell No. 1, Gear Hobbers.
1—USED 1¾″ Gridley multiple spindle automatic, arranged for motor drive, but without motor.
1—USED No. 2 LeBlond Universal Milling Machine, Fine condition
1—NEW 20″ Canedy-Otto Drill Press.
2—NEW Cleveland Single Spindle Sensitive Drills.
4—NEW Cleveland three Spindle Sensitive Drills.
1—24″ x 24″ x 5′ Morse Planer, one head.
1—16″ Smith & Mills Crank Shaper.
1—No. 13 Garvin Plain Miller.
1—No. 6 Becker-Lincoln Type Miller.
1—No. 1½ Cincinnati Universal Miller.
1—No. 1½ Landis Internal Grinder.
1—16″ x 8′ Lodge & Shipley patent head Engine Lathe, including Universal Chuck.
1—24″ x 12″ Schumacher & Boye Engine Lathe.
1—3½″ x 84″ Fitchburg lo-swing Lathe, all geared heads, single pulley drive, quick change feed.

PARTIAL LIST OF MACHIES LISTED WITH US FOR SALE

BORING MACHINES—VERTICAL.

1—NEW Bullard, 24″ New Era, with 4 jaw chuck.
1—34″ Gisholt, turret head.
1—38″ Bausch & Harris, 2 swivel heads.
1—40″ King, 2 swivel heads.
1—42″ Bullard, 2 swivel heads, quick change feed.
1—60″ Bickford, 2 swivel heads.
1—64″ Rogers, 2 swivel heads, single pulley drive.
1—8′ Bickford, 2 swivel heads, equal to new.
1—96″ Vertical cylinder boring machine. Good as new.
1—10′ Niles, 2 swivel heads.
1—NEW 14′ Niles pattern two swivel heads.

BORING MACHINES—HORIZONTAL.

1—NEW Cleveland 2½″ bar.
1—No. 2 Rockford, with special large table, Good as new.
1—No. 3 Lucas, Very fine condition.
1—Detrich & Harve, floor type, all geared feeds, univeral table 3½″ bar.
1—Niles knee type, all geared feeds.

BULLDOZERS.

1—No. 2 Wms. & White 16″ stroke.
1—No. 5 Wms. & White 13″ stroke.
1—No. 23 Wms. & White Belt driven.
1—Wms. & White 18″ stroke.
1—No. 137 Ajax Bulldozer.
1—No. 29-U Wms. & White, weight about 100,000 lbs.

CRANES—TRAVELING.

1—10-Ton Whiting, 37′, 3″ span, 2 motors.
1—NEW 10-Ton, 3 motor type case, 40′ span, 220 volt D.C.
1—20-Ton Niles, 75′ span.
1—25-Ton Case, 28′ span.
1—Single leg, 4 motor Gantry Crane.

CRANES—LOCOMOTIVE.

1—15-Ton McMyler, 8 wheel, 42′ boom.
1—20-Ton Brown Hoist, 8 wheel, 40′ boom bucket.

DRILLING MACHINES—RADIAL

2—NEW 3½′ Morris, single pulley drive.
1—NEW 3½′ Cincinnati Bickford, single pulley drive, Immediate delivery.
3—NEW 4′ Gang single pulley drive.
1—4′ Cincinnati Bickford Plain, all gear drive.
1—NEW 5′ Dresses Plain, July delivery.
1—5′ Bickford Plain, arranged for variable speed motor.
1—5′ American Full Universal, gear box drive.
1—6′ Bickford, motor driven 7½ H.P. 220 volt D.C. motor.
5—6′ Reed Prentice, heavy duty hall bearing.
1—No. 10 Prentice, 7′ arm, Universal table, motor driven.

DRILLING MACHINES—HEAVY DUTY.

10—Moline Hole Hogs, heavy duty, 2½″ capacity.
18—No. 310 Baker.
1—No. 23 Foote-Burt.
1—No. 24 Foote-Burt.

DRILLING MACHINES—SLIDING HEAD

1—26″ Barnes Sliding head Gang Drill, with 4 spindles, weight about 6000 lbs.
1—NEW 28″ Sibley.
1—32″ Cincinnati Bickford.
2—34″ Barnes.

GEAR CUTING MACHINES.

4—NEW No. 1 Ada Farwell Gear Hobber.
1—No. 2-A Newark x 8″ capacity.
1—15″ Gleason Bevtear Generator.
1—36″ Fellows Gearaper.
1—No. 4 Brown & Sbe, capacity 48″ latest type, equal to new.
1—NEW 4-A Cincin capacity 48″ x 12″.
1—NEW No. 5 Leesadner Gear Generator, 14″ swing, full universal.
1—NEW 36″ Gossmatic Gear Hobber, Immediate delivery.
1—NEW 40″ Flathear Cutter, Immediate delivery.

GRINDERS—LINDRICAL—PLAIN.

2—NEW Modern 8, self-contained.
2—NEW 12 x 24 Mn, self-contained.
4—NEW Modern, sontained, capacity 12″ x 48″.
1—12″ x 48″ Queen
1—14″ x 66″ Landis.
1—No. 21 Landis, city 10 x 30.

GRINDERS—CYDRICAL—UNIVERSAL.

1—NEW No. 1—10″ Webster & Perks.
1—NEW No. 3 Moccapacity 13″ x 40″.
1—NEW Landis Noapacity 12″ x 42″.
1—No. 5 Brown & Sr, capacity 22″ x 72″.

GRINS—INTERNAL.

1—No. 2½ Bath Du
1—NEW No. 70 Hemmediate delivery.
1—No. 70 Heald, Vood condition.

GRINS—SURFACE.

2—Walker, single stGood as new.
1—NEW No. 1 Wilt & Morman.
1—NEW No. 3 Wilnx Morman, Immediate delivery
2—3′ Pratt & Whitntical.
1—Blanchard, 16″ w14″ magnetic chuck.

HAMS—POWER.

1—NEW Wms. & W0-lb. Yeakley.
2—NEW Wms. & W50-lb. Yeakley.
2—800-lb. Bliss, boap.
1—1200-lb. Billings Ecer, board drop.
1—1500-lb. Lennox.

HAMS—STEAM.

1—700-lb. Bement siame.
1—1100-lb. Pittsburgle frame.
1—NEW 1100-lb. Msingle frame.
1—NEW 2000-lh. Msingle frame.
1—3000-lb. Morgan, frame.
1—NEW 6500-lb. M.
1—7000-lb. Morgan.

KATERS.

1—No. 1 Baker.
1—No. 2 Little Giantroke.
1—No. 5 Colburn, 4s.

LATHES—ENGINE.

10—NEW 16 x 8 Cincinnati, quick change, double back, Engine Lathes, immediate delivery.
1—18″ x 8′ Lodge & Shipley, quick change, Good as new
1—24″ x 16′ Lodge & Shipley.
1—30″ x 28′ Flather, double back geared, quick change.
1—NEW 32″ x 18′ Bidgeford.
1—32″ x 24′ Fay & Scott.
1—42″ x 20′ New Haven, triple geared, face plate drive.
1—51″ x 18′ Fifield, triple geared, face plate drive.
1—60″ x 28′ New Haven, triple geared, fine condition.
1—NEW 60″ x 30′ Fifiled, triple geared, immediate deliv.
1—90″ x 20′ Pond, face plate drive.

LATHES—TURRET.

2—21″ Gisholt, 18″ Chuck, quick traverse, taper attachment.
2—2 x 24 Jones & Lamson.
1—3 x 36 Jones & Lamson, single pulley drive.
18—6-A Potter & Johnson.
1—3-A Warner & Swasey hollow hexagon, bar and chucking equipment.

MILLING MACHINES—KNEE TYPE—UNIVERSAL.

1—NEW No. 1 Cincinnati.
1—No. 2 Milwaukee, all geared head, single pulley drive, As good as new.
1—NEW No. 2 Kempsmith.
2—NEW No. 3 Kempsmith.
1—NEW No. 3-A Garvin.
1—NEW No. 4 LeBlond.

MILLING MACHINES—KNEE TYPE—PLAIN.

5—NEW Gooley & Edlund, type "A" Briggs.
6—NEW No. 1½ American.
1—NEW No. 2 Kempsmith.
1—No. 3 LeBlond with vertical attachment, modern tool.
1—No. 4 Cincinnati, motor driven, first class condition.
1—No. 5 Cincinnati, geared head, single pulley drive.
2—NEW No. 15 Garvin.

MILLING MACHINES—VERTICAL.

1—No. 2 Cincinnati, single pulley drive.
2—NEW No. 4-"B" Becker.
1—No. 5 Becker-Brainard, with rotary table.
2—New Garvin No. 15 table, feeds 60″.

PLANERS.

2—24″ x 24″ x 6′ American late type, 1 head.
1—26″ x 26″ x 10′ Gray, 1 head.
1—NEW 27″ x 27″ x 10′ Woodward & Powell, 2 heads.
1—30″ x 30″ x 10′ Gray, 1 head.
3—36″ x 36″ x 8′ Gray, 2 heads.
1—36″ x 36″ x 8′ Pond, 2 heads.
1—40″ x 40″ x 8′ Pond, 1 heavy swivel head.
1—42″ x 42″ x 12′ Hill-Clarke, heavy pattern, 3 heads.
1—48″ x 48″ x 12′ Niles, 2 heads on rail.
1—52″ x 52″ x 24′ Betz, 1 head.
1—60″ x 46″ x 15′ Patch, 4 heads, excellent condition.
1—16′ Hilles & Jones, plate planer.
1—18″ Hilles & Jones, plate planer.

Wm. F. Davis Mhine Tool Co., Inc.

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Riverside Machinery Depot

We own every Tool Offered

Lathes

1—60 x 20 Shellenbach H. D. Engine Lathe.
3—New 16 x 6 Springfield Ideal Engine Lathes.
1—20 x 8 Rockford New Engine Lathe.
1—16 x 8 Porter Lathe.
1—16 x 8 Reed Lathe.
1—14 x 6 Barnes Lathe.
1—13 x 8 Barnes Lathe.

Turret and Screw Machines

4—3 x 36 Jones & Lamson Turret Lathes.
1—4¼" Gridley S. S. Automatic Screw Machine.
3—No. 3 Smurr & Kamen Hand Screw Machines.
3—No. 2 Smurr & Kamen P. F. Hand Screw Machines.
3—New 14" Pierce Turret Lathes.
3—New 1 x 8" Pierce Hand Screw Machines.
4—16" Warner & Swasey P. H. Turret Lathes with air chucks.
4—No. 107 Wells Hand Screw Machines.
2—2" Cleveland Automatic Screw Machines.
1—⅝-¾" Cleveland Automatic Screw Machines.
8—No. 52 National Acme 4 spindle Automatics.
1—No. 53 National Acme 4 spindle Automatics.
2—No. 515 National Acme 4 spindle Automatics.

Grinders and Milling Machines

1—No. 60 Heald Cylinder Grinder.
1—No. 6 Bryant Internal Grinder.
1—New No. 2½ Woods Cylindrical Grinder.
1—New No. 2 Woods Cylindrical Grinder.
3—No. 1 Thompson Cutter & Rieme Grinders, New.
3—No. 1½ American Plain Millin achines, New.
1—No. 0 Brown & Sharpe Plain lling Machine.
1—No. 13 Garvin Plain Milling hine.
4—New Burke Hand Milling Ma es.

Gear Cutter

1—No. 6 Fellows Gear Shaper.
6—No. 3-36 Brown & Sharpe omatic Spur Gear Cutters.
2—No. 3-26 Brown & Sharpe omatic Spur Gear Cutters.
2—No. 13 Brown & Sharpe Au tic Spur and Bevel Gear Cutters.

Planers, Boring Mills & Shapers

1—60 x 45 x 15' Patch four hea er.
1—36 x 36 x 12' New Haven Pla S.H.
1—30 x 30 x 7' New Haven Plan H.
2—24" Milwaukee Shapers, New
2—16" Milwaukee Shapers, New
3—20" Milwaukee Shapers, New
3—20" Columbia Shapers, New.
1—20" Hendey Geared Shaper.
1—26" Davis & Egan GearedSh
1—18" Hendey Geared Shaper.
1—60" Bickford Boring Mill.
1—No. 3 Lucas Horizontal Bori l.

Drill Press

2—24" Milwaukee Drill Presses,
1—2 spindle Baker H. D. Drill.
1—16 spindle Natco Drill.
1—12 spindle Pratt & Whitney Drill.
3—20" Buffalo B.G. P.F. Drill Presses, New.
3—20" Buffalo Drill Presses, New.
1—38" New Haven B.G. Drill Press.
1—14" Henry & Wright H.S. Drill Press.
3—8" Langelier H.S. Drill Presses.
1—Hammond Flexible Arm Radial Drill, T. A.
1—3½' Canedy-Otto Plain Floor Radial Drill.
2—14" U. S. Plain Drill Presses, New.
3—20" Excelsior Plain Drill Presses, New.

Presses and Hammers

1—No. 14 Bliss Toggle Drawing Press.
1—Waterbury-Farrel B.G. Heavy O.B.I. Press.
1—No. 2-W Bliss Wiring Press.
1—No. 21 Consolidated Horning Press.
1—No. 1 Sidney O.B.I. Press, New.
1—No. 2 Sidney O.B.I. Press, New.
1—No. 3 Sidney O.B.I. Press, New.
1—800 Billings & Spencer Roll Board Hammer.
1—No. 2 Williams & White Bulldozer.

Steam Engines

1—20 x 42 Huetteman & Kramer R.H. H.D. Corliss Engine.
1—15 x 20 Russell R.H. Automatic Girder frame Engine.
1—13 x 15 Erie R.H. 4 valve Automatic Engine.
1—13½ x 15 Taylor Automatic Engine.
1—10 x 16 Brownell R.H. Automatic Engine.

We also carry, in stock, Steam Pumps, E ical Equipment and are in the market to purchase good eq nent of all kinds.

RIVERSIDE MACH ERY DEPOT

23 St. Aubin Avenue **DETROIT, MICH.**

USED MACHINERY—EW CONDITION

Just a few of the numerous ma e tools at our warehouse. Wire, write or ph your needs.

1—No. 3 **LeBlond Miller,** late type.
1—No. 3 **Wilmarth & Morman Surface Grinder,** new.
1—2" **Cleveland Automatic Screw Machine,** magazine feed, late type.
1—25" **Steptoe Shaper, back-geared.**
1—24" **Gould & Eberhardt Shaper,** back-geared.
1—36" **American Sensitive Radial Drill.**
1—18 x 8 **Prentice Bros. Lathe,** double back-geared, quick change gears, excellent condition.
3—2 x 24 **Jones & Lamson** flat turret lathes, cone pulley drive, good condition.
1—No. 3 **Styles & Parker** - 21 Bliss.
1—**New Haven,** 26 x 26 x 6 Planer, 1 head on cross rail, with vis .

Pratt & Whitney Tool Room Lathe, with taper achment and draw-in-collets, excellent con- ion.

4 **Styles** back-geared **power press.**

1 **Wilmarth & Morman Universal Grinder,** new, plete.

Gang Radial Drill, with tapping attachment.

51 **National Acme Screw Machine,** ¼" capac- practically new.

ator Shear, 12" blades, will shear 2" stock, ght 9000 lbs.

75 **Consolidated Press,** back-geared, weight 00 lbs.

AMERICAN MACHINE EXCHANGE, INC.

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HONEST SERVICE

THE BIGGS-WATTERSON CO.

Cleveland, Ohio

NEW MACHINES

1—16" Queen City B.G. Crank Shaper. Cone drive.
1—20" Queen City B.G. Crank Shaper, Cone drive.
2—24" Queen City B.G. Crank Shapers, Cone drive.
2—20" Queen City B.G. Crank Shapers, Gear Box Drive.
1—23" Snyder Upright drill, stationary head.
2—25" Snyder Upright drills, sliding head.
1—28" Snyder Upright drill, sliding head.
1—14" x 6' Champion Q.C. Lathe with taper attachment.
1—Webster & Perks No. 1¼ Floor type Grinder.
1—Webster & Perks No. 2 Floor type grinder.
1—Webster & Perks No. 1 Floor type grinder.
1—Webster & Perks No. 1¾ Floor type grinder.
1—Webster & Perks No. 6 Polishing and buffing lathe.
1—Webster & Perks No. 7 Polishing and Buffing lathe.
1—Webster & Perks No. 1 Bench Grinder.
1—No. 2 Washburn Shops two spindle drill.
1—No. 2-B Washburn Shops single spindle drill.
1—No. 20 Bliss Ininable press.
1—No. 1 Racine Ecksaw.
1—No. 4 Racine Ecksaw.
1—No. 32-B Dem Floor type drill presses.
1—No. 22 Demco ench Drills.
1—18" x 8' Machi Tool Works engine lathe.
3—No. 1 Toledo End Milling Machines.
1—Simmons Prem Universal Tool and Cutter Grinder.
1—No. 2 Grand Rids Universal Grinder.
1—No. 2 Canton Bor Crane.
1—No. 4 Canton Bor Crane.
1—No. 4½ Bardo & Oliver Hand Screw machine.
1—No. 2 Toledo Hd Screw Machine.

USED MACHINES

1—No. 3H LeBlond Universal Milling Machine.
1—36" x 30" x 16" Planer with three heads.
1—24" Gisholt turret lathe with complete tool equipment.
2—19" x 7' LeBlond heavy duty lathes. Quick Change.
1—20" x 12' Lodge & Shipley selective head lathe.
1—Lees-Bradner gear cutter.
1—Heald Cylindrical grinder.
1—Rockford 20" Gear drive drill.
1—Kern sensitive drill with tapping attachment.
1—Large Ingle tooth rounding machine.
1—Air Compressor and tank.
1—36" Band Saw.
1—No. 4 J. N. LaPointe Broaching Machine.
1—Cincinnati No. 1 Cutter Grinder.
No. 3—26" Brown & Sharpe Gear Cutters.
No. 3—36" Brown & Sharpe Gear Cutters.
12"x6" Gould & Eberhardt Gear Hobbing Machines.
24"x12" Gould & erhardt Gear Hobbing Machines.
24"x24"x6' G. A. Gy Planer, single head.
5' Full Universal Arican Radial Drill.
No. 2 Cincinnati Pl Milling machine—cone type.
No. 3-C Lees-Bradthread millers.
24" Brown & Sharpertical Chucking machine.
12"x48" Queen Citlain Grinder—rebuilt-excellent condition.
15" Potter & Johnshaper, revolving table.
No. 1 Warner & Sw Hollow Hex. Turret Lathe, bar and chuckit
No. 2 LaPointe Mae Toll Co. single broaching machine.
No. 2 J. N. LaPoinbuble broaching machine.
No. 1 Adams Gear ber.
No. 4 Toledo hand w machinc.
21" Kern upright dress.
16" x 10' Betts Trag head shaper.
14" x 6' American sard engine lathe.

We buy and sell Machine Tools. nd us list of your requirements or tools you he for sale.

MACHINE TOOLS

Jones & Lamson Turret Lathe 16" x 5'.
American Semi-Automatic Tur. Lathe 24" x 11'.
Barnes Lathe 13" x 7', C.R., H.S.
Johnson Lathe 20" x 12', Taper Att., H.S.
American Lathe 22" x 8', Taper Att., H.S.
New Haven Lathe 22" x 12', with Turret.
Pittsburgh Lathe 26" x 15', Taper Att.
New Haven Lathe 36" x 21', C.R.
48" Niles Car Wheel Lathe with Journal Turning Attachment.
26—56" x 26' McCabe 2-Spindle Lathe.
Rockford 16" Back Geared Crank Shaper.
Lodge & Davis 28" Shaper.
American Planer 30" x 30" x 10', Sgl. Head.
Pond Planer 26" x 26" x 5', Sgl. Head.
Chandler Planer 24" x 24" x 8', Sgl. Head.
Jarecki No. 7 Pipe and Bolt Cutter, 2" cap.
Kenyon 1½" Bolt Cutter.
Curtis 6" Pipe Machine with 5 HP Engine.
Baker No. 2 Keyseater. Davis Keyseater ⅜ to 1".
Robertson No. 5 Sensitive Drill.
20" Foote-Burt Mfrs. Vertical Drill.
20" Silver Upright Drills, Plain and B.G.
36" Gould & Eberhardt Drill, Tapping Att.
40" New Haven Drill, B.G.
Bement Milling Machine No. 229, Table 10"x36".
Cincinnati No. 2 Universal Milling Machine.
LeBlond No. 2 Universal Milling Machine.
Gliem Cold Saw, 22" saw, 6" Cap.
Newton Cold Cut-off Saw, 20" saw, 5¼" cap.
Bradley 30-lb. Upright Strap Hammer.
Bradley 100-lb. Upright Strap Hammer.
Morgan 600-lb. Sgl. Leg Steam Hammer.
Bement 800-lb. Sgl. Leg Steam Hammer.
Ajax Bulldozer, Heavy Type, 18" stroke.
Williams-White No. 5 Bulldozer, 13" Stroke.
Birmingham Alligator Shear, Cap. 1¼" sq.
Industrial Dbl. End Punch and Shear, Cap. 1".
Forging Press 46" bet. Housings.
No. 56 Dbl. Housing Knuckle Joint Power Press.
No. 3½ Greenerd Arbor Press.
24" Colladay Pony Planer, cylinder feed
Hilles & Jones Plate Planer, Cap. 14' long for ½" Plate.
Lennox Rotary Shear 30" throat; Cap. ⅜" Plate.
Ransom Wet Tool Grinder 20", with 1 HP Motor.

AIR COMPRESSORS

Smith-Vaile Belt Driven 14 x 18, 400 cu. ft. 100-lbs.
Ingersoll-Sergeant Steam Driven 10 x 16½ x 10¼ x 10", 250 cu. ft., 120 lbs. steam press.
Air Receivers 21" dia., 8' and 9' long, ½" Plate

Russell Machine Company
Pittsburgh, Pa.

Heavy Duty Presses

1—No. 202-C Toledo Plain Overhanging Double Crank Press; Bolster Plate 30 x 42"; opening in bed 23 x 27"; width between uprights 36"; 2" stroke; weight of fly wheel 650-lbs.; total weight 5,700-lbs. Price.....$750.00
1—No. 204-A Special Toledo Geared Overhanging Double Crank Press; Bolster plate 31 x 40; opening in bed 13 x 32"; width between uprights 32"; 3" stroke; geared 6½ to 1; weight of balance wheel 850-lbs.; total weight 13,300-lbs. Price.....$1200.00
Both of the above presses are without defect and in every way new for service.

Cylindrical Grinder

1—No. 2 Landis Universal Cylindrical Grinder; Swings 16" dia., 32" long; complete with pump, countershaft, center rest, two back rests, wheel trueing fixture and 6 dogs; weight 2500-lbs. excellent condition.

Tool Grinders

1—No. 2 Grand Rapids Universal Tool Grinder.
1—Gisholt Universal Tool Grinder.
1—Automatic Machine Co. Universal Grinder.
1—No. 3½ Safety Whet Tool Grinder.

Drill Presses

1—32" Hamilton Back Geared Power Feed, B.G.P.F., Sliding Head.
1—24" Hoefer, B.G.P.F., Sliding Head.
2—21" Hoefer, B.G.P.F.
2—21" Champion, N.G.P.F.
1—20" Champion, W. & L.
1—21" Hoefer, W. & L.
1—14" Canedy & Otto No. 27.
4—10" Barnes.

Seven hundred machines in stock.

We solicit opportunity to submit best offerings in the way of any equipment required.

Wayne Machinery Company
Fort Wayne, Indiana

FOR SALE

12 ft. Niles Vertical Boring and Turning Mill

Two Swivel Heads, also a Boring Head on Rail in operation in New Jersey. Immediate delivery.

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Immediate Shipment

Two 100 H. P. Babcock & Wilcox
WATER TUBE BOILERS
Complete without Stack

Location—Central Ohio

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5000 feete inch Steel Cable.
8500 feet d" Galvanized Cable.
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A FEW—AVE OTHERS N. Y. Sto—Write Needs

16'-24' extd. 36t. Mill, 2 head Niles.
12' 3 head Verl, Niles.
36" 1 head Verl, Bridgeport.
34", also 24" G Turret Lathes.
14", E. C. & lso 4" Saunders Pipe Machines.
6' Universal Rdrill, Niles.
Dallett Co.'s Pe Drills
42", also 36" Gd Eberhardt Drills.
Vert. Miller, N & J., heavy.
8' Vert. Boring No. 2 heads, NEW.
54" x 54" x 12' 4 head planer.
36/48" x 21' tri Bement Lathe.
28" x 21' Pond, l. Lathe.
24" x 20' New l Lathe.
36" x 36" x 8' P. 1 head planer.
48" Car Wheel Niles.

G. L. Benn achinery Co., Inc.
(Warehouse and R.s, West Side, Jersey City)
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GOOD AS NEW

LATHES

26″ x 14′ Putnam Heavy Duty Q.C.G. D.B.G.
2—25″ x 10′ LeBlond heavy duty Q.C.G. D.B.G.
30″ Furrier Pulley Lathe Double C.R.
20″ x 8′ Muller Q.C.G. D.B.G.
15—18″ x 8′ Simplex Lathes.
16″ x 6′ Pratt & Whitney taper attachment draw-in spindles and collets.
18″ x 8′ Springfield Q.C.G. D.B.G.
16″ x 8′ W. P. Davis Q.C.G.
2—14″ x 6′ Hendey Q.C.G.
14″ x 8′ Prentice D.B.G.

MILLING MACHINES

No. 3 BG Cincinnati Universal.
No. 2 BG Cincinnati Universal.
No. 2-A BG Garvin Universal.
No. 2 Brown & Sharpe Plain.
2—No. 21 BG Garvin Plain.
2—No. 15 BG Garvin Plain.
2—No. 14 BG Garvin Plain.
No. 14ABG Garvin Plain.
No. 1½ BG Valley City Plain.
8—No. 26 Becker Plain.
2—No. 7 Becker Lincoln Type.
3—No. 25 BG Becker Plain.
Steptoe Plain.
No. 2 Cincinnati Vertical like new.

GRINDERS

No. 2 Brown & Sharpe Universal.
No. 4 Cincinnati Universal.
10″ x 50″ Norton Cylindrical Grinder.
10″ x 42″ Landis Cylindrical Grinder.
No. 3 W & M Surface Grinder (New).
No. 1 W & M Surface Grinder (New).
No. 1 Grand Rapids Universal (New).
3 spindle Bryant Chucking Grinder.
2—Ford Smith Shell Grinders.

POWER PRESSES

No. 6 Consolidated Geared Inclinable.
No. 5 Toledo Geared Inclinable.
No. 5 Niagara Inclinable.
No. 3 Toledo Inclinable.
No. 4 Bliss Geared (Stiles pattern).
3—Crosby Straight sided.
5—No. 7 American Straight sided B.G.

TURRET AND SCREW MACHINES

2″ x 24″ J & L C.D. Equipment.
6—3″ x 36″ J & L Flat turrets.
No. 3 Foster Geared friction head.
2″ Millholland Geared friction head.
No. 4 B & O Geared friction head.
⅞″ Cleveland Model C Automatic.
½″ Cleveland Model B Automatic.
½″ Cleveland Model A Automatic.
3—No. 2 B & S Full Automatics.

DRILLS

3½-ft. Bickford Radial.
32-spindle Fox adjustable.
8-spindle Foote Burt Gang.
3-spindle Foote Burt Gang.

New Jersey Machinery Exchange
21 Mechanic Street
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Telephone System

For Sale

Intercommunicating telephone system 13 stations—3 desk phones and 10 wall phones. Also one switchboard for 15 phones complete with 3 extra desk phones. All material in first class order.

The Mersman Bros. Brandts Co.
Celina, Ohio

IMMEDIATE DELIVERY

Subject to Prior Sale

2 Open Hearth Steel Furnaces with ladle and floor cranes and steel casting equipment. Also buildings and accessories. For removal or operation at present site.
Slab Charging Crane. Span 41′ 10¾″. Motors 220 V. D. C.
250-ton Hot Metal Mixer with [illegible]ton ladle car and 50-ton scale.
2—Carbondale Machine Co. Air Compressors.
McMyler Conveyor Bridge (steam driven), span 168′-10½″.
21 Cast Iron Pressure Tanks Tested 50-300 lbs.
100-ton Hydraulic Riveting Machinery (Riveter, Tower Crane, Accumulator, Pressure Pump).
15-ton Electric Furnace and accessories.
2″ Acme Cutting Off Machine.
Structural Frame for 12 story building.
Vertical Plate Rol's. Cap. 1¾″. Motor driven.
22″ Sheet Bar Mill, Allis-Chalmers, 26″ x 60″.
32″ 2-High Blooming Mill and Engine.
Overhead Electric Traveling Crane.
1-15 ton, top pour, 2nd one ½-ton ladle.

(The foregoing all good second-hand condition.)

G.E. Ind. Motor, Form "I" 6 H.P., 125-95 R.P.M. 6600 V., 3 ph., 25 cycle, with panel controllers. Puddle Mill Parts.
Complete Distilling Apparatus for Benzol and Toluol with specially designed fitting.
Boiler House 22′ 0″ x 28′ 10″.
Bolt and Nut Machinery.

(The four preceding items never used.)

Address inquiries to Rolling Mill Steel Works Dept.

Mitchell-Tappe[illegible]o.
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FOR SALE

1—Bertsch & Company No. 4″ Plate Straightening Roll—consisted of seven (7) forged steel rolls diameter, 50″ between housings, [illegible] 1″ x 48″, power adjustment, cast base and arranged for motor drive, never been used.

1—Abramsen Engineering Company Bar Straightening Machine capacity ¾″ to 2″ in angles, 2″ in square bars, and ⅜″x⅛″ and up to 2″ in flats, rolls equipped to straight round edge or square edge flats ½″ wide. Arranged for motor drive.,—New, never been used.

1—35-Ton capacity Flat[illegible]n, bottom pour, side leverage Stee[illegible]le, 7′ diameter top, 5′ 6″ diam. bottom, 5′ 9″ depth. Above in first-class co[illegible]

2—72″ Cast Steel Plate Rolls, approximately .70 to .75 bearings finished.

The Morgan Engi[illegible]ng Co.
Purchasing Dep[illegible]ent
ALLIANCE, [illegible]

BARGA[illegible]

36″x36″x20′ Gray [illegible]2 heads. Following New To[illegible]
No. 1 Cleveland Hori[illegible]tal Boring and Drilling [illegible]ne 2½″ bar.
200 Ton Watson [illegible]an Hydraulic Bending [illegible]ne.
Kempsmith Plain [illegible]niversal Millers.

GEO. W. CLARKE [illegible]NY, Inc.
149 Broadway, [illegible]k City
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Immediate Shipment

NEW DRILLS—Right Hand, High Speed, Straight Shank, Solid, Standard Length Letter and Number Drills. Number 4 to 55.
(NEW) FRACTION DRILLS $\frac{5}{64}$″ to ⅞.
(NEW) LEFT HAND FRACTION and NUMBER DRILLS ⅛″ to $1\frac{1}{64}$″.
(NEW) LEFT HAND, HIGH SPEED, STRAIGHT SHANK, OIL TUBE DRILLS ½″ to $1\frac{3}{4}$.
(NEW) RIGHT HAND, HIGH SPEED, STRAIGHT SHANK, OIL TUBE DRILLS $\frac{3}{64}$ to ⅞.
(USED) RIGHT HAND, HIGH SPEED, STRAIGHT SHANK, OIL TUBE DRILLS $\frac{31}{32}$ to $1\frac{1}{4}$.
(NEW) LEFT HAND REAMERS. Assorted sizes.
(NEW) RIGHT HAND REAMERS. Assorted sizes.
(USED) RIGHT HAND REAMERS. Assorted sizes.
(NEW) HIGH SPEED GUN DRILLS. Assorted sizes.
Also a miscellaneous lot of Chasers, Taps, Dies and Die Heads.

We can furnish for immediate shipment OPEN HEARTH Steel Castings in any quantity up to twenty tons per day.

Honest Service

THE BIGGS-WATTERSON COMPANY
Cleveland, Ohio
Branches: Detroit - Dayton

New and Used Machine Tools

1—84″ Pond Vertical Boring Mill.
1—12′ Vertical Boring Mill.
1—1½″ Landis Bolt Cutter.
1—24″ x 14′ Slab Miller.
1—No. 314 Baker Bros. High Duty Drill.
1—Murchey & Geometric Die Heads.
1—No. 1 Table for Baker Bros. Key Seaters.

WE HAVE OTHERS
SEND FOR OUR LIST

COLMAN MACHINERY and TOOL CO., Inc.
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Horizontal Boring Mills

Beamen & Smith special boring and facing. 4″ bar, double drive, 26″ swing, table 22″x28″.
Excellent mechanical condition throughout.

A. G. Schoonmaker & Sons, Inc.
25 Church Street New York City

Bolt Heading Machine

1½″ National Side Lever Heading Machine, for heading bolts, rivets, etc. from ½″ to 1½″ dia. square, hexagon and round heads. Now at National Factory, overhauled.
Immediate delivery Price $2250 F. O. B Cars

Room 1814
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OIL STORAGE TANKS

1— 9′ dia., 32′ long capacity 15000 gals.
1—76″ " 32′ " " 7500 "
1—76″ " 26′ " " 6000 "
1—Open Tank 10′ dia., 15′ deep.

WICKES MACHINERY CO.
Jersey City, N. J.

EQUIPMENT

For Immediate Delivery

1—20″ x 12′ B. & S. 4 spindle cylinder Boring Machine.
1—Niles Car Wheel Boring Mill 54″ swing 48″ table.

2—Herbrand 4 spindle Gang Drills complete.
1—Herbrand 6 spindle Gang Drill complete.
1—Barnes 20″ single spindle Drill Press.
1—Baush Twelve spindle Multiple Drill.

1—20″ x 8′ Muller Lathe back geared hollow spindle.
1—32″ x 18′ N. Y. Engine Co., triple geared Lathe.
1—24″ x 9′ Pratt & Whitney Lathe, back geared, screw cutting.
1—New Haven Engine Lathe 36″ x 21′ 5″ step cone, back geared.
1—Pittsburg Engine Lathe 26″ x 15′ 4″ step cone, back geared.
1—New Britain Automatic Turret Lathe.

1—30″ x 30 x 7′ New Haven Planer.
1—30″ x 30 x 20′ New Haven Planer, one head geared, power feed.
1—54″ x 40″ x 12′ Lincoln Planer 2 heads on cross rail, 2 side heads.

1—Lodge & Davis Milling Machine back geared, table 8′ x 32″.
1—Smith & Garbin No. 3 Miller.

2—No. 3 Mitts & Merrill Keyseaters.

3—Bliss Straight Side Wiring Presses.
4—60½ Bliss reducing Presses, geared.
1—No. 19 Bliss Press. 1—No. 20 Bliss Press.

1—20″ Smith & Mills B.G. Crank Shaper.
1—24″ Niles B.G. Crank Shaper.
1—16″ Single Crank Shaper, shifting belt.

1—Ajax Forging Roll for reducing bar stock No. 1.
1—3″ Ajax Upsetting Machine, geared.

1—No. 1 Williamson Metal Band Saw Machine, capacity 7½″.

1—250-lb. Niles-Bement-Pond single frame Steam Hammer.
2—800-lb. Massillon All Steel Steam Drop Hammer.
4—1200-lb. Massillon All Steel Steam Drop Hammers.

1—36″ Automatic Planer Knife Grinder.
1—No. 60 Heald Cylinder Grinder.

1—8 x 8″ Chicago Pneumatic Tool Co. Air Compressor 8 x 8.
1—Ing. Serg. Duplex Steam Driven Compound Air Compressor 526 cu. ft.
1—Norwalk Compound Steam Driven Air Compressor 1160 cu. ft.

1—Steel Tank 8′ diam. x 25′ long thickness shell and heads ⅜″.
1—Steel Tank 6′ diam. x 30′ long ⅜″ steel plate.
1—Steel Tank 4′ diam. x 16′ long thickness shell heads ⅜″.
1—48 x 144″ Air Receiver Tank for 125 lbs. pressure.

1—20-Ton Elec. Traveling Crane, double 14″ I-beam girder 40′ span, 1–25 H.P. Motor A.C. 220 volts, 900 R.P.M., 3 lever clutches to move and hoist on top of crane, New Albany make, with 200′ of rails.

6—60,000 lbs. Flat Cars. Good condition.
4—10,000 gallon 50-ton truck Tank Cars with coils and heater valves.

National Products Co.
East Liverpool, Ohio

Rails

1800 tons 70 lb.
250 tons 85 lb.
150 tons 40 lb.
Complete with angle bars and spikes for immediate delivery.
6 miles 36″ gauge portable track with steel ties, 20 and 25 lb.

Punches and Shears

1—Heavy duty gate shear, with 21″ blade, 11″ throat, capacity cutting up to 1½″ plates, spur gear 42″, diam. by 10″ face.
1—Bement Miles combined punch and shear; 22″ depth of throat both sides, capacity 1¼ through 1″; shears 1 x 1 flats, weight 16,000 lbs.
Single end shear, 22″ throat; will punch 1½ through 1″.
Single end punch, 27″ throat, punch ¾″ through ¾″.

Rolling Mill Stand

1—New rolling mill stand for finishing ends 72″ plate mill, two rolls high, 24″ diam. by 72″, arranged for direct connection.
1—16″ rolling mill, three rolls high, two stand, direct connected to a steam engine.
1—10″ rolling mill finishing stand, two rolls high, arranged for belt drive.

Plate Bending Rolls

1—4′ Hand power roll, capacity 10 gauge material

Nut and Tapping Machine

6 spindle 1½″ vertical nut tapping machine (Acme type).

Rotary Shears

Lennox rotary bevel shear, inclined cutters, cuts ½″ plate.
Kling Rotary Shear, 16″ throat, cuts ½″ plate.
Lennox Rotary plate splitting shear, will shear to center of 1(Will shear rounds and flats ¾″.

Steel Tanks

20—10,000 gal storage tanks.
4—5,200 gallon storage tanks.
2—4,000 gallon storage tanks.
2—3,000 gallon storage tanks.
1—5′ x 24′ pipe tank.
2—60″ x 18′ pipe tanks.
1—54″ x 12′ pipe tank.
25—16″ x 46″ pipe tanks.

Water Tower Tank

1-20′ dia. 135 ft. water tower tank, made of plates ½, ¾″, including ladder to top of tank.

Steel Building

1—All-steel building 75′x134′. Columns 45′ to bottom of roof. Monitor roof.
1—Steel building 62′ wide, 100′ deep, with 50′x 300′ L, complete with 10 ton, 57′ electric traveling crane one 5 ton, 48′ electric traveling crane, three motors, 220 volt D.C.
1—Converter for rotating crane, 60 cycle, 3 phase from A.C. volt to D.C. 220 volt.
1000 tons "I" beams, all sizes.

Large Pumps

3—16x10¼x14 side packed Knowles.
2—7½x5x10 Worthington.
1—14″x8½x10″ Worthington.
1—16″x10¼x16″ Worthington.
1—16x28x15½ Wilson Snyder Duplex Pump, with 10x14 inch condenser.
1—18x29x16½ Laidlaw-Dunbar & Gordon compound Duplex Pump.

300 H. P. Boilers

3—Wickes Brothers vertical boilers, pressure type, quadruple riveted butt strapped, equipped with Murphy stoker and all breeching connections. These boilers are located at Detroit, Michigan, and shipment can be made at once. Hartford inspection, 150 lbs. pressure.

Steam Hammers

Bement Miles 8000 lb. single frame steam hammer.
400-800 lb. Board hammers.
1—400 Miner & Coard drop hammer.
1—800 lb. Merrill drop hammer.
2—100 lb. Rope Drop Hammers.
1—100 lb. Little Giant upright trip hammer.
1—Boss Novelty upright trip hammer.
1—30 lb. Rochester wooden Helde trip hammer
1—30 lb. Bradley wooden Helde trip hammer.

Get our New Bulletin ITR-305

Harris Brothers Co.
CHICAGO, ILL.

For Example

From the

"CALLESON LIST"

of used machine tools in stock and owned by us

1—Long & Allstatter Double End Punch and Shear.
1—Long & Allstatter Combination Shear and Bevel Machine.
1—Lennox Rotary Shear.
1—60″ Rogers & Hemphill Vertical Boring Mill.
1—60″ Horizontal Cylinder Borer, being lifted with 9″ bar, 3 facing heads, side adjustment 24″, will bore cylinders to 10′ long, very heavy tool, fine condition.
1—38″ x 24′ New Haven Lathe, compound rest, power cross feed, 4 step cone for 4″ belt, main spindle bearing 5″, solid bed, fine condition.
1—36″ x 18′ New Haven Lathe, compound rest, power cross feed, 5 step cone, fine condition.
1—24″ x 15′ Niles Lathe, heavy tool.
1—18″ x 8′ Reed Lathe.
1—16″ x 6′ Reed Engine Lathe, quick change gear.
1—16″ x 6′ American Fox Lathe.
Large stock of smaller sizes.
1—No. 24 Brown & Sharpe Milling Machine, back geared, table 14½″ x 72 automatic feed.
1—No. 0 Mitts & Merrill Keyseater.
1—Morton Keyseater.
1—26″ Barnes Drill Press.
1—24″ Prentiss Drill Press, sliding head, power feed, back geared.
1—700-lb. Bement Steam Hammer.
1—75-lb. Belden Hammer.
Smaller hammers for immediate delivery.
1—Set of Plate Bending Rolls, 8′ 6″ between housings, each 12″ in diameter, solid housings.
1—Diamond Concave Knife Grinder, complete in all respects and as good as new.
1—30″ Brainard Gear Cutter.
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14″ and 15″ Shapers.

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1—45 H. P. Fitchburg Corliss Engine.
1—30 H. P. Fitchburg Corliss Engine.
1—80 H. P. Economic Type Portable Boiler, 100 lbs. W. P.
1—60 H. P. Locomotive Type Boiler, 100 lbs. W. P.
1—30 H. P. Locomotive Boiler, 100 lbs. W. P.
1—10 x 10 x 9 Clayton Air Compressor.
1—8 x 9 Blaisdel Air Compressor.

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50 Church Street
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1—500 KW. A.C., 2300 volt, 3 phase, 60 cycle Westinghouse, direct connected to four valve compound engine.
1—75 KW., D.C., 250 volt, connected to Buckeye Engine.

BELTED ENGINES

1—8" x 12" Buckeye Engine.
1—16½" x 30" Buckeye Engine.

MOTORS

1—75 H.P., A.C., 440 volt, 60 cycle, 3 phase. New

WATER TUBE BOILERS

2—150 H.P., B&W.

GENERATORS

1—100 KW., D.C., 110-125 volt, 250 RPM., 2 bearings, rheostat, half coupling.
1—75 KW., D.C., 350 volt, 200 RPM., 2 bearings, rheostat, half coupling and Switchboard.

PUMPS

1—6" x 4" x 6" Boiler Feed Pump.
1—4½" x 4" Duplex Power Pump.

COMPRESSORS

1—18 x 18 Belt Driven Laidlaw-Dunn-Gordon Air Compressor.

Complete Plant consisting of one (1) 400 Hp B&W Boiler, one 325 HP Corliss Engine, two jackshafts with pulleys—100' 30½" leather belt, 45' 26" leather belt, 45' 18" leather belt.

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"2 and 3 phase, 60 cycle, 220, 440 and 2,200 volt motors."

HP.	MAKE	RPM	TYPE
50	Whse.	1140	CCL
50	W. El.	900	
50	Whse.	850	CCL
75	G. E.	900	K
75	Linc.	1800	
75	G. E.	514	L
75	G. E.	980	
150	Whse.	700	CCL
150	G. E.	720	M
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2,000 other items.

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One new 7½ H. P. 2 phase, 60 cycle, 860 RPM. 220-440 volt Wagner B. W. self Starting Motor. Other machines in stock.

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Direct Current Motors 220-250 V

No.	H.P.	R.P.M.	Wdg.	Type	
3	5	1850	Sh.	CM	ake
1	5	1870	Sh.		Wheeler
1	5	1700	Sh.	CVC	Electric
1	5	1700	Sh.		Electric
1	5	1650	Sh.		Electric
1	5	900	Sh.	A-5	
1	5½	1675	Sh.	CVC	Electric
1	7½	1425	Sh.		Wheeler
1	7½	535	Cp.		ern
1	15	375	Sh.		ial
1	15	800	Sh.		Wheeler
1	15	650	Sh.		western
1	15	625	Sh.	CVC	Electric
1	15	625	G		
2	17½	585	Sh.	A-14	
2	20	575	Sh.	TR	anks-Morse
1	20	1150	Sh.	TR	anks-Morse
1	20	800	Sh.		rial
1	20	800	Sh.		Electric
1	20	650	Sh.		ankee
1	20	600	Sh.		ern Elec.
1	22	710	Cp.	C	one
1	30	950	Sh.	CS-20	al
1	30	630	Sh.		western
1	30	575	Sh.	K	Chalmers
1	38	590	Sh.		
1	40	675	Sh.		western
1	40	820	Sh.		rn Elec.
1	40	575	Sh.	A-30	aukee
1	40	550	Sh.	M	nghouse
1	50	625	Sh.	A-40	aukee
2	50	1200	Sh.	TR	anks-Morse
1	55	575	Sh.	6½AOR	n Elec.
1	60	500	Co.		aukee
1	75	850	Sh.	MP	aukee
1	75	850	Cp.	MP	aukee
1	85	750	Cp.	CL-65	
1	120	450	Cp.	MPA	
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No.	Type	Size	Volts	N c U	Prc. Each
4	S&T	9"	110	A.C. N	h... 8.00
1	OSC	12"	110	D.C. U	... 13.00
9	S&T	12"	110	D.C. U	... 10.00
2	OSC	16"	110	D.C. U	Elc. 14.50
2	OSC	16"	110	D.C. U	... 14.50
6	OSC	16"	110	A.C. N	s.. 18.00
1	S&T	16"	100-115	D.C. U	... 12.00
1	OSC	12"	110	A.C. N	s . 15.00
8	Ceiling	15"	110	D.C. U	an. On Ap
1	Ceiling	16"	110	D C. U	... On Ap
10	S&T	12"	110	A.C. N	s.. 13.50

EXHAUST

No.	HP	Size	Volts	New Used	Stock No.
1	1¼	24"	230 D.C.	Used	st B-645
1	....	24"	110 D.C.	Used	n B-646
3	1.85	36"	230 D.C.	Used	st B-647

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1—Molding Machine "Taber", 14-in. x 16-in., power rammer, jar and squeezer.

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1—1250 KW. Westinghouse-Parsons horizontal turbo-unit, 3 pse, 2300 volts, 3600 RPM., with LeBlanc jet type condensennd turbine driven pumps.

1—1000 KW. Gen. Elec.-Curtis vertical turbo-unit, 3 phase, 300 volts, 1200 RPM., with Wheeler Cond. & Eng'g Co. surfaceon-denser and necessary pumps.

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1—600 KW. Westinghouse-Parsons turbo-unit, horizontal, nonn-densing, 3 phase, 220 volts, 3600 RPM.

1—550 KW. Gen. Elec.-Curtis vertical non-condensing turbo-it, 3 phase, 440 volts, 1800 R.P.M.

1—550 KW. Gen. Elec.-Curtis, vertical, non-condensing turbo-it, 3 phase, 4600 or 2300 volts, 1800 RPM.

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1—500 KW. Allis-Chalmers horizontal turbo-unit, 3 phase, 480 vs, 3600 RPM., with Allis-Chalmers jet condenser and necesy pumps.

1—500 KW. Gen. Elec.-Curtis horizontal turbo-unit, 3 phase, 0 volts, 3600 RPM. NEW.

1—500 KW. Gen. Elec.-Curtis horizontal turbo-unit, 3 phase, 0 volts, 3600 RPM., with Westinghouse-LeBlanc condenser i necessary pumps.

1—500 KW. Gen. Elec.-Curtis vertical turbo-unit, 3 phase, 4000-0 volts, 1800 RPM., with Wheeler Cond. & Eng'g Co. jet conde and necessary pumps.

2—400 KW. Westinghouse-Parsons horizontal turbo-unit, 3 ph 2300 volts, 3600 RPM.

1—300 KW. Westinghouse-Parsons horizontal turbo-unit, 3 ph 440 volts, 3600 RPM., with Wheeler Cond. & Eng'g Co. sur condenser and necessary pumps.

1—100 KW. Gen. Elec.-Curtis horizontal turbo-unit, 2 or 3 ph 240 volts, 3600 RPM.

ALTERNATING CURRENT DIRECT CONNECTED UNITS—60 Cycle

1—500 Kva. General Electric, ATB, 3 phase, 2300 volts, 120 RI dir. conn. to 27-in. x 42-in. Hamilton Corliss engine.

1—450 KW. General Electric, ATB, 3 phase, 2300 volts, 100 RI dir. conn. to 22-in. and 42-in. x 48-in. E. P. Allis cross compo heavy duty engine.

2—340 Kva. Westinghouse, 3 or 2 phase, 220 volt, 150 RPM., En type. No Engines.

1—300 KW. General Electric, 3 phase, 2200 volts, 150 RPM., conn. to 19-in. x 30-in. x 22-in. McEwen tandem compound

1—200 KW. Westinghouse, 3 or 2 phase, 220 volt, 116 RPM., conn. to 20-in. x 42-in. Hewes & Phillips horiz., side crank en

1—120 KW. Allis-Chalmers-Bullock, 3 or 2 phase, 2400 volts, 277 RPM., engine type. No engine.

1—50 KW. Ft. Wayne, 3 or 2 phase, 60 cycle, 2300 volts, 300 RPM., dir. conn. to 11-in. x 12-in. Chuse horizontal engine.

1—50 Kva. Fairbanks-Morse, 3 phase, 2300 volts, type D, 300 RPM., Engine type. No Engine.

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2—800 KW. Ft. Wayne, MPL, 250-275 volts, 16 pole, 120 RPM., dir. conn. to 26½-in. and 53-in. x 36-in. Erie City heavy duty cross compound engine.

2—500 KW. General Electric generators, MP-H, 275 volts, 10 pole, 100 RPM., each direct conn. to a 32-in. x 48-in. Greene engine.

2—500 KW. Fort Wayne generators, MPL., 220-250 volts, 10 pole, 90 RPM., each dir. conn. to a 22-in. and 38-in. x 48-in. Bates cross compound engine.

1—500 KW. Crocker-Wheeler, CCD, 250 volts, 16 pole, 90 RPM., dir. conn. to 22-in. and 38-in. x 48-in. Hamilton cross compound eng.

1—325 KW. Westinghouse, 250 volts, 10 poles, 100 RPM.,dir. conn. to 16-in. and 30-in. x 42-in. Hamilton Corliss horizontal tandem engine.

1—200 KW. General Electric, MPC, 275 volt, 8 pole, 150 RPM., Engine type. No engine.

1—75 KW. Allis-Chalmers-Bullock, 250 volts, 6 pole, 275 RPM., dir. conn. to 11-in. and 18-in. x 11-in. Shepard vertical cross compound engine.

1—25 KW. Rochester generator, 230 volt, 6 pole, 400 RPM., dir. conn. to 10-in. x 8-in. Buffalo Forge vertical engine.

WATER TUBE BOILERS

4—512 H.P. Babcock & Wilcox, 200 lbs. pressure.
2—483 H.P. Heine, 200 lbs. pressure.
2—480 H.P. Stirling, 160 lbs. pressure.
1—400 H.P. Babcock & Wilcox, 160 lbs. pressure.
4—360 H.P. Erie City, 160 lbs. pressure.
1—310 H.P. Stirling, 200 lbs. pressure.
14—290 H.P. Babcock & Wilcox, 160 lbs. pressure.
2—283 H.P. Aultman & Taylor, 160 lbs. pressure.
2—283 H.P. Babcock & Wilcox, 160 lbs. pressure.
3—243 H.P. Heine, 160 lbs. pressure.
2—240 H.P. Stirling, 140 lbs. pressure.
3—156 H.P. Heine, 160 lbs. pressure.

CATERPILLAR TRACTOR

1—80 HP. Hornsby Steam Caterpillar Tractor with compound driving engine mounted directly on top of boiler. Tractor and tender approx. 20 ft. long overall, approx. extreme width over caterpillar chains 9 ft. length of caterpillar chains 17 ft. Complete with two heavily built 4-wheeled trailers and one trailing sled for winter use.

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1—W. H. Wood Size No. 31 Hydraulic Riveter, complete with accumulator, high pressure pump, overhead traveling crane, tank and hydraulic hoist, gap has 8 ft. 3 in. clearance. Have numerous snaps, dies, and punches, as well as rivet heating furnace.
1—Lennox Rotary Bevel Shear, size 2, capacity ¾ in. steel. Six extra cutting disks or shear blades.
1—Set 10 Ft. 6 In. Power Bending Rolls with reversing mechanism hand raising and lowering attachments, top roll 12 in. dia. Bottom Rolls 8 in. dia.
1—Chicago-Pneumatic Air Hoist 5-ton capacity ⅝-in. cable.
1—McGrath Air Flue Welder complete with 18 x 36 oil burning Rockwell furnace.
1—Flue cutter and cleaner 120 in. long, belt drive.
2—Sturtevant 30-in. steel pressure blowers.
2—Heavy cast iron round blacksmith forge bowls with connections, 48-in. dia.
1—American Radial Drill, 42-in. arm, 36-in. swing, cone drive, with swinging and tilting table, with worm movement.
1—No. 4 Long and Allstater Combination Punch and Shear, 5-in. throat, no shear attachments have punches and dies.
2—Anvils 250 lbs. each; 1 good shape, 1 poor shape, 300 ft. Track.
200-ft. 2⅞-in. dia. line shaft with pulleys and hangers.
1—10 x 16 Nagle center ank, slide valve engine.
1—60-in. x 16-ft. Horizontal er (return tubular).
1—10-ft. x 10-ft. x 6-in. dee -in. plate tank (open top).
1—30-in. wide 36-in. deep, 12 long tank (open top).
1—10 gallon air pressure fu l burner, or torch.
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1—6-in. wrought iron vise.
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1—Boiler testing pump.
1—Fairbanks 2000-lb. scale.
3—4000-lb. capacity Yale & ne chain block.
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1—Set 4-Ft. Bending Rolls, s 5½-in. Dia. (hand power).
1—Set 7 Ft. Bending Rolls, s 6½-in. Dia. either hand or belt
1—Set 36-in. tinners bendin s 2¾-in. diameter.
1—JERECKI BOLT CUT capacity ⅜-in. to 1½-in. complete dies for standard bolts and stay
1—Angle or rail bending an ightening machine, size 6-in., screw er.
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1—Lot of hand tools.
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1—Wall Crane Double Channels, 12 ft. arm and attachments with trolley.
1—Small overhead crane made of 8-in. double channels 18-ft. span with trolley.
1—Small overhead crane made of single 12-in. I-beam with trolley span 16 ft.
1—10-in. Throat Horizontal Flange and Beam Punch capacity ¾ in.
1—Allen 72-in. Portable Pneumatic Hammer, Boiler or Plate riveter, capacity 1 -in. rivets.
1—Allen Compression Lever Riveter, 10-in. reach, 11-in. gap capacity ⅞ rivets.
1—Norwalk Straight Line High Pressure Air Compressor, with primary and secondary air cylinders making it two stage, 12-in. stroke capacity about 250 ft. free air per minute at 100 lbs. pressure.
1—Overhead 12-Ton Capacity Hand Power Traveling Crane 26 Ft. 8 In. Span, constructed of 15-in. I-beam ⅞-in. webb, 6½-in. flange.
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1—25 HP Special Electric Muncie Oil Engine with complete equipment, brand new.

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Bridge span 80' 2"
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complete with moors and controllers.

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1—54" diam. x 19'0"
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1—49½-ton 4' 8½" gage 6-wheel Switcher. Steam 180-lb. ***Practically New.***

1—30-ton 4-wheel Davenport s.t. steam 150-lb. ***First-class.***

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1—906 ft. Norwalk compound steam, 2 stage air Corliss Valves, 100 lb. air pressure. ***First-class.***

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1—35 k. w. Northern Generator, 125 volts D. C. Direct connected to Buckeye Heavy Dy Engine. ***Complete. Excellent.***

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2—400 H.P.	W. "	150 lb.	"
4—250 H.P.	W. "	150 lb.	"
1—275 H.P.	W. "	150 lb.	"
4—200 H.P.	e "	150 lb.	"
1—425 H.P.	"	150 lb.	"
1—400 H.P.	ng "	150 lb.	"
4—72"x18'	Tar "	125 lb.	"
1—260 H.P.	ng "	150 lb.	"
7—66"x16'	Tar "	125 lb.	"
4—350 H.P.	ng "	200 lb.	"

And makes and sizes.

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1408 Harrist Bldg., Chicago, Ill.

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Prompt Shipment Subject to Prior Sale.
Uniflow Retubular Boilers rated at 134, 155, 216, 259, 323 H. P., 125 lbs. working pressure. Uniflow Boilers are noted for high efficiency, great load capacity compactness and smokeless.
Write for Quotation
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15th and Market Sts., Philadelphia, Pa.

LOCOMOTIVE CRANES
10 to 30 Tons Capacity

One 1¾ Yd. McMyler Clam Shell Bucket. Located Jersey City.

One 25' Steam Shovel Boom with 18' dipper arm and 1 yd. dipper. Located Jersey City.

TITAN EQUIPMENT COMPANY
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Phone, Cortland 1111

ENGINES and HOISTS
FOR SALE

Seven—Slide Valve, Right Hand, 14" x 18" Erie Engines, complete with 60" fly wheel, 6" face, 180 R.P.M complete with governers cylinder oilers, sight feed oil cups, drip valves, exhaust pipes, and gate valves.

CONNECTED TO

Seven—Slow Speed Twin Drum Hoists—30" in diameter, 17¼" face, 3 15/16" bore, hubs oil grooved, geared to 65" cast iron gears, with 4" face. Complete with oilers, run on plain shaft 3 15/16" diameter, 7 ft. long. Drums not scored.

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Double Reversing Geared, 28-inch Pinions and housings. Engine entirely rebuilt, Pinion new. Immediate Delivery.

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House Building, Pittsburgh, Pa.

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One Four-head Southwark.
Designed to cut rounds up to 7" diameter, complete with back gears and pinions including air cylinder for discharging, bed 12' long.

The Milton Manufacturing Company
Milton, Pa.

FOR SALE
For Immediate Shipment

2—1½-inch Ajax Automatic Rivet and Bolt Headers.
2—Barr Improved Track Spike Machines, all in first-class condition.

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Farmers Bank Bldg. Pittsburgh, Pa.

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500 tons new O. H. 105-lb. NYC standard rails with splices.

1000 tons new O. H. 90-lb. ASCE rails with splices.

Will quote on entire quantity or on such lots as required for prompt shipment.

M. MITSHKUN CO.
BOOK BLDG. DETROIT, MICH.

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For shipment from Cleveland

NEW RAILS	RELAYING RAILS
12 lbs.—100 tons	30 lbs.—100 tons
16 lbs.—125 tons	35 lbs.—100 tons
20 lbs.—130 tons	40 lbs.—100 tons
25 lbs.—175 tons	56 lbs.—150 tons
30 lbs.—180 tons	60 lbs.—100 tons
40 lbs.—140 tons	70 lbs.—250 tens
	75 lbs.—300 tons
RAILROAD TIES	80 lbs.—900 tons
	85 lbs.—725 tons

The Fishel & Marks Co.
Cleveland, O.
Pittsburg Detroit Chicago

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FOR SALE

22 ft. diameter 46" face 15" bore, weight 55,000 pounds.

WICKES BROTHERS
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RAILS, MACHINERY and EQUIPMENT

New and Used. Buy, Sell or Exchange.

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1609 First National Bank Bldg.



RAILS

New and Relayers

Several sections for **Immediate Shipment**

ATLANTIC EQUIPMENT CO.
Singer Bldg., New York

For Sale

One No. 25—24" Foote-Burt upright drill in first-class operating condition.

THE TIMKEN ROLLER BEARING CO.
Canton, Ohio

Equipment Wanted

For Machine Shops, Foundries, Iron and Steel Works, Mines, Railroads and Metal Working Plants Generally

ADVERTISING RATES: 1" One Time $3.50; 2" One Time $6.50; 3" One Time $9.50; 4" One Time $12.00.
RATES FOR LARGER SPACE OR LONGER PERIODS FURNISHED ON REQUEST

WE BUY FOR CASH

ANY SURPLUS STOCK OF

Bar Iron
Bar Steel
Structural Material
Plates, Sheets, Etc.
Good Second Hand Iron and Steel

Send itemized lists with full description and prices

AMIRON SUPPLY CO., Inc.
137th St. and Lincoln Ave. New York

Spot Cash

For Used Machinery, Tools, Etc.

Mail your list stating age, make and condition of items offered

Schlieper Engineering Co.
714 Ferguson Bldg. Pittsburg, Pa.

WANTED

Steel Angles, second-hand, must be straight and fit for use in lattice bracing between girders and miscellaneous work on construction job. Prefer size 4" x 4", thickness ¼" to ⅜". Can use small carload. State price f.o.b. Saxton, Pa. and size and length in answer.

JOSEPH E. THROPP
Everett, Pa.

Drop Hammers Wanted

Ten board drop hammers sixteen hundred to two thousand pounds; Chambersburg or Bliss preferred.

Immediate delivery.

Globe Malleable Iron & Steel Co.
Syracuse, N. Y.

SECOND-HAND FOUNDRY EQUIPMENT WANTED

Including cupolas, ladles, tumbling barrels, etc. Quote price and state condition.

Address Box 984
THE IRON TRADE REVIEW, Cleveland, O.

Wanted Steam Skip Hoist Engine

Good second-hand Otis furnace hoist, can use skip hoist engine or elevator hoist engine that can be altered to operate single skip. Cylinders 12"x12" or larger. State shop number, condition and price.

Joseph E. Thropp, Everett, Pa.

Wanted

High Pressure R. T. B. and W. T. Boilers.
Direct current Generators.
Locomotive Crane.
One yard Clam-Shell Buckets.

Address Box 573
THE IRON TRADE REVIEW, Cleveland, O.

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A 5" to 12" Vertical Coupling Tapping Machine Complete

South Chester Tube Company
Chester, Pa.

Track Scales Wanted

100 ton capacity standard gauge track scales, with steel frame. Must be modern and in first class condition. State price and length of platform.

Joseph E. Thropp, Everett, Pa.

Wanted

To correspond with party having a second-hand Power Annealing Charging Truck for sale.

Address Box 565,
The Iron Trade Review, Cleveland, O.

Wanted Pipe Machine

Capacity of thread 2½" to 8" pipe. Prefer Curtis or other revolving die machine.

State price and condition.

Joseph E. Thropp, Everett, Pa.

YOU MAY BE OVERLOOKING a money-saving opportunity if you fail to read the advertisements in this Section each week.

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Fill-in and Contract Work

Where orders may be secured for machine work, foundry work, stamping, forging, jig, tool, die and pattern making, special machinery, experimental work, etc.; where special work may be secured for prompt delivery.
ADVERTISING RATES: 1" One Time $3.50; 2" One Time $6.50; 3" One Time $9.50; 4" One Time $12.00.
RATES FOR LARGER SPACE OR LONGER PERIODS FURNISHED ON REQUEST

CHICAGO

Shafting lathes up to 30 feet long 18" swing over carriage

Special Machine Work of all kinds
Our Own Foundry

Send us your inquiries

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In quantities.
10 lbs. to 7½ tons. Quick Deliveries.
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Louisville, Ky.

FORGINGS

QUICK SHIPMENTS
from 200 to 4000 lbs.
THE BARKER STEEL CO.
Provident Bank Bldg.,
CINCINNATI, OHIO

J. E. WILLIAMSON CO.

Bellwood, Pa.
Grey Iron Machinery and Engine Castings up to 5000 lbs.
Quality and service guaranteed

FORGINGS

Gear blanks, bars, rods, shafting.
How you want them.
When you want them.
JOLIET FORGE CO.
Joliet, Ill.

GRAY IRON CASTINGS

With Merit
The Simpson Foundry Co.
Established 1895
Newark, Ohio

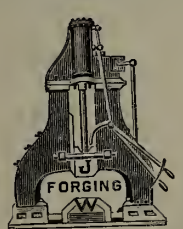
We are looking for outside work for our
Machine, Pattern and Smith Shops
Brass, and Gray Iron Foundry
Send Blue Prints for estimates.
Klotz Machine Co.
Sandusky, Ohio.

WANTED

General Machine Work
Planer capacity 27" x 27" x 12'. Lathe 23" x 10'.
Send blueprints for estimates.
Standard Machine Co.
1726-30 Columbus Rd., Cleveland, O.

FORGINGS

Shafting — Gear Blanks
Rings — Pinion Blanks
Cranks



JERSEY FORGING WORKS
16th Street and Jersey Avenue JERSEY CITY, N. J.

PRECISION WORK
Products of
Automatic and Hand Screw Machines
S. A. E. NUTS AND TAPER PINS
THE METAMACHINING TOOL CO.
2176 East 76th Street Cleveland, Ohio

"DURO" Pure Iron

The A. O. Smith Co. MIDDLETOWN OHIO U.S.A.

Manufacturer of "Duro" Rust Resisting Silos and Tanks. Equipped to produce 7 to 27 Gauge. Sketches-Circles-Flanged Heads, Angles, Channels. In and out angle rings, stamping, acetylene welding. Let us quote on your specifications, please.

CONTACT WORK

WANTED
HAVEELL-EQUIPPED
MHINE SHOP
OPERA' OWN FOUNDRY
Ses your inquiries
Newman Mne Co., Greensboro, N. C.

GRAY IRON CASTINGS

1 to 500 lbs.
THE ALLOY FOUNDRY CO.
Cuyahoga Falls, Ohio

The J. L. Simpson Company
Bellefontaine, O.
High Grade
GRAY IRON CASTINGS
Prompt Deliveries.
Send us your inquiries.

Brass Castings

If you are looking for the following
Better Service
Perfect Castings
Fair Prices
Write me at once
E. A. DECKER, 8 Ferry St., Binghamton, N.Y.

GRAY IRON and SEMI-STEEL CASTINGS

Advance-Rumely Company
La Porte, Ind. Battle Creek, Mich.

Y[illegible] MAY [illegible] overlooking a [illegible]rney–saving opp[illegible]unity if you fail[illegible] read the advisements in this section each wee[illegible]

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We have a Well Equipped Daylight Machine Shop

For building special machinery.
Special gasoline and steam motors, etc.
Let us figure with you.
Lammert & Mann Company
Wood and Walnut Sts. Chicago, Ill.

It's orders we want for
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One Pound to Five Tons
Prompt Deliveries
Acme Castings Company
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MetalStampings

DIES TOOLS JIGS
Let Us Estimate on Your Work
LANSING STAMPING & TOOL CO.
Dept. A LANSING, MICH.

The Colonial Iron Works Company

WE WANT TO FIGURE ON YOUR WORK



SEND US YOUR PLANS AND SPECIFICATIONS

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Metal Stamping,

Spot Welding.

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Cleveland, Ohio

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Pittsburgh, Pa.

Diamond Machine Company
Manufacturing Engineers
Contract and Machine Work
Pattern Work
Estimate Furnished.
Monongahela, Pa. (Pittsburg District)

MACHINE WORK
of all kinds
Our Equipment Is Complete
To manufacture small parts (brass or iron) tools, valves and other specialties.
Write us at once
No work too small
Gwynn Engineering Company
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Energetic substantial company with up to date well equipped
Machine Shop and Assembling Plant,
now completing large contract for government trailers, is open for similar jobs, chassis assembly or any kind of metal or wood construction. Can handle any size contract.
Truck Attachment Company
1201 West 11th St., Cleveland, Ohio

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Machine Work
in contract lots
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Dunkirk, N.

The Most Complete Pattern Plant in the Country
Wood patterns made for Universal, Bar, Blooming and Billet Mills.
Automobile Engines and Parts.
Blast and Open Hearth Furnaces.
Send Blue Prints for estimates.
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Canton, Ohio

Pattern Work
Wood, Brass, or Aluminum Patterns.
Accurate work. Prompt Delivery.
Marion Malleable Iron Works
Dept. P. S. Marion, Indiana

SPECIAL
SCREW MACHINE PRODUCTS
Automatic and Hand Equipment
WELLMAN PRODUCTS CO.
1444 E. 49th St., Cleveland, O.

Do you consult these advertisements when you have orders to place—

For Machine Work—Found Work—Stamping—Screw Machine Work—Pans—Dies—Tools—Jigs—Special Machinery—or any other class of work for your particular need?

Before placing your future orders, get in touch the advertisers in the "FILL-IN-AND-CONTRACT WORK" section—consult—get their prices—deliveries. This will enable you to dispatch your orders without entailing a great deal of trouble and loss of time.

When placing your business with the firms presented in the "FILL-IN-AND-CONTRACT-WORK" section, you can have absolute confidence that they are trustworthy and responsible. You can rest assured that your order will be executed and your requirements properly handled once your order has been placed.

The services of THE IRON TRADE REVIEW are at your disposal when your buying problems are of an unusual character.

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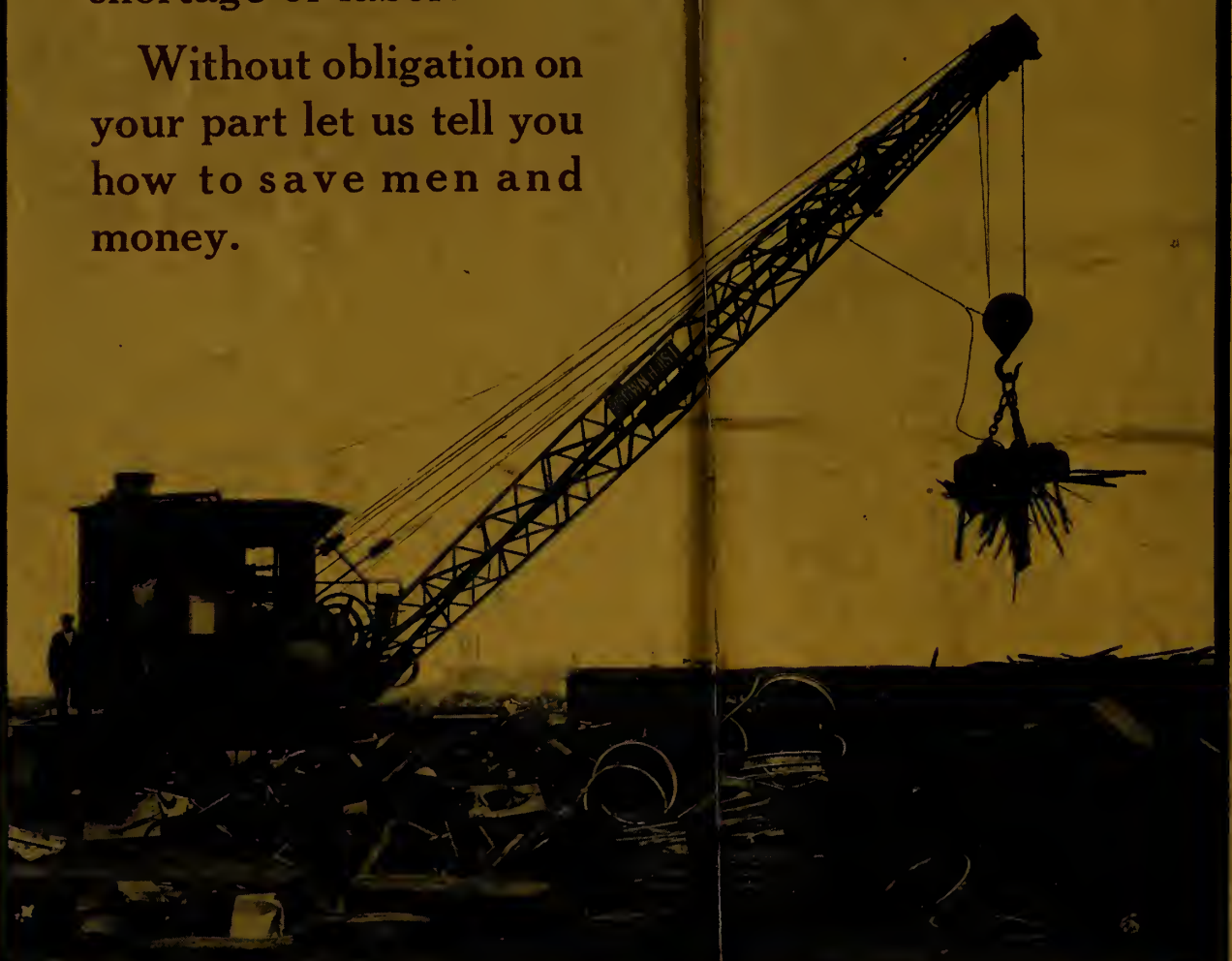
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